Published in final edited form as:

Assessment. 2009 March ; 16(1): 3–15. doi:10.1177/1073191108322259.

Factor Structure of the Condoms Barriers Scale With a Sample of Men at High Risk for HIV

Suzanne R. Doyle,
University of Washington, Seattle

Donald A. Calsyn, and
University of Washington, Seattle

Samuel A. Ball
Yale University School of Medicine

Abstract

This study assesses the psychometric properties of the Condom Barriers Scale (CBS), an instrument originally designed to measure women's perceptions and attitudes regarding male condom use, with a sample of men at high risk for human immunodeficiency virus (HIV). Participants include 590 male patients in drug abuse treatment involved in a gender-specific HIV prevention intervention for teaching safer sex skills. Second-order confirmatory factor analysis generally supported the underlying four-factor subscale structure of the CBS. However, exploratory factor analysis revealed a few specific discrepancies in the factor structure between men and women. Internal consistency and test-retest reliability estimates were moderate to high in value. CBS scores correlated with use of condoms for men with high-risk sexual partners, supporting criterion-related validity. Overall, the analysis indicates that the CBS is a potentially valid and reliable instrument and has utility for assessing barriers to condom use with men, but may need some item content modifications to allow appropriate assessment of gender differences and comparisons across studies.

Keywords

Condom Barriers Scale; confirmatory factor analysis; exploratory factor analysis; factor congruence; test-retest reliability

According to the Centers for Disease Control and Prevention (2006), the proper use of a male latex condom can be one of the most highly effective ways of preventing the transmission of the human immunodeficiency virus (HIV), the virus that causes AIDS, as well as other sexually transmitted infections (STIs). Over the past several decades, public health agencies have implemented a variety of campaigns to increase the use of condoms, especially among high-risk populations, including substance abusers. Research with substance abusers has indicated that sexual risk behaviors have been slower to change than needle-use risk behavior (Coyle, Needle, & Normand, 1998; Sorenson & Copeland, 2000). Sexual risk prevention efforts have

© 2009 Sage Publications

Please address correspondence to Suzanne R. Doyle, PhD, Alcohol and Drug Abuse Institute, University of Washington, 1107 NE 45th Street, Suite 120, Seattle, WA, 98105-4631; srdoyle@u.washington.edu.

Authors' Note: Data presented in this report were collected as part of the multisite controlled clinical trial sponsored by the National Institute on Drug Abuse (NIDA), Clinical Trials Network (CTN) study "Reducing HIV/STD Risk Behaviors: A Research Study for Men in Drug Abuse Treatment (CTN-0018)." Information on this study can be found at <http://www.nida.nih.gov/CTN/protocol/0018.html>. The NIDA-CTN is made up of "nodes" comprised of a Regional Research and Training Center (RRTC) housed at an academic institution and 5 to 10 Community Treatment Programs (CTPs). The Washington Node served as the lead node.

been somewhat successful at reducing the number and type of partners, but increases in condom use have been modest at best (Sorenson & Copeland, 2000). However, obstacles to the use of condoms that can interfere with effective reduction of infection risk remain poorly understood. The reliable and valid measurement of such barriers will provide an important step in designing interventions aimed at promoting a more positive attitude toward and increased use of condoms.

Recognizing the importance of assessing perceived barriers to the use of male condoms by their partners, St. Lawrence et al. (1999) developed the Condom Barriers Scale (CBS), a 29-item self-report instrument originally designed for HIV and STI prevention efforts in women. The selection of items for the instrument, its internal consistency reliability, factor structure, validity, and temporal stability were originally assessed in a series of studies involving predominately African American women (St. Lawrence et al., 1999). Study 1 evaluated the factor structure, internal consistency, and convergent validity in a sample of 178 women. The original pool of 42 items was reduced to the final 29 items of the current CBS scale, and exploratory principal components analysis suggested four components (Partner Barriers, Effects on Sexual Experience, Access/Availability, and Motivational Barriers) with very good internal consistency. Study 2 consisted of a cross-validation sample of 279 women, and a principal components analysis supported the four-component model. Study 3 indicated good 2-week test-retest reliability (range .70 to .86) in a sample of 30 women. Overall, the studies reported in St. Lawrence et al. (1999) indicated that the CBS demonstrated acceptable psychometric properties with women. However, they also recommended research evaluating the generalizability of the four-component model to men and to a broader range of ethnic groups, socioeconomic status, and geographic locations. Assessment of gender and ethnic differences is necessary for establishing the reliability and validity of the CBS given the variability in both high-risk behaviors and rates of infections in individuals with different demographic characteristics.

The protocol development team of the Safe Sex for Men clinical trial (National Institute on Drug Abuse Clinical Trials Network) chose the CBS as the instrument to measure attitudes toward condoms and barriers to their use in their multisite trial. Several studies with women had demonstrated the utility of the CBS and provided further support for the criterion-related validity of the instrument with women (Crosby et al., 2002; Crosby et al., 2003). Although there were other potential instruments that might be used, which had been used with both men and women (Basen-Enquist et al., 1999; Hanna & Tompkins, 1999; Lollis, Johnson, & Antoni, 1997; Sunmola, 2001), the CBS was chosen because of its strong psychometric development noted above and because an examination of items and factors from other scales suggested that they did not tap motivational or relationship factors as widely as the CBS. Although the CBS has been used with men, no study has yet evaluated its factor structure and this is an important undertaking because some items may not be equally reliable or valid for men and women. Before recommending substantive gender-oriented modifications to the questionnaire, we felt it was important to conduct a test of the factor structure of the CBS to evaluate the validity of its original items for men.

On examining the CBS items, we determined only 10 items that needed to be revised to deem them appropriate for men (see appendix). Nine of these items only required adding the feminine pronoun as an option or using a generic term such as *partner*. The meaning of these items remained unchanged. Only for Item 2, which was changed from “I don’t want to put a condom on my partner” to “I don’t want my partner to put a condom on me,” is there an obvious difference in the content meaning. However, both items have face validity. In addition, Crosby, Salazar, and DiClemente (2004) used the CBS with men, but did not describe item modifications or psychometrics for the men’s version, although they did find that the motivation factor was related to condom use.

Gender differences have been found in attitudes toward condom use (Campbell, Peplau, & DeBro, 1992), attitudes toward buying or carrying condoms (Jadack, Hyde, & Keller, 1995), intentions to use condoms (Morrison, Gillmore, & Baker, 1995; von Haeften, Fishbein, Kasprzyk, & Montano, 2000), and negotiating condom use with a partner (Carter, McNair, Corbin, & Williams, 1999). The association between race/ethnicity and condom use has also been assessed by several studies. Johnson et al. (1994) found significant variability between African Americans and Whites in perceptions about condom use, anger response to request for condom use, and number of sexual partners. Smith (2003) reported that African Americans and Latinos had a higher level of unwanted noncondom use than Whites. Essien, Ross, Fernández-Esquer, and Williams (2005) found that condom use was lowest among African Americans and Hispanic men, and that race/ethnicity was a significant predictor of condom use, difficulty in using a condom during sexual contacts, and agreement from partner(s) concerning the use of condoms.

