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## Let's talk about pleasure: Validating an event-level, male sexual pleasure scale (EMSEXpleasure) among condom-using men in the United States

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### Abstract

Sexual pleasure is a key determinant of condom use. We developed and validated a male, event-level sexual pleasure scale (EMSEXpleasure) among a sample of condom-using men in the United States in order to facilitate improved measurement of sexual pleasure. Based on an expert panel process, a 12-item scale was developed. An online sample of 169 men who have sex with men and 162 men who have sex with women were recruited. Factor analysis yielded a two-factor solution that matched domains identified a priori by the expert panel, general pleasure and condom-specific pleasure, indicating internal validity of the instrument. One item was deleted from the scale due to poor validity performance. The overall EMSEXpleasure scale, and each subscale, had high (>0.8) Cronbach's alpha coefficients, indicating internal reliability. The scale demonstrated convergent validity, with theoretically-related constructs associated both with individual scale items and with scale totals. Overall relationship quality (B 3.0, 95%CI 2.0, 4.0), sexual relationship quality (B 2.9, 95%CI 2.0, 4.0), foreplay quality (B 7.5, 95%CI 2, 13), positive feelings about condoms (B 18.8, 95%CI 15, 23) and erection problems while using condoms (B -17.9, 95%CI -22, -14) were associated with the EMSEXpleasure scale in expected directions. The validated EMSEXpleasure event-level scale may be advantageous for future assessments of the ephemeral experience of sexual pleasure, including clinical trials of condoms and other interventions, because it can be used immediately after sex, potentially limiting recall error.

### Keywords

measurement; pleasure; condoms; HIV; prevention

### INTRODUCTION

Sexual pleasure is a key component of and interwoven with sexual health; in what one review found to be the first attempt to formally define sexual health (Edwards & Coleman,

2004), a World Health Organization report noted that “the right to pleasure” is “fundamental to the concept” of sexual health (WHO Education, 1975). Sexual pleasure has been described as, “the authentic, abiding satisfaction that makes us feel complete as human beings.” (Tepper, 2000) Laboratory data supports such qualitative observations; experiencing pleasure, produced by self-stimulation, increased the threshold for classification of an external physical pressure stimulus to as painful by over 80%, and at orgasm by over 100% (Whipple & Komisaruk, 1985). Pleasure has been cited frequently as an under-focused area of research in sexual health (J. A. Higgins & Hirsch, 2007; J.A. Higgins & Hirsch, 2008; Scott-Sheldon, Marsh, Johnson, & Glasford, 2006; Tepper, 2000), in regard to both its positive role in life experiences and to its impact on condom uptake.

Perceived reductions in pleasure have long been considered to be among the most substantial contributors to condomless sex (Calabrese, Reisen, Zea, Poppen, & Bianchi, 2012; Carballo-Diequez et al., 2011; R. Crosby, Milhausen, Yarber, Sanders, & Graham, 2008; R. A. Crosby, Graham, Yarber, & Sanders, 2004; Davis & Flowers, 2011; Fennell, 2013; Graham, 2012; Graham et al., 2006; Hensel, Rosenberger, Novak, & Reece, 2012; Hensel, Stupiansky, Herbenick, Dodge, & Reece, 2012; Scott-Sheldon et al., 2006). Condom use is highly effective in preventing both HIV and STI (Holmes, Levine, & Weaver, 2004; Pinkerton & Abramson, 1997; Smith, Herbst, Zhang, & Rose, 2015). Modeling indicates that increases in condom use among at-risk populations would lead to substantial declines in long-term HIV incidence and prevalence, including in scenarios that model scale-up of HIV pre-exposure prophylaxis and early initiation of anti-retroviral therapy for those who are HIV positive (Sullivan et al., 2012). Increasing condom use also is the only efficacious prevention intervention for bacterial sexually transmitted diseases. This is a particularly important issue since gonorrhea, chlamydia, and syphilis transmission all increased from 2014–2015 in the United States, with over 20 million incident infections in 2015 (Centers for Disease Control and Prevention, 2016). Sexually transmitted diseases can lead to long-term morbidity including pain and reproductive complications. The largest limitation of condoms as a successful public health intervention strategy is non-use (Steiner, Cates, & Warner, 1999).

