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The UCLA Multidimensional Condom Attitudes Scale: Documenting the Complex Determinants of Condom Use in College Students

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This article describes the development and validation of the UCLA Multidimensional Condom Attitudes Scale (MCAS). The relationships between the MCAS and gender, sexual experience, intentions to use a condom, and past condom use were assessed. The MCAS has five distinct factors: (a) Reliability and Effectiveness of condoms, (b) the sexual Pleasure associated with condom use, (c) the stigma attached to persons who use condoms (Identity Stigma), (d) the Embarrassment About Negotiation and Use of condoms, and (e) the Embarrassment About the Purchase of condoms. The results strongly suggest that condom attitudes are multidimensional and thus cannot meaningfully be summed to a single global score. Results further indicate that men and women hold very different attitudes toward condoms. Implications of scale multidimensionality and directions for future research are discussed.

Key words: college students, condom attitudes, condom attitudes scale, gender differences

The proper use of condoms is one of the most effective types of protection against sexually transmitted diseases (STDs) in general and against the human immunodeficiency virus (HIV) in particular (U.S. Department of Health and Human Services, 1986). Condoms also reduce the risk of unplanned pregnancy. The fatal prognosis of an HIV infection has propelled condom use to a prominence in our culture that may be unprecedented in history. Pessimism about finding a medical cure for HIV in the near future has elevated risk behavior change, especially condom use, to the forefront of public health campaigns.

Young people are among the highest risk groups for both STDs and unwanted pregnancies. In fact, 85% of all reported STDs occur in individuals between 15 and 30 years of age (Quackenbush & Sargent, 1988), and STDs are widely considered to be at an epidemic level in the United States (Fisher, 1990a). With respect to HIV, young heterosexuals presently have HIV infection rates substantially lower than gay men and intravenous drug users, but this relatively low level of current infection should not promote complacency. The current patterns of sexual behavior of young people will place them at great risk if or when HIV enters this population (Boyer & Kegeles, 1991). Despite the serious consequences of unprotected vaginal intercourse and despite the increasing knowledge regarding the risks involved, most sexually active adolescents do not use condoms during intercourse (Baldwin & Baldwin, 1988; Fisher, 1990a, 1990b; Kegeles, Adler, & Irwin, 1988). DeBuono, Zinner, Daamen, and McCormack (1990), for example, found that although the use of condoms increased among college women from 1975 to 1989, 58% of the sexually active women reported never or seldom using condoms. Indeed, the fact that most college students are sexually active but do not use protection during intercourse makes them a particularly important population to study (Boyer & Kegeles, 1991; DiClemente, Forrest, Mickler, & principal site investigators, 1990).

In spite of the fact that knowledge about disease processes bears little or no relationship to risk-reducing behavior (see, e.g., Aspinwall, Kemeny, Taylor, Schneider, & Dudley, 1991; Brandt, 1987; DiClemente, 1991; DiClemente et al., 1990; Flora & Thoresen, 1988, 1989; Kegeles et al., 1988), the vast majority of theoretical models used still focus on the rational, health-related reasons for why condoms should be used. In fact, nearly all current theoretical analyses of pregnancy and STD prevention rely on a relatively homogeneous set of decision-making models, emphasizing conscious, rational, and deliberative behavior change. These models appear to be the sole source of conceptual help in the analysis of behavior related to unprotected intercourse. In all of these models, individuals are seen as first weighing and deliberating the costs and benefits of a particular set of behaviors and then forming an intent or commitment to the behavior with the best cost–benefit ratio. The most frequently cited of these rational decision-making models are the health belief model (Becker, 1974; Rosenstock, 1966; see Bozulich, Collins, & Reed, 1992, for an extension of the health belief model); the theory of

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reasoned action (Fishbein & Ajzen, 1975; Fishbein & Middlestadt, 1989); and self-efficacy theory (Bandura, 1977, 1986, 1989). Other closely related theories include protection motivation theory (Rogers, 1975, 1983, 1985) and the theory of planned action (Ajzen, 1988; Ajzen & Madden, 1986; see Schwarzer, 1990, for an integrated review of all these theories). Although there exist models of sexual behavior that sample more widely from a variety of conceptual tools (e.g., Byrne & Fisher, 1983; Byrne & Kelley, 1986; Gagnon & Simon, 1973; Geis & Gerrard, 1984), these models are rarely incorporated into the literature on condom use. Such a focus on a small set of factors may place limits on the overall usefulness of condom research.

It is important for condom researchers to recognize that there are many respected theories of attitudes and behavior for which belief systems and expectancy value decision-making processes do not play a role in causing behavior. Examples include psychoanalytic theories and sociobiological theories as general theories of human behavior. Examples from the attitude change literature include both functional theories of attitude change (e.g., Herek, 1987; Katz, McClintock, & Sarnoff, 1957; Smith, Bruner, & White, 1956; see review in Kiesler, Collins, & Miller, 1969) and theories of attitude change in which message content is irrelevant to attitude change (e.g., peripheral routes to attitude change in Petty & Cacioppo, 1986; heuristic attitude change in Eagly & Chaiken, 1992; see also Bozulich et al., 1992).

Cognitive dissonance theory, which dominated social psychology in the 1960s and 1970s, is just one example of an important attitude change theory that falls completely outside the range of models now in use in the condom use literature (Aronson, 1992; Collins, 1992; Festinger, 1957). In this theory, changes in beliefs and attitudes *follow* changes in behavior. That is exactly the opposite causal chain found in the health belief model, the theory of reasoned action, and expectancy value theories of rational decision making, where changes in behavior follow changes in attitudes or beliefs. Furthermore, the laboratory and field experiments stimulated by dissonance theory have been extremely successful at producing long-lasting, transsituational changes in behavior (see reviews by Aronson, 1992; Cialdini, 1988; Collins, 1992; Collins & Hoyt, 1972; Cooper & Croyle, 1984; Eagly & Chaiken, 1992). As such, we feel it is important to draw from research and theories other than those from the expectancy value tradition.

Five features characterize most of the studies on risky sexual behavior that are based on the expectancy value models of decision making: (a) a focus on the intraindividual, *intrapsychic determinants* of risky sexual behaviors while neglecting social, interpersonal determinants; (b) an emphasis on variables relevant to conscious, logical, planned, and *deliberative decision making,* in lieu of other conceptual tools available for the analysis of human behavior; (c) a focus on the *belief systems* thought to be associated with condom use (e.g., the theories of reasoned and planned action); (d) a focus on *health threat* as the major determinant of sexual behavior in general and condom use in particular without considering other important variables irrelevant to health that may cause sexual behavior; and (e) an almost exclusive focus on *knowledge of disease processes* and on education about risky sexual behaviors without consideration of many other applicable models of social influence.