Given observed gender and race/ethnic differences toward condom use, the purpose of the present study was to assess the psychometric properties of the CBS, originally designed for women with a large national sample of men participating in a multisite randomized clinical trial to reduce high-risk behaviors associated with HIV infection. We predicted that the four-factor model would be supported, and that internal consistency and test-retest reliability estimates would be comparable with those reported in St. Lawrence et al. (1999). Differences in the underlying factor structure of the CBS among African American and White men were also examined.

Method

Participants

Participants were 590 men enrolled in an HIV-risk reduction intervention study delivered within seven methadone maintenance ($n = 288$) and seven outpatient psychosocial ($n = 302$) substance abuse treatment programs across the United States (Sorensen et al., 2007). This study consisted of the comparison of a five-session intervention developed specifically for men, Real Men Are Safe (REMAS), with a standard single-session HIV/AIDS education group (HIV-Ed). The REMAS intervention was a workshop of five 90-min group sessions, which included lecture material, roleplays, peer-group discussions, and self-assessment motivational exercises. The first two sessions focused on identifying the risks of and planning the prevention of HIV/AIDS. The following three sessions included topics on sex with/without drugs, communication about sex, and safer sex relations. The HIV-Ed intervention represented a standardized treatment-as-usual and served as the standard-of-care HIV/AIDS education. It consisted of selected educational material from sessions one and two of the REMAS intervention and was conducted within an approximately 60-min single session covering HIV/AIDS definitions, transmission, testing and counseling, treatment, and prevention.

Inclusion criteria consisted of being a male above the age of 18 years in substance drug abuse treatment at a participating community treatment program who selfreported engaging in unprotected vaginal or anal inter-course during the prior 6 months. Patient eligibility required willingness to be randomly assigned to one of two interventions, complete assessment batteries at baseline, postintervention, 3- and 6-months follow-up, and the ability to speak and understand English.

Exclusion criteria included observable, gross mental status impairment, including severe distractibility, and incoherence or retardation as measured by the Mini Mental Status Exam (Folstein, Folstein, & McHugh, 1975). Sample demographics include age (between 18 and 69 years, mean [M] = 39, standard deviation [SD] = 10.5), race (White, 58.0%; African American, 28.0%; Hispanic, 11.2%; other, 2.8%), and marital status (married, 19.0%; widowed/divorced/

separated, 33.7%; never married, 47.3%). A majority of the men were unemployed (63.2%), and only 29% were educated beyond high school ($M = 12.2$ years, $SD = 1.9$). A total of 54% of the participants indicated no income in the previous 30 days and of those reporting a monthly income ($n = 271$), the average was \$1,124 ($SD = 1,525.2$).

Assessment Procedure

The CBS is a self-report instrument consisting of 29 items worded as short statements and rated on a 5-point Likert-type scale from 1 (*strongly agree*) to 5 (*strongly disagree*). Items are summed and yield a total condom barriers score as well as scores on four conceptual domains: Partner Barriers (8 items), Effects on Sexual Experience (7 items), Access/Availability (8 items), and Motivational Barriers (6 items). Because the CBS had originally been developed for use with heterosexual women, the wording of 10 items of the original 29 were slightly modified (see appendix) to make the items more gender- or sexual-orientation neutral.

Responses to the CBS were obtained as part of a larger assessment battery from participants in the multisite, randomized controlled clinical trial sponsored by the Clinical Trials Network, National Institute on Drug Abuse. Assessments were administered at baseline, postintervention, and at 3- and 6-months follow-up. Although this report focuses on the evaluation of the factor structure of the CBS, we provide test-retest reliability and one measure of criterion-related validity from a subsample of 326 participants identified as being at high risk for HIV infection. High risk was defined as reporting having multiple sexual partners, or having a main male or female sexual partner for less than 6 months, or having a partner who is HIV positive, or having a partner who has traded sex for money, drugs, or other goods in the past 3 months. Condom use was defined as the proportion of times a male or female condom was used in relation to the number of vaginal or anal sex acts within a 3-month period. Self-report sexual behavior data were collected using an audio computer assisted structured interview (ACASI) methodology shown in a number of studies to facilitate self-disclosure of high-risk behaviors (Gross et al., 2000; Metzger et al., 2000). Most of the items were selected or adapted from the Sexual Risk Behavior Assessment Schedule (SERBAS; Meyer-Bahlburg, Ehrhardt, Exner, & Gruen, 1991; Sohler, Colson, Meyer-Bahlberg, & Susser, 2000).

Analysis

To assess the four-factor subscale structure (Partner Barriers, Effects on Sexual Experience, Access/Availability, and Motivational Barriers) concurrently with the concept of unidimensionality as defined by a total score of the CBS, a second-order confirmatory factor analysis (CFA) was conducted on responses obtained at baseline. The initial model used maximum likelihood (ML) estimation, which was assessed by the χ^2 test and five model fit indices: the comparative fit index (CFI), nonnormed fit index (NNFI), goodness-of-fit index (GFI), the root mean squared residual (RMSR), and the root mean square error of approximation (RMSEA). The cutoff criteria for assessing model fit were based on recommendations by Hu and Bentler (1999) and Marsh and Hau (1996): .90 for the NNFI and GFI, .95 for the CFI, .08 for the RMSR, and .06 for the RMSEA.

Although ML estimation is preferred, with violation of the multivariate normality assumption, this procedure can lead to incorrect approximate standard errors and fit statistics, although the parameter estimates tend to be more stable (West, Finch, & Curran, 1995). Given that all CBS item distributions deviated from normality in this study, which can result in an inflated χ^2 test (Curran, West, & Finch, 1996; Lei & Lomax, 2005) and decreased indices of model fit (Hu & Bentler, 1998), an unweighted least squares (ULS) method of CFA (Browne, 1984) was also evaluated in this study.

Model fit for the ULS method was based on the GFI, the GFI adjusted for degrees of freedom (AGFI), and the RMSR. The GFI was interpreted in analogy with the coefficient of determination and the AGFI with the correction for bias of a squared multiple correlation with values supporting a model structure being greater than .90. The RMSR measures the average absolute magnitude of the fitted residuals and a value of less than .08 was used as a criterion for acceptable model fit. With the reported CFA, composite reliability indices for each latent factor included in the model were calculated in a manner similar to computing the coefficient alpha reliability estimate for that particular subscale (Fornell & Larcker, 1981).

