

Development and Psychometric Evaluation of the Gay Male Sexual Difficulties Scale

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Abstract Sexual difficulties (i.e., disturbances in normal sexual responding) have the potential to significantly and negatively affect men's social and psychological well-being. However, a review of published measurement tools indicates that most have limited applicability to gay men, and none offer a nuanced understanding of sexual difficulties, as experienced by members of this population. To address this omission, the Gay Male Sexual Difficulties Scale (GMSDS) was developed using a sequential mixed-methods approach. The 25-item GMSDS uses a 6-point frequency Likert-type response format and examines: difficulties with receptive and insertive anal intercourse (5 items each); erectile difficulties (4 items); foreskin difficulties (4 items); body embarrassment (4 items); and seminal fluid concerns (3 items). The measure's scale score dimensionality, assessed using both exploratory and confirmatory factor analyses, as well as scale score reliability and validity (e.g., known-groups and convergent) was tested and deemed to be satisfactory. Limitations of the current series of studies and directions for future research are discussed.

Keywords Sexual dysfunction · Gay men · Sexuality · Psychometrics · Sexual behavior

Introduction

Sexual difficulties, defined as any disturbance in normal sexual responding (Rowland, 2007), have the potential to significantly and negatively affect men's social and psychological well-being and quality of life (e.g., Althof, 2002; Laumann, Paik, & Rosen, 1999). A sizeable proportion of men have reported experiencing at least one sexual difficulty: e.g., 51 % among a sample of heterosexual men surveyed in Hong Kong ($N = 1516$: Lau, Kim, & Tsui, 2005) and 31 % in a demographically representative survey of American heterosexual men ($N = 1410$: Laumann et al., 1999). Further, rates of sexual difficulties appear to be even higher among gay men: 74 % among self-identified gay men from six high HIV+ caseload general practices in Australia ($N = 542$: Mao et al., 2009) and 79 % in an online survey of 7001 American men who have sex with men (MSM: Hirshfield et al., 2010). However, such substantial discrepancies should be interpreted with caution, as studies differ greatly in terms of how sexual difficulties are conceptualized and measured, the populations studied (e.g., HIV + gay men, straight and gay samples), and the methodologies used (McDonagh, Bishop, Brockman, & Morrison, 2014; Sandfort & de Keizer, 2001; Štulhofer, Šević, & Doyle, 2014).

Additionally, most studies on sexual difficulties are anchored in Masters and Johnson's (1966) human sexual response model, which was derived from the study of heterosexual men and women. Examining gay men's sexuality from a heterosexual vantage is inappropriate for a number of reasons. First, heterosexual men are taught from childhood to operate in accordance with a heterosexual script which teaches men how to act, feel, and behave in sexual encounters (Sandfort & de Keizer, 2001), whereas gay men define their sexuality through the coming out process, which consists of *rejecting* the heterosexual script (Campbell & Whiteley, 2006). Second, sex roles and positions have power-related symbolic meanings (Philaretou & Allen,

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2001; Underwood, 2003). The sexual acts performed between two men or between a man and a woman are similar but the power dynamics may differ. Heterosexual men are expected to be the domineering, active partner, whereas heterosexual women are expected to be the submissive, receptive partner (Sandfort & de Keizer, 2001). In sexual relations between two men, power dynamics are less straightforward (Kippax & Smith, 2001; Zheng, Hart, & Zheng, 2012). Further, while sexual practices can be guided by normative understandings of masculinity and femininity (e.g., Lick & Johnson, 2015), adoption of certain “roles” (i.e., “top” or “bottom”) may stem from the physical pleasure one receives from a particular position (Johns, Pingel, Eisenberg, Santana, & Bauermeister, 2012; Moskowitz & Hart, 2011). Third, non-coital sexuality, such as oral sex, is more common in same-sex interactions and, in contrast to heterosexual relationships, there is generally no a priori assumption that penetration will occur (e.g., Blumstein & Schwartz, 1983; Laumann, Gagnon, Michael, & Michaels, 1994). Fourth and finally, it may be easier for a gay man to hide sexual difficulties by avoiding specific behaviors (e.g., gay men with erectile difficulties may eschew the insertive role in penetrative sex or opt to give, rather than receive, oral sex: McCarthy, 1992).

The problems associated with examining sexual difficulties in gay men through a heterosexual lens, in conjunction with the absence of a psychometrically sound instrument for use with gay male samples (McDonagh et al., 2014), highlights the need to create a measure of sexual difficulties tailored for gay participants. The series of studies outlined herein were designed to achieve this objective. Item generation for the Gay Male Sexual Difficulties Scale (GMSDS) is outlined in Study 1 followed by assessments of the scale’s dimensionality, reliability, and validity (Study 2).

Study 1

The purposes of Study 1 were threefold: (1) to develop a measure assessing sexual difficulties in gay men (i.e., the GMSDS); (2) to assess the scale’s dimensionality using guidelines for best practice in exploratory factor analysis (e.g., Costello & Osborne, 2005; Fabrigar, Wegener, MacCallum, & Strahan, 1999); and (3) to examine the preliminary construct validity (specifically, known-groups validity) of the measure.

Known-groups validity refers to whether a scale is able to discriminate between different groups (e.g., clinical and non-clinical samples) who theoretically are expected to score differently on the measured construct (Cronbach & Meehl, 1955). Known-groups validity will be assessed through comparisons of those who evidence lower versus higher levels of psychological well-being. It is widely accepted that well-being, in terms of anxiety, depression, and stress, is associated with sexual difficulties (e.g., Araujo, Durante, Feldman, Goldstein, & McKinlay, 1998; Beck, 1967; Cassidy, Flanagan, Spellman, & Cohen,

1957; Kennedy, Dickens, Eisfeld, & Bagby, 1999; Schreiner-Engel & Schiavi, 1986). In particular, previous research has found that men with sexual difficulties exhibit poorer levels of psychological well-being than do their sexually functional counterparts (e.g., Angst, 1998; Costa, Fagan, Piedmont, Ponticas, & Wise, 1992; Laumann, Das, & Waite, 2008).

In relation to stress, Laumann et al. (1999) reported that individuals who experienced stress-related problems were more likely to experience sexual difficulties. Similarly, in Laumann et al.’s (2004) study, a positive association was documented between erectile difficulties and stress resulting from financial problems. Further, Mao et al. (2009) found that reported stress was positively associated with sexual difficulties for HIV– and HIV+ men.

For the variable of anxiety, Bancroft et al. (2003)¹ reported that 39 % of anxious participants reported a decrease in sexual interest, and 31 % reported a decrease in erectile function. Likewise, Bancroft, Carnes, Janssen, Goodrich, and Long (2005) found that anxiety levels were higher for participants with erectile difficulties, compared to those without. In a sample of 1550 women and 1455 men (age range 57–85 years), Laumann et al. (2008) noted that, among men, anxiety was associated with an increased lack of sexual interest.

Bancroft et al. (2003) observed that, when experiencing depression, 47 % of participants reported a decrease in sexual interest, and 37 % reported a decrease in erectile function. Correspondingly, Bancroft et al. (2005) documented that, for both gay and heterosexual men, scores on a measure of depression were higher for those with erectile difficulties and delayed ejaculation. Mao et al. (2009) also found that HIV– and HIV+ men who had several sexual difficulties were more likely to suffer from depression.

Based on the aforementioned findings, it was hypothesized that those reporting greater sexual difficulties also would experience greater levels of anxiety (Hypothesis 1), depression (Hypothesis 2), and stress (Hypothesis 3).