Thus we focus on four illustrative contributions from social psychology which, we argue, can augment our analysis of condom use behaviors: (a) the negotiation of condom use within a social interaction, (b) public enactment behaviors such as the purchase of condoms, (c) impression management in social interactions, and (d) the role of gender roles in shaping social interactions. One major advantage of focusing on these particular barriers to condom use is that there are rich theoretical traditions in social psychology that can assist in the analysis of the problem and the design and implementation of ameliorative interventions.

Negotiations with partner. The discussion of the structural and psychological barriers to safer sex behaviors by Fisher and his colleagues provides a useful starting point regarding the first two processes in the list above (e.g., Fisher, 1990a, 1990b; Fisher, Byrne, & White, 1983). Fisher (1990a) views the process of negotiating contraception as one of the major structural barriers to condom use. He suggested that discussion and negotiation of sex-related prevention should occur before any sexual involvement and should focus on setting limits short of intercourse or agreeing on which method to use to prevent pregnancy or STDs. However, Chervin and Martinez (1987) reported that only 26% of the college students they sampled discussed sexual health before sexual activity. Unsafe sexual practices involve an exchange of potentially infected bodily fluids—almost inevitably a social and interpersonal interactive process. As Grieco (1987) points out: "Unlike changes in dietary, smoking, or exercise habits, changes in sexual behavior typically involve sensitive interpersonal issues. Physicians and other health professionals . . . have typically overlooked the specific interpersonal obstacles to adopting STD-preventive behaviors" (p. 70).

Public enactment behaviors. As part of the preventive behavior sequence, Fisher (1990a) also discussed the performance of public preventive acts as one of the necessary ingredients of an effective protective sexual behavior. The need to keep a sexual interaction private and unknown by parents, friends, or even strangers, for instance, may interfere with the best of contraceptive intentions. Fisher mentioned the purchase of condoms as an example of a public, sex-related preventive act.

The management of social impressions. Yet another important social force on behavior is generated by impression management needs. Learning that a person uses (or proposes to use) a condom may transmit information about who that person is (Bozulich et al., 1992). Studies by Collins (1989; Collins and Aspinwall, 1988, 1989; Collins & Karney, 1993) indicate that a proposal to use a condom can "inform" one's partner that one is interesting, strong, and active, but also promiscuous, inappropriate, and a poor friend. An impression management perspective suggests that it is important to look beyond attitudes toward condoms, per se, and to focus on the stigma attached to the identity of condom users. These identity images (e.g., positive halos and negative stigma) attached to condom users can facilitate or inhibit condom use. In other

words, the perceived implications of condom use in the creation and maintenance of desirable and undesirable self-images and social impressions (Collins & Karney, 1993) illustrate a causal determinant of condom use behaviors unlikely to be uncovered in a review of the health belief model or the theory of reasoned action.

Sex roles. Gender roles provide an additional social, interpersonal causal force that shapes unprotected sexual intercourse and condom use behaviors. Society's definitions of "what it means to be a man" and "what it means to be a woman," for example, are particularly pertinent to sexual interactions, where gender roles are highly salient. We argue that there are important differences in the causal dynamics of male and female sexual behavior. The condom is a male-controlled contraception and the only kind of contraception that protects against both STDs (including HIV) and pregnancy. Again, the fact that condom behaviors might be inconsistent with one's gender role is another potential barrier to condom use. But neither the health belief model nor the theory of reasoned action provides much help in the identification of sex roles, in particular as a barrier to condom use. And should gender roles prove, in fact, relevant to condom use behaviors, there is a rich conceptual tradition in social psychology to assist in the analysis and remedy of the barriers to condom use generated by gender roles. Very little research has examined gender differences and condom use. Some articles have reported gender differences with respect to the importance of contraceptives (Murray, Harvey, & Beckman, 1989) and in condom attitudes (Campbell, Peplau, & DeBro, 1992; Sacco, Levine, Reed, & Thompson, 1991), but others reported no differences (e.g., Brown, 1984).

Despite the widespread attention devoted to condom use behaviors in recent years, few attempts have been made to develop systematically a valid and reliable condom attitudes scale. This lack of multiple-indicator, multidimensional scales may exist, in part, because many studies on condom use have been conducted in a survey research tradition, in which concepts are typically measured by a single item. It may also reflect a hope that the causal dynamics of condom use behaviors are simple and unidimensional; the quest for a magic bullet is admirable, but such simple solutions have been both very seductive and very elusive in the campaign against STDs throughout history (Brandt, 1987).

At the time the present study was designed, there existed only one factor-analytically derived, multidimensional condom attitude scale (Brown, 1984). There are several problems inherent in the Brown scale and its factor solution, many of which Brown noted but which have been ignored by subsequent users of the scale (e.g., Baffi, Schroeder, Redican, & McCluskey, 1989; Brafford & Beck, 1991; Chapman & Hodgson, 1988; Kyes, 1990; Ross, 1988a, 1988b; Tanner & Pollack, 1988). First, a closer analysis of the published factor loadings reveals that of the 40 questions in the scale, 11 questions did not have factor loadings greater than .35 on any factor. That is, these 11 items (more than 25% of the questions used in the scale) accounted for less than 12% of the common variance, suggesting that these 11 questions may be unreliable or invalid. Second, Brown reported finding five distinct subscales: safety and reliability, comfort, embarrassment, sexual arousal/excitement, and interruption of sexual activity. However, these subscales were poorly defined and do not cover several well-established barriers to condom use. In Brown's set of 40 questions, for example, none pertains to issues related to the purchase of condoms. An additional problem with the Brown scale is that the individual components have not been correlated with criterion variables to test the separate construct validity of the individual factors. Finally, whereas Brown stated that condom attitudes were multidimensional, researchers who used the scale reported a single global score (e.g., Brafford & Beck, 1991; Kyes, 1990; Kyes, Brown, & Pollack, 1991; Tanner & Pollack, 1988).[1]

Overview of the Present Studies

There were two purposes for this investigation. Our first goal was to develop a multidimensional, multiple-indicator condom attitudes scale that would include items tapping several independent determinants of condom use behavior. Second, we set out to correlate the five factors of the UCLA Multidimensional Condom Attitudes Scale (MCAS) with other criterion variables, to establish the construct validity for each factor in the scale. In Study 1, the five domains in the MCAS were developed, and the MCAS was correlated with relevant criterion variables—such as sexual experience, intentions to use condoms, and past as well as future condom use. In Study 2, the scale domains were cross-validated by means of factor analyses, and one item was added to improve one domain. In Study 3, we replicated the factor structure through structural equations modeling, tested the factor structure against a one-factor model, and assessed the independence of the five MCAS factors.