Given that the exploratory factor analysis (EFA) results by St. Lawrence et al. (1999) did not reveal all the criteria for good simple structure (Thurstone, 1947), there was concern that some CBS items may be complex variables; that is, they may load on more than one factor, and the CFA may provide similar indices of model fit if a certain complex item is allowed to be an indicator of different factors. For example, in Study 1 of St. Lawrence et al. (1999), Item 9 loads .45 on Access/Availability, .31 on Partner Barriers, .28 on Effect on Sexual Experience, and -.08 on Motivational Barriers. In a similar manner, Item 27 loads .33 on Access/Availability, .34 on Partner Barriers, .29 on Effect on Sexual Experience and .47 on Motivational Barriers. Because this may be due to complexity of the variables or from the use of an orthogonal rotation when factors are actually correlated, subsequent to the CFA, an EFA was conducted on baseline responses, using two common-factor analytic procedures: alpha factor analysis (Kaiser & Caffrey, 1965) and ML factor analysis (Jöreskog & Lawley, 1968). In contrast to the CFA, which requires specification of which items load on a given factor, the EFA would allow all items to load on all factors. The two extraction procedures, which differ both theoretically and in the mathematical approach for the extraction of factors (Kaiser & Derflinger, 1990), were used to obtain a factor solution that is not dependent on a particular extraction process. Correlations among estimated factor scores between the two methods were calculated to determine similarity across the different extraction procedures.

The number of factors to retain with the exploratory procedures was based on parallel analysis ([PA]; Hayton, Allen, & Scarpello, 2004; Horn, 1965; Turner, 1998), the scree test, similarity of factors extracted across the two different extraction methods based on correlations of factor scores, coefficient alpha greater than .50 for each factor prior to rotation, and interpretability of the underlying dimensions.¹ Interpretation of factors was based on the results of the alpha extraction, a procedure designed to be used in scale construction and testing, by producing common factors with optimal generalizability in the sense of Cronbach's alpha coefficient. Extracted factors were allowed to be correlated by rotating to an oblique solution, using the direct quartimin procedure (Jennrich & Sampson, 1966).

To compare the dimensionality of the CBS derived from this sample of men with the factor structure obtained by St. Lawrence et al. (1999) from two studies with responses on the CBS by women (Study 1 and Study 2), coefficients of congruence (Tucker, 1951; Wrigley & Neuhaus, 1955) between the exploratory factor loadings were calculated. Coefficients of congruence were also calculated to assess differences between the factor structure of the CBS among African American and White men. Other race/ethnicity groups were not considered because of the small number of observations and the inability to obtain a stable factor solution with this sample. The values of these coefficients were assessed according to the guidelines used by MacCallum, Widaman, Zhang, and Hong (1999): .98 to 1.00 = excellent, .92 to .98 = good, .82 to .92 = borderline, .68 to .82 = poor, and less than .68 = terrible.

¹The SAS program written by O'Connor (2000) was used to determine the number of factors to extract with the parallel analysis procedure, based on eigenvalues from random data sets that paralleled the actual data with regard to the number of cases and variables. The SAS (2004) software and the Calis and Factor procedures were used for the confirmatory and exploratory factor analyses, respectively.

Additional psychometric properties of the CBS were evaluated by considering internal consistency reliability estimates (Cronbach's alpha) of the four subscales as originally defined by St. Lawrence et al. (1999) and as defined by the factor analysis results in this study. Test-retest reliability estimates were obtained on a subsample of 326 men with responses to the CBS at all assessment periods (baseline, postintervention, 3- and 6-months follow-up) using the original St. Lawrence et al. (1999) scales and on factor scores derived in this study. Factor scores were calculated at each of the four occasions, subsequent to an alpha extraction and oblique rotation. Coefficients of congruence were also calculated to assess the temporal congruence of the underlying factor structure.

Criterion-related validity was assessed by correlating CBS subscale and total scores as originally defined by St. Lawrence et al. (1999) with the proportion of condom use with low-risk ($n = 208$) and high-risk ($n = 326$) partners. The proportion of condom use is defined as the number of reported sexual acts with condoms divided by the total number of sexual acts in the previous 3 months. Low partner risk is defined as having only one partner throughout the entire length of the study who is identified as one's main partner, and who is not thought to be HIV positive, involved as a commercial sex trade worker, or trading sex for drugs.

In this study, possession of condoms was significantly related to condom use. That is, men indicated an odds ratio (OR) of being 4.7 times more likely to use condoms if they reported possession of condoms. Given this outcome, CBS subscale and total scores were used to predict both condom possession and condom use, for the total sample and for younger and older (40 + years) men with a logistic regression analysis. For ease of interpretation, CBS subscale and total scores were dichotomized at the median into low and high categories, and ORs were evaluated.

Results

Confirmatory Factor Analysis

Results of the CFA with ML estimation revealed that the four-factor solution did not provide a good fit to the data, as indicated by the χ^2 test value, $\chi^2_{373} = 1610.8$, $p < .0001$, and indices of fit, most falling short of reaching the prespecified cutoff criteria for assessing model fit: NNFI = .81, GFI = .83, CFI = .81, RMSR = .08, and RMSEA = .07. However, given that all CBS variables demonstrated significant departures from univariate normality according to the D'Agostino-Pearson χ^2 test (D'Agostino, 1986) and multivariate kurtosis estimated by Mardia's (1970) index, the ULS estimation procedure was also considered. Deviations from normality were generally caused by the platykurtic nature of many items; that is, there was near equal endorsement of each possible response on the Likert-type scale. However, five items (3, 12, 16, 21, and 22) were negatively skewed, with a substantial proportion (42% to 58%) of respondents indicating strong disagreement with the item content.

With ULS, indices of model fit indicated support for the underlying factor structure: GFI = .95, AGFI = .94, and RMSR = .07. Coefficients of congruence of the factor structure between the ULS and ML solutions were extremely high: .999, .993, .986, and .998 for the Partner Barriers, Effects on Sexual Experience, Access/Availability, and Motivational Barriers subscales, respectively. Overall, 83% of the factor loadings between the ULS and ML estimation methods differed by only .10 or less, the greatest difference being a value of .14.

The results of the ULS and ML second-order CFAs are presented in Table 1. Factor loadings on average are generally higher for the Partner Barriers and Effect on Sexual Experience subscales than for Access/Availability and Motivational Barriers. Composite reliability estimates for each subscale also reflect higher values for the Partner Barriers and Effect on Sexual Experience subscales (.90 and .84, respectively) than for Access/Availability (.69) and

Motivational Barriers (.65). Factor loadings of each subscale with the total CBS are generally moderate to high (ranging from .56 to .94), as are the interfactor correlations (ranging from .41 to .86).

Exploratory Factor Analysis

The number of factors to extract established with the PA procedure and scree plot indicated four factors. Coefficient alpha prior to rotation for each of the first four factors exceeded .62. Factor score correlations between the alpha and ML extractions were greater or equal to .99 for similar dimensions with a four-factor solution. With the additional criterion of interpretation of the underlying factors, four factors were retained and rotated to an oblique solution.