Method

Participants

The sample comprised 1122 “exclusively gay” men who ranged in age from 18 to 79 ($M = 34.55$, $SD = 11.87$). A majority of participants were from either North America (53 %, $n = 591$) or Europe (34 %, $n = 382$); identified as Caucasian (86 %, $n = 961$); and were working full-time, part-time, or self-employed (67 %, $n = 754$). Greater variability was observed in terms of

¹ It should be noted a small minority of participants reported heightened sexual interest and arousal when depressed or anxious (see Bancroft et al., 2003).

relationship status, with the top three options being single (34 %, $n = 384$), cohabiting (18 %, $n = 198$), and dating one person exclusively (16 %, $n = 180$).

Procedure

Ethical approval was obtained from the research ethics committee affiliated with the senior author's doctoral institution (National University of Ireland, Galway). *Surveygizmo*[®] (<http://www.surveygizmo.co.uk/>) was used to create a questionnaire pack which consisted of an information sheet outlining the purpose of the research and required ethics stipulations, informed consent, and relevant measures. Two versions of the questionnaire pack were created; both contained identical information sheets detailing the purpose of the research and required ethics stipulations, informed consent, demographic questions, and sexual difficulties items. However, the first version included the validation measures for the current study (Study 1), whereas the second version included the validation measures for Study 2. Studies 1 and 2 were conducted simultaneously, with participants being randomly assigned to one of the studies in accordance with the month of their birth (i.e., those born in January, March, May, July, September, and November participated in Study 1, while those born in February, April, June, August, October, and December were directed to the survey for Study 2). This process ensured that there was no overlap between participants in the current study and those in Study 2. Secure Sockets Layer encryption, standard security technology for creating an encrypted link between server and client (Weaver, 2006), was used to ensure participant confidentiality.

A number of recruitment strategies were used. In Ireland, advertisements were placed in local and national newspapers, and the research was discussed on local and national radio stations. Posters describing the study were displayed in gay bars and nightclubs throughout the country. Internationally, LGBT organizations and groups (e.g., Pride event organizers) were contacted and asked to forward “an invitation e-mail” to their members. Invitations to participate in a study on sexual difficulties were posted online in several locations (e.g., blogs, websites, and discussion forums), with site administrators being asked to forward information about the study to personal contacts. Chain-referral sampling also was used whereby acquaintances of the senior author were asked to inform other men about the study. Additionally, a *Facebook* page (“Gay Men’s Sex Survey”) was created, which described the research and provided links to the survey. Other LGBT-related *Facebook* pages (e.g., gay choirs) also were contacted and asked to post a link to the survey on their page. All participants could enter a competition to win a gift voucher worth €175 (\$200), if desired. Contact details were submitted separately (via e-mail) from survey data to ensure participant anonymity. Cookie-based duplicate protection was used to prevent duplicate responses.

Measures

In addition to demographic questions (e.g., age, ethnicity, country of residence, and sexual orientation), participants completed the following:

Hospital Anxiety Depression Scale (HADS; Zigmond & Snaith, 1983) The HADS is a 14-item instrument that provides a brief state measure of anxiety (HADS-A: seven items; e.g., “I feel tense or wound up”) and depression (HADS-D: seven items; e.g., “I still enjoy the things I used to enjoy”). Responses are scored on a four-point Likert scale, with different response items for each question (e.g., 0 = not at all, 3 = most of the time; 0 = definitely as much, 3 = hardly at all). Higher scores denote greater anxiety or depression (possible range for each seven-item subscale is 0–21). Bjelland, Dahl, Haug, and Neckelmann (2002) identified a score of 8 or greater (out of 21) as being the cut-off point for “possible cases” of anxiety disorder or clinical depression. Adequate scale score reliability and validity have been demonstrated (Bjelland et al., 2002; Moore et al., 1991; Zigmond & Snaith, 1983). In the current study, Cronbach’s alpha was .84 (95 % CI .82–.85) for the HADS-A, and .80 (95 % CI = .78–.81) for the HADS-D.

The Perceived Stress Scale-Four (PSS-4; Cohen & Williamson, 1988) The PSS-4 is a four-item measure of the degree to which situations in one’s life are appraised as stressful (e.g., “In the last month, how often have you felt that you were unable to control the important things in your life”). Responses are coded on a five-point Likert scale (0 = never; 4 = very often) with higher scores denoting more perceived stress (possible range is 0 to 16). While the PPS-4 is not a clinical diagnostic tool, a score of 9 and above has been identified as the cut-off value for “severe stress” (Amr, El Gilany, & El-Hawary, 2008; Shah, Hasan, Malik, & Sreeramareddy, 2010). Research suggests the scale is psychometrically sound (Cohen, Kamarck, & Mermelstein, 1983; Cohen & Williamson, 1988). In the current investigation, Cronbach’s alpha was .81 (95 % CI .79–.83).

Gay Male Sexual Difficulties Scale (GMSDS)—Preliminary Items Using scale development guidelines established by DeVellis (2012), a large pool of items (150) was created following an extensive review of sexual functioning literature (McDonagh et al., 2014) and a series of personal interviews and focus groups ($N = 52$) with men (see McDonagh, Nielsen, & Morrison, in press). The latter facilitated the emergence of novel constructs (e.g., difficulties associated with a tight foreskin). The language used by participants (e.g., words such as “arse,” “cum,” and “jerk off”) also was noted to ensure that items reflected how the constructs were phrased. To improve upon existing measures, items for the GMSDS were (1) worded to take gay men’s sexual behaviors into account (e.g., rimming); (2) designed to be appropriate for respondents with varying levels of sexual experience; and (3) multifaceted (i.e., accounts for sexual difficulties in a variety of contexts).

To create a high-quality measure, the item pool was exhaustive and over-inclusive, as per guidelines set forth by DeVellis (2012). To ensure clarity, colloquial terms as well as formal phrases were provided when deemed necessary (illustrative item: “When you penetrated a guy anally [i.e., topped him/fucked him], were you able to ejaculate [i.e., cum]?”). All items were worded to be compatible with Likert-type response formats, due to their ease of administration and analysis.

A panel of content experts ($n = 6$: e.g., individuals that had published in the field of psychometrics and LGBT research) and “lay experts” (i.e., potential research participants [$n = 3$]) assessed the items in terms of their: (1) representativeness (i.e., how well did each item characterize a given sexual difficulty?); (2) clarity (i.e., how clearly was each item worded?); and (3) comprehensiveness (i.e., was a given content domain sufficiently sampled by the relevant items?: McGartland Rubio, Berg-Weger, Tebb, Lee, & Rauch, 2003). To accommodate this input, revisions were made to the item pool. For example, one content expert suggested the inclusion of items relating to seminal fluid concerns.

Two item pools were generated: the first measuring physical sexual difficulties and the second measuring psychological sexual difficulties. The combined item pool consisted of 143 questions representing several domains of sexual difficulties: embarrassment about one’s physique (12 items); embarrassment about one’s penis (12 items); seminal fluid concerns (11 items); foreskin-related difficulties (11 items); penis size difficulties (nine items); body odor (eight items); erectile difficulties (eight items); anal hygiene (six items); appearance of one’s skin (six items); body hair (six items); fear of sexually transmitted infections (six items); pain (six items); sexual desire (six items); sexual enjoyment (six items); premature ejaculation (five items); delayed ejaculation (five items); absence of ejaculation (five items); anus capabilities (four items); self-blame for sexual dissatisfaction (i.e., sexual attribution of responsibility; four items); testicular embarrassment (four items); and perceived sexual prowess (three items).