Study 1

Method

Subjects

Subjects were 239 undergraduate students (33% men and 67% women), age 15 to 35 (mean age = 19, median age = 18) recruited from introductory psychology classes at the University of California, Los Angeles. About 20% were high school students participating in a summer course, whereas the remaining students were mostly undergraduates: 46% freshmen, 18% sophomores, 10% juniors, 3% seniors, and 3% graduate students or special students. Fifty percent of the participants were White, 31% Asian, 5% Black, 11% Chicano or Hispanic, and 3% other ethnicities.[2] Forty-six percent of the partici-

[1] Ross (1988a) modified the Brown (1984) scale to be used with gay and bisexual men. On the basis of a factor analysis, he found five distinct dimensions that differentiated a number of criterion variables such as frequency of anal and oral condom use. In a subsequent study (1988c), Ross listed the results separately for each factor but drew all conclusions on the basis of a single total scale score. Ross therefore essentially disregarded his own previous results, suggesting that it is not meaningful to add the factors to a single score.

[2] The effects of age and ethnicity on the five MCAS factors were analyzed in Study 1, Study 2, and Study 3. There were very few significant differences for age across the five MCAS factors, and the significant differences showed no consistent pattern and did not

pants indicated that they had engaged in sexual intercourse (57% of the men and 41% of the women), and 91% of these students reported that they had used a condom at least once (86% of the men and 94% of the women).

Procedure

Participants were recruited for a study entitled Opinions About Health. When they were assembled in groups ranging from 5 to 20 people, the participants were informed in writing that the study was about opinions about sexual health. They were instructed that if they did not want to participate they could leave immediately, turn in a blank questionnaire, or turn in a partially completed questionnaire (and in any case receive full credit for participating). No participants chose any of these options.[3]

Measures

A 15-page, 187-item questionnaire assessed demographic information, condom attitudes, intention to use condoms, perceived personal vulnerability to AIDS and STDs and past experiences (if any) with condoms (sections were presented to participants in this respective order). With respect to past condom use, participants were asked to indicate how often they had used a condom during intercourse in the past year, on a scale ranging from *never* (1) to *always* (7). Participants responded to all intention questions and condom attitude questions on a scale ranging from *strong disagreement* (1) to *strong agreement* (7). Before data analysis, all scores for negatively worded items were reversed, so that high scores would reflect positive attitudes toward condoms or greater intention of future condom use.

The UCLA MCAS. Questions were carefully selected to fit the a priori theoretical barriers that were based on Fisher's (1990a) structural and psychological barriers as well as the interpersonal aspects of condom use discussed in the introduction. All of Brown's (1984) condom attitude scale questions that loaded above .35 were included (29 out of 40 questions met this requirement). A number of other questions from previous investigations (Campbell et al., 1992; Collins, 1989; Collins & Aspinwall, 1988, 1989) were included, and further items were developed to maximize the range and heterogeneity of items in the initial set.

The intention to use a condom scale. To evaluate the intentions to use condoms, participants were asked how likely it was that they would use a condom in the future. Participants were asked the following: "Imagine that you have recently begun dating a new person, and you are going to have sex for the first time. You know that you (or your partner) do not use birth control pills." Participants were then asked to respond to questions about this situation even if they were not sexually active, had never used (or had a partner who used) condoms, or did not anticipate getting a new partner soon. Seven questions asked how likely it was that they would reject, insist, suggest, resist, or refuse to use (or have the partner use) a condom in such a situation. These questions were combined into a single intention index.

Results[4]

Factor Analysis

We performed a principal factor extraction with varimax rotation on the 111 condom attitudes items to discover which condom attitudes questions formed coherent and largely independent subsets. We used varimax rotation because our initial goal was to create factors that were as independent as possible. (The degree to which we succeeded was tested directly in Study 3.) Given the large number of items and relatively small sample size for men, these analyses were exploratory. Consequently, we conducted Study 2 and Study 3 to further investigate and replicate the factor structure.

Factor analyses were completed separately for men and women. As expected on the basis of the large number of items rotated and the relatively few subjects, a large number of factors with eigenvalues above 1 resulted (Tabachnick & Fidell, 1989): 22 factors for men and 16 factors for women. Five factors were retained, for two reasons: (a) A screen test (eigenvalues plotted against factors) indicated that the appropriate number of factors was between 4 and 7 factors for both men and women, and (b) 5 factors resulted in a parsimonious solution and interpretable factors in keeping with the literature on condom attitude domains. The eigenvalues for the first 5 factors ranged between 18.2 and 3.7 for men and 19.0 and 3.3 for women. A total of 24 items were retained (5 items for each factor except for the Identity Stigma factor, with 4 items) on the basis of the following criteria: (a) Only questions with factor loadings above .30 were retained, (b) in cases where more than 5 items loaded above .30 for both men and women, items with the highest factor loadings averaged across men and women were retained, (c) the item did not load .30 or above on a second factor, and (d) the item fit conceptually in the factor and did not overlap with another item in that factor with a higher factor loading.

Table 1 contains the MCAS in its entirety and the results of the factor analysis for the 24 MCAS items that were retained. The MCAS has five distinct factors: (a) the reliability and effectiveness of condoms, (b) the pleasure associated with condom use, (c) the stigma attached to being a condom user, (d) the embarrassment associated with the negotiation and use of condoms, and (e) the embarrassment associated with the purchase of condoms.

The 24 MCAS items were then submitted to a principal factor extraction with varimax rotation, which indicated that all items loaded on the appropriate factors, with most loadings in .70s and .80s ranging from .38 to .92. The five factors accounted for about 65% of the variance in the total

replicate across samples. For ethnicity, there were also few differences. The only effect found in Study 1 and in Study 3 was that Hispanic men compared with White and Asian men (the sample size for Blacks was too small to analyze) tended to have more positive attitudes regarding negotiating condom use.

[3] Participants were randomly assigned to the control group or one of the four conditions. The participants in the experimental conditions read a brochure about STDs and then completed a 15-page anonymous questionnaire. The control group read the brochure after completing the questionnaire. Although it was predicted that the brochures would produce mean differences in condom attitudes, there was no reason to expect that the brochures would result in a different factor *pattern* in condom attitudes (the number of subjects in the control group was too small to statistically compare the factor analysis results). For purposes of scale development, responses from all subjects were therefore included in the factor analyses.

[4] To be vigilant with respect to the possibility that the casual dynamics of unprotected intercourse and condom use might be different for men and women, all scale development and scale validation analyses were consistently conducted separately for men and females.

