Development and Validation of the Shy Bladder Scale

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Abstract. Paruresis, characterized by the difficulty or inability to urinate in a variety of social contexts, is a scientifically under-studied phenomenon. One reason for this state of affairs is the paucity of reliable and valid measures for assessing this problem. The present article attempted to address this limitation by investigating the psychometric properties and validity of a new measure of paruresis: the Shy Bladder Scale (SBS). In two undergraduate samples, the SBS demonstrated excellent internal consistency and a stable factor structure assessing difficulty urinating in public, impairment and distress, and paruresis-related fear of negative evaluation. Undergraduate students evidenced very low levels of paruresis-related concerns. In contrast, SBS scores were markedly elevated among individuals recruited from an online support network who appeared to meet diagnostic criteria for paruresis-specific social phobia. Our findings highlight the SBS's potential utility as a measure of paruresis in clinical and research contexts. *Key words: paruresis; shy bladder; assessment; anxiety; social phobia*

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Introduction

Paruresis, also known as shy bladder syndrome, is characterized by the difficulty or inability to urinate under a variety of social circumstances, and avoidance of situations where difficulties urinating may occur. This problem is social in nature, as individuals with paruresis report increased difficulties under decreasing levels of privacy (Vythilingum, Stein, & Soifer, 2002). The tendency for individuals with paruresis to have difficulty urinating in the presence of others may be a more severe form of what appears to be a relatively common phenomenon. As privacy decreases, even individuals without paruresis report mild difficulties initiating urination (Middlemist, Knowles, & Matter, 1976). What differentiates individuals with paruresis is they often have a fear of not being able to urinate in public restrooms along with a functional inability to do so, which is often coped with through extensive avoidance of situations where urinary inhibition is likely to occur (Ascher, 1979; Vythilingum et al., 2002).

Paruresis was first defined by Williams and Degenhardt in 1954 as faulty or disordered micturition (urination). In the first formal investigation of this problem, these authors reported that approximately 14% of college students indicated having difficulty urinating in the presence of others and were said to have paruresis. Williams and Degenhardt differentiated paruresis from other disorders of the urinary system by noting that among individuals with paruresis, urinary difficulties are resolved after a change in social conditions. For example, an individual with paruresis may be unable to urinate in a public restroom with

others around, but is able to urinate in a private setting free from any social concerns.

Since the initial classification and examination of paruresis in 1954, a handful of reports have suggested similar characteristics of this problem. Although a more conservative prevalence rate of 2.8% was reported recently among a German sample of males (Hammelstein, Pietrowsky, Merbach, & Brähler, 2005), prevalence rates ranging from 6.8% (Malouff & Lanyon, 1985) to 25% (Rees & Leach, 1975) have been reported in North American samples. Despite being identified and empirically examined over a half of a century ago, scientific knowledge of paruresis has grown little, with the majority of published reports consisting of anecdotal accounts, case studies, and theoretical conceptualizations (e.g. Boschen, 2007; Jaspers, 1998; McCracken & Larkin, 1991; Soifer, Zgourides, Himle, & Pickering, 2001; Soifer & Ziprin, 2000). As a result, the empirical knowledge base associated with the fear of urinating in public lags far behind that associated with most other forms of anxiety. A major reason for this state of affairs is the paucity of validated scales assessing the important features of paruresis.

To date, two measures of paruresis have been described in the literature. The Paruresis Checklist (PCL; Soifer et al., 2001) was originally intended for use as part of a self-help book for individuals with difficulties urinating in the presence of others. The original PCL consisted of 10 dichotomous items assessing the extent to which the symptoms of paruresis characterize the reader. At the time of this writing, no psychometric or validity data have been published on this measure. A modified German version of the PCL based on the DSM-IV criteria of social phobia has been used as an epidemiological tool (Hammelstein et al., 2005) and appears to successfully differentiate individuals with paruresis from those with generalized social phobia, non-generalized social phobia, and no anxiety disorder (Hammelstein & Soifer, 2006). The modified PCL consists of 10 dichotomous items designed to assess diagnostic criteria for social phobia due to paruretic concerns (e.g. "Do you have a marked or persistent fear of using public restrooms while others are present?", "Do you avoid urinating in public restrooms and/or do you endure the public restroom situation with