The alpha extraction (Table 2) revealed low to moderately high initial communality estimates (squared multiple correlations), ranging from .168 to .685, ($M = .424$). Four factors, with interfactor correlations ranging from .222 to .450 ($M = .333$), generally represented the four-subscale structure of the CBS, with the exception of five items. Two items (Item 23 and Item 29) did not load on any factor, where a salient factor loading is defined as being .30 or greater in absolute value. Two items originally defined by Access/Availability with women (St. Lawrence et al., 1999) loaded significantly on Partner Barriers (Item 9) and Motivational Barriers (Item 4) in this study. One item originally defined by Motivational Barriers with women (Item 27) loaded on the Effects of Sexual Experience factor with the responses from men in this study. In addition to these five items, Item 5 revealed salient loadings on both the Partner Barriers (.38) and Motivational Barriers (.34) dimensions.

Congruence of Factor Structure

To further compare the dimensionality of the CBS derived from this sample of men with the factor structure obtained by St. Lawrence et al. (1999), coefficients of congruence between the exploratory factor loadings were calculated (see Table 3). Similarity was highest among the Partner Barriers (ranging from .87 to .90) and Effect on Sexual Experience dimensions (.83 to .85), and lower (.61 to .77) for Access/Availability and Motivational Barriers.

Fairly good to high congruence between the factor structures was found among African American ($n = 165$) and White ($n = 342$) men: .981 for Partner Barriers, .947 for Effect on Sexual Experiences, .862 for Access/Availability, and .909 for Motivational Barriers. The interpretation of the underlying factor structure was the same for both African Americans and Whites, and the same two items (Items 23 and 29) did not load on any factor for both race/ethnicity groups. *T* tests among these two groups on the four subscales and total CBS scores indicated no statistically significant difference between three of the subscales and the total score but did reveal a difference ($p < .05$) on the Effect on Sexual Experience subscale. That is, African American men ($M = 20.70$) reported slightly less barriers on sexual experience with condom use than did White men ($M = 18.98$), but this difference was small (effect size = .20). The means for Access/Availability, Partner Barriers, Motivational Barriers, and total CBS scores, respectively, are 31.67, 26.62, 19.10, and 98.08 for African American men and 31.92, 27.69, 19.00, and 97.56 for White men in this sample.

Reliability and Criterion-Related Validity

Cronbach's alpha reliability estimates of the original structure of the CBS (St. Lawrence et al., 1999) were moderate to high in value: .90 for Partner Barriers, .84 for Effect on Sexual Experience, .66 for Access/Availability, and .65 for Motivational Barriers. Reliability estimates were also obtained for the structure derived from the EFAs in this study. Alpha coefficients were similar in value as those obtained with the original subscale structure for Partner Barriers (.91) and Effect on Sexual Experience (.85), and higher in value for Access/

Availability (.67) and Motivational Barriers (.69). The overall internal consistency of the total CBS scale was high (.90).

Test-retest reliability estimates based on the original subscale scores (St. Lawrence et al., 1999) and our factor scores with the current sample of men in this study at baseline, postintervention, and 3- and 6-months follow-up are presented in Table 4. The results are very similar and moderate in value with correlations of baseline measures across time ranging from .41 to .65 for the original scoring of the CBS subscales and from .40 to .65 for the factor scores.

Test-retest reliability estimates obtained after baseline are generally higher in value, ranging from .52 to .77 and .48 to .76, for the original subscale and factor scores, respectively. This result was expected, given that both intervention groups (REMAS and HIV-Ed) received similar educational material on basic concepts concerning HIV/AIDS definitions, prevention, and condom use. In addition, test-retest reliability estimates were also obtained to evaluate any possible differences between the intervention groups. The results of this analysis indicated that any observed differences in reliability estimates between the two intervention groups at each specific time of assessment were negligible.

Although test-retest reliability estimates are generally moderate, coefficients of congruence indicated good to excellent (.927 to .991) temporal stability of the underlying factor structure. Criterion-related validity coefficients of the CBS with the proportion of condom use with high-risk partners were statistically significant ($p < .0001$), but low to moderate in value: Partner Barriers (.25), Effects on Sexual Experience (.30), Access/Availability (.21), Motivational Barriers (.45), and total CBS (.38). Given the CBS was rated on a 5-point Likert-type scale from 1 (*strongly agree*) to 5 (*strongly disagree*), positive correlations indicate an association of increased condom use with fewer barriers to condom use as measured by the CBS. These relations were lower for low-risk partners: Partner Barriers (.18, $p = .0113$), Effects on Sexual Experience (.10, $p = .1366$), Access/Availability (.08, $p = .2374$), Motivational Barriers (.25, $p = .0002$), and total CBS (.20, $p = .0039$).

Logistic regression analysis indicated men high on CBS total scores (fewer barriers) were more likely to possess condoms (OR = 2.47, $p < .0001$) and use condoms (OR = 2.76, $p < .0001$). When CBS subscale scores were assessed individually, possession of condoms was related to men with fewer barriers on Partner Barriers (OR = 2.11, $p < .0001$), Effects on Sexual Experience (OR = 1.49, $p = .0213$), Access/Availability (1.51, $p = .0167$), and Motivational Barriers (OR = 3.86, $p < .0001$). Again, with individually assessed subscales, condom use was related to men with fewer barriers on Partner Barriers (OR = 2.00, $p = .0003$), Effects on Sexual Experience (OR = 1.70, $p = .0043$), and Motivational Barriers (OR = 2.88, $p < .0001$), but not on Access/Availability (1.18, $p = .3660$). Given the interrelations of the CBS subscales, taken together as predictors, only Motivation Barriers predicted condom possession (OR = 3.44, $p < .0001$) and condom use (OR = 2.40, $p < .0001$).

CBS total scores (fewer barriers) also indicated greater condom possession (OR = 3.87, $p < .0001$) for older men (40+ years) but only marginally for younger men (OR = 1.59, $p = .0554$), and greater use of condoms by both older men (OR = 2.43, $p = .0012$) and younger men (OR = 3.06, $p < .0001$). Using all four subscales as predictors together, only fewer Motivational Barriers indicated greater prediction of both condom possession (OR = 3.55, $p < .0001$) and condom use (OR = 1.86, $p = .0360$) for older men, and both possession (OR = 3.24, $p < .0001$) and use of condoms (OR = 2.97, $p < .0001$) for younger men.