Items were worded so that higher scores indicate greater sexual difficulties and all used a 6-point Likert-type response format (i.e., 0 = not applicable, 1 = never, 2 = once or twice, 3 = several times, 4 = most of the time, 5 = all of the time). Details about the factor structure of the measure and its psychometric properties are provided later.

Data Analysis

Data were analyzed using SPSS 20. To determine whether participants who had missing data were different from those who responded in full, Little’s Missing Completely at Random (MCAR) test was used (Little, 1988). Although there are various methods for dealing with MCAR data, Expectation Maximization (EM) methods were deemed an appropriate choice for the present research. EM is considered an excellent procedure for

handling missing data (Allison, 2001; Graham, 2009), and is acceptable when data are MCAR (Scheffer, 2002) and the percentage of missing data is minimal (i.e., less than 5%: Graham, 2009; Scheffer, 2002).

Exploratory Factor Analysis There are two types of factor analysis used for scale development: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA allows items to be related to any of the underlying factors; hence, it is most advantageous when the underlying relationships between items and factors are unknown. CFA, in contrast, requires a theoretical or empirical basis for an assumed factor structure (Fabrigar et al., 1999). Accordingly, the item pool for the GMSDS was subjected to an EFA.

The factorability of the data was examined using Bartlett’s test of sphericity and the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy. If Bartlett’s test is statistically significant, the hypothesis that the variables being factor analyzed are unrelated to one another can be rejected (i.e., the correlation matrix for the data is an identity matrix; Morrison & Morrison, 2006). For the KMO, values above .60 are necessary for EFA (Tabachnick & Fidell, 2007). As Bartlett’s test was statistically significant ($p < .001$) and the KMO statistic was .87, EFA was suitable for the data.

The dimensionality was examined using principal axis factoring (PAF) with oblique rotation (direct oblimin, delta set to zero). PAF is a method of extraction which fits common factor models to data without distributional assumptions (Fabrigar et al., 1999). Considering scores on the GMSDS were non-normally distributed (i.e., in the current study, participants reported infrequent sexual difficulties), PAF was deemed to be appropriate. Oblique rotation was employed as some degree of inter-relatedness among factors was expected.

Decisions regarding the number of factors to retain were based on a parallel analysis (O’Connor, 2000), in conjunction with an examination of the scree plot. Parallel analysis is a method whereby multiple random data sets are generated. The generated random data sets have the same number of participants and variables as the observed data set (i.e., the actual data collected for the research study). Correlation matrices with eigenvalues are computed for the random data set. The eigenvalues from the random data are then compared to eigenvalues from the observed data. The first observed eigenvalue is compared to the first random eigenvalue, the second observed eigenvalue is compared to the second random eigenvalue, etc. The number of factors to retain is indicated when the eigenvalue for the random data becomes larger than the corresponding (or parallel) eigenvalue for the observed data (Thompson, 2004). (For an in-depth tutorial on parallel analysis, see Hayton, Allen, & Scarpello, 2004). A screeplot is a graph of eigenvalues; the number of factors to retain is suggested by counting the number of data points above where the curve flattens out, excluding the data point where the break occurs (Costello & Osborne, 2005).

Item Reduction Each factor was assessed for the presence of redundant items. High correlations between variables may indicate item redundancy (Furr & Bacharach, 2008); thus, if two items correlated with each other in excess of .90 (Field, 2009), the item with the lower factor loading was deleted. Items also were removed if inter-item correlations were weak (i.e., r s across other items were less than .30; Field, 2009). In addition, corrected item-total correlations for each factor were inspected; items with values less than .30 were removed (Field, 2009). For the purpose of retaining items, the minimal acceptable factor loading was .50, with no cross-loadings great than .32 (Worthington & Whittaker, 2006).

Results and Discussion

Little's (1988) Missing Completely at Random (MCAR) test was statistically non-significant ($p > .05$) suggesting that data were MCAR (Tabachnick & Fidell, 2007). As the proportion of missing data was minimal (i.e., less than 5 %; Graham, 2009; Scheffer, 2002), expectation maximization (EM) was deemed to be an appropriate choice (Allison, 2001; Graham, 2009).

Exploratory Factor Analysis

Applying the aforementioned item removal criteria, 47 items were retained. Using syntax provided by O'Connor (2000), parallel analysis suggested that a six-factor solution was appropriate (i.e., the first six eigenvalues for the real data [9.03, 4.94, 4.10, 3.93, 3.23, 3.09] exceeded the first six eigenvalues for the random data [5.03, 3.97, 3.07, 3.06, 3.06, 2.84]). Thus, the analysis was repeated forcing a six-factor solution, which accounted for 60.18 % of the total variance. Inspection of the items' loadings on each factor suggested they measure difficulties with receptive anal intercourse (RAD; eigenvalue = 9.03); erectile difficulties (ED; eigenvalue = 4.94); seminal fluid concerns (SFC; eigenvalue = 4.10); difficulties with insertive anal intercourse (IAD; eigenvalue = 3.93); foreskin difficulties (FD; eigenvalue = 3.23); and body embarrassment (BE; eigenvalue = 3.09). The average factor loadings were .66 (RAD), .77 (ED), .73 (SFC), .68 (IAD), .87 (FD), and .79 (BE), respectively, which reflects a high degree of correlation between test items and their corresponding factors.

Scale Score Internal Consistency

Results attested to the reliability of the GMSDS total scale score ($\alpha = .90$; 95 % CI .89–.91). Alpha coefficients and confidence intervals for all subscales (and validation measures), as well as means, standard deviations, and score ranges are presented in Table 1.

The six subscales were moderately intercorrelated (see Table 2) suggesting that they measure interrelated, yet distinct,

constructs (i.e., an individual may experience erectile difficulties but not experience foreskin difficulties).

Construct Validity

For clarity, the GMSDS total scale score will be referred to as "Overall Sexual Difficulties" (OSD) and the subscale scores correspond with the six identified factors (RAD, IAD, ED, BE, SFC, and FD). To avoid overestimates of sexual difficulties, the "not applicable" option was coded as missing values for validity analyses (Meyer-Bahlburg & Dolezal, 2007; Yule, Davison, & Brotto, 2011). Thus, rather than summing the scores for individual items on each subscale (and summing each subscale for a total scale score), for each respondent a mean score was computed based on the number of items the participant had answered (i.e., items that *were* applicable to them). This resulted in different sample sizes for each indicant of sexual difficulties: $n = 1016$ for receptive anal difficulties; $n = 980$ for insertive anal difficulties; $n = 1119$ for erectile difficulties; $n = 1080$ for body embarrassment; $n = 1115$ for seminal fluid concerns; $n = 600$ for foreskin difficulties; and $N = 1122$ for overall sexual difficulties.

To examine the scale's known-groups validity, gay men "at risk" for anxiety, depression, or stress were compared to their "low-risk" counterparts in terms of the frequency with which they experienced the sexual difficulties measured by the GMSDS. This comparison permitted testing whether individuals evidencing anxiety, depression, or stress report more frequent experiences with the sexual difficulties measured by our scale.

Participants who scored in the "healthy" range for anxiety (i.e., a score from 0 to 7, $n = 560$) were compared to those classified as possible cases (i.e., a score from 8 to 21, $n = 560$). Those "at risk" for anxiety reported more frequent difficulties with receptive anal intercourse and insertive anal intercourse, greater seminal fluid and foreskin concerns as well as body embarrassment, and greater overall sexual difficulties (i.e., GMSDS total). Means, standard deviations, and t test results are presented in Table 3.