Table 1
MCAS Factor Loadings and Alpha Values

MCAS factors	Factor loadings for Study 1		α					
			Study 1		Study 2		Study 3	
	Men	Women	Men	Women	Men	Women	Men	Women
Reliability and Effectiveness			.81	.83	.75	.84	.81	.86
1. Condoms are an effective method of birth control.	.66	.68						
2. The condom is a highly satisfactory form of contraception.[a]	.79	.76						
3. I think condoms are an excellent means of contraception.	.84	.82						
4. Condoms are unreliable.[b]	.73	.77						
5. Condoms do not offer reliable protection.[b]	.61	.78						
Pleasure			.80	.80	.77	.74	.75	.74
6. The use of condoms can make sex more stimulating.	.69	.74						
7. Condoms ruin the sex act.[b]	.65	.69						
8. Condoms are uncomfortable for both partners.[b]	.70	.70						
9. Condoms are a lot of fun.	.78	.76						
10. Use of a condom is an interruption of foreplay.[b]	.38	.69						
Identity Stigma			.71	.74	.74	.44	.67	.62
11. Men who suggest using a condom are really boring.[b]	.77	.73						
12. If a couple is about to have sex and the man suggests using a condom, it is less likely that they will have sex.[b]	.75	.65						
13. Women think men who use condoms are jerks.[b]	.74	.78						
14. A woman who suggests using a condom does not trust her partner.[b]	.49	.63						
15. People who suggest condom use are a little bit geeky.[b,c]	—	—						
Embarrassment About Negotiation and Use			.86	.86	.78	.86	.87	.90
16. When I suggest using a condom I am almost always embarrassed.[b]	.58	.76						
17. It is really hard to bring up the issue of using condoms to my partner.[b]	.80	.85						
18. It is easy to suggest to my partner that we use a condom.	.71	.75						
19. I'm comfortable talking about condoms with my partner.	.71	.78						
20. I never know what to say when my partner and I need to talk about condoms or other protection.[b]	.49	.76						
Embarrassment About Purchase			.94	.92	.92	.86	.89	.88
21. It is very embarrassing to buy condoms.[b]	.92	.88						
22. When I need condoms I often dread having to get them.[b]	.83	.84						
23. I don't think that buying condoms is awkward.	.87	.82						
24. It would be embarrassing to be seen buying condoms in a store.[b]	.87	.79						
25. I always feel really uncomfortable when I buy condoms.[b]	.86	.88						

Note. MCAS = Multidimensional Condom Attitudes Scale. For factor analysis and alpha values for Study 1, $n = 239$ (values based on 24 items). For alpha values for Study 2, $n = 171$.
[a]Question 2 can be replaced with "Condoms are an effective method of preventing the spread of AIDS and other sexually transmitted diseases" (see Study 3 for psychometric details). [b]Reverse the item before scoring. [c]Question 15 was not included in Study 1.

Table 2
Mean MCAS Factor Scores Across Gender and Sexual Experience

MCAS factors	Men	Women	*F* value	*p* value	Ever engaged in intercourse: Yes	Ever engaged in intercourse: No	*F* value	*p* value
Reliability and Effectiveness	5.4	5.3	0.55	*ns*	5.3	5.4	0.30	*ns*
Pleasure	4.1	4.3	1.02	*ns*	4.0	4.4	5.64	.02
Identity Stigma	5.6	6.2	35.44	.0001	6.1	5.9	7.24	.008
Embarrassment About Negotiation and Use	4.8	4.8	0.67	*ns*	5.2	4.4	23.84	.0001
Embarrassment About Purchase	4.3	3.5	9.09	.003	4.1	3.5	7.49	.007

Note. MCAS = Multidimensional Condom Attitudes Scale. Higher numbers indicate more positive attitudes toward condoms. Items were rated on a 7-point scale ranging from *strongly disagree* (1) to *strongly agree* (7). All data are from Study 1 (n = 239).

scale(66.6% for men and 63.7% for women). Alpha values for men and women were generally high, ranging from .74 to .94. In Study 2 and Study 3 (described below), an additional item was added to Factor 3. The alpha values for the Identity Stigma factor in Study 1 are therefore based on only the first 4 (rather than 5) items listed in Table 1.

Gender and Sexual Experience

To establish construct validity for the MCAS, the relationship between gender and sexual experience for each of the five MCAS domains was investigated. Two-way analyses of variance (ANOVAs) were performed with gender and sexual experience (have or have not had intercourse) as classification variables for each of the five MCAS domains. The main effects of gender and sexual experience are shown in Table 2. No interactions were significant.

Gender As shown in Table 2, men and women held significantly different attitudes toward condoms on two out of the five condom attitudes domains. Specifically, women's views were more positive than men's regarding the identity stigma associated with condom proposers, F (1, 224) = 35.44, p < .0001. However, men were less embarrassed about buying condoms than women, F (1, 224) = 9.09, p < .003. There were no gender differences on the other three domains (pleasure, embarrassment of negotiating condoms, or reliability and effectiveness of condoms).

Note that if the 25 MCAS items had been added to form a single score, (a) these differences would have gone undetected, and (b) no conclusion could be reached regarding whether men or women are more positive toward the use of condoms.

Sexual Experience Table 2 shows that sexually experienced subjects (those who indicated that they had at least once engaged in sexual intercourse) were significantly more positive with respect to the Embarrassment of Negotiating and Use, F (1, 224) = 23.84, p < .0001, Embarrassment About Purchase, F (1, 224) = 7.49, p < .007, and Identity Stigma, F (1, 224) = 7.24, p < .008. Sexually experienced students were, however, more negative on the issue of condoms' reducing the pleasure of sex, F (1, 224) = 5.64, p < .02. Having sexual experience (91% of these students had also used condoms) had no impact on the attitudes toward the reliability and effectiveness of condoms. In other words, having at least some sexual experience reduces some of the anticipated embarrassment about suggesting and using condoms as well as the stigma of the condom proposer, but it actually strengthens the opinion that condoms reduce the pleasure of sex. Pleck, Sonenstein, and Ku (1990) found the same pattern when comparing sexually experienced and inexperienced men. Sexually experienced men were more positive on issues related to purchase, discussion of condom use, and whether condom suggestions would upset the woman. As in the present study, the sexually experienced men were less positive about the reduced pleasure associated with condom use.

Note that the MCAS domains that show significant differences differed depending on whether gender or sexual experience was used as a criterion variable. These findings would have been lost had the five domains not been investigated separately.

Condom Use: Past and Intended Use

Table 3 contains correlations between subjects' self-reported past condom use and each of the MCAS factors. For men, the frequency of past condom use was significantly correlated with the Pleasure factor (r = .31, p < .05) and with Embarrassment About Purchase (r = .41, p < .01). That is, men who were less embarrassed about buying condoms and who did not think that condoms interfered with the pleasure of sex were more likely to indicate frequent condom use during intercourse in the past year. There were no significant correlations between the five MCAS domains and women's past condom use.

Correlations between the subjects' stated intent to use condoms in the given situation and each of the MCAS domains were also calculated (see Table 3). The only sizable correlation (r = .39, p < .0001) was between men's intentions to use a condom and Embarrassment About Negotiation and Use. In other words, men who were more likely to say that they would use condoms in a future situation were also more likely not to be embarrassed about negotiating their use. Women's intentions to use condoms were significantly correlated with Embarrassment About Negotiation and Use (r = .18, p < .05) and Identity Stigma (r = .17, p < .05). However, overall strength of the correlation for identity stigma was actually greater for men (r = .19, *ns*), suggesting that the significance level may partly be the function of a very large number of women compared with men (3:1 ratio) in this study's sample.