Not surprisingly, lower levels of perceived pleasure when using condoms is associated with lower willingness to use condoms and less condom use (Brown et al., 2008; Calabrese et al., 2012; Hensel, Rosenberger, et al., 2012; Randolph, Pinkerton, Bogart, Cecil, & Abramson, 2007). Qualitative research similarly finds that condom use is limited due to perceived reductions in pleasure,(Siegler, Mbwambo, McCarty, & DiClemente, 2012; Siegler et al., 2014; Thomsen, Stalker, & Toroitich-Ruto, 2004) with one representative participant noting that condoms don't, “feel as good. And isn't that the point?” (Fennell, 2013).

Several interventions that seek to promote increased condom use explicitly target pleasure, through eroticization of condoms and their use (Philpott, Knerr, & Maher, 2006; Scott-Sheldon & Johnson, 2006). Other interventions seek to provide more choice regarding condoms, (Emetu et al., 2014; McNaghten et al., 2014) seeking to address perceptions of reduced pleasure by providing more condom options. In a similar vein, a smartphone app is currently being tested in the United States that would allow participants to order different varieties of condoms as part of a larger HIV prevention package (Sullivan, Jones, Kishore, &

Stephenson, 2015). There is also interest in developing novel condoms, such as the recent Gates Foundation grant series (Bill and Melinda Gates Foundation, 2013) that funded applications to develop a “next generation condom that significantly preserves or enhances pleasure.” Each of these efforts seeks to improve the pleasure of using condoms, thereby potentially increasing levels of condom use.

Despite the centrality of pleasure to condom use, there is currently no scale that assesses sexual pleasure at the event level. One excellent scale available to measure overall quality of a sexual experience at the event-level is the Quality of Sexual Experience Scale, which assesses overall sexual experience through questions that explore domains including emotion, expectation, and general assessment. This scale has the benefit of being gender-neutral, yet relies on only a single measure that directly assesses pleasure. Similarly, in other scales and measurement instruments pleasure has frequently been assessed as a unidimensional construct, through a single question (Hensel, Rosenberger, et al., 2012; Hensel, Stupiansky, et al., 2012; Randolph et al., 2007). It is likely, however, that there are multiple domains regarding the experience of pleasure. Pleasure has been described as including the domains of orgasm and quality of orgasm (Opperman, Braun, Clarke, & Rogers, 2014; Tracy & Junginger, 2007). The close relationship between orgasm and pleasure is observed in studies using fMRI, with changes in a brain region associated with hedonistic experience, the mid-anterior orbitofrontal cortex, observed during orgasm but not during other stimulation or failed orgasm (Georgiadis & Kringelbach, 2012). Other related but distinct domains of pleasure include timing of orgasm (Jannini & Lenzi, 2005) and quality of experience of ejaculation (Jannini & Lenzi, 2005). Sexual sensations, including touch/feel and quality of arousal (Stulhofer, Busko, & Brouillard, 2010) have also been noted as distinct components of pleasure; the inclusion of these domains more directly addresses physiological components of pleasure outside of orgasm. Male sexual arousal is also directly linked to erectile turgidity (Arnow et al., 2002), indicating another potential domain of pleasure. Capturing the experience of all of these domains in a single item is likely not possible, indicating utility in developing a scale to directly measure pleasure.

Existing measures designed to more extensively assess domains of pleasure, although useful for context, cannot provide event-level data because they use a time frame that is aggregated over time or with substantial recall periods, (Brown et al., 2008; Calabrese et al., 2012; Randolph et al., 2007; Stulhofer et al., 2010) rather than being measured at the event level. Although unidimensional or recall-based methods are appropriate for many study designs such as overall sexual relationship health or sexual dysfunction, clinical trials of condoms and other event-level assessments of sexual health could benefit from improved measures regarding pleasure. Event-level measurement may be particularly important, because pleasure is inherently ephemeral and is therefore likely prone to recall-related errors. Event-level data collection also has the benefit of allowing a granular assessment of this construct across multiple sex acts, a potentially important component to provide sufficient power for clinical trials.

The present study is one component of a larger study that includes a clinical trial to assess whether there are differences in pleasure or preference between standard, thin, and fitted latex condoms (Sullivan, 2016). The US Food and Drug Administration (FDA) guidance on