intense anxiety or distress?"). This scale demonstrated adequate inter-item reliability ($\alpha = .75$ in Hammelstein et al., 2005; $\alpha = .88$ in Hammelstein & Soifer, 2006) and appears to be a useful diagnostic tool. However, the dichotomous response format, along with restriction of content to DSM-based diagnostic criteria, limit the PCL's ability to adequately assess the phenomenological aspects of paruresis, such as contexts associated with difficulty urinating, associated cognitions, and the extent of functional impairment and distress.

The Paruresis Scale (PARS; Hammelstein & Peitrowsky, 2005) is a German-language, 13-item self-report measure of paruresis. The first two items are screener questions and do not contribute to the total score. Participants are instructed to complete the remaining 11 items only if they responded "yes" to at least one of the screener questions, effectively limiting the scale's applicability to those with at least mild paruretic concerns. PARS items assess avoidance (e.g. "I try to avoid public restrooms"), cognition and emotion (e.g. "I worry that someone might think badly about me, if I can't urinate right away when using a public rest room", "I feel ashamed because of my urination problems"), and impairment (e.g. "My urination problems make me feel impaired on the job"). Factor analysis indicated that all 13 items loaded onto a single factor. The PARS correlated with the PCL at $r = .84$, and the scale successfully distinguished between participants with self-identified paruresis and those with social phobia (Hammelstein & Peitrowsky, 2005). Despite these promising findings, this scale's response format and single-factor structure limit its utility in the multidimensional assessment of paruresis.

Despite preliminary research supporting their psychometric properties and discriminative validity, the PCL and PARS are not ideal for use in research aimed at better understanding the phenomenological aspects of this disorder. Recent interest in the cognitive-behavioral characteristics of paruresis (e.g. Boschen, 2007) highlights the need for a more *functionally based*, rather than *diagnostic*, tool for assessing this problem. Accordingly, the present article describes the development, psychometric properties, and discriminative validity of a new measure of paruresis: the Shy Bladder Scale (SBS). Intended to be applicable in both research and clinical settings, the SBS

was developed to assess the cognitive, behavioral, and functional aspects of paruresis with the ultimate goal of stimulating further research and treatment development for this disorder.

Study 1: Development of the Shy Bladder Scale

Method
Participants and procedure. Three hundred and forty-nine undergraduate students enrolled in psychology courses at the University of Wyoming completed a web-based, mass testing questionnaire packet for course credit that included the preliminary version of the SBS. The mean age was 19.8 years (SD = 3.1) and most participants were women (70.2%) and Caucasian (86.5%). Consent forms were signed prior to data collection, and all participants were informed that their responses would be kept completely confidential and that they were free to withdraw from the study at any time.

Measure: Shy Bladder Scale, Preliminary Version. Based on clinical experience with paruretic patients and the available literature on the nature and assessment of this disorder, the authors collaboratively developed an initial pool of 100 items assessing the cognitive, behavioral, and functional aspects of this problem. After elimination of items with redundant content or problematic wording, 49 items remained and comprised the preliminary version of the scale. These items were administered in random order with the following instructions: "This questionnaire asks you about common (yet uncomfortable) experiences that people sometimes have when using the restroom. Please answer honestly by indicating how much you agree or disagree with each statement. Your responses will be kept confidential." Respondents rated their agreement with each item on a five-point scale ranging from 0 ("very little") to 4 ("very much").

Results
With the aim of condensing the scale, items were removed from the 49-item preliminary SBS based on several criteria. First, we deleted those with mean inter-item correlations less than .30 (Nunnally & Bernstein, 1994). This resulted in the removal of 10 items with inter-item correlations ranging from .04 to .29.