Discussion

The objective of this study was to evaluate the factor structure of the CBS, an instrument, originally designed to measure women's perceived barriers to condom use, with a sample of

men at high risk for HIV infection. Second-order confirmatory factor analysis with ULS estimation provided indices of model fit supporting the underlying four-factor subscale structure (Partner Barriers, Effects on Sexual Experience, Access/Availability, and Motivational Barriers) concurrently with the concept of unidimensionality as defined by a total score of the CBS. However, because these indices indicate only the average or overall fit of the model, it is important to consider particular aspects of the instrument that provide better or poorer fit to the data. In particular, CFA results revealed item indicators of Partner Barriers, and Effect on Sexual Experience subscales provided stronger associations with underlying dimensions. Evidence for obtaining lower values in the CFA factor loadings and composite reliability estimates for the Access/Availability and Motivational Barriers subscales was obtained with the subsequent exploratory analysis.

Despite there being evidence in the literature (cited in the beginning of the article) of significant differences on condom use between different race/ethnic groups, we found the underlying factor structure of the CBS that measures barriers to condom use to be very similar for African American and White men. Although EFA supported a similar, general structure of these two race-ethnicity groups of men, it revealed several specific differences between men and women. Two items, “it is a man’s responsibility to provide a condom” (Item 23) and “use of a condom was not necessary, because another method was used” (Item 29), were not associated with any of the prespecified subscales. These two items may well be relevant only for women and may not have been included in the original items pooled had it been generated conceptually for men only.

Two items originally found to be defining Access/Availability and one item defining Motivational Barriers with women were associated with different dimensions on responses to the CBS by the sample of men in this study. Item 9, “being afraid to suggest to their partner they use a condom,” was associated with Partner Barriers rather than Access/Availability. Many women may view condoms as not being available to them if their partner is not open to the idea. They may also have experienced being the recipient of angry or violent outbursts at such suggestions in the past. Whereas with men, suggesting condoms to a partner is probably not an access issue but may be perceived as having potential negative consequences for the relationship. Therefore, Item 9 appears to meet content and face validity for its new factor as well as factor validity.

For men, Item 4 “being unable to find a condom right before sexual intercourse” was associated with Motivational Barriers rather than Access/Availability. Men may be reporting that not having a condom available is a way of saying that they just do not really want to use them (motivation). Thus, Items 4 and 9 appear to meet content and face validity for their new factors as well as factor validity. The performance of Item 27, “when I use a condom I feel less involved or committed to the relationship,” is a bit more puzzling. Although it loads on Motivational Barriers for women and Effects on Sexual Experience for men, the item content is more similar to Partner Barriers. Additionally, in Study 1 of St. Lawrence et al. (1999), this item loaded .33 on Access/Availability, .34 on Partner Barriers, .29 on Effect on Sexual Experience, and .47 on Motivational Barriers. Item 24, “I feel closer to my partner without a condom,” which loads on Effects of Sexual Experience for both men and women, may be informative here. Men may be indicating that they enjoy sex more when they feel emotionally close to their partner and condoms interfere with that feeling of closeness. It is important to note that observed differences in the factor structure between women and men did not appear to be related to item content modifications made with this sample, because only 1 of 10 modified CBS items revealed discrepant results.

Failure to extract identical factors with men as originally obtained by St. Lawrence et al. (1999) with women is likely to be due to a few differences in perception between males and

females on issues concerning condom use and sexual relationships. Sampling fluctuations may also be contributing to differences observed. However, with the exception of five items previously noted, the factor structure that emerged with men was very similar to that obtained with women.² Because we chose to adapt the CBS items rather than generate new items specific for men, it is unknown if the factor structure might be different or if new factor domains may have been identified specific to men if male-specific items had been added.

Overall, the findings suggest that the CBS is a potentially valid and reliable instrument for men and women, and may have utility for assessing barriers to condom use. The clinical and research utility of the CBS will need to be determined in future studies. In this report, we demonstrated that positive attitudes toward condoms as measured by the CBS were associated with higher percentage of condom use. But additional studies are needed to determine if CBS scores are sensitive to interventions aimed at overcoming barriers to condom use. Although the potential differential utility of the CBS factors has yet to be determined, future studies might explore whether CBS factor scores may inform prevention interventionists about where to focus their efforts. Although Crosby et al. (2004) demonstrated the utility of the CBS with male criminal justice detainees, further research would be needed to determine the utility of the CBS with other groups of men at high risk for contracting or transmitting STIs.

Acknowledgments

The authors of this manuscript wish to thank members of each participating RRTC and CTP node (California/Arizona, Delaware Valley, Long Island, North Carolina, New England, Ohio Valley, Pacific, South Carolina, and Southwest) for their contributions to the CTN-0018 study. Preparation of this report was supported by National Institute on Drug Abuse (NIDA) Clinical Trials Network grants: U10 DA13714 (Dennis Donovan, principal investigator [PI]), U10 DA13035 (Edward Nunes, PI), U10 DA15815 (James Sorensen, PI), U10 DA13043 (George Woody, PI), U10 DA13038 (Kathleen Carroll, PI), U10 DA13711 (Robert Hubbard, PI), U10 DA13732 (Eugene Somoza, PI), U10 DA13045 (Walter Ling, PI), U10 DA13727 (Kathleen Brady, PI), and U10 DA15833 (William Miller, PI).

Appendix

-
1.	Most of the time neither of us has a condom available.
*2.	I don't want my partner to put a condom on me.
[I don't want to put a condom on my partner.]
*3.	If I suggest to my partner we use a condom he/she might end the relationship.
[If I suggested my partner use a condom he might end the relationship.]
4.	I can never find a condom right before sexual intercourse.
*5.	My partner doesn't want us to use condoms.
[My partner won't use a condom.]
*6.	If I suggested we use a condom my partner would think I don't trust him or her.
[If I suggested my partner use a condom he would think I don't trust him.]
7.	I usually forget about using a condom.
*8.	If I suggested we use a condom my partner would think I'm accusing him/her of cheating.
-

²Some differences in the results of the exploratory factor analyses with the current study and Study 1 and Study 2 conducted by St. Lawrence et al. (1999) may also be due to the different factor analytical techniques employed. Whereas we elected to use a common factor model with oblique rotation, they selected a principal components analysis, retaining components based on the eigenvalue-greater-than-one rule, with an orthogonal varimax rotation. Their method is of particular concern because potential consequences of this approach have been frequently cited in the research literature (Bentler & Kano, 1990; Fabrigar, MacCallum, Wegener, & Strahan, 1999; Floyd & Widaman, 1995; Lee & Comrey, 1979; Widaman, 1990, 1993). With principal components analysis, the components are mathematical abstractions, which may or may not correspond to latent constructs underlying the measured variables, and the procedure frequently tends to result in component loadings that are numerically much larger than comparable common factor loadings and tends to underestimate the correlations between factors. Additionally, orthogonal varimax rotation is a strategy that is difficult to justify in many cases, because use of an oblique solution, which does not preclude zero correlations among factors, is the appropriate method when one expects significant associations among underlying dimensions, and for justification of calculating a total score from subscale measures. Although their method is considered inappropriate for the current data analysis, when a principal components analysis with varimax rotation is performed, the results in this study are the same. That is, both items 23 and 29 do not load ($< .30$) on any component. The loadings for Item 23 are .21, .09, .26, .16, and for Item 29 are -.00, .26, .28, .27, for Partner Barriers, Effect on Sexual Experience, Access Availability, and Motivational Barriers, respectively. Item 4 still loads on Motivational Barriers (.65), Item 9 on Partner Barriers (.68), and Item 27 has its highest loading on Effect on Sexual Experience (.45).

