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## Development and validation of the Shy Bladder and Bowel Scale (SBBS)

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### ABSTRACT

Currently research exploring paruresis and parcopresis, anxiety relating to urinating and having bowel motions in public respectively is limited. While there are several validated measures of paruresis, no valid measure assessing parcopresis is currently available. The present study investigates the development and validation of the Shy Bladder and Bowel Scale (SBBS) which assesses both paruresis and parcopresis. Two participant groups were utilised to validate this scale, a student psychology cohort ( $n = 387$ ) and a public cohort ( $n = 334$ ). An eight-item two-factor model was identified in the psychology cohort and confirmed in the public cohort. The two-factor SBBS was found to be a valid and reliable measure of paruresis and parcopresis. Paruresis and parcopresis-related concerns were associated with social anxiety in both cohorts. Subscales for both paruresis and parcopresis (i.e. difficulty, interference and distress) were positively correlated, suggesting individuals are likely to report similar levels of concerns across both conditions. Further, individuals self-identifying with either paruresis or parcopresis reported significantly higher scores on the respective SBBS subscales than non-identifying paruresis and parcopresis individuals. The SBBS also demonstrated strong test–retest reliability in a small sample of adults ( $n = 13$ ). Overall, the developed scale provides clinicians and researchers with a valuable tool to evaluate both paruresis and parcopresis.

### ARTICLE HISTORY

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### KEYWORDS

Paruresis; parcopresis; shy bladder; shy bowel; scale development

Paruresis is known by many names, including shy bladder syndrome and functional or psychogenic urinary retention (Soifer, Nicaise, Chancellor, & Gordon, 2009). It refers to a difficulty, or inability, associated with urinating in public settings (Deacon, Lickel, Abramowitz, & McGrath, 2012). While individuals with paruresis usually feel comfortable urinating in the privacy of their own home, difficulties arise when they are in a setting where others may be able to hear or observe them urinating (e.g. public bathrooms, the homes of friends or family members; Ascher, 1978; Bohn & Sternbach, 1997; Boschen, 2008; Soifer, Himle, & Walsh, 2010). The International Paruresis Association estimates the prevalence of paruresis to be 7% worldwide (International Paruresis Association Inc,

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2015). Little research has been conducted on paruresis since Williams and Degenhardt first identified it in 1954, with Deacon et al. (2012) proposing that this is primarily due to a lack of validated assessment scales.

To date, four measures have been developed to assess paruresis: The Paruresis Checklist (PCL; Soifer, Zgourides, Himle & Pickering, 2001), the Paruresis Scale (Hammelstein, Pietrowsky, Merbach, & Braehler, 2005), the Bashful Bladder Scale (Soifer et al., 2010), and the Shy Bladder Scale (Deacon et al., 2012). In a review of the available paruresis assessments, Deacon et al. (2012) identify that psychometric and validity data have not yet been published for the PCL, and while a German-language version of the PCL has demonstrated reliability, it appears more appropriate for diagnostic purposes than for research (Deacon et al., 2012). Additionally, the authors note that while the Paruresis Scale has demonstrated discriminative validity, it is a single factor scale, therefore limiting the broader assessment and understanding of paruresis. The Bashful Bladder Scale was not addressed by Deacon et al. (2012), but again, psychometric and validity information has not yet been published for this assessment.

In response to these findings, Deacon et al. (2012) developed the Shy Bladder Scale (SBS) specifically for use in both research and clinical settings. The SBS comprises 19 items scored on a 4-point Likert scale ranging from 0 = “very little” to 4 = “very much”. The scale shows excellent internal consistency across three factors: difficulty urinating in public (e.g. “My bladder seems to “lock up” when I have to urinate in public restrooms”), interference and distress (e.g. “It’s easier for me to urinate in a public restroom if there is a lot of noise”), and fear of negative evaluation (e.g. “I feel uncomfortable if other people can hear me urinating”). Deacon et al. (2012) also assessed the psychometric properties and discriminative validity of the scale with positive results.

There is some contention around the conceptualisation of paruresis (e.g. Hammelstein & Soifer, 2006), however the most common belief is that it is a symptom or subtype of Social Anxiety Disorder (Boschen, 2008). In the American Psychiatric Association Diagnostic and Statistical Manual 5th edition (American Psychiatric Association, 2013), paruresis is even listed as a feature of Social Anxiety Disorder. Like other social phobias, individuals with paruresis demonstrate anticipatory anxiety and fear of negative evaluation, with urinary difficulties that increase as the level of privacy decreases. In addition, this anxiety often leads to avoidance behaviours and limited social functionality (Ascher, 1978; Hammelstein & Soifer, 2006; Hammelstein et al., 2005; Maia Barros, 2011; Malouff & Lanyon, 1985; Rogers, 2003; Simon, 2007; Vythilingum, Stein, & Soifer, 2002). Many patients with paruresis also report individual or family histories of other social anxiety symptoms (Vythilingum et al., 2002).