Participants scoring from 0 to 7 ($n = 907$)² were compared to those scoring at 8 or higher ($n = 212$), the cut-off for "potential cases" of clinical depression. Statistically significant differences were found between the "at risk" and "low risk" groups in terms of difficulties with receptive anal intercourse, insertive anal intercourse, erectile functioning, body embarrassment, and overall sexual difficulties. More frequent occurrences of a greater number of sexual difficulties were reported by those "at risk" for depression. Means, standard deviations, and t test results are presented in Table 3.

² Sullivan and D'Agostino (1992) suggest that independent samples t tests are robust when used with data that contain unequal sample sizes and may be subject to floor effects.

Table 1 Descriptive statistics for all measures in Study 1 and Study 2

Variable	Number of items	<i>M</i>	<i>SD</i>	α	95 % CI	Possible range	Attained range
Study 1							
RAD	13	16.59	9.47	.90	.89–.91	0–65	0–44
IAD	10	11.92	7.02	.87	.86–.88	0–50	0–29
ED	8	11.35	5.80	.92	.91–.92	0–40	0–40
BE	5	8.17	4.70	.89	.88–.90	0–25	0–25
SFC	7	7.84	3.12	.88	.87–.89	0–35	0–35
FD	4	2.44	2.74	.92	.91–.93	0–20	0–20
OSD	47	58.30	18.76	.90	.89–.90	0–235	3–130
HADS-A	7	7.74	4.04	.84	.82–.85	0–21	0–21
HADS-D	7	4.48	3.44	.80	.78–.81	0–21	0–21
PPS-4	4	6.64	3.18	.81	.79–.83	0–16	0–16
Study 2: Data Set A							
RAD	5	7.13	4.48	.81	.78–.83	0–25	0–25
IAD	5	6.40	4.19	.77	.74–.80	0–25	0–21
ED	4	5.52	2.32	.82	.79–.84	0–20	0–19
BE	4	6.96	4.32	.90	.89–.92	0–20	0–20
SFC	3	3.43	1.70	.83	.80–.85	0–15	0–15
FD	4	2.40	2.68	.91	.89–.92	0–20	0–18
OSD	25	32.28	11.27	.82	.80–.84	0–125	0–73
M-BISC	17	43.49	12.95	.90	.89–.91	17–85	17–85
R-ADMI	19	16.19	9.75	.81	.78–.83	0–76	0–49
Study 2: Data Set B							
RAD	5	6.87	4.47	.82	.79–.84	0–25	0–25
IAD	5	6.46	3.90	.74	.70–.77	0–25	0–25
ED	4	5.66	2.52	.82	.79–.84	0–20	0–20
BE	4	6.71	4.21	.92	.91–.93	0–20	0–20
SFC	3	3.31	1.45	.76	.73–.79	0–15	0–15
FD	4	2.45	2.76	.91	.90–.92	0–20	0–20
OSD	25	31.46	10.62	.82	.79–.84	0–125	1–109
M-BISC	17	42.09	13.00	.90	.89–.91	17–85	17–78
R-ADMI	19	16.71	10.45	.83	.81–.85	0–76	0–76

RAD receptive anal difficulties, *IAD* insertive anal difficulties, *ED* erectile difficulties, *BE* body embarrassment, *SFC* seminal fluid concerns, *FD* foreskin difficulties, *OSD* overall sexual difficulties, *HADS-A* Hospital and Anxiety Depression Scale-Anxiety Subscale, *HADS-D* Hospital and Anxiety Depression Scale-Depression Subscale, *PPS-4* Perceived Stress Scale-Four, *M-BISC* Male Body Image Self-Consciousness Scale, *R-ADMI* Revised Auburn Differential Masculinity Inventory

Participants who scored above the midpoint on the PPS-4 (i.e., a score of 9–16, $n = 297$) were labeled as “stressed” and compared to those scoring at the midpoint or below (i.e., a score of 0–8, $n = 826$) who were labeled as “not stressed.” A statistically significant difference was found between stress/no stress and difficulties with receptive anal intercourse, insertive anal intercourse, seminal fluid concerns, erectile difficulties, body embarrassment, and overall sexual difficulties. Specifically, those individuals classified as stressed more often reported experiencing a greater number of sexual difficulties. Means, standard deviations, and *t* test results are presented in Table 3.

While it appears that the GMSDS holds promise as an instrument measuring sexual difficulties among gay men, additional

psychometric testing is required. Specifically, a confirmatory factor analysis (CFA) would be useful in (1) gaging the reproducibility of the GMSDS’ factor structure and (2) identifying items that are redundant, the elimination of which would shorten the GMSDS and minimize respondent load.

Study 2

The purposes of Study 2 were twofold: (1) to assess the GMSDS’ dimensionality using confirmatory factor analysis and (2) to provide further evidence for the construct validity of the GMSDS.

Table 2 Summary of intercorrelations for the Gay Male Sexual Difficulties subscales and total scale score

	1	2	3	4	5	6
Study 1						
1. RAD						
2. IAD	.34***					
3. ED	.25***	.25***				
4. BE	.26***	.18***	.25***			
5. SFC	.20***	.18***	.18***	.18**		
6. FD	.11***	.12***	.08**	.05	.12**	
7. OSD-5	.41***	.33***	.33***	.30***	.26***	.13***
Study 2: Data Set A						
1. RAD						
2. IAD	.32**					
3. ED	.12**	.01				
4. BE	.30**	.25**	.22**			
5. SFC	.33**	.26**	.25**	.38**		
6. FD	.11*	.16**	.05	.09*	.13**	
7. OSD-5	.39***	.31***	.17***	.38***	.43***	.16***
Study 2: Data Set B						
1. RAD						
2. IAD	.29***					
3. ED	.19***	.12**				
4. BE	.19***	.16***	.26***			
5. SFC	.26***	.24***	.20***	.29***		
6. FD	.12**	.10*	.04	.09*	.16***	
7. OSD-5	.34***	.27***	.24***	.30***	.37***	.14***

RAD receptive anal difficulties, IAD insertive anal difficulties, ED erectile difficulties, BE body embarrassment, SFC seminal fluid concerns, FD foreskin difficulties, OSD-5 Overall Sexual Difficulties-Five Subscales (for example, for the RAD correlation, RAD items were excluded from OSD-Total to avoid inflated results); * $p < .05$, ** $p < .01$, *** $p < .001$

In relation to the second objective, two validation coefficients were targeted: masculinity and body image.

Masculinity, a socially constructed phenomenon (Sanchez, Greenberg, Liu, & Vilain, 2009), refers to all those qualities and activities that convey a sense of “maleness” to an individual (Philaretou & Allen, 2001). Abiding by the standards of hegemonic (i.e., traditional) masculinity can have dangerous consequences for men’s psychological functioning (Goldberg, 1976; Good, Heppner, DeBord, & Fischer, 2004; Harrison, Chin, & Ficarrotto, 1992; Liu, Rochlen, & Mohr, 2005; Pollack, 1998; Sharpe & Heppner, 1991). For example, a man who refuses to take sick leave from work; insists that he needs little sleep; or boasts that drinking does not impair his driving is demonstrating dominant norms of masculinity (Courtenay, 2000).

In relation to sexual difficulties, it has been reasoned that an “ill performing” penis is viewed as a loss of masculinity as men feel they are not adhering to societal standards of “being a man” (Tiefer, 1986; Zilbergeld, 1978, 1992). Normative masculine sexuality and sexual identity are defined so specifically that the action (attainment, sustainment, and penetration) of an

erect penis is essential (e.g., Brubaker & Johnson, 2008; Potts, 2004; Rubin, 2004). According to Rosen and Leiblum (1988), sexual difficulties which result from feelings of incompatibility with a partner can present a challenge to one’s masculinity and result in lower levels of sexual satisfaction.

