Structure of Outcome Beliefs in Condom Use

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To study the structure of beliefs about condom use outcomes, the authors derived and tested 4 psychosocial hypothetical models: (a) a 2-factor model of the personal and social outcomes of condom use; (b) a 2-factor model of the pros and cons of the behavior; (c) a 3-factor model (i.e., physical, self-evaluative, and social) of outcome expectancies; and (d) a thematic 4-factor model of the protection, self-concept, pleasure, and interaction implications of the behavior. All 4 models were studied with a confirmatory factor analysis approach in a multisite study of 4,638 participants, and the thematic solution was consistently the most plausible. Self-concept and pleasure were most strongly associated with attitudes toward using condoms, intentions to use condoms, and actual condom use, whereas protection and interaction generally had little influence.

Key words: condom use, belief structure, attitudes, HIV

Several psychosocial models assume that people are more likely to use condoms when they believe that condom use will result in desirable outcomes than when they believe it will not. For example, most people think that condom use prevents AIDS and sexu- ally transmitted diseases (STDs). To the extent that people believe strongly in these positive outcomes and perceive other, negative outcomes (e.g., "condom use decreases sexual pleasure") to be unlikely, their attitudes toward using condoms are likely to be

positive (see, e.g., W. R. Fisher, Fisher, & Rye, 1995), and their use of condoms is likely to be frequent (Fishbein et al., 1995). These psychosocial models include (a) the theory of reasoned action and related models (Boyd & Wandersman, 1991; Fishbein & Ajzen, 1975; W. A. Fisher, 1984; W. A. Fisher et al., 1995; Reinecke, Schmidt, & Ajzen, 1996; for reviews, see Albarracín, Johnson, Fishbein, & Muellerleile, in press; Eagly & Chaiken, 1993); (b) the transtheoretical model of change, developed by Prochaska and DiClemente (1983, 1984); and (c) social learning theory (Bandura, 1989). These models provided more or less direct insights to the hypothetical structures of condom use beliefs that we tested in this work.

Structure of Beliefs About Condom Use

According to the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; for applications, see Rise, 1992; Ross & McLaws, 1992; Schaalma, Kok, & Peters, 1993), people's actions are based on intentions to perform these actions. Attitude is the degree to which one has a positive versus a negative evaluation of the behavior and is presumably based on the perceived likelihood that favorable outcomes will occur and unfavorable ones will not (i.e., behavioral outcome beliefs and evaluations; Ajzen & Fishbein, 1980). The (subjective) norm is the perception that important others think that one should or should not perform the behavior in question, and is theoretically based on the perception that certain normative referents (e.g., friends, parents) support the behavior (Ajzen & Fishbein, 1980). Both attitudes toward the behavior and subjective norms can influence intentions, and these intentions should give way to actual behavioral performance.

According to Miniard and Cohen (1981), both personal and normative considerations can be expected to influence one's attitudes toward condom use and the intentions and behaviors that are based on these attitudes. If this prediction is reasonable, the behavioral outcomes in Fishbein and Ajzen's (1975) model should reflect both personal and normative perceptions. That is, in thinking about condom use, people may consider personal outcomes such as expectations about health prevention but also normative outcomes that reflect the perceived likelihood that using condoms upsets or satisfies one's partner. (Outcome evaluations were not measured in this study.)

Prochaska and DiClemente (1983, 1984; for a review, see Prochaska, Redding, Harlow, Rossi, & Velicer, 1994), however, suggested that in making decisions about condom use people consider pros and cons (Galavotti et al., 1995; Prochaska, Redding, et al., 1994; Prochaska, Velicer, et al., 1994). Consistent with this idea, using exploratory analytic procedures, Grimley, Prochaska, Velicer, and Prochaska (1995) found two factors that suggest that condom use with main and occasional partners involves (a) the pros of being safer from disease, making people feel more responsible, protecting both partners, being safer from pregnancy, and being easily available. On the other hand, people think that condom use can also (b) make sex feel unnatural, be too much trouble, make partners angry, make partners rely excessively on each other's cooperation, and reduce partners' trust in each other. Although both of these factors included diverse elements, Prochaska, Velicer, et al. (1994) argued that there is no benefit in separating them further.