Anxiety may also play a role in the presentation of a similar condition called parcopresis. Parcopresis refers to fear and inability associated with defecating when other persons are nearby (Maia Barros, 2011; National Phobics Society, 2015). Like in cases of paruresis, individuals with parcopresis are only able to pass a bowel movement in toilets that they consider to be safe and private (National Phobics Society, 2015). While elimination was once a popular topic in earlier forms of psychology (e.g. psychoanalysis), it is not as prominent in the mainstream psychology of today (Haslam, 2012). Accordingly, very limited information is available on parcopresis and a literature search of the term only returned a single case study (Maia Barros, 2011).

At present, parcopresis is not listed as a social anxiety disorder in the DSM-5 (American Psychiatric Association, 2013), however it is recognised elsewhere as a form of social phobia (National Phobics Society, 2015). As with paruresis, anxiety is reported to increase when others are in close enough proximity to listen to, or otherwise scrutinise, the bowel movement of the individual with parcopresis (National Phobics Society, 2015). Bowel movements may even be a greater threat for psychological distress than urination, due to the more obvious sounds and smells, as well as the general shame and embarrassment that people tend to associate with defecation (Haslam, 2012). Although yet to be explored in the literature, the experience of paruresis and parcopresis may also be higher in individuals who have an underlying bladder or bowel condition such as prostate disease or Inflammatory Bowel Disease. It is expected that those living with a bladder or bowel condition may be more anxious with regard to utilising a public toilet due to the potential for their symptoms to be displayed in public, for example being unable to urinate.

Paruresis and parcopresis are two forms of toilet phobia associated with social anxiety. These disorders can lead to significant distress as well as reduced quality of life including impaired relationships, social life, and confidence, difficulty managing jobs, and in some cases fear of leaving the house (National Phobics Society, 2015; Vythilingum et al., 2002). In order to gain a better understanding of these disorders, further research must be conducted using validated measures. While validated measures are available for paruresis (e.g. SBS), there is currently no tool available to assess parcopresis. Considering the similarities between these conditions, including the shared triggers and association with social anxiety, it would be useful to explore them using the same tool. The present study investigates the development and validation of the Shy Bladder and Bowel Scale (SBBS), which assesses both paruresis and parcopresis.

## **Study 1: Development of the SBBS**

### **Method**

#### ***Participants and procedure***

Three hundred and eighty-seven undergraduate university students enrolled in a psychology course at a medium-sized Australian university completed an online survey. The mean age of the sample was 27.67 years ( $SD = 11.36$ ) and most participants were women (77.5%), single (62.8%), worked either casually (21.2%), part-time (21.7%) or work full-time (16.8%), and were Australian (85.5%). Participants were able to access the survey via a URL where they were informed that their participation in this study was voluntary and that they were free to withdraw at any time. Completion of the survey was taken as informed consent. Ethical approval for the study was obtained by the University Human Ethics Committee.

#### ***Measure: SBBS, preliminary version***

An initial set of items for both paruresis and parcopresis were developed based upon previous scales, the published literature, advice from gastroenterologists and patient-based experiences from the primary author's gastroenterological-focused psychology clinic. The initial pool of items (>80) were then screened by the authors and where appropriate language modified to provide consistency across the paruresis and parcopresis items. The

**Table 1.** Items for the urinary subscale of the SBBS.

Item	F1	F2
I get anxious when urinating	.85	-.02
I can't relax when urinating	.75	.03
I worry I cannot empty my bladder when close to others	.81	-.02
If there are other people in the restroom I wait until they leave before urinating	.83	-.08
My anxiety about urinating in public has negatively impacted upon my life	.02	.92
My anxiety about urinating in public interferes with my daily functioning	-.10	.99
I am anxious due to the fear of urinating in public	.19	.76
The anxiety about urinating in public interferes with my social life	.00	.88

Note. F1 = Difficulty urinating in public; F2 = Urinary-related interference and distress.

preliminary questionnaire consisted of 75 items (30 paruresis and 45 parcopresis). At the start of the SBBS, participants were advised “This questionnaire asks you about common (yet uncomfortable) experiences that people sometimes have when using a public restroom. Please answer honestly”. Each item was assessed on a 5-point rating scale (“None of the time”, “A little of the time”, “Some of the time”, “Most of the time”, and “All of the time”; scored 0–4, respectively).