- *9. [If I suggested my partner use a condom he would think I'm accusing him of cheating.]
I would be afraid to suggest to my partner we use a condom.
[I would be afraid to ask my partner to use a condom.]
- *10. If I used a condom my partner might think I'm cheating on him/her.
[If I asked my partner to use a condom he might think I'm cheating on him.]
11. Condoms rub and cause irritation.
12. I wouldn't know where to get a condom.
13. Condoms don't feel good.
- *14. If I suggested my partner use a condom he/she might be turned off and lose interest in having sex.
[If I suggested my partner use a condom he might be turned off or lose his erection/hard on.]
15. Condoms interrupt the mood.
16. Condoms are against my religious values.
17. Condoms feel unnatural.
- *18. If I used a condom my partner might get angry.
[If I asked my partner to use a condom he might get angry.]
19. Condoms don't fit right.
20. Condoms cost too much.
21. I don't have transportation to buy or get condoms.
22. I would be embarrassed to buy condoms or ask for them.
23. It's up to the man to provide a condom.
24. I feel closer to my partner without a condom.
- *25. If I suggested my partner use a condom he/she might think I am putting him/her down or insulting him/her.
[If I suggested my partner use a condom he might think I'm putting him down or insulting him.]
26. I don't need to use a condom, I never catch anything.
27. When I use a condom I feel less involved or committed to the relationship.
28. Condoms change the climax or orgasm.
29. I don't need to use a condom, I use another method.

Note: The Condom Barriers Scale for men contains 10 modified items, indicated by an asterisk preceding the item number, with original item content used with women in square brackets.

References

- Basen-Engquist K, Masse LC, Coyle K, Kirby D, Parcel GS, Banspach S, et al. Validity of scales measuring the psychosocial determinants of HIV/STD-related risk behavior in adolescents. *Health Education Research: Theory and Practice* 1999;14:25–38.
- Bentler PM, Kano Y. On the equivalence of factors and components. *Multivariate Behavioral Research* 1990;25:67–74.
- Browne MW. Asymptotic distribution-free methods for the analysis of covariance structures. *British Journal of Mathematical and Statistical Psychology* 1984;37:62–83. [PubMed: 6733054]
- Campbell SM, Peplau LA, DeBro SC. Women, men, and condoms: Attitudes and experiences of heterosexual college students. *Psychology of Women Quarterly* 1992;16:273–288. [PubMed: 12286010]
- Carter JA, McNair LD, Corbin WR, Williams M. Gender differences related to heterosexual condom use: The influence of negotiation styles. *Journal of Sex and Marital Therapy* 1999;25:217–225. [PubMed: 10407794]
- Centers for Disease Control and Prevention. Fact sheet for public health personnel: Male latex condoms and sexually transmitted diseases. 2006. Retrieved June 9, 2006, from <http://www.cdc.gov/nchstp/od/latex.htm>
- Coyle SL, Needle RH, Normand J. Outreach-based HIV prevention for injecting drug users: A review of published outcome data. *Public Health Reports* 1998;113:19–30. [PubMed: 9722807]
- Crosby RA, DiClemente RJ, Wingood GM, Cobb BK, Harrington K, Davies SL, et al. Condom use and correlates of African American adolescent females' infrequent communication with sex partners about preventing sexually transmitted diseases and pregnancy. *Health Education and Behavior* 2002;29:219–231. [PubMed: 11942716]
- Crosby RA, DiClemente RJ, Wingood GM, Salazar LF, Harrington K, Davies SL, et al. Identification of strategies for promoting condom use: A Prospective analysis of high-risk African American female teens. *Prevention Science* 2003;4:263–270. [PubMed: 14598998]
- Crosby R, Salazar LF, DiClemente RJ. Lack of recent condom use among detained adolescent males: A multi-level investigation. *Sexually Transmitted Infections* 2004;80:425–429. [PubMed: 15572607]
- Curran PJ, West SG, Finch JF. The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods* 1996;1:16–29.

- D'Agostino, RB. Tests for the normal distribution. In: D'Agostino, RB.; Stephens, MA., editors. Goodness-of-fit techniques. Marcel Dekker; New York: 1986. p. 367-419.
- Essien EJ, Ross MW, Fernández-Esquer ME, Williams ML. Reported condom use and condom use difficulties in street outreach samples of men of four racial and ethnic backgrounds. *International Journal of STD and AIDS* 2005;16:739-743. [PubMed: 16303069]
- Fabrigar LR, MacCallum RC, Wegener DT, Strahan EJ. Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods* 1999;4:272-299.
- Floyd FJ, Widaman EF. Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment* 1995;7:286-299.
- Folstein MF, Folstein SE, McHugh PR. "Mini-mental state": A practical method for grading the state of patients for the clinician. *Journal of Psychiatric Research* 1975;12:129-138. [PubMed: 1202204]
- Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research* 1981;18:39-50.
- Gross M, Holte SE, Marmor M, Mwatha A, Koblin BA, Mayer KH. Anal sex among HIV-seronegative women at high risk of HIV exposure. *Journal of Acquired Immune Deficiency Syndromes* 2000;24:393-398. [PubMed: 11015157]
- Hanna KM, Tompkins ES. An adolescent and young adult condom perception scale. *Western Journal of Nursing Research* 1999;21:621-630. [PubMed: 11512183]
- Hayton JC, Allen DG, Scarpello V. Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organizational Research Methods* 2004;7:191-205.
- Horn JL. A rationale and test for the number of factors in factor analysis. *Psychometrika* 1965;30:179-185. [PubMed: 14306381]
- Hu L, Bentler PM. Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods* 1998;3:424-453.
- Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling* 1999;6:1-55.
- Jadack RA, Hyde JS, Keller ML. Gender risk and knowledge about HIV, risky sexual behavior, and safer sex practices. *Research in Nursing and Health* 1995;19:313-324. [PubMed: 7624525]
- Jennrich RI, Sampson PF. Rotation for simple loadings. *Psychometrika* 1966;31:313-323. [PubMed: 5221128]
- Johnson EH, Jackson LS, Hinkel Y, Gilbert D. I. Hoopwood T, Lollis CM, et al. What is the significance of black-white differences in risky sexual behavior? *Journal of the National Medical Association* 1994;86:745-759. [PubMed: 7807559]
- Jöreskog KG, Lawley DN. New methods in maximum likelihood factor analysis. *British Journal of Mathematical and Statistical Psychology* 1968;2:83-87.
- Kaiser HF, Caffrey J. Alpha factor analysis. *Psychometrika* 1965;30:1-14. [PubMed: 14293189]
- Kaiser HF, Derflinger G. Some contrasts between maximum likelihood factor analysis and alpha factor analysis. *Applied Psychological Measurement* 1990;14:29-32.
- Lee HB, Comrey AL. Distortions in a commonly used factor analytic procedure. *Multivariate Behavioral Research* 1979;14:301-321.
- Lei M, Lomax RG. The effect of varying degrees of nonnormality in structural equation modeling. *Structural Equation Modeling* 2005;12:1-27.
- Lollis CM, Johnson EH, Antoni MH. The efficacy of the health belief model for predicting condom usage and risky sexual practices in university students. *AIDS Education and Prevention* 1997;9:551-563. [PubMed: 9451482]
- MacCallum RC, Widaman KF, Zhang S, Hong S. Sample size in factor analysis. *Psychological Methods* 1999;4:84-99.
- Mardia KV. Measures of multivariate skewness and kurtosis with applications. *Biometrika* 1970;57:519-530.
- Marsh HW, Hau K-T. Assessing goodness of fit: Is parsimony always desirable? *Journal of Experimental Education* 1996;64:364-390.