Overall, then, very different patterns appear across the MCAS factor when past and anticipated future condom use is examined. Men who were more frequent users of condoms in the past were less negative about condoms' effects on pleasure and were less embarrassed about buying condoms. Expected future condom use was affected by neither the pleasure aspect nor the embarrassment of purchase. On the other hand, the embarrassment about negotiation of condom use was significantly related to expected future use for both women and men but was not a factor in the past use of condoms. These results again point to the importance of investigating condom attitudes as multivariate as opposed to univariate concepts.[5]

Table 3
Correlations Between Each of the MCAS Domains and Past Condom Use and Intention to Use a Condom

MCAS factors	Gender	Past condom use	Intention to use a condon
Reliability and Effectiveness	Men	.01	−.10
	Women	.06	.06
Pleasure	Men	.31*	.14
	Women	.14	.15
Identity Stigma	Men	.28	.19
	Women	.23	.16*
Embarrassment About Negotiation and Use[a]	Men	.28	.39***
	Women	.13	.18*
Embarrassment About Purchase	Men	.41**	.13
	Women	−.05	−.06

Note. MCAS = Multidimensional Condom Attitudes Scale. For all MCAS items, higher values indicate more positive attitudes toward condoms. Higher values also indicate more intentions to use a condom, more knowledge (from Study 1, $n = 239$), and higher frequency of past condom use (from Study 1, $n = 106$). All correlations are two-tailed.
*$p < .05$. **$p < .01$. ***$p < .0001$.

Study 2

Method

Rationale

In Study 2, the scale domains were cross-validated in an independent sample, and one item was subsequently added to improve the Identity Stigma factor.

Subjects

Subjects were 181 undergraduate students (44% men and 56% women), age 18 to 30 (mean and median age = 19), enrolled in introductory psychology classes at the University of California, Los Angeles. None of these students had participated in Study 1. Over half were freshmen (57%), 26% were sophomores, 10% juniors, and 7% seniors. Thirty percent of the participants were White, 39% Asian, 6% Black, 20% Chicano or Hispanic, and 5% other ethnicities. No data were collected on the sexual orientation or experience of the subjects.

Procedure

Students participated in the study in partial fulfillment of a course research requirement. The measures relevant for this study were embedded in a long list of unrelated personality measures and other scales. Students were informed that some of the materials concerned questions about sexual issues and that they could leave any questions blank without losing credit for participating. All subjects were assured that their answers were completely anonymous.

Materials

On the basis of the factor-analysis results from Study 1, 40 items from the initial set of the MCAS used in Study 1 were selected. On the basis of our conceptual analysis of the five factors from Study 1, an additional 9 new questions were generated to clarify the Identity Stigma factor and to confirm our conceptual grasp on the remaining four factors.

Results

Two different strategies were used to validate the factor-analysis results reported in Study 1 and to continue our search for a set of multidimensional constructs that could be measured with the same set of items for both men and women. For four of the domains (excluding Identity Stigma), items from each domain were entered in a separate factor analysis, and the loadings on the first unrotated (common theme) factor were examined separately for men and women. This analysis tested the hypothesis that all items in a single factor tapped a single, unidimensional latent variable. The factor loadings on the first, unrotated factor ranged from .46 to .93 with an average loading of .69, averaging loadings across the four domains for men and women. The first unrotated factor for each domain accounted for between 75.0% and 92.9% of the variance. The mean percentage of the variance accounted for was 83.6%, averaging across the four domain for men and women. We therefore concluded that the five questions constituting each of these four factors did in fact constitute a unidimensional construct.

The second strategy concerned the Identity Stigma factor. Principal factor extraction with varimax rotation was performed on the nine Identity Stigma items. Factor analyses were completed separately for men and women. The final five items were selected on the basis of the following two criteria: (a) Because more than five questions loaded above .30 for both men and women, the questions with the highest factor loading averaged across men and women were used while taking into account that item's loadings for men and women from Study 1, and (b) the item fit conceptually into the factor and was not overlapping with another item in that factor with a higher factor loading.

One five-item Identity Stigma domain was thus created on the basis of factor loadings from both Study 2 and Study 1 while also considering the results from men and women. For

[5] Note that these correlations contain both within- and between-conditions covariance because all subjects in the four brochure conditions and the control group were included in these analyses. In other words, 80% of the subjects read one of the four brochures before completing the condom use questions. Although the information in these brochures was similar to the kinds of information the subjects may have encountered before reading the brochure, these correlations may differ from those that would have been obtained if the questions had been answered before reading any brochure. (The sample size was too small to analyze the no-brochure control group separately.)

the Identity Stigma factor, four items from Study 1 were retained while a newly created item was added (see Table 1 for the 25 MCAS items).

Study 3

Method

Rationale

There were three primary objectives for Study 3: (a) to test the five-factor structure against a one-factor model, (b) to replicate the factor structure using methods of confirmatory factor analysis in structural equations modeling, and (c) to confirm that the reliability and effectiveness domain included reliability and effectiveness as protections against AIDS and other STDs as well as pregnancy.

Subjects

Subjects were 426 undergraduate students (43% men and 57% women) at the University of California, Los Angeles; Loyola Marymount University; or Pomona College. None of these students had participated in Study 1 or Study 2. The mean and median age of participants was 21, and 52% of the participants were White, 23% were Asian, 3% were Black, 16% were Chicano or Hispanic, and 6% were other ethnicities. Seventy-five percent of the participants indicated that they had engaged in sexual intercourse (76% of the men and 75% of the women), and nearly all of these students reported that they had used a condom at least once (96% of the men and 97% of the women). Data were not collected on marital status, class standing, or the sexual orientation of the subjects.

Procedure

Approximately half of the participants were students in psychology courses, who filled out the survey during class time. Students were informed that some of the materials concerned questions about sexual issues, that they could leave any or all of the questions blank, and that their answers were completely anonymous. After their surveys had been collected, students were given additional information about the scale and thanked for their participation. The remainding half of the surveys were collected by students as part of a class exercise in a methodology laboratory class. Student experimenters were given extensive and detailed training in how to collect data from people on campus without violating the participants' rights to anonymity or their rights to refuse to participate. The student experimenters approached strangers on campus (primarily in the eating facilities) who appeared to be college students between the ages of 18 and 25. After obtaining the person's consent to complete a short survey about sexual issues, they asked the participants to complete the survey and to put it in a sealed envelope when finished. The envelope was picked up by the student experimenters about 10 min later. The participants were then debriefed and thanked for their participation.