### Data analyses

Data were analysed using SPSS Version 22.0 and Mplus Version 7.1. Prior to analysis, data were screened and assumptions tested where it was revealed that item responses were typically positively skewed. In order to address the skewness of the item-level data, a Maximum Likelihood Robust (MLR) estimation method with Geomin rotation was used to test the different factor analytic models conducted in this study since the MLR method provides parameter estimates with standard errors that are robust to non-normality for simple and complex factor analysis models (Muthen & Muthen, 2010).

### Results

An exploratory factor analysis (EFA) was conducted using 30 urinary-related items. Although one-, two- and three-factor solutions were tested, the two-factor solution was found to provide the best fit to the data. However, with the aim of reducing the number of items for the survey to aid administration, scoring and interpretation in research and clinical settings, it was decided to retain only the items with the four highest factor loadings per factor. The final model fit for the 8-item two-factor model was  $\chi^2(13) = 32.83$ ,  $p < .001$ , SRMR = .018, RMSEA = .072 and CFI = .962 (see Table 1). The intercorrelation between the two factors was .62.

Similar to the approach taken for the urinary-related items, an EFA was conducted using 45 bowel-related items and revealed a three-factor model to best fitting model. Consistent with the urinary-related items, the four highest factor loadings for each factor were retained for the scale, though only three items significantly loaded on one of the factors. As such, the two-factor model was used. The final model fit for the 8-items was excellent,  $\chi^2(19) = 34.02$ ,  $p = .001$ , SRMR = .019, RMSEA = .065 and CFI = .983 (see Table 2). The intercorrelation between the two factors was .34.

**Table 2.** Items for the bowel subscale of the shy bladder and bowel scale.

Item	F1	F2
I can't have a bowel motion when around others in a bathroom/restroom	.70	-.02
I avoid going to the toilet, even if I need to have a bowel motion	.89	.03
I delay going to the toilet, even if I need to have a bowel motion	.93	-.02
I worry I cannot empty my bowel when close to others	.76	.08
My bowel habits make my life unbearable	-.00	.86
My bowel habits are the most significant contributor to my anxiety levels in life	.02	.93
My bowel habits reduce my quality of life	-.08	.99
My bowel habits make me feel frustrated	-.10	.76

Note. F1 = Difficulty having a bowel motion in public; F2 = Bowel-related interference and distress.

Following the EFAs, Cronbach's alphas for the urinary and bowel scales were calculated respectively to assess internal consistency and were revealed to be  $\alpha = .94$  and  $\alpha = .85$ , indicating that both of these scales demonstrated high internal consistency. The spearman's rank correlation coefficient between the two subscales was  $.34$  ( $p < .001$ )

## Discussion

Based on an initial 75 items (30 paruresis and 45 parcopresis), a two-factor solution for both paruresis and parcopresis was derived. Each eight-item subscale was found to demonstrate high internal consistency and face-validity across both scales. Specifically, both subscales included a factor with four items reflecting difficulty urinating or having a bowel motion in public and a second factor that incorporated items reflecting interference and distress associated with urinating or having a bowel motion in public. Based on these results we choose to evaluate the 16-item SBBS in a large public sample.

## Study 2. Replication and discriminant/convergent validity of the SBBS in a public cohort

### Participants and procedure

Upon approval by the University Human Ethics Committee, invitations to participate in an online survey investigating toilet phobia were posted on a variety of online sources, including paruresis and parcopresis websites, forums and associations. A link to the survey was also included on the researcher's (SK) own toiletanxiety.org website. Three hundred and thirty-four adults from the public completed an online survey. The mean age of the sample was 43.61 years ( $SD = 14.58$ ) with more than half of the sample being women (59.0%). Participants in the public sample tended to be married (43.4%), employed full-time (41.0%), and Australian (74.0%). Of the 334 adults, 15 reported being diagnosed with paruresis, five reported being diagnosed with both paruresis and parcopresis, and 314 reported not being diagnosed with either paruresis or parcopresis. No participants were diagnosed with parcopresis in the absence of paruresis.