Research in the field of sexual function and masculinity has mostly focused on men’s experience of erectile disorder following prostate cancer. In one of the few studies to include gay men, Fergus, Gray, and Fitch (2002) interviewed 18 individuals (14 heterosexual, four gay) who were treated for prostate cancer. Results indicated that participants redefined their sexuality and preference for penetrative sex when “potency” was lost. Thus far, however, the available research has not examined the relationship between masculine standards and sexual difficulties in men who do not have a life-threatening illness. The current study addresses this gap in the literature. Specifically, it is predicted that gay men evidencing stronger endorsement of a traditional model of masculinity will be more likely to report sexual difficulties (i.e., they may be more “attuned” to discrepancies between idealistic standards of sexual performance, as

Table 3 Means, standard deviations, and *t* tests for sexual difficulties' indicators and anxiety, depression, and stress groupings

Measure	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>	<i>d</i>
	Non-anxious			"At-risk" Anxiety						
RAD	506	1.50	.39	508	1.74	.49	964.47	−8.58	<.001	−.54
IAD	521	1.49	.46	513	1.68	.57	982.10	−5.99	<.001	−.37
ED	558	1.48	.70	559	1.54	.74	1115	−1.35	.179	−.08
BE	547	1.74	.73	544	2.22	.97	1009.40	−9.24	<.001	−.56
SFC	556	1.12	.41	557	1.18	.46	1097.32	−2.11	.035	−.14
FD	303	1.16	.43	294	1.26	.64	515.08	−2.14	.033	−.17
OSD	560	1.43	.29	560	1.63	.39	1028.27	−9.78	<.001	−.58
	Non-depressed			"At-risk" Depression						
RAD	829	1.58	.44	184	1.77	.54	239.82	−4.34	<.001	−.39
IAD	849	1.55	.51	184	1.70	.59	245.68	−3.06	.002	−.27
ED	905	1.46	.67	211	1.70	.88	269.33	−3.64	<.001	−.31
BE	891	1.88	.82	199	2.40	1.04	255.13	−6.51	<.001	−.56
SFC	903	1.14	.41	209	1.21	.53	267.05	−1.82	.070	−.15
FD	487	1.20	.53	110	1.25	.60	595	−.82	.413	−.09
OSD	907	1.49	.31	212	1.70	.48	252.84	−4.89	<.001	−.52
	Non-stressed			"At-risk" stress						
RAD	747	1.56	.42	269	1.79	.52	406.28	−6.69	<.001	−.44
IAD	771	1.53	.48	265	1.72	.61	384.29	−4.39	<.001	−.35
ED	824	1.47	.68	296	1.62	.82	447.29	−2.74	.006	−.20
BE	809	1.85	.79	284	2.36	1.03	405.26	−7.75	<.001	−.57
SFC	821	1.14	.42	295	1.21	.51	445.97	−2.26	.024	−.15
FD	435	1.18	.50	166	1.28	.64	244.45	−1.70	.090	−.17
OSD	826	1.48	.30	297	1.69	.44	402.32	−7.84	<.001	−.56

RAD receptive anal difficulties, IAD insertive anal difficulties, ED erectile difficulties, BE body embarrassment, SFC seminal fluid concerns, FD foreskin difficulties, OSD overall sexual difficulties; mean scores were standardized (i.e., participants' total score was divided by the number of items that they considered applicable to them) and could range from 1 to 5

disseminated by a hegemonic model of masculinity, and the ways their bodies actually perform: Hypothesis 1).

Body image is a multidimensional construct which encompasses one's degree of satisfaction (or dissatisfaction) with one's body, and the behavioral and cognitive importance one assigns to one's appearance and body (Ryan, Morrison, & McDermott, 2010). Media depictions of the ideal male body, which is a mesomorphic, v-shaped physique with broad shoulders, well-developed arms and chest, a flat stomach, and narrow hips (Mishkind, Rodin, Silberstein, & Striegel-Moore, 1986; Pope et al., 2000), is impossible for most men to achieve (Leit, Pope, & Gray, 2001). The body dissatisfaction that may ensue appears to be especially pronounced in gay men (e.g., Gil, 2007; Levesque & Vichesky, 2006; Yelland & Tiggemann, 2003).

With respect to sexual difficulties, a growing area of research highlights the role of body image issues. The construct entitled 'body image self-consciousness' has been used to describe how concerned individuals are with their physical appearance during sexual intimacy (McDonagh, Morrison, & McGuire, 2008). As might be expected, sexual performance can be impaired when

individuals are distracted by concerns about their appearance, resulting in an inability to relax and experience sexual pleasure (Barlow, 1986; Dove & Wiederman, 2000; Fredrickson & Roberts, 1997; Masters & Johnson 1970; Sanchez & Keifer, 2007). Based on this research, it is predicted that gay men reporting greater self-consciousness during sexual intimacy also will be more likely to report sexual difficulties (Hypothesis 2).

Method

Participants

The sample comprised 1124 "exclusively gay" men who ranged in age from 18 to 76 years ($M = 34.38$, $SD = 11.64$). To strengthen the validity of the results, the sample was randomly divided into Data Set A ($n = 562$, age range 18–73 years, $M = 34.35$, $SD = 11.62$) and Data Set B ($n = 562$, age range 18–76 years, $M = 34.41$, $SD = 11.67$) for analyses. This split allowed for the model to be tested twice (first in Data Set A, then re-

Table 4 Fit statistics of original and revised versions of the Gay Male Sexual Difficulties Scale, Data Set A

Model	$\chi^2(df)$	Q	RMSEA (90 % CI)	CFI	AIC	χ^2_{diff}	
						$\chi^2(df)$	p
GMSDS—47 items	5002.54 (1019)	4.91	.083 (.081–.086)	.76	5220.54	–	–
GMSDS—25 items	1002.11 (260)	3.85	.071 (.067–.076)	.90	1132.11	–	–
Covary 7 and 8	959.50 (259)	3.71	.069 (.065–.074)	.90	1091.50	42.61 (1)	<.001
Covary 19 and 20	898.19 (258)	3.48	.067 (.062–.071)	.91	1032.19	61.31 (1)	<.001
Covary 25 and 29	775.29 (257)	3.02	.060 (.055–.065)	.93	911.29	122.90 (1)	<.001
Covary 44 and 45	496.96 (256)	1.94	.041 (.036–.046)	.97	634.96	278.33 (1)	<.001
Final model (4 covariances)	496.96 (256)	1.94	.041 (.036–.046)	.97	634.96	503.15 (4)	<.001

GMSDS Gay Male Sexual Difficulties Scale, χ^2 chi-square, df degrees of freedom, Q chi-square/ df ratio, RMSEA root mean square error of approximation, CFI comparative fit index, AIC Akaike's information criteria, χ^2_{diff} chi-square difference test

confirmed in Data Set B). For Data Set A, most participants were from North America (50 %, $n = 283$) or Europe (35 %, $n = 196$). These proportions were 52 % ($n = 293$) and 34 % ($n = 192$), respectively, for Data Set B.

Procedure

Details about the procedure used to recruit participants are outlined in Study 1.