According to Bandura's (1997) social learning theory, persons engage in health-related behaviors to achieve physical outcomes because physical outcomes provide psychological and social satisfaction. To this extent, outcome expectancies are organized as (a) physical, (b) social, and (c) self-evaluative, and each type can be either positive or negative. In condom use, (a) physical outcomes should include health protection and decreases in pleasure; (b) social outcomes may comprise the interaction problems that often result from condom use (e.g., fear of partner's negative reactions or feelings of distrust) as well as positive social outcomes (e.g., feelings that partners want to protect each other); and (c) self-evaluative outcomes should involve the increases that can arise from engaging in beneficial behaviors.

Other researchers (e.g., DiIorio, Maibach, O'Leary, Sanderson, & Celentano, 1997; Gaies, Sacco, & Becker, 1995; Helweg-Larsen & Collins, 1994; Ross, 1988; Wendt & Solomon, 1995) found yet more complicated structures for these attitudes based on exploratory factor analysis of beliefs about the outcomes of condom use. An examination of the solutions in their research suggests that four factors appeared consistently in a variety of samples, including (a) protection, (b) self-concept, (c) pleasure, and (d) interaction implications. Although the content of these factors may differ slightly according to the beliefs of a given population, we propose that people categorize condom use outcomes as these four themes of their experience without necessarily elaborating a cognitive balance sheet or subdividing outcomes into theoretical domains (e.g., social vs. physical). Our thematic conceptualization also assumes that different themes in condom use may determine attitudes and behavioral decisions in different degrees.

Distinguishing interaction and pleasure may also be useful in identifying differences in the formation of attitudes about condom use with main and other partners and among males and females. Thus, persons may be more concerned with interaction problems when they consider using condoms with a valued, steady partner than when they intend to use condoms with an occasional partner (Hammer, Fisher, Fitzgerald, & Fisher, 1996; Misovich, Fisher, & Fisher, 1997). Similarly, women may be more concerned with men's responses because women need to enlist the help of men to attain the goal of condom use (Amaro, 1995; C. A. Campbell, 1995; S. M. Campbell, Peplau, & DeBro, 1992; Geringer, Marks, Allen, & Armstrong, 1993; Gerrard, Breda, & Gibbons, 1990; Gil, 1995; Libbus, 1995; Pivnick, 1993; Reisen & Poppen, 1995), and they are less worried about potential decreases in sexual pleasure than men (S. M. Campbell et al., 1992; Eiser & Ford, 1995; Geringer et al., 1993; Hammer et al., 1996; Helweg-Larsen & Collins, 1994; Landry & Camelo, 1994; Sacco, Rickman, Thompson, & Levine, 1993; Sheer, 1995).

Present Study

In the present study, we used confirmatory factor analysis to test the four models that guided our study of belief structure with the data from a multisite project funded by the Centers for Disease Control and Prevention (CDC). To some extent, the four conceptualizations of condom use beliefs that we tested are compatible with each other. In fact, some of these models only imply finer distinctions than the lower order models. For example, the four-factor thematic model is a partition of pros and cons into more specific concerns about condom use. Given such nested models (Figure 1), we attempted to compare models as representations of
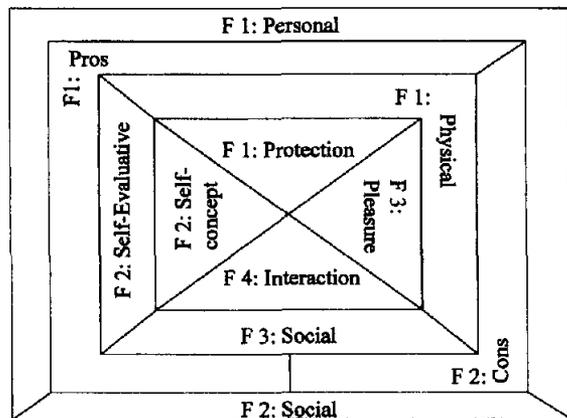
Figure 1. Hypothetical models of outcome beliefs. F = factor.

the underlying cognitive structure while controlling for the possibility that simply adding factors is likely to improve the fit of any given model. In addition, we examined predictions concerning the use of outcome-related cognitions as a basis for attitudes and the intentions and behavior that are mediated by these attitudes (see Fishbein & Ajzen, 1975).