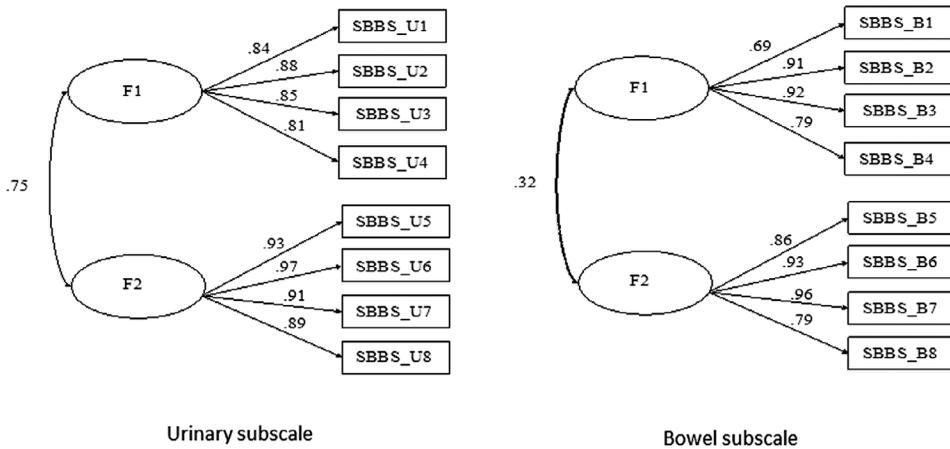
We also sought to explore the potential differences in SBBS subscale scores in relation to social anxiety. Consistent with Deacon et al. (2012), a self-rated version of the Mini International Neuropsychiatric Interview (MINI) for DSM-IV (Sheehan et al., 1998), diagnostic criteria for social anxiety with or without paruresis and/or parcopresis were developed. For example, in relation to paruresis, individuals were asked to respond yes or no to

“In the past month, did you have persistent fear and significant anxiety at being watched, being the focus of attention, or of being humiliated or embarrassed while URINATING IN A PUBLIC RESTROOM?”, “Do you fear URINATING IN A PUBLIC RESTROOM so much that you avoid them or suffer through them most of the time?” and “Do these social fears about URINATING IN A PUBLIC RESTROOM disrupt your normal work, school or social functioning or cause you significant distress?” If the answer to all three questions was yes, or yes to all three of the bowel-related questions (modified to reflect having a BOWEL MOTION IN A PUBLIC RESTROOM”), individuals were allocated to the relevant Shy Bladder and/or Bowel group. Based on the criteria, four groups were identified: “Social Anxiety with Shy Bladder/Bowel” ( $n = 17$ ), “Social Anxiety with no Shy Bladder/Bowel” ( $n = 57$ ), “No Social Anxiety with Shy Bladder/Bowel” ( $n = 30$ ), and “No Social Anxiety with No Shy Bladder/Bowel” ( $n = 230$ ).

In this study, validated scales were included to allow for the convergent and discriminant validity of the SBBS bladder and bowel subscales. To provide convergent validity of the SBBS-bladder subscale, the SBS Deacon et al. (2012) and the American Urological Association (AUA) Symptom index (AUA, 2010) and the Depression Anxiety and Stress Scale (Lovibond & Lovibond, 1995) were used, discriminant validity was assessed using the Bowel Symptom Severity Scale (BSSS; Boyce, Gilchrist, Talley, & Rose, 2000). Convergent validity of the SBBS-bowel subscale was assessed using the BSSS and DASS, while discriminant validity was assessed using the SBS and American Urological Association Symptom index (AUA-SI). As identified in the Introduction, the premise for the utilisation of symptoms scales (i.e. BSSS and AUA) were to provide validation of the shy bowel and shy bladder scales, respectively. It was expected that individuals with an underlying bladder or bowel condition may also be anxious when using a toilet near others when their symptoms occur.

### **Measures: SBBS**

The 16-item scale as derived in Study 1 was included in the online survey. Consistent with Study 1, each of the 16 items were assessed on the five-point scale, scored 0–4, respectively. Two averaged total scores were derived, a paruresis subscale score (eight-items), and a parcopresis subscale score (eight-items). Averaged scale scores with higher values are representative of greater paruresis or parcopresis symptoms, see the supplementary file for the full scale and scoring procedure. *Shy Bladder Scale* Deacon et al. (2012). The SBS comprises 19 items that are summed to attain a total score with higher values representative of greater paruresis symptoms. (AUA-SI; AUA, 2010) is a measure that assesses urinary symptoms across seven areas (incomplete emptying, frequency, intermittency, urgency, weak stream, straining and nocturia) as perceived by an individual over a 1-month period. An item example is regarding frequency—“How often have you had to urinate less than every two hours?” Responses are based on a six-point scale (“not at all” to “almost always”; scores 0–5, respectively) with higher summed scores indicating more severe symptoms. *Depression Anxiety Stress Scale* (DASS-21; Lovibond & Lovibond, 1995). The DASS is a 21-item measure assessing stress (e.g. I found it hard to wind down), anxiety (e.g. I felt I was close to panic) and depression (e.g. I felt downhearted and blue), each assessed using seven items. Each item is scored on a 4-point rating scale: 0 (Did not apply to me at all) – 3 (Applied to me very much, or most of the time). Items for each subscale were summed and then multiplied by 2 to give an overall measure stress, anxiety and depression, respectively (range of 0–42,