Measures

In addition to demographic questions (e.g., age, ethnicity, country of residence, and sexual orientation) and the 47-item GMSDS, participants completed the following:

Male Body Image Self-Consciousness (M-BISC; McDonagh et al., 2008; McDonagh, Morrison, & McGuire, 2010). The M-BISC is a 17-item measure of how self-conscious men feel about their body while engaging in sexual relations (e.g., “During sexual activity, it would be difficult not to think about how unattractive my body is”). Responses are coded on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree), with total scores ranging from 17 to 85 (higher scores denote greater body image self-consciousness). With respect to the scale's psychometric properties, McDonagh et al. (2008) provide evidence attesting to the measure's scale score reliability and validity. In the current investigation, Cronbach's alpha coefficients were .90 for Data Set A (95 % CI .89–.91) and .90 for Data Set B (95 % CI = .89–.91).

Revised Auburn Differential Masculinity Inventory (R-ADMI; Bishop, Kiss, Morrison, Rushe, & Specht, 2014; Burk, Burkhart, & Sikorski, 2004). Suitable for distribution to gay men, the R-ADMI is a 19-item version of Burk et al.'s original 60-item Auburn Differential Masculinity Inventory (e.g., “Many men are not as tough as me”). Responses are coded on a five-point Likert scale (0 = not at all like me; 4 = very much like me) and summed, with possible total scores ranging from 0 to 76. Higher scores denote greater hypermasculinity. Bishop et al. provide

evidence suggesting that the R-ADMI possesses good scale score reliability and validity. For Data Sets A and B, Cronbach's alpha coefficients were .81 (95 % CI .78–.83) and .83 (95 % CI .81–.85), respectively.

Data Analysis

Data were analyzed using SPSS 20 and AMOS 20. Little's MCAR test (Little, 1988) was used to determine whether missing values were MCAR. In the current study, Little's test was statistically non-significant for all measures; thus, similarly to Study 1, EM methods were employed.

Confirmatory Factor Analysis To investigate the factor structure of the GMSDS which emerged in Study 1, Data Sets A and B were subjected to CFA. First, all 47 GMSDS items were included in a first-order measurement model. The initial model fit was assessed and subjected to respecification. Second, to examine if the six constructs represented by each subscale were accounted for by a higher-order construct (i.e., overall sexual difficulties [OSD]), a higher-order CFA was performed based on the respecified model. Alpha coefficients (and 95 % confidence intervals) for the total scale and subscales were assessed, and subscale inter-correlation analyses were conducted.

Model fit, or how adequately each item resides within a model (Byrne, 2010), was assessed using multiple criteria as per Kline's (2011) recommendations. In the current study, absolute fit was examined using the chi-square/ df ratio (Q) and the Root Mean Square Error of Approximation (RMSEA); comparative fit was assessed using Bentler's comparative fit index (CFI). Stringent thresholds were used to assess model fit: $Q < 5$, RMSEA \leq .08, and CFI \geq .90 signify adequate fit, while $Q \leq 2$, RMSEA \leq .06, and CFI \geq .95 denote excellent fit (Byrne, 2010; Tabachnick & Fidell, 2007). Although the chi-square statistical significance test (where statistical non-significance suggests good model fit to data) is not very useful when determining the fit of a single model, and is almost always statistically significant for large samples (i.e., greater than 400), it is reported as

per current guidelines (Kline, 2011; Thompson, 2004). The Akaike Information Criterion (AIC) was employed to compare the relative fit of competing models; the superior model is the one with the lower AIC value (Burnham & Anderson, 2002).

Item redundancy was assessed through an examination of modification indices (i.e., the expected drop in chi-square value if the parameter were to be freely estimated in a subsequent run) and regression weights of item pairs (Byrne, 2010; Thompson, 2004). Additionally, the content of item pairs with high modification indices was examined and models were only re-specified if theoretical justification for the changes was established (Thompson, 2004). If the statistical analysis was supported by the content analysis, the item with the lowest standardized coefficient was deleted and model fit was reassessed.

Results and Discussion

Dimensionality for Data Set A

First-Order Model Fit The original 47-item GMSDS did not possess adequate model fit: $\chi^2(1019) = 5002.54$, $p < .001$; $Q = 4.91$; RMSEA = .083 (90 % CI .081–.086); CFI = .76; and AIC = 5240.94. Modification indices suggested that numerous items were redundant and could be deleted: RAD (7 items), IAI (5 items), ED (4 items), SFC (4 items), and BE (1 item). Additionally, another item from the RAD cross-loaded with the BE factor and was removed.

The resultant 25-item model was retested; however, the fit statistics remained suboptimal: $\chi^2(260) = 1002.11$, $p < .001$; $Q = 3.85$; RMSEA = .071 (90 % CI .067–.076); CFI = .90; and AIC = 1132.11. Re-examining the modification indices suggested that the error terms for four pairs of items should be covaried³: 2 items on the RAD (“Have you had difficulty engaging in receptive anal intercourse because your partner’s penis is too small” and “Were you unable to engage in receptive anal intercourse because your ass was too loose”); 2 items on the IAD (“Have you had difficulty engaging in insertive anal intercourse because your penis is too big” and “Were you unable to engage in insertive anal intercourse because your partner’s ass was too tight”); 2 items on the ED (“When you wanked, were you able to get an erection” and “When you wanked, were you able to maintain your erection”); and 2 items on the FD (“When you engaged in sexual activity, did you experience any difficulties because your foreskin is too tight” and “When you wanked, did you experience any difficulties because your foreskin is too tight”).

³ Each observed variable (i.e., each item) has an associated error. The addition of a covariance (i.e., a covarying path) allows the error associated with one item to correlate with the error associated with another item. This does not alter how the items are scored. It is a common structural equation modeling method used when two items measure related constructs and are not deemed redundant, and when the removal of an item results in a worse model fit (Byrne, 2010).

As these items appeared to be thematically related, the addition of covariances was a reasonable decision.

Fit statistics for the 25-item model, with four covariances, were excellent: $\chi^2(256) = 498.96$, $p < .001$; $Q = 1.94$; RMSEA = .041 (90 % CI .036–.046); CFI = .97; and AIC = 634.96. The chi-square difference test was statistically significant, $\chi^2_{\text{diff}}(4) = 503.15$, $p < .001$, demonstrating the addition of covariances greatly improved the model fit. Standardized coefficients ranged from .59 to .86 ($M = .72$; RAD), .56 to .83 ($M = .64$; IAD), .57 to .83 ($M = .70$; ED), .78 to .92 ($M = .84$; BE), .73 to .83 ($M = .80$; SFC), and .70 to .95 ($M = .82$; FD). Fit statistics for the original and revised models for Data Set A are presented in Table 4.

All of the subscales were weakly positively correlated (see Table 2; $r_s = .09$ –.38, $p_s < .05$), except for the ED and IAD, and ED and FD ($p_s = .757$ and .247, respectively) suggesting the subscales measure distinct but related concepts.

Higher-Order Model Fit Fit statistics for the higher-order model were excellent suggesting that the six factors load onto the common factor of overall sexual difficulties: $\chi^2(265) = 528.09$, $p < .001$; $Q = 1.99$; RMSEA = .042 (90 % CI .037–.047); CFI = .963. The final model with standardized coefficients is presented in the Appendix.

Dimensionality for Data Set B

First-Order Model Fit The 25-item model, with four covariances, that was deemed optimal for Data Set A was tested. Fit statistics were excellent: $\chi^2(256) = 470.95$, $p < .001$; $Q = 1.84$; RMSEA = .039 (90 % CI .033–.044); CFI = .97; AIC = 608.95. Standardized coefficients ranged from .59 to .88 ($M = .73$; RAD), .50 to .81 ($M = .60$; IAD), .55 to .89 ($M = .69$; ED), .82 to .93 ($M = .86$; BE), .71 to .76 ($M = .74$; SFC), and .73 to .97 ($M = .83$; FD). All of the subscales were weakly positively correlated (see Table 2; $r_s = .09$ –.29, $p_s < .05$), except for the ED and FD ($p = .324$).