Second, mean-corrected item-total correlations were examined for the remaining 39 items, all of which exceeded the minimum criterion for acceptability of .30 (*r* ranged from .47 to .76; Nunnally & Bernstein, 1994).

Third, we conducted a principal components analysis for further data reduction (Floyd & Widaman, 1995). We employed an oblique (oblimin) rotation because factors emerging from this analysis were assumed to be correlated. The first eight eigenvalues were 17.13, 3.60, 1.96, 1.70, 1.23, 1.10, 1.00, and 0.80. Parallel analysis and factor interpretability were used to determine the number of factors to retain. Parallel analysis is a statistical procedure for determining the break in the scree plot and is one of the most accurate methods for determining the number of factors to retain (Zwick & Velicer, 1986). Parallel analysis using both the mean and 95th percentile eigenvalues (Longman, Cota, Holden, & Fekken, 1989) indicated a clearly interpretable four-factor solution accounting for 62.6% of the item variance. Based on eigenvalues from the pattern matrix, six items that had salient (> .40) loadings on more than one factor were deleted. Further, we elected to retain only those items with a primary loading of at least .60 in order to maximize the replicability of the SBS's factors (Guadagnoli & Velicer, 1988) and minimize the length of the scale for ease of administration. This resulted in the removal of 11 items. Finally, we sought to retain only those factors with a sufficient number of items with primary loadings > .60 to be considered replicable (Guadagnoli & Velicer, 1988). Because the fourth factor had only two items with loadings > .60, we elected to remove the three items with highest primary loadings on this factor.

The remaining 19 items comprised the final version of the SBS. Repeating each of the above psychometric tests of exclusion with this final item pool resulted in the retention of all 19 items. The scale's internal consistency was excellent (α = .91). Principal components analysis of the 19-item SBS yielded a clearly interpretable three-factor solution (first four eigenvalues = 8.40, 2.66, 1.59, 0.80). The three rotated SBS factors explained a substantial portion of the item variance (66.6%), and the magnitude of the communalities indicates that these factors accounted for a moderately large portion of the variance

in most items. The pattern matrix (i.e. factor loadings) and communalities for this solution are presented in Table 1. The first factor contained seven items with loadings greater than .60 and accounted for 44.3% of the SBS item variance. This factor was labeled *difficulty urinating in public*. Factor II, consisting of six items with highly salient loadings and explaining 14.0% of the item variance, was labeled *interference and distress*. The third factor, labeled *fear of negative evaluation*, consisted of six items with loadings greater than .60 and explained 8.4% of the variance in SBS item scores. Factor scores were significantly correlated with each other ($p < .001$ for all) and ranged from .28 (*interference and distress* and *fear of negative evaluation*) to .47 (*difficulty urinating in public* and *fear of negative evaluation*).

The three-factor SBS solution demonstrated excellent simple structure (Thurstone, 1947) as no items had loadings |.40| on more than one factor, no items failed to load on any factor, and each factor had an adequate number of items with salient loadings. The three-factor solution also satisfied Guadagnoli and Velicer's (1988) criteria for stability since each factor had at least four items with loadings above .60. Finally, to determine each factor's internal consistency we created subscales based on the pattern of factor loadings in Table 1. Each subscale showed good internal consistency (α for Factors I, II, and III = .90, .90, and .87, respectively).

The mean SBS total score was 6.40 (SD = 8.79). A Kolmogorov–Smirnov test indicated that the distribution of SBS total scores was significantly different from a normal distribution ($Z(349) = 4.36$, $p < .001$). The distribution of SBS scores was extremely positively skewed, and the modal score of 0 was obtained by 102 participants (29.2% of the sample). Independent samples *t*-tests yielded comparable scores between men and women on the SBS total score ($p > .10$) and *difficulty urinating in public* ($p > .40$) and *interference and distress* ($p > .05$) subscale scores. Women scored significantly higher than men on the *fear of negative evaluation* subscale ($t(347) = 4.12$, $p < .001$).