**Figure 1.** CFAs for Urinary and Bowel Subscale from the Shy Bladder and Bowel Scale.

with higher scores indicating symptom severity). *Bowel Symptom Severity Scale* (BSSS; Boyce et al., 2000). For the purpose of this study we used the frequency subscale from the BSSS. Frequencies relating to eight gastrointestinal symptoms (loose stools, hard stools, abdominal pain, bowel motion frequency, bloating, urgency to defecate, constipation and discomfort in the abdomen) were assessed on a 5-point Likert scale. For example “Over the past week how often have you had loose or watery bowel motions?” 0 (Not at all) – 4 (More than 3 times per day). Items were summed to provide a total bowel symptoms score (range of 0–32, with higher scores indicating symptom severity).

## Results

### **Confirmatory factor analysis of Shy Bladder and Bowel Subscales**

Both two-factor models for the urinary and bowel scales identified in the sample of 387 university students were validated using confirmatory factor analyses (CFA) in this sample. For the urinary-related items, a MLR CFA revealed a good fit to the data,  $\chi^2(19) = 54.07$ ,  $p < .001$ , SRMR = .048, RMSEA = .069 and CFI = .948. Furthermore, for the bowel-related items, a MLR CFA also provided a good fit to the data,  $\chi^2(19) = 62.43$ ,  $p < .001$ , SRMR = .044, RMSEA = .077 and CFI = .965, see Figure 1. After confirming the factor structure of the SBBS, Cronbach’s alpha values were calculated for the revised urinary and bowel scales and found to be  $\alpha = .95$  and  $\alpha = .87$ , respectively.

### **Construct validity of the SBBS shy bladder and bowel subscales**

The means and standard deviations for each of the urinary- and bowel-related factors as well as the total urinary and bowel scores are presented in Table 3. The results indicated that participants who reported being diagnosed with Paruresis or both Paruresis and Parcopresis (i.e. dual diagnosis) scored higher on the two urinary-related factors compared to non-diagnosed participants. However, while participants diagnosed with both conditions scored higher on difficulty having a bowel motion in public and total shy bowel subscale score than

**Table 3.** Medians and interquartile ranges for the SBBS by self-reported diagnostic group.

Patient reported diagnosis	Difficulty urinating in public	Urinary-related interference and distress	Shy bladder subscale score	Difficulty having a bowel motion in public	Bowel-related interference and distress	Shy bowel subscale score
Diagnosed with paruresis ( $N = 15$ ; 13 M, 2 F)	2.50 (2.00)	2.50 (1.75)	5.00 (3.25)	.25 (1.75)	.00 (.75)	.50 (3.25)
Diagnosed with parcopresis ( $N = 0$ )	–	–	–	–	–	–
Diagnosed with paruresis and Parcopresis ( $N = 5$ ; 2 M, 3 F)	.50 (2.75)	.25 (2.88)	.50 (5.50)	2.75 (1.13)	1.50 (2.25)	4.25 (3.38)
Non-diagnosed ( $N = 314$ ; 122 M, 192 F)	.25 (1.75)	.00 (.75)	1.60 (2.20)	1.50 (2.50)	1.00 (2.75)	3.00 (3.56)

either the diagnosed with Paruresis or non-diagnosed participants, non-diagnosed participants scored higher on the two bowel-related factors compared to participants diagnosed with Paruresis. None of the participants were diagnosed with Parcopresis in the absence of Paruresis.

Two independent samples Mann Whitney U tests were performed to determine whether there were significant median differences in shy bladder and shy bowel scores across gender. It was revealed that men (Median = 2.25) scored significantly higher ( $p < .001$ ) on the shy bladder subscale than women (Median = .25), though women (Median = 3.75) scored higher ( $p < .001$ ) on the shy bowel subscale compared to men (Median = 1.75). Two independent samples Kruskal–Wallis tests were also performed to test whether there were significant median differences in shy bladder scores and shy bowel scores across patient reported diagnoses. The first test revealed a significant difference ( $p < .01$ ) in shy bladder scores where participants diagnosed with paruresis (Median = 5.00) reported a higher median ( $p < .05$ ) score compared to participants with dual diagnosis (Median = .50) or no diagnosis (Median = .50). No significant difference was found between the dual diagnosis and no diagnosis groups. A second Kruskal–Wallis test did not reveal a significant median difference in shy bowel scores across the patient reported diagnoses ( $p = .200$ ).