design of condom studies limits reporting of outcomes to be from the male, insertive partner that is wearing the condom (U.S. Food and Drug Administration (FDA), 1995), so the scale developed to assess pleasure is focused on the experience of pleasure from that perspective. We sought to assess the scale across different types of insertive partnerships, including both men who have sex with women (MSW) and men who have sex with men (MSM). We anticipate that such a scale could be used for research into interventions that may impact pleasure for male insertive partners, such as new condom sizes or materials and new lubricants. Development of a standardized method of measuring sexual pleasure, that can take into account barrier methods of disease prevention, is essential because reductions in pleasure are the primary cited reason for nonuse of the barrier methods (Calabrese et al., 2012; Carballo-Diequez et al., 2011; R. Crosby et al., 2008; R. A. Crosby et al., 2004; Davis & Flowers, 2011; Fennell, 2013; Graham, 2012; Graham et al., 2006; Hensel, Rosenberger, et al., 2012; Hensel, Stupiansky, et al., 2012; Scott-Sheldon et al., 2006). Therefore, we sought to develop and validate an event-level male pleasure scale (EMSEXpleasure), including a subscale focused on event-level condom-specific pleasure, prior to conducting the clinical trial.

## METHODS

### Participants

Participants were recruited to participate in a “Men’s health survey” using Facebook banner advertisements from (July 2015 – September 2015). Previous research has demonstrated that Facebook-based recruitment does not lead to substantially more bias than the standard recruitment method for MSM: venue-based, time-space sampling. (Hernandez-Romieu et al., 2014) We targeted recruitment of MSM and MSW using Facebook targeting mechanisms such as age and gender. Overall, the banner advertisement received 6,474 clicks, with 4,192 not opting to view the consent form, 1127 not completing the consent form, 10 refusing consent, and 1145 consenting to participate. Eligibility criteria for the study included age 18 or older, self-identify as male, for MSW vaginal sex in the last 2 weeks or for MSM anal sex in the last 2 weeks, condom use in the past 2 weeks, and no multiple survey completions from a single IP address to prevent fraudulent completions. Participants reporting both vaginal and anal sex were ineligible for the study to facilitate clear assessment of scale validity by type of sex (vaginal or anal). Of 1145 consenting, 458 were eligible for the study and 331 (169 MSM and 162 MSW; 72% of eligibles) completed all survey items and are included in the present analysis.

### Scale Development

We convened an external scientific panel, seeking to include panel members with expertise in the domains of sexual health (Dr. Jeffrey Parsons), minority sexual health (Dr. Maria Cecilia Zea), condoms (Dr. Richard Crosby, Dr. Bill Potter), and sexual health measurement (Dr. Stephanie Sanders). The goal of convening the panel was to gain input regarding development of the EMSEXpleasure scale. With panel members participating, we reviewed literature and identified seven existing scales for item-level consideration by the panel (Calabrese et al., 2012; R. A. Crosby et al., 2016; R. A. Crosby et al., 2013; Flynn et al., 2013; Sanders, Herbenick, et al., 2013; Sanders, Hill, Crosby, & Janssen, 2013; Siegler et

al., 2012; Snell Jr, 1998). None of these scales had been designed to measure pleasure at the event-level, but each had relevance to measuring sexual satisfaction or pleasure. We had panel members complete an electronic online survey, quantitatively rating on a Likert scale each item in the seven scales for quality/appropriateness, and providing qualitative feedback through open text boxes for each item and for each overall scale. Following this process and discussion among panel members, Emory researchers adapted scale items from the pre-existing scales. Once each item was adapted, the revised scale was sent back to external experts for their final review. One notable outcome of the scientific panel process was identification of eight facets of general pleasure potentially relevant for insertive males, and 4 facets of condom-specific pleasure. These facets came from the items reviewed by the panel, from their comments in the expert rating forms, and crystalized during the expert panel discussion. We reviewed relevant literature on pleasure, and found that these identified domains had each previously been described as being sub-domains of the broader construct of pleasure (Arnow et al., 2002; Georgiadis & Kringelbach, 2012; Jannini & Lenzi, 2005; Opperman et al., 2014; Stulhofer et al., 2010; Tracy & Junginger, 2007). Each area is represented in the scale tested by a separate item (see Table 1), with each item's original source or sources prior to adaptation noted. The panel also identified overall pleasure and condom-specific pleasure as separate domains for measurement, and the panel recommended inclusion of items representing each domain. An area of concern to panel members was that measures of sexual function, especially items regarding pleasure, can have high skew and limited variability. To address this concern, the panel recommended loading items in a positive direction (e.g. adding words such as "ideal" or "outstanding" to scale items) and using slider scales with a large numerical range (0–100) that might allow for enhanced assessment of variation. Some items were adapted nearly verbatim from general to event-level consideration, such as "Condoms help me enjoy sex" (R. A. Crosby et al., 2016) which was adapted to "This condom helped me enjoy sex." Other items required more substantial changes, such as adding a positive frame, loading and specificity to "Condoms decrease my sensation" (Sanders, Hill, et al., 2013), which was adapted to "The physical sensation on my penis was outstanding."