An analysis of the reading level of the SBS was conducted using Microsoft Word and revealed that the Flesch–Kincaid grade-level score was 9.7 and the Flesch reading ease score

was 50.5. These indices suggest that the SBS is easily understandable for people aged 13–15 years and above or who read at about a ninth-grade level.

Discussion

From an initial pool of 49 rationally derived items, 30 items were removed from the scale based on psychometric considerations. The final 19-item SBS evidenced good item-level psychometrics, excellent internal consistency, and a clearly interpretable factor structure assessing three dimensions of paruresis. Although these findings support further exploration of this scale's psychometric properties and validity, they should be considered preliminary because of the favorable capitalization on chance inherent in simultaneously developing and validating a scale in the same sample. Accordingly, we elected to administer the SBS to a second sample of undergraduate students.

Study 2: Replication of the Shy Bladder Scale's Psychometric Properties in an Independent Sample

Method

Participants and procedure. The SBS was administered to an additional sample of 391 undergraduate students enrolled in psychology courses at the University of Wyoming. Administration was web-based and the scale was completed along with other measures as part of a mass testing procedure. The mean age was 19.8 (SD = 3.8) years, and the majority of participants were women (68.8%) and Caucasian (87.5%). Participants received course credit for completing the mass testing and provided informed consent prior to data collection.

Results

The mean SBS total score was 5.96 (SD = 9.33). A Kolmogorov–Smirnov test indicated a significant skew in the distribution of SBS total scores ($Z(391) = 5.17$, $p < .001$), and the modal score of 0 was obtained by 108 participants (27.6% of the sample). Men and women did not differ significantly in their SBS total scores ($p > .05$) or *difficulty urinating in public* ($p > .90$) and *interference and distress*

Table 1. *The Shy Bladder Scale: Loadings and communalities from principal components analysis (Study 1) and common factor analysis (Study 2)*

	Factor			
Item	Factor I Study 1(2)	Factor II Study 1(2)	Factor III Study 1(2)	h^2 Study 1(2)
1. I avoid public restrooms because I have difficulty urinating around other people.	**.85 (.69)**	− .05 (− .02)	.05 (.13)	.74 (.62)
2. I feel uncomfortable if other people can hear me urinating.	.32 (.26)	− .13 (− .03)	**.66 (.62)**	.70 (.62)
3. My bladder seems to "lock up" when I have to urinate in public restrooms.	**.78 (.84)**	− .12 (− .04)	.09 (.09)	.63 (.78)
4. The only way I can urinate is if I am alone.	**.79 (.83)**	.07 (.04)	− .02 (.08)	.66 (.80)
5. I worry that other people will be disgusted by the sound of my urine.	.00 (.08)	.09 (.02)	**.77 (.65)**	.65 (.51)
6. I have trouble urinating if I know there are people waiting in line behind me to use the restroom.	**.78 (.72)**	− .02 (.06)	.05 (.12)	.64 (.68)
7. I wait until the restroom is empty before urinating.	**.69 (.78)**	.19 (.05)	.02 (.09)	.64 (.74)
8. The fear of urinating in public has negatively affected my life.	.15 (.31)	**.72 (.56)**	− .04 (− .07)	.62 (.54)
9. It's easier for me to urinate in a public restroom if there is a lot of noise.	.05 (.11)	− .12 (− .05)	**.84 (.72)**	.69 (.61)
10. If I urinate for too long, other people will think there is something wrong with me.	− .15 (− .16)	.27 (.30)	**.75 (.56)**	.63 (.39)
11. I try to hide the sounds I make when using public restrooms.	.00 (.08)	.01 (− .03)	**.79 (.67)**	.63 (.51)
12. I avoid urinating in restrooms at crowded places such as sporting events or parties.	**.64 (.44)**	.15 (.12)	.03 (.22)	.53 (.43)
13. I have difficulty urinating in public restrooms even when I have a strong urge to urinate.	**.83 (.90)**	.11 (.13)	− .06 (− .09)	.72 (.85)
14. It's easier for me to urinate in a public restroom if nobody seems to be paying attention to me.	.10 (.37)	− .04 (− .11)	**.72 (.48)**	.58 (.51)
15. The fear of urinating in public interferes with my daily functioning.	− .03 (.17)	**.90 (.80)**	.06 (− .01)	.82 (.80)
16. I avoid going to crowded places because of my fear of urinating in public.	.07 (− .05)	**.87 (.90)**	− .01 (.13)	.81 (.85)
17. I am distressed by the fear of urinating in public.	− .07 (.08)	**.83 (.84)**	.02 (.03)	.65 (.81)
18. The fear of urinating in public interferes with my social activities.	.02 (.03)	**.81 (.88)**	.04 (.01)	.69 (.82)
19. I have a fear of urinating in public that seems excessive.	.17 (**.64**)	**.69 (.40)**	.03 (− .10)	.63 (.72)