Higher-Order Model Fit Akin to Data Set A, fit statistics for the higher-order model tested with Data Set B were excellent: $\chi^2(265) = 503.10$, $p < .001$; $Q = 1.90$; RMSEA = .040 (90 % CI .035–.045); CFI = .967.

Scale Score Internal Consistency

Alpha coefficients and their 95 % confidence intervals for the GMSDS and all subscales as well as means, standard deviations, and score ranges for all variables, stratified by data set, are presented in Table 1.

Construct Validity

A series of Pearson product moment correlations were conducted to assess the relationships between indicators of sexual

difficulties and body image self-consciousness during intimacy as well as masculinity. Moderate, statistically significant, positive correlations were observed between self-consciousness and body embarrassment (Data Set A, $r[533] = .50, p < .001$; Data Set B, $r[537] = .47, p < .001$) as well as overall sexual difficulties (Data Set A, $r[560] = .26, p < .001$; Data Set B, $r[560] = .22, p < .001$). Weak, though statistically significant, positive correlations were observed between masculinity and overall sexual difficulties in both Data Set A ($r[560] = .16, p < .001$) and Data Set B ($r[560] = .24, p < .001$).

Findings from this study provide additional strands of evidence in support of the psychometric soundness of the GMSDS and its subscales. While the correlations obtained were modest, this may be attributable, in part, to restriction of range (i.e., mean scores on both body image self-consciousness and masculinity were below scale midpoints).

General Discussion

Sexual difficulties have the capacity to impair one's quality of life and can have an adverse impact on one's social and psychological well-being (e.g., Štulhofer et al., 2015). However, much of our understanding of sexual difficulties has been framed by the reliance on heterosexual couples which, in turn, has resulted in the elision of problems that may be more common among gay men such as pain during receptive anal sex (e.g., Bancroft et al., 2005; Cove & Boyle, 2002; Damon & Rosser, 2005; Rosser, Meta, Bockting, & Buroker, 1997; Rosser, Short, Thurmes, & Coleman, 1998).

McDonagh et al.'s (2014) review of measures commonly utilized to assess sexual difficulties in men suggested that none were optimal for use with gay male participants. Thus, the central objective of the current study was to develop a self-report measure of gay men's sexual difficulties (i.e., the GMSDS).

The research summarized herein outlined the development and preliminary validation of the GMSDS. Based on themes emerging from personal interviews and focus groups as well as an exhaustive review of the literature on sexual functioning, a large pool of items was generated and, over the course of two studies, whittled to 25 items. Confirmatory factor analyses, with two samples of gay men, revealed that these items represented six dimensions: difficulties with receptive anal intercourse, erectile difficulties, seminal fluid concerns, difficulties with insertive anal intercourse, foreskin difficulties, and body embarrassment. Assessments of scale score reliability and construct validity were satisfactory. Total scores on the GMSDS differed between gay men categorized as being "at risk" for anxiety, depression, and stress and their "no-risk" counterparts, with the former reporting more frequent occurrences of a greater number of sexual difficulties. Further, as predicted, gay male respondents that reported higher levels of body image self-consciousness or masculinity also reported more overall sexual difficulties.

A series of limitations warrant mention. First, a potential lack of generalisability must be noted. Given the sensitive nature of this research, those who participated could potentially differ from those unwilling or uninterested in doing so. As well, although Internet surveys have been found to be as representative as non-Internet survey research (Gosling, Vazire, Srivastava, & John, 2004), the experiences of men who are not proficient computer users and those who do not have access to a computer were not examined (Eysenbach & Wyatt, 2002; Kraut et al., 2004; Poynton, 2005). It would be valuable for future research to employ traditional methods of data collection (i.e., pen and paper techniques) in conjunction with online surveys.

The second limitation relates to the characteristics of the samples used. An attempt was made to access an ethnically and culturally diverse sample; however, the majority of participants in all studies were Caucasian and from Western countries such as Ireland, Canada, the United Kingdom, and the United States. Consequently, it is currently unknown whether the GMSDS will evidence comparable psychometric soundness when distributed to men of different ethnic and cultural backgrounds. Ethnic variations in prevalence rates of sexual difficulties have been reported. Laumann et al. (2006), for instance, observed that the prevalence of erectile difficulties was approximately 22% in Caucasian individuals, 24% in Black individuals, and 20% in Hispanic individuals. Similarly, Laumann et al. (1999) reported that Black individuals were more likely and Hispanic persons less likely to report experiencing sexual difficulties. Additionally, regarding the characteristics of the samples, only men who identified as "exclusively gay" were included in the current analyses; therefore, the utility of the GMSDS when distributed to men that are not "exclusively gay" (i.e., those who identify as "more gay than heterosexual," "bisexual," or "more heterosexual than gay") is currently unknown. In one of the few studies to distinguish between subsamples of sexual minority men, Nazareth, Boynton, and King (2003) found that identifying as bisexual was the only independent predictor of sexual difficulties in men (after controlling for psychological well-being and demographic variables such as age and ethnicity). Future psychometric testing of the GMSDS should endeavor to include more heterogeneous samples and explore cross-cultural differences.

Third, the only type of reliability assessed was Cronbach's alpha, which provides an estimate of internal consistency. Test-retest reliability assesses the extent of equality between the ratio of true variance to error score variance when scale scores are produced at multiple time points (Furr & Bacharach, 2008). It is recommended that future researchers distribute the scale to a sample of gay men on two different occasions to investigate the scale's temporal stability.

Fourth, given the current study's reliance on cross-sectional data, the potential causes and effects of gay men's sexual difficulties cannot be disentangled (i.e., one cannot determine whether sexual difficulties lead to poorer levels of psychological well-being or vice versa). Future research using the GMSDS would

benefit from the inclusion of longitudinal data, which would enable a deeper understanding of the complex relationship between sexual difficulties and various psychological variables (e.g., depression and state/trait anxiety).

Fifth, and finally, the level of distress associated with each sexual difficulty was not assessed. It is possible that some men who reported experiencing sexual difficulties do not consider it to be problematic. For example, a man who experiences premature ejaculation may employ other strategies to ensure his partner's sexual satisfaction and, thus, experience little distress (Rowland, 2012). At the time of item development, the DSM-5 (American Psychiatric Association, 2013), which stipulates that the distress associated with sexual dysfunction be assessed, had not been released. Item development was partially based on classifications described in the DSM-IV-TR (American Psychiatric Association, 2000) which does not provide specific guidelines as to how distress should be measured. To accommodate revisions to the DSM, it is recommended that researchers using the GMSDS employ indicators of distress for each item (e.g., "How much distress did this cause you?" Response format: 0 = not applicable, 1 = no distress, 2 = mild distress, 3 = moderate distress, and 4 = severe distress). To score the GMSDS with these additional items, three summary scores should be generated: (1) frequency, a simple count of the number of difficulties experienced, which can range from 0 to 125 (25 items in total; 0 = not applicable, to 5 = all of the time); (2) cumulated distress, the sum of the 4-point distress ratings, which can range from 0 to 500 (4×125); and (3) intensity, the cumulated severity divided by the frequency, which can range from 0 to 4

(i.e., higher scores indicate that one experiences sexual difficulties more intensely regardless of frequency).