## Measures

We assessed demographics with items from the National HIV Behavioral Surveillance (NHBS), (Finlayson et al., 2011) including age, education, income, race/ethnicity, gender, and marital status. We also included in the survey several a priori expected correlates of pleasure, including quality of foreplay in relationship, condom perception, past erection problem with condoms, relationship quality, and sexual relationship quality. *Quality of foreplay in relationship* was assessed with the item, "What is the quality of foreplay in your relationship with [name]?" *Condom perception* was assessed with the item, "In general, how do you feel about using condoms?" *Past erection problem with condoms* was assessed with, "Have you ever had issues maintaining an erection while using a condom?" *Relationship quality* was assessed with a previously validated scale, the Global Measure of Relationship Satisfaction scale (Byers & Macneil, 2006; Lawrance & Byers, 1995). This scale has a stem phrase of, "In general, how would you describe your **overall** relationship with [name]?" and it uses five Likert items with anchors of Very bad – Very good; Very Unpleasant – Very Pleasant; Very Negative – Very Positive; Very Unsatisfying – Very Satisfying; and Worthless

– Very valuable. *Sexual relationship quality* was measured using the Global Measure of Sexual Satisfaction Scale, also previously validated, (Byers & Macneil, 2006; Lawrance & Byers, 1995) which has the same response categories as the overall relationship quality scale, but has the stem, “In general, how would you describe your **sexual** relationship with [name]?” For these items, to enhance clarity, we asked participants to provide a nickname for the last partner they used a condom with, a process that we have used in previous surveys, (McNaghten et al., 2014; Sullivan, Rosenberg, et al., 2015) and then had the electronic survey insert the partner nickname into questions as appropriate. All survey items in the current study can be found in online Appendix A.

### Statistical analyses

To determine construct validity of the scale, we conducted an exploratory factor analysis to understand whether the scale contains latent constructs. Principle factors extraction with Varimax rotation was computed based on the 11 items of the Pleasure Scale (one of the original 12 items was excluded due to poor fit). To determine an appropriate number of latent factors for the factor analysis, we used Eigenvalue cutoffs based on parallel analysis. The parallel analysis technique generates cutoff values obtained by a Monte Carlo simulation process that inputs uncorrelated normal variables to generate appropriate cut-off levels, a process that has been shown to perform well in modeling studies (Glorfeld, 1995; Zwick & Velicer, 1986). Factor loadings less than 0.5 were considered insufficient to be included in the model, and we assessed the factors for the absence of multicollinearity among items. Reliability of the overall scale and for each subscale was determined through Cronbach’s alpha coefficients, considering values >0.7 to indicate moderate reliability and >0.8 to indicate high reliability. We assessed item-total correlations to explore the performance of individual scale items. We determined scale item correlations with a priori expected correlates (e.g., Global Measure of Sexual Satisfaction) for continuous variables with Spearman’s rank coefficient, and for relations between dichotomous and continuous variables with the rank biserial coefficient (Somers’ D). Correlations between the overall scale and a priori expected correlates were performed with linear regression, controlling for demographic measures. All analyses were conducted in Stata 14.

## RESULTS

The 331 eligible and complete survey responses were used to assess scale reliability and validity. Items considered for the pleasure scale, based on the literature review and expert panel procedures, are shown in Table 1. For each item, the range spanned the entirety of the potential range, 0–100. Items 1–9 were considered *a priori* to be part of the domain of general pleasure, and items 10–12 were considered *a priori* to be part of the domain of condom-specific pleasure. Except for an item regarding penile soreness (Item 9), items from the general pleasure domain had higher mean values (Range 51–90) than items from the condom pleasure domain (Range 31–33). Most items had mean values across different types of sex. Items addressing erection sustained and quality were higher among those reporting vaginal sex compared to those reporting anal sex or other/multiple types of sex. For the overall scale, there was no difference between those reporting vaginal or anal sex, although

those reporting using condoms for other (e.g. oral) or multiple sex acts (e.g. oral and vaginal) had lower scores.

Assessment of Eigenvalues based on parallel analysis suggested a two-factor solution (Online Appendix B), with two factors having Eigenvalues greater than anticipated due to chance. Factor loadings from the rotated model are shown in Table 2. One item, the reverse coded item regarding condom soreness, was excluded from the factor solution based on low factor loading ( $<0.1$ ) and low item-total correlations ( $<0.15$ ). Items in our analysis factored into two groups: the first comprised of *general pleasure* and the second *condom-specific pleasure*. No items had cross-loading scores greater than 0.5, so we included all items in the final scale. The final overall scale had Cronbach's alpha of 0.89, with alpha values of 0.89 for the 8-item general pleasure subscale and 0.84 for the 3-item condom-specific subscale. Similar Cronbach's alphas were found when subgroup analyses were conducted for MSM and MSW.