Notes. *Factor loadings ≥ |.40| are listed in boldface type. Factor I = difficulty urinating in public; factor II = interference and distress; factor III = fear of negative evaluation. Loadings on Factor II in Study 2 have been multiplied by −1 for ease of interpretability.*

($p > .40$) subscale scores. As in Study 1, women scored significantly higher than men on the *fear of negative evaluation* subscale ($t(388) = 4.43, p < .001$).

All 19 items had a mean inter-item correlation greater than .30 (range = .34–.58) and a corrected item-total correlation greater than .30 (range = .48–.80). Internal consistency was excellent for the SBS total scale ($\alpha = .93$) and the *difficulty urinating in public* ($\alpha = .93$), *interference and distress* ($\alpha = .93$), and *fear of negative evaluation* ($\alpha = .85$) subscales.

Consistent with the recommendations of Floyd and Widaman (1995), the factor structure of the SBS was examined via common factor analysis, rather than principal components analysis as in Study 1, because we were interested in identifying latent constructs rather than data reduction. The first four eigenvalues were 9.85, 2.31, 1.37, and 0.74. Parallel analysis indicated a clearly interpretable three-factor structure that explained 71.2% of the SBS item variance. Table 1 presents the pattern matrix-derived loadings and communalities for this solution. The pattern of item-factor loadings largely followed that obtained in Study 1. Only item 19 ("I have a fear of urinating in public that seems excessive") had a primary loading on a different factor in Study 2 than in Study 1. Simple structure was excellent as each item had a salient ($|.40|$) loading on only one factor, no items had salient loadings on multiple factors, and each factor had a sufficient number of items with highly salient loadings to be considered replicable (Guadagnoli & Velicer, 1988).

To examine the replicability of the three SBS factors across both studies, we computed coefficients of congruence (Gorsuch, 1983) between the factor loadings from the principal components analysis in Study 1 and common factor analysis in Study 2. These results are displayed in Table 2. Corresponding factors from each study were highly replicable, with coefficients of congruence ranging from .86 to .89. Non-corresponding factors were substantially less replicable (range = .32–.63). These results demonstrate excellent convergence between the three-factor solutions in Study 1 and Study 2 despite the different factor analytic methods employed in these studies.

Table 2. *Coefficients of congruence between Shy Bladder Scale factors from Study 1 and Study 2*

Factor from Study 1	Factor from Study 2		
	I	II	III
I	.89	.41	.53
II	.58	.87	.32
III	.63	.33	.86

Notes. *Coefficients are presented in absolute value for ease of interpretability. Factor I = difficulty urinating in public; factor II = interference and distress; factor III = fear of negative evaluation.*

Discussion

Findings from Study 2 are consistent with those in Study 1 in supporting the strong psychometric properties of the SBS. In both studies, each item on the final 19-item version of the scale demonstrated acceptably high inter-item and corrected item-total correlations. Internal consistency of the SBS total and subscale scores was high. A replicable three-factor solution assessing paruresis-related *difficulty urinating in public, interference and distress*, and *fear of negative evaluation* was obtained in each study. Finally, SBS scores were extremely positively skewed in both undergraduate samples, with approximately one quarter of participants failing to endorse agreement with any of the SBS items. Taken together, the results from Study 1 and Study 2 indicate that the SBS is a psychometrically sound measure of paruresis. However, the validity of this measure is not elucidated by these studies. The aim of the following study was to examine the discriminative validity of the SBS by testing its ability to distinguish between individuals with and without paruresis.