Method

Overview

We analyzed the data collected by Project RESPECT, a multisite study funded by CDC. Project RESPECT (Kamb, Dillon, Fishbein, Willis, & Project RESPECT Study Group, 1996; Kamb et al., 1998) was a randomized, controlled trial comparing three separate face-to-face HIV/STD prevention interventions used with 1,500 participants who had been randomly allocated to each intervention. The interventions were (a) educational messages typical of current practice, (b) brief counseling, and (c) enhanced counseling. All interventions had the goal of encouraging consistent condom use during sexual intercourse and were brief. The educational message involved two 5-min sessions over 10 days; brief counseling involved two 20-min sessions over 10 days; and enhanced counseling involved four sessions (i.e., an initial 20-min session and three 60-min sessions) over 3 weeks. The project was longitudinal, and measures of behavioral and psychosocial variables were obtained at (a) baseline, (b) immediate follow-up, (c) 3-month follow-up, (d) 6-month follow-up, (e) 9-month follow-up, and (f) 12-month follow-up. For the sake of brevity, we restricted our analyses to the data collected at baseline and 12-month follow-up.

Participants

Project RESPECT's participants were heterosexual clients of STD clinics who were HIV negative, understood and spoke English, and reported vaginal sex in the previous 3 months. For the study-related follow-up visits, volunteers were paid $15 for each questionnaire. The STD clinics were located in Denver, Long Beach, Baltimore, San Francisco, and Newark. The sample size at baseline was 4,638. Between 16% and 24% of participants came from each site.

Participants were both male (57%) and female (43%) and from diverse ethnic groups. Ethnically, participants were distributed as follows: 21% European American; 61% African American; 11% Latino; 2% Asian, Filipino, or Pacific Islander; 1% American Indian; 4% other; and 1% unidentified. Participants also exhibited a variety of behavioral risk factors, including (a) multiple sexual partners (i.e., the mean number of sexual partners in the last 6 months was 3.7 [SD = 11.95]), (b) sharing syringes

and needles when injecting drugs (i.e., 4% of the baseline participants reported ever sharing "works" when they injected drugs), (c) having a partner who used intravenous drugs (i.e., 15% of the baseline participants reported ever having a partner who injected drugs), (d) having a partner infected with HIV (i.e., 2% of the baseline participants reported ever having had a partner who was HIV positive), and (e) exchanging sex for money or drugs (i.e., 7% and 14% of the male and female baseline participants, respectively, reported ever receiving money or drugs in exchange for sex; 23% and 0% of male and female participants, respectively, reported ever giving money or drugs in exchange for sex).

Measures

Of interest in this study were measures of beliefs, attitudes, intentions, and behaviors concerning consistent condom use during vaginal sex. These questions treated main and occasional partners separately. To determine whether a person had a main or a steady partner, interviewers asked, "Right now, is there a man [woman] you consider your one main partner, like a boyfriend [girlfriend], husband [wife], or lover?" If participants answered "no," they were asked, "During the past 3 months, did you have a partner you considered your main partner?" Only participants who reported presently having or recently having had a main partner during the last 3 months were asked questions about the main partner. If participants had mentioned that, during the last 3 months, they had sex with partners who could not be classified as their main partner, these other partners were considered occasional partners. From that point, the questionnaire had different sections for condom use with main and occasional partners. The items in these sections were designed to be gender sensitive. Thus, men responded to questions about "using condoms" with either their main or occasional partners, whereas women responded to items about "getting their main and occasional partners to use condoms."

Condom use. Participants were asked whether, during the past month, they had used condoms "never," "almost never," "sometimes," "almost always," or "always" on a scale of ranging from 1 (*never*) to 5 (*always*).

Intentions to use condoms. To measure intentions, participants were asked, "How likely is it that from now on, for at least 6 months, you will [would] [get your partner/s to] use a condom every time you have vaginal sex with her [him/them]?" and "How likely is it that you will [would] [get your partner/s to] use a condom the next time you have sex with her [him/them]?" Participants responded on a scale of 1 (*very unlikely*) to 7 (*very likely*). Separate questions were asked about using condoms with main and other partners. These two intention items were highly intercorrelated (mean *r* for main and other partners = .82, *p* < .01) and were, therefore, averaged as measures of intentions.