The sample was predominantly young (40% aged 18–24, 44% aged 25–39, and 16% aged 40–49), with nearly three-quarters White and the remainder Latino (14%), Black (7%) or Other/Multiracial (6%) (Table 3). The sample was evenly divided between those who had not completed college (51%) and those who had completed college (49%). Most earned less than \$49,999 yearly, and most (86%) were not married or in a civil union or domestic partnership. In accordance with our target of having a sample of MSM and MSW, approximately half reported vaginal sex with women in the last two weeks ( $n=162$ , 49%) and the other half reported anal sex with a man in the last two weeks ( $n=169$ , 51%). Just over half of participants ( $n=159$ , 56%) described their most recent sex partner as being a committed relationship, and 14% ( $n=46$ ) described their most recent partner as a one-time occurrence. Most recent condom use was reported as being for anal sex only ( $n=170$ , 51%), vaginal sex only ( $n=127$ , 38%), or oral sex or multiple sex acts ( $n=34$ , 10%).

Both subscales and the overall scale were correlated with hypothesized variables in expected directions (Table 4). For the general pleasure and condom pleasure subscales, higher foreplay quality in the relationship was associated with higher scale scores respectively ( $B=17.5$ , 95%CI: 12, 23 and  $B=12.5$ , 95%CI: 5, 20). The general pleasure subscale was associated with overall relationship quality ( $B=3.3$ , 95%CI: 2, 5) and sexual relationship quality ( $B=3.1$ , 95% CI 2, 4). Similarly, the condom pleasure subscale was associated with overall relationship quality ( $B=2.2$ , 95% CI 0.4, 4) and sexual relationship quality ( $B=2.2$ , 95% CI 0.5, 4). Both subscales were also positively associated with affirmative feelings about condoms, and negatively associated with ever experiencing erection issues related to condoms. In subgroup analysis assessments for MSM and MSW, correlation coefficients were in expected directions, with respectively 12/14 and 11/14 of relations significant in the overall assessment being significant in subgroup assessment. For individual item assessment, all items in the general pleasure subscale were associated with at least 3/5 hypothesized variables, and all items in the condom pleasure subscale were associated with at least 2/5 hypothesized variables (Table 5). The strength of relation for these associations ranged from low to moderate.

We assessed whether general pleasure or condom pleasure subscales were associated with demographic and relationship variables. The general pleasure scale was associated with being in a committed relationship ( $B=8.3$ , 95%CI: 4, 13) and negatively associated with using a condom for oral sex or other (not vaginal or anal) type of sex ( $B=-10.0$ , 95%CI: -18, -2), but was not associated with age, race, education, income marital status, partner gender, one-time sex partner. The condom pleasure subscale was associated with being in a committed relationship ( $B=11.4$ , 95%CI: 5, 17) and with older age groups 25–39 and 40–49 negatively associated relative to younger peers aged 18–24 ( $B=-7$ , 95%CI: -13, -1 and  $B=-10.8$ , 95%CI: -19, -2), but was not correlated with any other demographic or partner-specific variables.

## DISCUSSION

The present study describes the creation and validation of the EMSEXpleasure event-level scale. To realize content validity, the scale was created through an expert panel process that included review of existing scales and identification of additional areas for measurement. As part of this process, the panel identified two domains for assessment: general pleasure and condom-specific pleasure. The panel also participated in the development and iteration of individual scale items, as well as the design of the item response option (a 0–100 point slider scale).

Internet survey recruitment yielded 169 MSW and 162 MSW eligible survey completions. Factor analysis yielded a two-factor solution that matched domains identified a priori by the expert panel, indicating internal validity of the instrument. The overall scale and each subscale had high ( $>0.8$ ) Cronbach's alpha coefficients, indicating internal reliability. The scale demonstrated convergent validity, with theoretically-related constructs identified a priori being associated both with individual scale items and with scale totals.

Neither the overall scale score nor subscale scores differed between MSM and MSW condom users, indicating that EMSEXpleasure is appropriate for use across different types of sex and different populations. Age was the only demographic variable associated with scale or subscale scores, with older respondents providing lower ratings on the condom-specific pleasure subscale. Those in committed relationships had higher EMSEXpleasure scores than those not in such relationships, with similar but non-significant trends for those married or in domestic partnerships.