Study 3: Discriminative Validity of the Shy Bladder Scale in a Paruresis Sample

Method

Participants and procedure. Participants were recruited from the University of Wyoming psychology participant pool as well as the International Paruresis Association (IPA) website for the present study. The IPA is a consumer advocacy group that provides education and support for individuals with

paruresis. Participants completed a web-based questionnaire packet that included the SBS. Participants were recruited with the aim of forming two groups: those with and without paruresis. A total of 245 individuals participated in the web-based survey and were available for group assignment, including 165 from the IPA website and 80 undergraduate students. None of the undergraduate students in this study had participated in Studies 1 or 2.

Of the pool of 245 participants, 111 individuals were selected for membership in the paruretic group based on their responses to a self-rated form of the Mini International Neuropsychiatric Interview for DSM-IV (MINI; Sheehan et al., 1998). The MINI was modified into a self-rated version that assessed DSM-IV social phobia diagnostic criteria in the context of the fear of urinating in public. A similar use of the self-rated MINI was reported by Vythilingum and colleagues (2002). The paruretic group consisted of individuals who responded affirmatively to all four paruresis-specific social phobia questions on the MINI. The majority (67.3%) of the individuals from the IPA website who participated met the inclusion criteria for the paruretic group; none of the undergraduate students met the inclusion criteria. The mean age was 37.4 years (SD = 14.3; range = 18–77) and most participants (85.4%) were men.

The non-paruresis control group consisted of 92 individuals who responded negatively to at least three of the four questions on the paruresis-specific form of the MINI. Individuals who positively rated only one of the four MINI items were included because of the relatively large proportion of individuals who agreed to only one question (25.1% of the control group). The control group included 77

of the 80 (96.3%) participants recruited from the University of Wyoming and 15 of the 165 (9.1%) of individuals recruited through the IPA website. The mean age was 22.0 years (SD = 9.45; range = 18–68) and 68.5% of participants were women. Data from the 42 individuals who did not meet the inclusion criteria for either group were not included in subsequent analyses. Due to missing data on one or more SBS items, data from three participants in the control group and 14 participants in the paruretic group were also excluded from the analyses.

Results

The mean SBS total score for the control group was 9.20 (*SD* = 13.6). A Kolmogorov–Smirnov test indicated a significantly non-normal distribution of SBS total scores (Z (89) = 2.36, $p < .001$), and the modal score of 0 was obtained by 34.8% of participants. Men and women did not differ significantly in SBS total or subscale scores ($p > .20$ for all). For the paruretic group, SBS total scores averaged 57.83 (SD = 8.91; range = 31–76) and were normally distributed (Z (97) = 0.81, $p > .50$). Non-significant gender differences were obtained on SBS total scores and the *difficulty urinating in public* and *interference and distress* subscales ($p > .40$ for all). Women scored significantly higher than men on the *fear of negative evaluation* subscale (t (95) = 1.98, $p < .05$).

A series of independent samples *t*-tests, conducted without the assumption of equal variances, were carried out to compare SBS scores between the paruretic and control groups. As shown in Table 3, extremely large between-group differences were evident on each SBS scale, with effect sizes (*d*) ranging

Table 3. *Group means (standard deviations) on Shy Bladder Scale total and subscale scores for participants in the paruretic and control groups*

	Group			
Scale	Paruresis	Control	*t* (184) ±	*d*
SBS total	57.84 (8.91)	9.20 (13.62)	28.55*	4.23
Difficulty urinating in public	24.52 (3.57)	4.06 (6.82)	25.30*	3.76
Interference/distress	20.20 (4.19)	1.09 (2.86)	36.56*	5.33
Fear of negative evaluation	13.12 (5.11)	4.06 (5.31)	11.84*	1.74