We also examined the construct validity of the scale by testing how scores from the urinary and bowel subscales were associated with total scores from the BSSS, the SBS, and the AUA-SI scale, and the DASS subscales. Spearman rank correlations were calculated (see Table 4) and revealed a non-significant association between the SBBS subscale scores, suggesting there is no tendency for individuals who scored high on the bladder subscale to also score high on the bowel-related subscale. The total urinary score was very strongly associated with the total SBS score, and moderately associated with the AUA-SI score, providing strong evidence of convergent validity for the SBBS bladder subscale. Furthermore, while the bladder subscale score was found to be positively associated with depression, anxiety and stress scores from the DASS, albeit weak in strength, it was negatively associated with BSSS. Convergent validity for the SBBS bowel subscale was also found where it was positively associated with the BSSS and depression, anxiety and stress scores from the

**Table 4.** Correlations across the SBBS-bladder and -bowel subscales and depression, anxiety, stress, bowel symptoms, urinary symptoms, and paruresis severity scores.

	1	2	3	4	5	6	7
SBBS-bladder	-						
SBBS-bowel	.05	-					
DASS-DEP	.21**	.36***	-				
DASS-ANX	.20***	.36***	.72***	-			
DASS-STRE	.21***	.44***	.77***	.73***	-		
BSSS	-.22**	.60***	.31***	.31***	.33***	-	
AUA-SI	.40***	.08	.21***	.26***	.18***	.04	-
SBS	.87***	.09	.18**	.14*	.19**	-.20**	.35***

Note.  $N = 334$ .

\* =  $p < .05$ .

\*\* =  $p < .01$ .

\*\*\*  $p < .001$ .

**Table 5.** Medians and interquartile ranges for the social anxiety groups.

Self-rated social anxiety and shy bladder, shy bowel criteria	Difficulty urinating in public	Urinary-related interference and distress	Shy bladder subscale score	Difficulty having a bowel motion in public	Bowel-related interference and distress	Shy bowel subscale score
Social anxiety with paruresis ( $N = 17$ ) <sup>1</sup>	3.25 (1.13)	3.75 (1.00)	7.00 (2.00)	3.35 (3.13)	2.50 (2.25)	6.00 (4.38)
Social anxiety with no paruresis ( $N = 57$ ) <sup>2</sup>	.25 (1.13)	.00 (.88)	.50 (2.13)	1.75 (2.63)	2.75 (3.00)	4.00 (2.50)
No social anxiety with paruresis ( $N = 30$ ) <sup>3</sup>	2.75 (1.06)	2.38 (1.63)	5.13 (2.44)	1.13 (2.75)	.25 (1.75)	1.25 (4.31)
No social anxiety with no paruresis ( $N = 230$ ) <sup>4</sup>	.25 (1.25)	.00 (.25)	.25 (1.75)	1.50 (2.50)	.75 (2.25)	2.75 (3.75)

1. 3/17 reported having been formally diagnosed with paruresis (2) and/or parcopresis (1).

2. 1/57 reported having been formally diagnosed with paruresis (1) and/or parcopresis (0).

3. 8/30 reported having been formally diagnosed with paruresis (8) and/or parcopresis (0).

4. 9/230 reported having been formally diagnosed with paruresis (5) and/or parcopresis (4).

DASS. Supporting evidence for discriminative validity, bowel scores were not associated with the AUA-SI and SBS.

As identified in Table 5, to explore the potential differences in SBBS subscale scores in relation to social anxiety, shy bladder and shy bowel, individuals were categorised based upon self-rated criteria (i.e. Social Anxiety with Shy Bladder/Bowel, Social Anxiety with no Shy Bladder/Bowel; No Social Anxiety with Shy Bladder/Bowel, and No Social Anxiety with no Shy Bladder/Bowel)

An inspection of the mean scores for the urinary and bowel-related subscales reveals differences between those individuals with and without social anxiety, though this varies depending on whether participants have been identified with Paruresis or Parcopresis, or both. Two independent samples Kruskal–Wallis tests were performed to test whether there were significant median differences in shy bladder scores and shy bowel scores across self-rated social anxiety groups. The first test revealed a significant difference ( $p < .01$ ) in shy bladder scores where participants who rated themselves as experiencing social anxiety with Paruresis (Median = 7.00) reporting higher scores than those who do not rate themselves as socially anxious but do nominate as experiencing Paruresis (Median = 5.12). Both of

these groups scored significantly higher than those with social anxiety and no Paruresis (Median = .50), and those with neither social anxiety nor Paruresis (Median = .25). The second Kruskal–Wallis test revealed a significant difference ( $p < .01$ ) in median shy bowel scores across the self-rated groups where those participants who rated themselves as socially anxious with (Median = 6.00) and without Paruresis (Median = 4.00) scoring significantly higher than both the non-socially anxious but self-rated Paruresis group (Median = 1.25) and the non socially anxious and non Paruresis group (Median = 2.75).