- Metzger DS, Koblin B, Turner C, Navaline H, Valenti F, Holte S, et al. Randomized controlled trial of audio computer-assisted self-interviewing: Utility and acceptability in longitudinal studies. *American Journal of Epidemiology* 2000;152:99–106. [PubMed: 10909945]
- Meyer-Bahlburg, H.; Ehrhardt, A.; Exner, TM.; Gruen, RS. Sexual risk behavior assessment schedule—adult armory interview. New York State Psychiatric Institute and Columbia University; New York: 1991.
- Morrison DM, Gillmore MR, Baker SA. Determinants of condom use among high-risk heterosexual adults: A test of the theory of reasoned action. *Journal of Applied Social Psychology* 1995;25:651–676.
- O'Connor BP. SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instrumentation and Computers* 2000;32:396–402.
- SAS. Release 9.1, software system for Windows. SAS Institute; Cary, NC: 2004.
- Smith LA. Partner influence on noncondom use: Gender and ethnic differences. *Journal of Sex Research* 2003;40:346–350. [PubMed: 14735408]
- Sohler N, Colson PW, Meyer-Bahlberg HFL, Susser E. Reliability of self-reports about sexual risk behaviors for HIV among homeless men with severe mental illness. *Psychiatric Services* 2000;51:814–816. [PubMed: 10828118]
- Sorensen JL, Brown L, Calsyn D, Tross S, Booth RE, Song Y, et al. AIDS research in the NIDA clinical trials network: Emerging results. *Drug and Alcohol Dependence* 2007;89:310–313. [PubMed: 17590899]
- Sorenson JL, Copeland AL. Drug abuse treatment as an AIDS prevention strategy: A review. *Drug and Alcohol Dependence* 2000;59:17–31. [PubMed: 10706972]
- St. Lawrence JS, Chapdelaine AP, Devieux JG, O'Bannon RE, Brasfield TL, Eldridge GD. Measuring perceived barriers to condom use: Psychometric evaluation of the condom barriers scale. *Assessment* 1999;6:391–400. [PubMed: 10539985]
- Sunnola AM. Developing a scale for measuring the barriers to condom use in Nigeria. *Bulletin of the World Health Organization* 2001;79:926–932. [PubMed: 11693974]
- Thurstone, LL. Multiple factor analysis. University of Chicago Press; Chicago: 1947.
- Tucker, LR. A method of synthesis of factor analysis studies. Department of the Army; Washington, DC: 1951. Personnel Research Section Report No. 984
- Turner NE. The effect of common variance and structure pattern on random data eigenvalues: Implications for the accuracy of parallel analysis. *Educational and Psychological Measurement* 1998;58:541–568.
- von Haefen I, Fishbein M, Kasprzyk D, Montano D. Acting on one's intentions: Variations in condom use intentions and behaviors as a function of type of partner, gender, ethnicity and risk. *Psychology Health and Medicine* 2000;5:163–171.
- West, SG.; Finch, JF.; Curran, PJ. Structural equation models with nonnormal variables. In: Hoyle, RH., editor. *Structural equation modeling: Concepts, issues, and applications*. Sage; Newbury Park, CA: 1995. p. 56-75.
- Widaman KF. Bias in pattern loadings represented by common factor analysis and component analysis. *Multivariate Behavioral Research* 1990;25:89–95.
- Widaman KF. Common factor analysis versus principal component analysis: Differential bias in representing model parameters? *Multivariate Behavioral Research* 1993;28:263–311.
- Wrigley CS, Neuhaus JO. The matching of two sets of factors. *American Psychologist* 1955;10:418–419.

Results of Second-Order Confirmatory Factor Analysis: Factor Loadings (*n* = 590)**Table 1**

	ULS	ML
Partner Barriers		
3. If I suggest to my partner we use a condom he or she might end the relationship.	.583	.568
5. My partner does not want us to use condoms.	.574	.516
6. If I suggested that we use a condom, my partner would think I do not trust him or her.	.762	.796
8. If I suggested we use a condom, my partner would think I'm accusing him/her of cheating.	.779	.834
10. If I used a condom, my partner might think I'm cheating on him/her.	.769	.811
14. If I suggested my partner use a condom, she might be turned off and lose interest in having sex.	.767	.713
18. If I used a condom my partner might get angry.	.824	.805
25. If I suggested my partner use a condom he/she might think I am putting him/her down or insulting him or her.	.793	.798
Effect on Sexual Experience		
11. Condoms rub and cause irritation.	.621	.602
13. Condoms do not feel good.	.614	.734
15. Condoms interrupt the mood.	.759	.708
17. Condoms feel unnatural.	.621	.727
19. Condoms don't fit right.	.651	.594
24. I feel closer to my partner without a condom.	.630	.530
28. Condoms change the climax or orgasm.	.654	.685
Access/Availability		
4. I can never find a condom right before sexual intercourse.	.506	.460
9. I would be afraid to suggest to my partner we use a condom.	.749	.612
12. I wouldn't know where to get a condom.	.435	.551
16. Condoms are against my religious values.	.466	.510
20. Condoms cost too much.	.336	.360
21. I don't have transportation to buy or get condoms.	.428	.500
22. I would be embarrassed to buy condoms or ask for them.	.384	.470
23. It's up to the man to provide a condom.	.363	.338
Motivational Barriers		
1. Most of the time neither of us has a condom available.	.404	.424
2. I don't want my partner to put a condom on me.	.420	.438
7. I usually forget about using a condom.	.529	.507
26. I don't need to use a condom, I never catch anything.	.519	.535
27. When I use a condom I feel less involved or committed to the relationship.	.642	.588
29. I don't need to use a condom, I use another method.	.394	.416
Loadings of Subscale Factors With Total CBS Factor		
Partner Barriers	.748	.729
Effect on Sexual Experience	.574	.564
Access/Availability	.912	.870
Motivational Barriers	.938	.923
Interfactor Correlations		
	Effect on Sexual Experience	Access/Availability
Partner Barriers		
Effect on Sexual Experience	.425 (.411)	
Access/Availability	.682 (.635)	.701 (.675)
	.526 (.491)	.538 (.521)
		.855 (.804)

Note: ULS = unweighted least squares; ML = maximum likelihood. Interafactor correlations are ULS and ML (in parentheses).