Note. ± *t-values do not assume equal variances between groups. Cohen's d was calculated as the difference between the mean scores in each group divided by the pooled standard deviation.*
*p < .001.

from 1.74 to 5.33. Next, we examined the utility of the SBS in detecting a diagnosis of paruresis by conducting a receiver operating characteristic (ROC) analysis. ROC analysis uses the association between sensitivity and specificity to estimate the area under the curve (AUC) to indicate how well a measure distinguishes between positive (i.e. a diagnosis of paruresis) and negative (i.e. membership in the control group) cases. A value of 1.0 indicates perfect diagnostic prediction, whereas a value of .50 indicates the level of chance. The AUC for the SBS total score was .99 (95% confidence interval = .98–1.00), indicating nearly perfect discriminatory power. A SBS total score of 31, the lowest obtained by a participant in the paruretic group, had a sensitivity of 1.0 and a specificity of .89. In other words, a score of 31 correctly classified all paruretic individuals into the paruresis group (true positives) and correctly classified 88.8% of control group participants as not having paruresis (true negatives). In contrast, a SBS total score of 40 demonstrated the most favorable combination of sensitivity (.96) and specificity (.96).

Lastly, we examined the relationship between the different facets of paruresis measured by the SBS among individuals in the paruretic sample. Table 4 presents zero-order correlations between SBS total and subscale scores. All three subscales were strongly correlated with SBS total scores. Among the subscales, *difficulty urinating in public* and *interference and distress* were significantly and moderately related, while *fear of negative evaluation* was not significantly correlated with either of the other two subscales.

Discussion

This study complements the strong psychometric properties of the SBS reported in Studies 1 and 2 by demonstrating exceptional discriminative validity with respect to detecting a diagnosis of paruresis. Individuals who met DSM-IV diagnostic criteria for paruresis-specific social phobia based on a self-administered interview obtained substantially higher scores on each SBS scale than a non-paruretic control group. The magnitude of the between-group differences on this scale was such that selected SBS cut-off scores evidenced nearly perfect performance in classifying participants as having or not having paruresis.

General discussion

The aim of the present article was to develop a reliable and valid measure of the phenomenology of paruresis. From an initial pool of 100 rationally derived items, 19 items passed a series of psychometric tests of exclusion and formed the final version of the SBS. Two studies conducted in undergraduate samples indicated that the SBS reliably measures three dimensions of paruresis: *difficulty urinating in public*, *interference and distress*, and the *fear of negative evaluation*. Whereas elevated paruresis-related concerns were infrequent among undergraduates, SBS scores were very high among individuals who appeared to meet diagnostic criteria for paruresis-specific social phobia and easily distinguished these individuals from a control group without paruresis. Two previously published measures of paruresis have been shown to effectively discriminate between paruretic and non-paruretic groups (Hammelstein & Peitrowsky, 2005; Hammelstein & Soifer, 2006), but are limited

Table 4. *Zero-order correlations between Shy Bladder Scale total and subscale scores among participants with paruresis*

	SBS scale			
	Total	Difficulty	Interfer./distress	Negative eval.
SBS total	–			
Difficulty urinating in public	.66*	–		
Interference/distress	.72*	.40*	–	
Fear of negative evaluation	.70*	.13	.15	–

Notes. *Total* = SBS total score; *Difficulty* = Difficulty urinating in public subscale; *Interfer./distress* = Interference/distress subscale; *Negative eval.* = Fear of negative evaluation subscale.
*p < .001.

by their focus on diagnostic criteria and lack of applicability among non-paruretic respondents. The SBS complements these measures by virtue of its multi-modal assessment of paruresis-related interference and distress as well as the cognitive and functional aspects of this problem.