## Discussion

Based on a large community sample ( $n = 334$ ), the findings from Study 2 support the initial Study 1 scale development. Specifically, CFA of both the bladder and bowel subscales of the SBBS were found to be a good fit to the data. Further, Cronbach's alpha for two scales were also excellent, .95 and .87, respectively. These findings Consistent with self-reported formal diagnosis, those with a paruresis diagnosis reported higher total shy bladder total scores than those with no diagnosis. Total shy bladder and shy bowel scores were also higher in the paruresis and parcopresis diagnosed group compared to the non-diagnosed group. Evidence for convergent validity across both scales was also found. While the total shy bladder score had a significant positive relationship with the SBS, AUA-SI and DASS subscales, and a significant negative relationship with BSSS. Shy bowel score has a significant positive relationship with BSSS, DASS subscales and a non-significant relationship with the SBS and AUA-SI. Consistent with the premise that social anxiety is associated with paruresis and parcopresis, social anxiety was found to influence total and subscale scores on the shy bladder and shy bowel scales. The findings in Study 2 provide evidence that the SBBS is a psychometrically sound scale with strong construct validity and the ability, and based on self-reported formal diagnosis, to distinguish individuals with or without paruresis and/or parcopresis.

## Study 3: Test–retest assessment of the SBBS

### Method

#### *Participants and procedure*

A test–retest reliability analysis was also completed on a small sample of participants ( $n = 13$ ) with a mean age of 30.31 (SD = 5.88) and who were mostly women (76.9%). These participants completed a pen-and-paper survey twice over a period of 2 weeks. Ethical approval for the study was obtained by the University Human Ethics Committee.

#### *Measure*

SBBS. Consistent with Study 2, each of the 16 items of the SBBS was assessed on the 5-point scale, scored 0–4, respectively. Three averaged total scores were derived, a paruresis subscale total (8-items), a parcopresis subscale (eight-items) score and a total toilet-phobia scale (16-items). The SBBS comprises 16 items scored on a four-point Likert scale ranging from 0 = “very little” to 4 = “very much”. Averaged scale scores with higher values are representative of greater paruresis or parcopresis symptoms.

## Results and discussion

The test–retest reliability coefficients for the urinary scale and bowel scale were .98 and .92, respectively. These findings indicate that the SBBS subscales are highly reliable over time further supporting the evidence from Study 2 that the scale is psychometrically very strong.

## General discussion

The aim of this research was to develop a psychometrically sound scale to assess paruresis and parcopresis. Based on an initial 75 items (30 paruresis and 45 parcopresis) two factors (entitled “difficulty urinating in public/difficulty having a bowel motion in public” and “urinary/bowel related interference and distress”), each with four items were derived in Study 1. Study 2 confirmed the factor structures, strong psychometric properties and construct validity for both scales of the SBBS. Study 2 also confirmed that the SBBS is able to differentiate between self-reported formal diagnostic groups and the non-diagnosed (control) group. While this result is consistent with other paruresis scales, such as the SBS (Deacon et al., 2012) and Paruresis Scale (Hammelstein et al., 2005) we have also shown that the parcopresis subscale also is able to differentiate between self-reported parcopresis diagnosed and non-parcopresis diagnosed groups. Study 3 has also demonstrated that the test–retest for each subscale and total scores for the bladder and bowel subscales are also consistent over a two-week time period.

Consistent with the SBS, the SBBS also contains a multi-modal approach assessing both difficulty urinating or having a bowel motion in public and bladder and bowel-related interference and distress. Unlike the three-factor (19-item) structure of the SBS, we identified a two-factor structure (8-item) for both paruresis and parcopresis subscales. Given the similarity, we chose to label the two-factor subscales to be consistent with the SBS subscales. The third paruresis factor found in the SBS relates to the fear of negative evaluation. However, our analyses indicated only two items that were significantly loading on a third factor, namely “If there is other people in the restroom I wait until there is a noise to mask the sounds I make when urinating” and “The sound of others urinating makes me feel anxious”. Consequently, we retained a highly stable and psychometrically sound two-factor solution for both paruresis and parcopresis subscales. We also choose the two-factor solution to ensure that the SBBS was as brief as possible while also providing high diagnostic capabilities allowing it to be applicable to both research and clinical arenas.