Materials

Participants responded to the 25 items of the MCAS from Study 2, a new reliability and effectiveness item, and a few additional items not discussed here. The item "Condoms are an effective method of preventing the spread of AIDS and other sexually transmitted diseases" was hypothesized to conceptually fit in the effectiveness and reliability domain. The following analyses were conducted on the original 25 items in Table 1; results for the new item are presented at the end of the *Results* section.

Results

We conducted a confirmatory factor analysis using EQS (Bentler, 1989), to determine whether the observed variables reflected the five latent constructs as hypothesized. That is, we tested a five-factor model in which five items loaded on each factor, as shown in Table 1 (i.e., our multidimensional model). We also tested a one-factor model in which all items loaded on one factor, to provide a test of a unidimensional model of condom attitudes. The fit of the models was evaluated using the following criteria: the chi-square goodness-of-fit statistic (which is very sensitive to sample size and to the number of parameters estimated) and the Bentler comparative fit index (CFI). For the chi-square test, a nonsignificant finding indicates that the model fits the data well; values above .90 in the comparative fit index are generally viewed as indicating an good fit.

One-factor model. The factor structure of the one-factor model was tested by allowing all of the observed variables (i.e., the 25 MCAS items) to load on one factor. This model yielded the following results for men and women: For men $\chi^2(275) = 1312.5, p < .001$, CFI = .37; for women, $\chi^2(275) = 1748.6, p < .001$, CFI = .37. Because these results indicate that the one-factor model provides a poor fit to the data, we now turn our attention to several variants of the five-factor model.

Model 1. Orthogonal five-factor model. The factor structure of the initial five-factor model was pure, in that each observed variable was allowed to load only on one hypothesized construct. This model yielded the following: For men, $\chi^2(275) = 624.1, p < .001$, CFI = 0.78; for women, $\chi^2(275) = 589.7, p < .001$, CFI = 0.87. The fit of this model was considerably better than for the one-factor model above, and all hypothesized factor loadings were large and significant for men and women.[6] However, the fit of this model was not excellent, especially for men.

Model 2. Oblique five-factor model. To improve the fit of our initial confirmatory factor model, we allowed some of the pairs of factors to correlate (there are 10 such factor pairs with five factors). This process was aided by the Lagrange multiplier test in EQS (Chou & Bentler, 1990), which suggests which changes in the model will significantly improve its fit with the data. These modification indexes suggested allowing 7 factor correlations for men and 5 for women. The CFIs improved to .83 for men $\chi^2(268) = 550.6, p < 0.001$, and .90 for women, $\chi^2(270) = 513.3, p < .001$.

[6] For those readers more familiar with traditional factor analysis, the factor structure of the MCAS replicated nearly perfectly using principal factor extraction with varimax rotation. Five-factor solutions computed separately for men and women strongly replicate the Study 1 and 2 results: For women, all items loaded on the expected factor, with factor loadings between .49 and .86. For men, the same pattern occurred (loadings ranged from .50 to .86) except for one item ("A woman who suggests condom use does not trust her partner"), which did not load on the Identity Stigma factor as expected. The lack of loading for men may indicate what the confirmatory analysis revealed, namely, that the Identity Stigma is correlated with several other domains and that the Identity Stigma for men is a domain that needs additional refinement.

Model 3. Final five-factor fitted model. For many, Model 2 would represent an acceptable fit given that the data analyses had been planned in advance and all were guided by a priori hypotheses. On the other hand, one's confidence in models with fit indexes around .90 is increased if one can demonstrate that a fit index in the very high .90s can be achieved without substantial changes in the parameters. To demonstrate that a near-perfect fit was possible without major changes in the parameters already set in Model 2, additional correlations between the residuals for each item were permitted.

The Lagrange multiplier test suggested that the oblique five-factor model (Model 2) could be improved by including several pairs of error correlations (40 pairs for men and 28 pairs for women). Model 3, created by allowing these pairs of errors to correlate, resulted in the following statistics: For men, $\chi^2(228) = 259.2$, $p < .08$, CFI = .98; for women, $\chi^2(242) = 274.24$, $p < .08$, CFI = .99. The fit was now excellent, and as was the case for Models 1 and 2, all items loaded significantly on the hypothesized construct. Note that the Model 3 modifications did not substantially change the relations among factors established in Model 2. Table 4 contains the factor correlations for both the initial and the final confirmatory analysis models. The correlations between the elements of the two correlation matrices was .99 for both men and women.[7] Figure 1 contains the final five-factor fitted model for men and women.

Two conclusions can be drawn from these results. First, the five-factor model clearly describes the data better than the one-factor model. The one-factor model is, of course, equivalent to a single global score (a unidimensional construct) indicating a general positive or negative attitude toward condoms. Thus the present results cast serious doubt about any analysis of condom use that relies on only a single, general evaluative index of condom use. Second, we have identified five relatively distinct and orthogonal condom domains. We also succeeded in our a priori goal to identify and measure five condom attitude domains with very comparable factor structures for both men and women. One is thus justified in using this particular set of items with both men and women. However we emphasize that correlations between the five attitudinal factors and criterion measures should be conducted separately for men and women.

Our last goal in Study 3 was to show that the conceptual domain of the Reliability and Effectiveness factor includes issues related to condoms as protection against AIDS and other STDs as well as a protection against pregnancy. A new item, "Condoms are an effective method of preventing the spread of AIDS and other sexually transmitted diseases," was written and added at the end of the MCAS. All 26 items were submitted to a principal-factor extraction with varimax rotation, again separately for men and women. The new item did load on the Reliability and Effectiveness factor for both men (.52) and women (.43). When we replicated this finding through confirmatory factor analysis in EQS, the item was constrained to load on the Reliability and Effectiveness factor in the final model reported above. These factor loadings were statistically significant for both men and women. We thus recommend the inclusion of this item in the MCAS. Because the item "The condom is a highly satisfactory form of contraception" had the lowest loading for both men and women and overlapped with the content of the other four items, we recommend that the "highly satisfactory form of contraception" item (#2 in Table 1) be replaced with the "effective method of preventing AIDS and other sexually transmitted diseases" item.

Table 4
Factor Intercorrelations for the Initial and Final Confirmatory Factor Models

Factor	1	2	3	4	5
Reliability and Effectiveness					
Women	—	−.20	0.0	0.0	0.0
Men	—	−.23	.29	0.0	−.20
Pleasure					
Women	−.20	—	.23	0.0	.18
Men	−.22	—	.37	0.0	0.0
Identity Stigma					
Women	0.0	.25	—	.42	0.0
Men	−.26	.32	—	.46	.16
Embarrassment About Negotiation and Use					
Women	0.0	0.0	.39	—	.33
Men	0.0	0.0	.44	—	.43
Embarrassment About Purchase					
Women	0.0	.17	0.0	.34	—
Men	−.17	0.0	.21	.40	—

Note. Initial correlations among factors are below the diagonal; final correlations among facators are above the diagonal. The correlation between the initial and the final model is .99 for both men and women. For all correlations, $p < .05$.