Attitude measures. Attitudes were measured by several items tapping evaluation, affect, and difficulty, which have been shown to be reliable components of attitudes (see Leach, Hennessy, & Fishbein, in press; Osgood, Suci, & Tannenbaum, 1957). First, participants were asked, "Would you say that getting him [them] to use [using] a condom every time you have vaginal sex would be . . . ," and responded on scales ranging from 1 to 7 with the ends labeled *very unpleasant* versus *very pleasant*, *very bad* versus *very good*, *very difficult* versus *very easy*, and *very uncomfortable* versus *very comfortable*. In addition, items stating, "How sure are you that you can get your main [occasional] partner[s] to use [use] a condom every time you have vaginal sex with him [her/them]?" and "How much would you like or dislike getting your occasional partner[s] to use [using] a condom every time you have vaginal sex with him [her/ them]?" were used. Participants provided their response to these two questions on a scale of 1 (*very unsure* and *I would dislike it very much*) to 7 (*very sure* and *I would like it very much*). Responses to the different dimensions were highly intercorrelated (*r*s = .62–.72; Cronbach's α = .85) and were, therefore, averaged as a single measure of attitudes.

Outcome belief measures. The study questionnaire also contained measures of salient beliefs identified previously in a qualitative study about the perceived advantages and disadvantages of condom use with main and occasional partners among clients of STD clinics (CDC, 1994). These

measures followed attitude measures. Beliefs that were frequently listed by earlier respondents were considered to be salient and were, therefore, included in the project questionnaire. The resulting questionnaire beliefs are listed in Table 1, organized according to our a priori predictions concerning the factor structure. Most questions were common to both main and occasional partners (see Table 1). Two items, however, were equivalent but not identical for main and occasional partners. In those instances, statements for main and occasional partners are listed separately. In all cases, participants provided their judgments of the likelihood that each outcome would occur with main or occasional partners along scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

To avoid having an extremely long questionnaire, participants did not provide belief data on both main and occasional partners. Instead, interviewers used an algorithm to guide the selection of questions for each participant. If a given participant had either a main or an occasional partner, the corresponding questionnaire was administered. When participants had both a main and an occasional partner, an algorithm was used to reduce the interview time while maximizing the amount of information obtained. Thus, when a male participant reported having both a main and an occasional partner, participants with odd registration numbers responded to questions about main partners, whereas those identified by even numbers provided data on their occasional partners. In contrast, because fewer females than males had occasional partners, any female who had both an occasional and a main partner provided data on her occasional partner. Of the total baseline sample with belief data, 2,727 participants had complete data on beliefs about condom use with the main partner and 1,911 reported data on occasional partners.

Results

To study the structure of outcome beliefs, we conducted a series of statistical analyses. First, we tested the fit of the two-, three-, and four-factor models to the male and female samples

using confirmatory factor analysis. After these preliminary analyses, we applied regression models to predict attitudes, intentions, and behavior from the factors in each hypothetical model.

Factor Analysis of Hypothetical Models

We tested the two-, three-, and four-factor models to see which one was the most plausible (see model structures in Table 1; correlations are presented in the Appendix). The goodness-of-fit indexes are displayed in Table 2, organized by gender and type of partner, and suggest that the hypothesized two- and three-factor models had an inadequate fit, whereas the four-factor model provided a good fit of the data.

A supplementary analysis was conducted to determine whether the increase in fit achieved by the four-factor model over that with pros and cons could be attributed specifically to (a) subdividing the cons into interaction and pleasure while leaving pros as a single factor (three-factor solution); (b) subdividing the pros into protection and self-concept while leaving cons as a single factor (three-factor solution); or (c) subdividing both the pros and the cons into protection, self-concept, interaction, and pleasure (four-factor solution). These supplementary three-factor models were compared with the four-factor model, and as judged by differences in chi-squares, performed worse than the four-factor model, $\chi^2(1) >$ 109.7 in all cases, $p < .01$.

Further confirmation that a more complex factorial solution fits the data more adequately than a simpler solution is also provided by the correlations among the factors. We expected that if the correlation between two factors was not significantly different