An inherent difficulty of interventions is uptake. The effectiveness of each intervention is limited to the extent that those in the target population are unwilling to adopt the intervention. For oral delivery of antiretroviral-based HIV prevention approaches, uptake is limited by daily adherence. For condoms, the main limitation in uptake is decreased pleasure. It is critical that research be conducted to address this barrier to condom use. For condoms, the most likely way to address pleasure, in addition to counseling-based approaches that are difficult to bring to scale, is developing new condoms that can perform in a technically similar way to standard-wall latex condoms, but that are manufactured in a format that increases acceptability such as enhancing perceptions of sexual pleasure. Having



a validated tool to measure pleasure at the event level will enhance the ability of future condom trials to assess a key metric that impacts willingness to use condoms.

This study is subject to several limitations. The assessment of pleasure is based on most recent condom use over a time period rather than on a daily diary approach, which could result in increased recall bias. To minimize the potential impact of recall bias, the maximum recall period for the study was two weeks. The study was only conducted among condom users, and future studies will be needed to determine whether the 8 item subscale that does not address condom use has validity for populations and sexual events that do not involve condom use. Another area for further research is assessment across current measures, which could determine to what extent event-level measurement of pleasure differs from non-event specific assessments of pleasure or event-specific assessments of general sexual experience. Studies that use the EMSEXpleasure scale should seek to control for past experiences of erectile or orgasmic dysfunction. Further qualitative inquiry or incorporation of theoretical models could yield additional domains of condom-specific pleasure that could be added to the present scale. There is no gold standard assessment of pleasure for comparison purposes, resulting in the need to rely on less direct assessments of validity (content, internal, and convergent). The trait of pleasure is ephemeral, and therefore test-retest reliability is not possible, limiting our assessment of scale reliability to the domain of internal reliability. Last, the study comes from an online sample recruited through Facebook, which despite prior data indicating a similar sample yield to venue-based sampling, is still a method susceptible to bias.

The present study also has several notable strengths. To our knowledge, EMSEXpleasure is the first scale to be developed and validated to assess sexual pleasure at the event level. Numerous clinical trials have sought to determine clinical failure of different condom types, (Beksinska, Smit, Mabude, Vijayakumar, & Joanis, 2006; Cook, Nanda, & Taylor, 2001; Macaluso et al., 2007; Potter & de Villemeur, 2003; Walsh et al., 2003) yet to our knowledge none have sought to address condom nonuse by evaluating pleasure as a primary outcome. With the EMSEXpleasure scale, future clinical trials will be able to assess whether products or interventions result in changes in sexual pleasure. An additional strength is that the scale demonstrates validity for both MSM and MSW. As novel condoms and other prevention methods come closer to market, the existence of a pleasure scale will allow for determination of whether new condom formulations impact the variable most relevant to condom uptake. Other sexual health interventions may also benefit from use of the EMSEXpleasure scale, such as interventions designed to enhance sexual function or to alleviate sexual dysfunction. Further studies providing addition data regarding the factor structure and performance of the scale in additional populations will add to the evidence base to inform appropriate application and interpretation of EMSEXpleasure results.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Pleasure item statistics by type of sex reported

Construct	Item	Overall				By type of sex reported <sup>b</sup>		
		Mean	SD	Item-rest correlation	Anal sex mean	Vaginal sex mean	Multiple or other sex	
1 <sup>a</sup>	Orgasm quality	66	24	0.68	66	67	58	
2	Orgasm timing	62	28	0.61	63	61	56	
3	Physical sensation	51	28	0.74	53	52	42	
4	Global pleasure perception	69	27	0.72	69	71	60*	
5	Erection sustained	78	28	0.61	75*	83	69 <sup>‡</sup>	
6	Erection quality	70	29	0.70	67*	76	64*	
7	Penile comfort	74	27	0.65	71*	78	73	
8	Global arousal perception	79	23	0.54	78	84	70 <sup>‡</sup>	
9 <sup>c</sup>	<i>Penile discomfort</i>	23	27	0.11	23	22	22	
10	Condom not intrusive	31	29	0.53	31	31	29	
11	Condom impact: sex experience	33	32	0.55	33	32	34	
12	Condom impact: sex quality	33	32	0.54	33	32	31	
	Overall	58	20	–	57	60	53*	

<sup>a</sup> n=282 for items 1–2 and n=331 for items 3–12, respondents who did not experience ejaculation were not provided the first two scale items.