General Discussion

The Multidimensionality of Condom Attitudes

The current data present a compelling case for multidimensionality; one should speak of an individual's condom attitudes. The present data challenge the argument that one dimension, any one dimension, can represent an adequate assessment of condom attitudes. It is clear that if we had analyzed only a single set of general-evaluative condom attitudes in this study, a large number of meaningful and significant findings associated with the five factors would have been obscured. If one is interested in predicting or changing condom attitudes or behavior, it is clear that one must specify which specific components of the condom attitude will be considered.

We are not alone in having demonstrated the multidimensionality of condom attitudes. Brown (1984) found five distinct domains in her scale, but researchers using the scale have

[7] The final model used maximum-likelihood (ML) estimation, but because the data were multivariately kurtortic (Mardia's normalized coefficient estimate was 26.2, $p < .05$, for men and 33.7, $p < .05$, for women), the final model was also evaluated with the Satorra-Bentler statistic as recommended by Hu, Bentler, and Kano (1992). The chi-square was lower than the normal-theory chi-square (45 points for men and 17 points for women), indicating that the model fit was moderately better than shown by the ML statistic. All parameters that were significant in the ML solution were also significant in the robust solution.

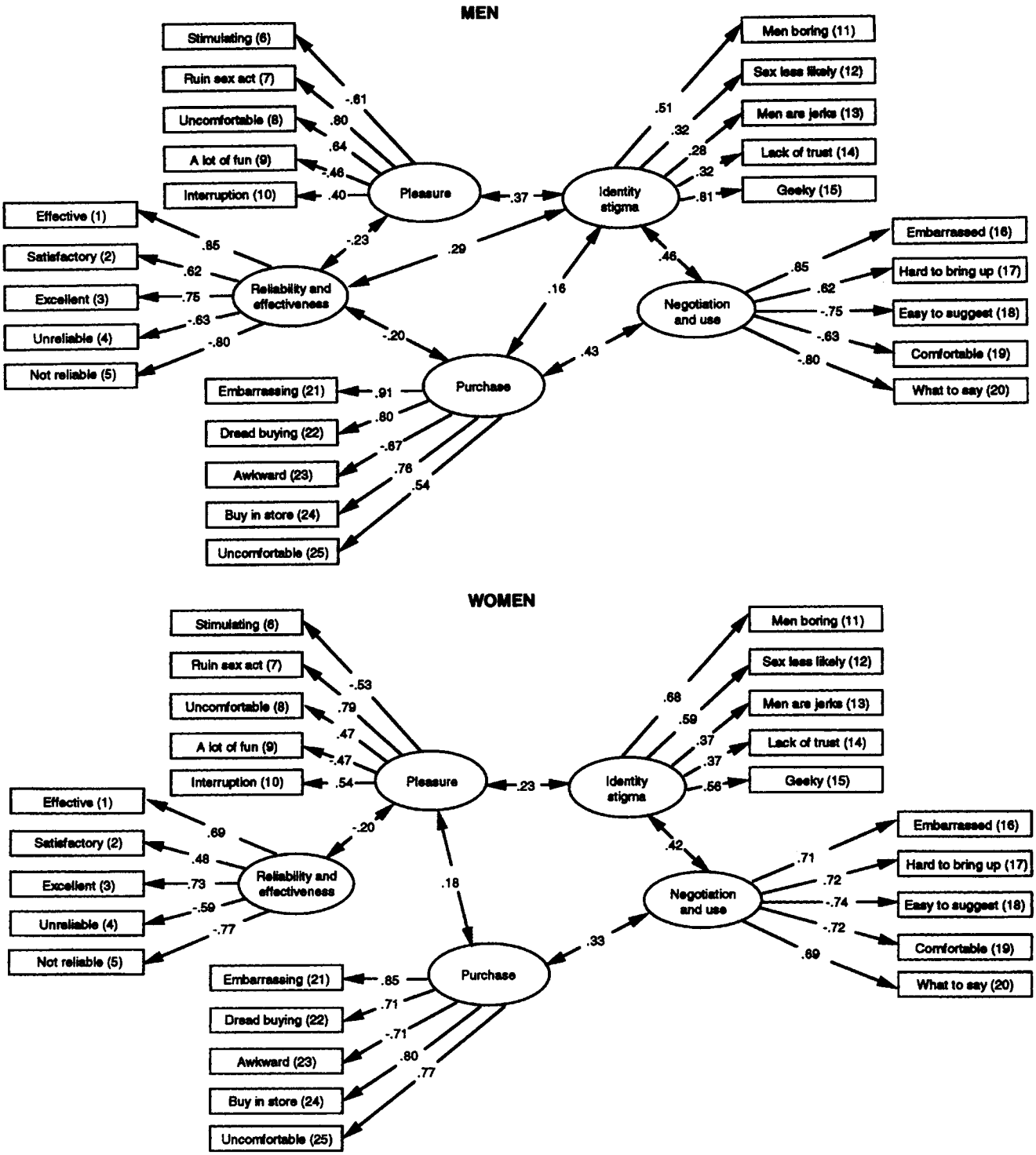

Figure 1. Final confirmatory factor-analysis model for men and women. Ovals represent latent factors and rectangles represent measured variables. Single-headed arrows are factor loadings; two headed-arrows are correlations. The factor loadings are standardized and based on the maximum-likelihood solution. All factor loadings were significant ($p < .001$; significance based on the unstandardized estimates).

largely ignored this fact and have treated it as a unidimensional scale. In a study published after the present data were collected, Sacco et al. (1991) found eight subscales in their 57-item Condom Attitudes Scale. Despite the clear evidence of multidimensionality, these authors suggest that the total score may be used when "a single measure of overall attitude toward condoms is desired" (p. 257). However, because their results revealed that (a) some subscales were irrelevant as predictor variables for carrying and keeping condoms and (b) gender differences were found in six out of the eight subscales, it is very unclear what the utility would be of adding across all eight subscales. On the basis of our results, it is clear that investigators in any research area in which condom attitudes need to be assessed will lose explanatory power by ignoring the multidimensionality of condom attitudes.[8]

Relation of MCAS to Previous Scales

Definitive conclusions about whether these particular five dimensions are the most important factors of condom attitudes will require further research. However, research by Brown (1984) and Sacco et al. (1991) indicates that the MCAS factors are in general agreement with previous efforts. Of Brown's five domains, two (Embarrassment About Use and Reliability) map directly onto two domains from the present five MCAS factors. The three remaining domains in her scale (Comfort, Interruption of Sexual Activity, and Sexual Arousal/Excitement) can be conceptually subsumed under the MCAS Pleasure factor. The Brown scale does not include factors corresponding to the MCAS Identity Stigma or Purchase Embarrassment factors.