In relation to gender differences, we found significant differences in paruresis and parcopresis subscales scores between males and females, which was not consistent with (Deacon et al., 2012) who found that there were no significant differences across the paruresis subscales and total scores. Although males scored higher on the paruresis subscale compared to females in the current study, the opposite pattern was found for the parcopresis subscale in which females scored higher than males. These findings are consistent with past research that has shown men to experience difficulties urinating in public restrooms and distress associated with such behaviour (Hammelstein et al., 2005; Vythilingum et al., 2002), as well as more men seeking treatment for paruresis than women (Soifer et al., 2001). Furthermore, the finding that females experienced more bowel-related problems compared to males is a novel result and one that requires replication in future studies.

The significance of the association between the total paruresis and parcopresis subscales scores differed in both Study 1 and 2. Whereas Study 1 revealed a tendency for university students with paruresis to also experience parcopresis, no such correlation was identified in Study 2. That is, individuals from the public cohort with paruresis were no more likely to report both difficulty and distress associated with parcopresis compared to those who do not experience paruresis. However, given the equivocal findings as well as the small number of individuals in the current study with diagnosed parcopresis, further research is required before recommendations about the clinical and research implications for exploring paruresis and parcopresis individually or collectively can be made.

An ongoing debate in relation to both paruresis and parcopresis is the role of social anxiety in the conditions (Boschen, 2008; Deacon et al., 2012). Utilising and extending upon the self-report MINI procedure reported by (Deacon et al., 2012), we created four distinct groups (Social Anxiety with Shy Bladder/Bowel; Social Anxiety with no Shy Bladder/Bowel; No Social Anxiety With Shy Bladder/Bowel; No Social Anxiety with no Shy Bladder/Bowel). Overall, we found that those with social anxiety and shy bladder reported higher subscale scores for both shy bladder and bowel compared to the other three groups. Notably, since there was no participant meeting only criteria for parcopresis, no comparison for this group was conducted. However, our results extend upon past research (Hammelstein & Soifer, 2006) by suggesting that individuals with self-rated social anxiety are likely to report heightened difficulty urinating or having a bowel motion in public, bladder and bowel related interference, and distress compared to individuals with no self-rated social anxiety. Furthermore, individuals with social anxiety and shy bladder also reported the highest levels of difficulty and distress.

There are several limitations that should be noted. First, this research was based on self-reporting, consequently verification of actual diagnosis of paruresis and/or parcopresis could not be confirmed. While primarily consistent with (Deacon et al., 2012), we created social anxiety/paruresis/parcopresis groups based upon modified MINI criteria again, this meant that verification of actual diagnosis was not able to be confirmed. Another limitation of this research was the inability to assess potential differences across the SBBS total and subscales in a parcopresis-only cohort. Further research is needed to explore this. While the SBBS was able to differentiate between individuals with or without a formal diagnosis of paruresis/parcopresis, no cut-off scores could be derived. Future research is also needed to evaluate if clinically based cut-off scores for paruresis and parcopresis can be attained and validated using the SBBS. Lastly, since no parcopresis scale existed for convergent validation, future research is required to confirm the convergent and discriminant validity of the parcopresis subscale.

Future research is needed to explore the potential clinical efficacy of the SBBS in a treatment trial for paruresis and/or parcopresis. Research is also needed to further explore the potential cognitive processes that may underpin paruresis and/or parcopresis, these may include known predictors of social anxiety such as fear of positive and negative evaluation (Weeks & Howell, 2012), or factors that are associated with psychological distress, such as dysfunctional attitudes, maladaptive coping styles, unhelpful thinking patterns. While paruresis and parcopresis can be seen as conditions that involve anxiety relating to using public toilets (i.e. involving over control of the bladder/bowel), individuals with bowel and/or bladder obsessions (see Kamboj et al., 2015; Pajak & Kamboj, 2014; Pajak, Langhoff, Watson, & Kamboj, 2013) tend to fear being unable to control their bladder/bowel leading

to an accident in public. Given that individuals with either parcopresis and/or paruresis, as well as those who suffer bowel and/or bladder obsessions experience anxiety and concerns about being judged by others, further research should explore the potential commonalities and differences across these conditions.

It is hoped that future research will be able to utilise the SBBS with other scales to help better understand the factors that maintain paruresis and parcopresis, and also what may differentiate them. It is only once this research is undertaken will we be able to definitively classify paruresis and parcopresis in the DSM and in turn be better able to provide effective targeted therapy for these complex and overlapping conditions.

In conclusion, the SBBS is a new and psychometrically strong scale that can be utilised to assess both paruresis and parcopresis. It is the first scale to the authors' knowledge that assesses both paruresis and parcopresis. While the SBBS is easy, short and easy to complete, it maintains a multi-model assessment approach and has strong diagnostic properties suggesting that it may be valuable to both clinicians and researchers.

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