<sup>b</sup> Linear regression, with referent category of vaginal sex, was used to assess differences in mean item scores by type of sex:

\* <.05,

<sup>‡</sup> <.01,

<sup>‡‡</sup> <.001

<sup>c</sup> Item 9, in italics, was excluded from the final scale.

Original source(s) for items prior to adaptation through expert panel process:

<sup>d</sup> Crosby 2016, condom pleasure scale;

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- <sup>e</sup> Sanders 2013, condom worries scale;
- <sup>f</sup> Flynn 2013, PROMIS sexual function and satisfaction scale;
- <sup>g</sup> Sanders 2013, quality of sexual experience scale;
- <sup>h</sup> Sanders 2013, negative condom attributes scale;
- <sup>i</sup> Crosby 2016, condom tumoffs scale.
- <sup>j</sup> Siegler 2012, negative condom beliefs scale.

**Table 2**

Exploratory factor analysis: Factor loadings and internal reliability

Item	Factor loadings		Alpha <sup>a</sup>
	General pleasure	Condom pleasure	If item deleted
The orgasm was outstanding	0.63		0.88
The timing of my ejaculation (cum) was just right	0.64		0.88
The physical sensation on my penis was outstanding	0.60		0.87
This sex was very pleasurable	0.65		0.88
I was able to maintain my erection throughout the sex act	0.71		0.88
The firmness of my erection was ideal during sex	0.79		0.88
My penis was comfortable during sex (for example, not pinched)	0.58		0.88
I was highly physically aroused during sex	0.61		0.89
This condom felt like wearing nothing		0.59	0.89
This condom helped me enjoy sex		0.85	0.88
This condom helped me have better sex		0.79	0.89

<sup>a</sup>Overall scale alpha was 0.89, general pleasure factor alpha was 0.89, and condom pleasure alpha was 0.84. Assessed separately for MSM and MSW, respectively, overall alpha was 0.91 and 0.88, general pleasure 0.90 and 0.88, and condom pleasure 0.84 and 0.84. Similarly, factor loadings were consistent with overall loadings for MSM and MSW groups.

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**Table 3**

Demographics and relationship characteristics and mean pleasure scale values

Item	All		Overall pleasure scale		General pleasure subscale		Condom pleasure subscale	
	n	%	Mean	p	Mean	p	Mean	p
<i>Age</i>								
18–24	134	40 %	60	ref	70	ref	37	ref
25–39	145	44 %	57	0.14	67	0.39	30	0.03
40–49	52	16 %	55	0.11	66	0.36	26	0.01
<i>Racial group</i>								
White	234	73 %	59	ref	69	ref	33	ref
Black	23	7 %	52	0.14	62	0.15	28	0.40
Latino	46	14 %	56	0.44	67	0.59	29	0.35
Other/multiracial	18	6 %	61	0.71	70	0.80	36	0.67
<i>Education</i>								
High school or less	47	14 %	58	ref	66	ref	36	ref
Some college	122	37 %	57	0.87	67	0.82	32	0.30
College or more	160	49 %	59	0.65	70	0.30	32	0.29
<i>Household Income</i>								
\$0 to \$19,999 yearly	74	25 %	55	ref	64	ref	32	ref
\$20,000 to \$49,999 yearly	114	39 %	58	0.37	68	0.33	33	0.73
\$50,000 to \$74,999 yearly	55	19 %	58	0.24	71	0.11	31	0.98
\$75,000 or more yearly	48	16 %	57	0.64	69	0.27	26	0.26
<i>Marital status</i>								
Not married	279	86 %	57	ref	67	ref	31	ref
Married, civil union	44	14 %	64	0.03	74	0.06	39	0.06
<b>Partner at last condom-protected vaginal or anal sex act</b>								
<i>Committed relationship</i>								
No	126	44 %	53	ref	64	ref	25	ref
Yes	915	56 %	62	<0.001	72	0.001	36	<0.001
<i>One-time sexual partnership</i>								
No	285	86 %	56	ref	65	ref	37	ref

Item	All		Overall pleasure scale		General pleasure subscale		Condom pleasure subscale	
	n	%	Mean	p	Mean	p	Mean	p
Yes	46	14 %	58	0.54	69	0.21	31	0.16
Partner gender								
Male	169	51 %	57	ref	67	ref	32	ref
Female	162	49 %	59	0.34	69	0.33	32	0.85
Type of sex								
Anal	170	51 %	57	ref	67	ref	32	ref
Vaginal	127	38 %	60	0.21	71	0.12	32	0.89
Oral or multiple types of sex	34	10 %	53	0.21	61	0.11	31	0.79