When we compared the MCAS domains with the Sacco factors, it appeared that at least three factors in both scales were directly comparable. The three MCAS factors of Pleasure, Embarrassment about Negotiation and Use, and Embarrassment About Purchase are conceptually similar to Sacco et al.'s subscales called Effects on Sexual Experience, Interpersonal Impact, and Inhibition, respectively. Unlike the MCAS, the Sacco et al. scale did not contain subscales that addressed issues of reliability and effectiveness of condoms or the potential identity problems faced by condom users.

The conceptual meaning of the MCAS Identity Stigma factor is, however, found in several of the Sacco et al. subscales. "People who use condoms are wimps" (in the Global Attitudes subscale) and "People who carry condoms are just looking for sex" in the Promiscuity subscale correspond to our notion of a stigma attached to the identity of condom users. Given the somewhat low alphas for the present Identity Stigma factor, the nature and variety of the stigma attached to condom users may require further research. One could wonder, for example, whether the "promiscuity," "boring," "jerk," and "geeky" attributes are all different indicators of the same, unidimensional identity stigma. Or, perhaps there might be two or more relatively orthogonal identity stigmata that are applied independently to condom users.

In summary, we propose that the MCAS both theoretically and practically improves on previous condom attitudes scales. The theoretically derived factors incorporate elements of social psychological theories of behavior and are highly interpretable both in theoretical and practical terms. The MCAS also includes domains (e.g., the reliability of condoms and embarrassment of buying and using condoms) not contained in other condom attitudes scales. The five MCAS factors are in strong adherence to previous research, and with the relatively clearly defined factors, we hope that the multidimensional properties of condom attitudes will be less likely to be ignored. Finally the practical utility is maximized with this relatively short scale, which makes it suitable for administration in many different kinds of research settings.

Gender Differences

Mean differences between men and women were discovered on two of the five MCAS factors, and correlations between a given condom attitude scale and criterion variables consistently differed for men and women. Overall, men were less embarrassed about purchasing condoms than women, whereas women were more positive on issues related to identity stigma. These results are consistent with those by Campbell et al. (1992), who found that women were more positive than men on two dimensions (sexual sensation and interpersonal issues) whereas men were more positive on issues of comfort and convenience (similar to our Embarrassment of Buying factor) and efficacy. Similarly, Hingson, Strunin, and Berlin (1990) found that compared with women, men were more likely to believe that condoms reduce pleasure. Sacco et al. (1991) found that women were more positive toward condoms than men on five out of eight subscales but were more inhibited than men about buying and keeping condoms. These authors suggested that women's positive attitudes failed to result in increased condom use because the women felt they had to rely on a male partner to buy, keep, and supply the condoms. In the present study, women's past condom use did not correlate significantly with any of the MCAS factors. This may indicate the same underlying dynamic: Women may not be in control of the decision to use condoms, and their attitudes are therefore not related to past use.

If all 25 questions in the MCAS had been added, gender effects would not have been apparent. This finding in and of itself demonstrates the problem of using a single, global condom attitude scale. More important, perhaps, is the fact that each domain of condom attitudes shows a different pattern of correlations with criterion variables for men and women. Of all the significant correlations with criterion variables, only one was significant for men and women. Both men and women who were more likely to indicate they would use condoms in the future were significantly more positive about negotiating condom use. Whether or not the two separate correlational patterns for men and women found in this study replicate in future studies remains to be discovered. We would argue, however, that these data strongly suggest that future

[8] Investigators wanting to use a subset of the 25 MCAS questions should either (a) decide a priori which domains are of particular interest and select all five questions from that area or (b) select a subset of questions (two or more) so that all five MCAS domains are represented.

research should analyze results separately for men and women. It is not enough to report mean differences on indexes that have been developed on a sample containing both men and women. Given the present findings with respect to gender, this strategy of separate analyses as applied to sexual preference and ethnic differences may be fruitful in future research.

The MCAS Factors

Research on the barriers to condom use has traditionally focused on the perception that condoms are not reliable and that they reduce sexual pleasure. These two issues are certainly important components of condom attitudes, and they do appear as separate domains on the MCAS. Indeed, these two domains of condom attitudes follow rather directly from the cost–benefit analysis of the rational decision-making theories that have dominated research on unprotected intercourse and condom use.

As previously discussed, negotiations with partner, public enactment behaviors, and impression management are three variables from social psychology that are important in the theoretical analysis of unprotected intercourse and condom use. The present MCAS includes a factor corresponding to each of these three theoretical concerns: the embarrassment about negotiation and use, embarrassment about purchase, and identity stigma. Such interpersonal and social factors have long received attention in the social psychology literature but very little in the AIDS, pregnancy prevention, or condom behavior literature.

Several of the factors in the MCAS also support features of Fisher's (1990a) theoretical framework on the barriers to condom use. Embarrassment about negotiation and embarrassment about purchase are both part of the structural steps that Fisher argued would inhibit condom use. The pleasure domain may fit into the "fantasies" psychological barrier (many mass-media images are provided for having exciting sex but none for how to incorporate condom use). Finally, reliability and effectiveness of condoms may fit onto Fisher's cognitive barriers to prevention (the fact that one may simply have inaccurate information about aspects of condom use). The MCAS domains are thus conceptually congruent with the barriers that some other researchers have suggested for the low rates of condom use among adolescents.

Beyond the Health Belief Model

Previous research guided by the health belief model has used single items measuring aspects of condom use that appear to fall within one or more of the five conceptual MCAS domains. The issue is not that the present five factors cannot be included as barriers to condom use in the health belief model. Rather the point is that several of these factors suggest that condom use is driven by theoretical decision processes that fall outside the usual intrapsychic, expectancy-value, conscious weighting of positive and negative outcomes implicit in the health belief model. We feel that our approach makes several contributions. First, we have developed multiple-indicator scales, which means that the measures will be more reliable than single items and thus provide meaningful increases in the statistical power of studies investigating correlates of condom use. In addition, the multiple indicators makes it possible to use such sophisticated statistical techniques as path analysis and structural equations modeling, which is not possible with single items. Second, we have found five relatively uncorrelated domains of condom attitudes. Orthogonal predictors minimize conceptual confusion in labeling each domain. They also make for better predictive power when all five scale scores are entered in a multiple regression. Third, the conceptual labels are linked to extensive literature in social psychology that will contribute to the analysis of (and interventions to minimize) the five, discrete obstacles to condom use that are identified in the MCAS.

In conclusion, we argue that the identification of the social, interpersonal components in a multidimensional analysis of unprotected intercourse and condom use is a step (if only a small one) in the right direction toward a more complete theory of sexual behavior and condom use. Theories of impression management, identity construction, public and private conformity, interpersonal negotiation, stigma, gender roles, and stereotypes must be integrated into the analysis of condom use behavior. The present data require us to acknowledge that condom use is complex and cannot be analyzed using only intrapsychic models of individual decision making while ignoring the social, interpersonal determinants of sexual behavior.

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