Results of Exploratory Factor Analysis ($n = 590$)

Factor Loadings				
Partner Barriers				
3. If I suggest to my partner we use a condom she might end the relationship.	.529	-.129	.152	.097
5. My partner doesn't want us to use condoms.	.382	.157	-.203	.335
6. If I suggested we use a condom my partner would think I don't trust him or her.	.849	.038	-.081	-.055
8. If I suggested we use a condom my partner would think I'm accusing her of cheating.	.871	-.055	-.019	-.042
9. ^a I would be afraid to suggest to my partner we use a condom. [originally Access/Availability]	.608	-.014	.087	.111
10. If I used a condom my partner might think I'm cheating on her.	.830	-.021	-.059	.001
14. If I suggested my partner use a condom she might be turned off and lose interest in having sex.	.647	.176	.051	-.011
18. If I used a condom my partner might get angry.	.776	.043	.086	.007
25. If I suggested my partner use a condom she might think I am putting her down or insulting her.	.760	.022	.075	-.006
Effect on Sexual Experience				
11. Condoms rub and cause irritation.	.058	.545	.137	-.056
13. Condoms don't feel good.	-.134	.766	-.022	.039
15. Condoms interrupt the mood.	.102	.644	.005	.054
17. Condoms feel unnatural.	-.051	.772	-.074	-.021
19. Condoms don't fit right.	.100	.553	.169	-.097
24. I feel closer to my partner without a condom.	.149	.473	-.095	.170
27. ^a When I use a condom I feel less involved or committed to the relationship. [originally Motivational Barriers]	.200	.364	.158	.096
28. Condoms change the climax or orgasm.	.008	.708	-.020	.004
Access/Availability				
12. I wouldn't know where to get a condom.	.028	-.138	.672	.094
16. Condoms are against my religious values.	.091	.076	.455	.015
20. Condoms cost too much.	-.020	.168	.332	.007
21. I don't have transportation to buy or get condoms.	.038	.029	.625	-.043
22. I would be embarrassed to buy condoms or ask for them.	.038	-.010	.597	-.045
Motivational Barriers				
1. Most of the time neither of us has a condom available.	-.022	-.100	.029	.652
2. I don't want my partner to put a condom on me.	-.012	.130	-.143	.580
4. ^a I can never find a condom right before sexual intercourse [originally Access/Availability]	.106	-.107	.105	.574
7. I usually forget about using a condom.	.137	.110	.025	.399
26. I don't need to use a condom, I never catch anything.	.016	.129	.262	.338
Items without salient factor loadings				
23. ^a It's up to the man to provide a condom. [originally Access/Availability]	.154	.042	.173	.099
29. ^a I don't need to use a condom, I use another method. [originally Motivational barriers]	-.075	.224	.195	.213
Interfactor Correlations				
	Effect on Sexual Experience		Access/Availability	Motivational Barriers
Partner Barriers	.291		.358	.450

Interfactor Correlations	Effect on Sexual Experience	Access/Availability	Motivational Barriers
Effect on Sexual Experience Access/Availability	.279	.337	.222

Note: Factor loading >.30 are given in boldface.

^aItem factor loading inconsistent with original Condom Barriers Scale subscales.

Table 3
Coefficients of Congruence Between St. Lawrence et al. (1999) Study 1 and Study 2 Component Loadings and Current Study (*n* = 590) Common Factor Loadings

Study 2	Study 1			
	Partner Barriers	Effect on Sexual Experience	Access/Availability	Motivational Barriers
Partner Barriers	.973	.457	.513	.330
Effect on Sexual Experience	.542	.976	.402	.358
Access/Availability	.455	.444	.957	.266
Motivational Barriers	.448	.395	.509	.820
Current Study	Study 1			
	Partner Barriers	Effect on Sexual Experience	Access/Availability	Motivational Barriers
Partner Barriers	.873	.317	.390	.110
Effect on Sexual Experience	.237	.832	.199	.255
Access/Availability	.216	.115	.770	.186
Motivational Barriers	.205	.199	.242	.608
Current Study	Study 2			
	Partner Barriers	Effect on Sexual Experience	Access/Availability	Motivational Barriers
Partner Barriers	.898	.338	.337	.263
Effect on Sexual Experience	.178	.850	.213	.189
Access/Availability	.193	.081	.727	.253
Motivational Barriers	.223	.214	.291	.719

Note: Coefficients defining congruence of factors are given in boldface.

Table 4
Test-Retest Reliability Estimates and Coefficients of Congruence (n = 326)

	Postintervention	3-Months Follow-up	6-Months Follow-up
Baseline			
Partner Barriers	.59 (.60) .979	.58 (.57) .980	.58 (.58) .978
Effect on Sexual Experience	.65 (.65) .986	.64 (.63) .982	.62 (.62) .979
Access/Availability	.48 (.46) .952	.41 (.40) .932	.45 (.42) .968
Motivational Barriers	.49 (.46) .927	.43 (.42) .970	.49 (.46) .936
Total CBS	.60 (.60)	.56 (.56)	.60 (.60)
Postintervention			
Partner Barriers		.70 (.71) .986	.68 (.68) .990
Effect on Sexual Experience		.74 (.71) .991	.70 (.71) .989
Access/Availability		.56 (.48) .964	.52 (.48) .963
Motivational Barriers		.69 (.58) .941	.61 (.58) .973
Total CBS		.77 (.77)	.70 (.71)
3-Months Follow-up			
Partner Barriers			.69 (.69) .986
Effect on Sexual Experience			.75 (.76) .984
Access/Availability			.58 (.53) .952
Motivational Barriers			.69 (.67) .946
Total CBS			.75 (.75)

Note: Two-digit values indicate correlations of original Condom Barriers Scale (CBS) subscale and total scores as defined by St. Lawrence et al. (1999), and correlations of CBS factor scores derived in this study (in parentheses); three-digit values indicate coefficients of congruence of factor loadings, based on alpha extraction and oblique rotation.