Table 4

Pleasure scale and subscale linear regression coefficients with sexual health measures

Item	Overall pleasure scale <sup>a</sup>		General pleasure subscale		Condom pleasure subscale	
	B	95% CI	B	95% CI	B	95% CI
Relationship quality scale	2.99	(1.7, 4.3)	3.23	(1.9, 4.6)	2.08	(0.3, 3.8)
Sexual relationship quality scale	3.03	(1.8, 4.3)	3.22	(1.9, 4.6)	2.27	(0.5, 4.0)
What is the quality of foreplay in your relationship with [name]?						
Excellent or Good	7.53	(2.3, 12.7)	9.55	(4.1, 15.0)	ns	
Ok, Fair, or Poor	ref		ref		ref	
In general, how do you feel about using condoms?						
Strongly like or like	18.68	(14.3, 23.0)	15.43	(10.7, 20.2)	26.70	(21.1, 32.3)
Neutral, Dislike, Strongly dislike	ref		ref		ref	
Have you ever had issues maintaining an erection while using a condom?						
Yes	-18.12	(-22.2, -14.0)	-17.40	(-21.8, -13.0)	-19.18	(-24.8, -13.5)
No	ref		ref		ref	

<sup>a</sup> All models were linear regressions controlling for age, race, and education. Associations were similar in direction and statistical significance for MSM and MSW subgroup analyses.

Table 5

Correlation table of scale items and external constructs

Item number	Item	Foreplay Quality	Relationship Quality	Sexual Quality	Condom perceptions	Condom erection problems
1	Orgasm quality	0.22 <sup>†ab</sup>	0.22 <sup>†</sup>	0.25 <sup>†</sup>	0.38 <sup>†</sup>	-0.21 <sup>†</sup>
2	Orgasm timing	0.19 <sup>*</sup>	0.25 <sup>†</sup>	0.26 <sup>†</sup>	0.24 <sup>†</sup>	-0.20 <sup>†</sup>
3	Physical sensation	0.16 <sup>*</sup>	0.20 <sup>†</sup>	0.18 <sup>†</sup>	0.45 <sup>†</sup>	-0.30 <sup>†</sup>
4	Global pleasure perception	0.24 <sup>†</sup>	0.25 <sup>†</sup>	0.30 <sup>†</sup>	0.29 <sup>†</sup>	-0.24 <sup>†</sup>
5	Erection sustained	0.07	0.20 <sup>†</sup>	0.21 <sup>†</sup>	0.12	-0.48 <sup>†</sup>
6	Erection quality	0.12	0.22 <sup>†</sup>	0.23 <sup>†</sup>	0.18 <sup>†</sup>	-0.51 <sup>†</sup>
7	Penile comfort	0.06	0.19 <sup>†</sup>	0.19 <sup>†</sup>	0.29 <sup>†</sup>	-0.28 <sup>†</sup>
8	Global arousal perception	0.09	0.21 <sup>†</sup>	0.29 <sup>†</sup>	0.23 <sup>†</sup>	-0.25 <sup>†</sup>
9	Condom not intrusive	0.08	0.11	0.09	0.37 <sup>†</sup>	-0.33 <sup>†</sup>
10	Condom impact: sex experience	0.05	0.09	0.10	0.56 <sup>†</sup>	-0.29 <sup>†</sup>
11	Condom impact: sex quality	-0.04	0.04	0.08	0.57 <sup>†</sup>	-0.33 <sup>†</sup>
	General pleasure subscale: Items 1–8	0.23 <sup>†</sup>	0.27 <sup>†</sup>	0.31 <sup>†</sup>	0.39 <sup>†</sup>	-0.41 <sup>†</sup>
	Condom pleasure subscale: Items 9–11	0.02	0.09	0.11	0.59 <sup>†</sup>	-0.37 <sup>†</sup>
	Total scale: Items 1–11	0.19 <sup>*</sup>	0.24 <sup>†</sup>	0.29 <sup>†</sup>	0.54 <sup>†</sup>	-0.46 <sup>†</sup>

<sup>a</sup> <sup>\*</sup> <.05,<sup>†</sup> <.01,<sup>‡</sup> <.001<sup>b</sup> Correlations between continuous variables calculated with Spearman's rank coefficient, correlations between dichotomous and continuous variables calculated with the rank biserial coefficient (Somers's D)