Conclusion

The current findings pose important challenges for clinical practice and research where sexual difficulties are primarily assessed through self-report questionnaires. The absence of reliable and valid measures of sexual difficulties suitable for use with sexual minority men has been emphasized. If sub-optimal measures of sexual functioning continue to be used, researchers will be hindered in their capacity to grasp the complexities of gay men's sexuality. Researchers and clinicians alike need to consider the factors that affect the sexual functioning of gay men. For example, a sex therapist who focuses on a heterosexist understanding of sexual difficulties when conducting sex therapy with a gay man may neglect to consider how other psychosocial factors (e.g., body image, masculine standards) may influence his sexual difficulties. Hence, the measure developed and validated using rigorous statistical techniques in the current studies may be a useful tool for sex therapists wishing to examine sexual difficulties from a non-heterosexist vantage. Broadening our understanding of sexual difficulties to include psychological, social, and physical factors pertinent to gay men will better equip clinicians in providing the appropriate treatment to those affected.

Appendix

See Table 5 and Fig. 1.

Table 5 Final version of the Gay Male Sexual Difficulties Scale

Receptive anal difficulties intercourse

1. When you engaged in receptive anal intercourse, did you experience pain?
2. When you engaged in receptive anal intercourse, were you concerned about your ass being dirty?
3. When you engaged in receptive anal intercourse, were you concerned about your partner's penis being too big?
4. Have you had difficulty engaging in receptive anal intercourse because your partner's penis was too small?
5. Were you unable to engage in receptive anal intercourse because your ass was too loose?

Insertive anal difficulties

6. When you penetrated a guy anally (i.e., topped him/fucked him), did you cum sooner than you wanted?
7. When you penetrated a guy anally, did you take longer to cum than you wanted?
8. When you engaged in insertive anal intercourse, did you experience pain?
9. Have you had difficulty engaging in insertive anal intercourse because your penis was too big?
10. Were you unable to engage in insertive anal intercourse because your partner's ass was too tight?

Erectile difficulties

11. When you engaged in sexual activity, were you able to get an erection?
12. When you wanked (i.e., jerked off), were you able to get an erection?
13. When you engaged in sexual activity, were you able to maintain your erection (i.e., keep it up)?
14. When you wanked, were you able to maintain your erection?

Body Embarrassment

15. When you engaged in sexual activity, were you embarrassed that your partner thought your body was too fat?
16. When you engaged in sexual activity, were you embarrassed that your partner thought your body was not muscular?
17. When you engaged in sexual activity, were you embarrassed that your partner thought your stomach was not toned?
18. Were you concerned that your partner thought your body was sexually unappealing?

Seminal fluid concerns

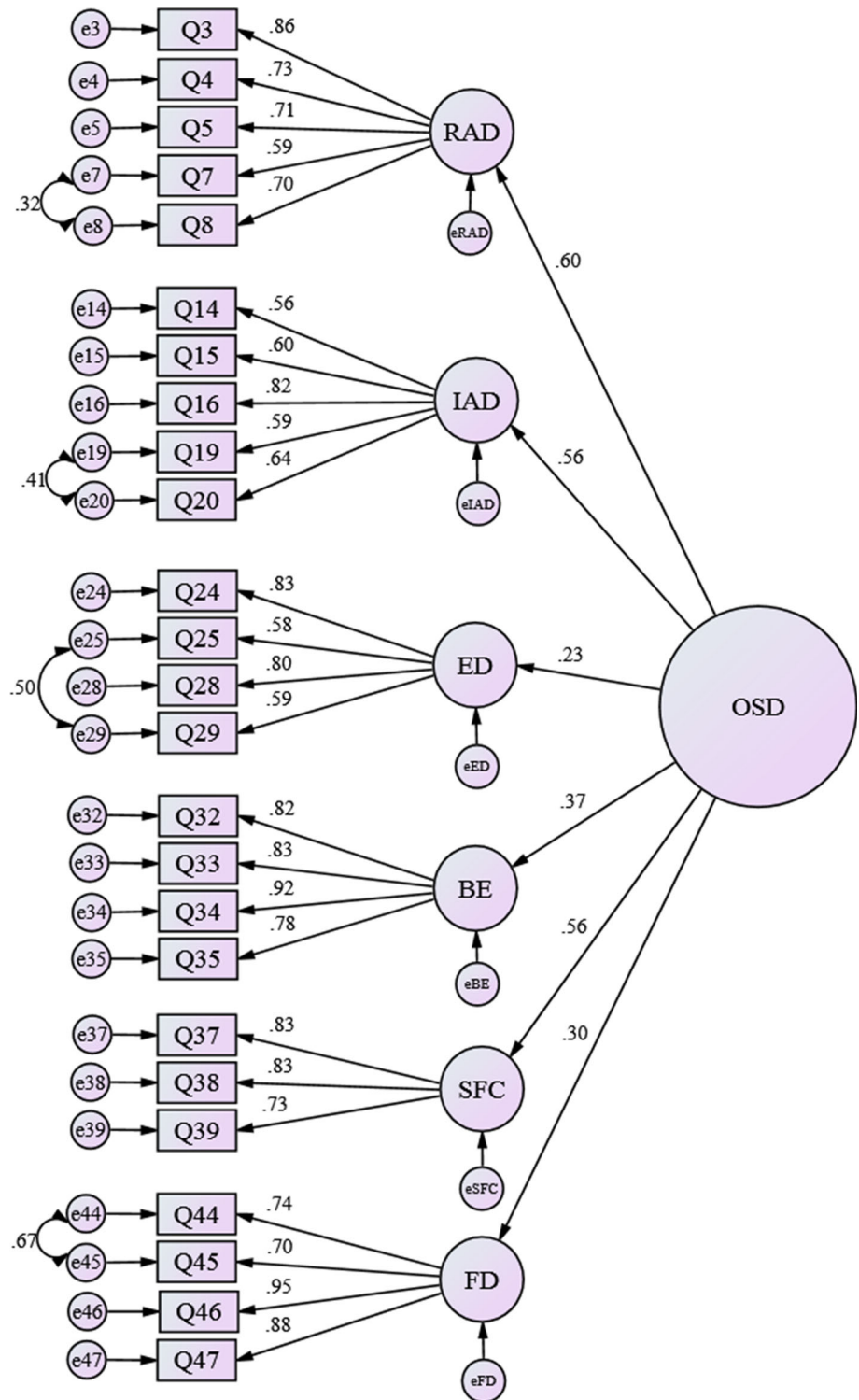
19. When you engaged in sexual activity, were you concerned about the smell of your ejaculate (i.e., cum, spunk)?
20. When you engaged in sexual activity, were you concerned about the color of your ejaculate?
21. When you engaged in sexual activity, were you concerned about the consistency (i.e., texture) of your ejaculate?

Foreskin difficulties

22. When you engaged in sexual activity, did you experience any difficulties because your foreskin was too tight?
23. When you wanked, did you experience any difficulties because your foreskin was too tight?
24. When you engaged in sexual activity, did you experience any difficulties because your penis had too much foreskin?
25. Have you had any difficulties putting on a condom because your penis had too much foreskin?

The response format is Not Applicable, Never, Once or Twice, Several Times, Most of the Time, All of the Time. For items 11, 12, 13, and 14, the response format was reverse scored. The time frame stem used before each item is "During the past 6 months..."

Fig. 1 Path diagram for higher-order confirmatory factor analysis of the Gay Male Sexual Difficulties Scale; data set A. *RAD* receptive anal difficulties, *IAD* insertive anal difficulties, *ED* erectile difficulties, *BE* body embarrassment, *SFC* seminal fluid concerns, *FD* foreskin difficulties, *OSD* overall sexual difficulties



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