The SBS appears to possess good psychometric properties. Owing to our psychometric tests of exclusion, each item retained for the final version of the SBS demonstrated strong item-level statistics and the SBS total and subscale scores were highly internally consistent. Further, each subscale met rigorous standards of replicability (Guadagnoli & Velicer, 1988) and is thus likely to be reproduced in other samples. Unfortunately, our methodology did not permit the assessment of test-retest reliability. The SBS also demonstrated excellent discriminative validity. SBS scores were very high in a sample of individuals with paruresis, to the extent that the distribution of SBS total scores in this sample had virtually no overlap with that of individuals without paruresis. Accordingly, the SBS appears to have excellent diagnostic validity and may prove useful in this regard for clinical and research purposes.

Clinicians have noted that men present for treatment for paruresis far more often than women (Soifer et al., 2001). Similarly, previous research has often predominantly (e.g. Vythilingum et al., 2002) or exclusively (Hammelstein et al., 2005) studied the fear of urinating in public among men. Our findings suggest that difficulty urinating in public restrooms and interference and distress related to this problem are not more common in men than in women. However, concerns about being negatively evaluated while using public restrooms appear higher in women than men, among both college students and individuals with paruresis. This finding is consistent with the observation that women are more likely than men to fear negative evaluation in general (Watson & Friend, 1969). Whereas our findings suggest that women may experience paruretic difficulties at least as severely as some men, the present study should not be construed as evidence that paruresis is equally common among men and women. The participants recruited from the IPA website in Study 3 were those individuals who joined an online support network, and as such comprise a highly self-selected sample that may not resemble the population of all individuals with paruresis. Because of the greater privacy afforded to women owing to the structure of women's restrooms, it is perhaps not surprising that men are more likely to present for treatment due to this problem.

The inclusion of items assessing paruresis-related fear of negative evaluation is a strength of the SBS given the central role of cognitions in a contemporary cognitive-behavioral model of paruresis (Boschen, 2007). The items comprising the SBS *fear of negative evaluation* subscale appear to assess both specific cognitions (e.g. "If I urinate for too long, other people will think there is something wrong with me") and sensitivity to others attending to oneself while urinating (e.g. "I feel uncomfortable if other people can hear me urinating"). Some authors (e.g. Boschen, 2007) have suggested that paruresis involves cognitions regarding the negative consequences of not being able to urinate. Unfortunately, items assessing such cognitions were among those removed from the preliminary version of the SBS due to psychometric shortcomings. This outcome reflects our a priori decision to retain items based on empirical rather than theoretical considerations. As a result, the SBS *fear of negative evaluation* subscale is a more direct measure of cognitions associated with the consequences of urinating in the presence of others than of cognitions regarding the inability to do so.

Among individuals with paruresis, difficulty urinating in public and paruresis-related interference and distress were significantly and moderately correlated. In contrast, the fear of being negatively evaluated while urinating in public was unrelated to either of these concerns. These findings suggest that the perceived negative impact of paruresis on one's life is more related to the functional inability to urinate in public than to catastrophic cognitions and attentional biases highlighted in cognitive-behavioral models (e.g. Boschen, 2007). Paruresis is unique among social fears in that it often renders individuals literally incapable of performing, as opposed to simply fearing the inability to perform adequately. Our findings suggest it is this inability to perform that is particularly associated with the interference and distress caused by this problem.

The present study has several limitations in addition to those outlined above. Perhaps the most important is that our comparison groups in Study 3 were drawn from very different populations (college students vs. internet support group members). As such, we cannot establish the extent to which the extremely large between-group differences in SBS scores were attributable to real differences in paruretic concerns as opposed to differences in age, gender, or other extraneous variables. A second limitation concerns the lack of a measure of concurrent validity for paruresis, such as the PARS (Hammelstein & Peitrowsky, 2005) or PCL (Soifer et al., 2001). Third, our use of a self-rated version of the MINI to assess a diagnosis of paruresis in Study 3, although convenient, lacks the validity of administration of this interview by an adequately trained clinician. Future research using the SBS might examine its utility as a measure of treatment outcome among individuals with paruresis, as well a diagnostic tool in epidemiological studies. The present study provides evidence for the promising psychometric properties and discriminative validity of the SBS. It is our hope that the availability of this measure to clinicians and researchers will stimulate further research on the nature and treatment of this problem.

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