Table 1
Beliefs About Condom Use and Place in Hypothetical Models

Item	Position of item in questionnaire	Pros vs. cons	Personal vs. social	Physical, self-evaluative, and social	Thematic model
It would protect you from getting AIDS.	1	Pros	Personal	Physical	Protection
It would protect him [her] from getting AIDS.	2	Pros	Personal	Physical	Protection
It would protect you from getting other STDs.	3	Pros	Personal	Physical	Protection
It would protect him [her] from getting other STDs.	4	Pros	Personal	Physical	Protection
It would protect you [your partner] from getting pregnant.	19	Pros	Personal	Physical	Protection
It would show him [her] that you care.	5	Pros	Personal	Self-evaluative	Self-concept
It would make you feel cleaner.	10	Pros	Personal	Self-evaluative	Self-concept
It would be the responsible thing to do.	13	Pros	Personal	Self-evaluative	Self-concept
It would make you worry less.	14	Pros	Personal	Self-evaluative	Self-concept
It would make you feel good about yourself.	16	Pros	Personal	Self-evaluative	Self-concept
It would make him [her] angry.	6	Cons	Social	Social	Interaction
It would decrease his [her] sexual pleasure.	9	Cons	Social	Social	Interaction
Main partner: He [she] would think you've been with other men [women]. Occasional partner: He [she] would think you have an STD.	17	Cons	Social	Social	Interaction
Main partner: He [she] would think that you believe he's [she's] been with other women [men]. Occasional partner: He [she] would think that you believe he [she] has an STD.	18	Cons	Social	Social	Interaction
It would be a lot of trouble.	7	Cons	Personal	Physical	Pleasure
It would decrease your sexual pleasure.	8	Cons	Personal	Physical	Pleasure
Sex would be less intimate.	11	Cons	Personal	Physical	Pleasure
It would ruin the mood.	12	Cons	Personal	Physical	Pleasure
Sex would be painful or uncomfortable for you.	15	Cons	Personal	Physical	Pleasure

Note. STD = sexually transmitted disease.

Table 2

Goodness-of-Fit Statistics for Hypothetical Models Across Genders and Partners: Baseline and 12-Month Follow-Up

| | Baseline | | | | 12-month follow-up | | | |
| | Males | | Females | | Males | | Females | |
Variable	Main	Other	Main	Other	Main	Other	Main	Other
			Two-factor model (personal vs. social, $df = 151$)					
SRMR	.17	.17	.15	.16	.20	.19	.21	.20
NNFI	.53	.50	.59	.56	.58	.58	.55	.54
CFI	.59	.56	.64	.61	.63	.63	.61	.60
χ^2	6,126.4	4,530.7	4,062.6	2,046.0	5,879.4	2,491.2	4,588.5	1,202.7
			Two-factor model (pros vs. cons, $df = 151$)					
SRMR	.10	.10	.12	.09	.12	.11	.11	.10
NNFI	.74	.75	.76	.78	.77	.78	.76	.81
CFI	.77	.78	.78	.81	.80	.80	.79	.83
χ^2	3,479.1	2,041.2	2,489.0	1,371.2	2,945.6	1,401.3	2,492.3	595.3
			Three-factor model (physical, self-evaluative, and social, $df = 149$)					
SRMR	.16	.16	.15	.15	.19	.18	.20	.21
NNFI	.65	.62	.67	.64	.71	.69	.68	.58
CFI	.70	.67	.72	.69	.74	.73	.72	.64
χ^2	4,530.7	3,032.2	3,229.9	2,513.2	4,074.8	1,866.9	3,340.0	1,095.0
			Four-factor model (protection, self-concept, pleasure, and interaction, $df = 146$)					
SRMR	.08	.08	.08	.08	.10	.09	.08	.10
NNFI	.88	.88	.90	.89	.91	.90	.92	.89
CFI	.90	.90	.91	.90	.92	.91	.93	.91
χ^2	1,593.0	1,022.7	1,102.6	705.2	1,354.6	691.7	964.5	387.0

Note. Models were estimated with iteratively reweighted generalized least squares based on elliptical distribution theory. The Bentler–Bonnet Nonnormed Fit Index (NNFI) and the Comparative Fit Index (CFI) indicate good fit when they approach .90 (Schumacker & Lomax, 1996). The Standardized Root Mean Residual (SRMR) is a measure of the average of the fitted residuals and indicates good fit when it is .08 or less (Hu & Bentler, 1998). These indexes are sensitive to model misspecification but are relatively unaffected by sample size (Hu & Bentler, 1998). The chi-square can be used to compare nested models. Because of sample size dependence, comparisons can only be made within groups by taking the difference between the chi-square of a more complex model and the chi-square of a simpler model. In this case, all differences between nested models (two-factor and four-factor models vs. supplementary three-factor models; three-factor model vs. two-factor model with personal and social dimensions) are statistically significant.

from .80, there would be little evidence to conclude that these are actually separate factors. Applying this logic we found that, as indicated by z tests, the correlations among the factors, which ranged from 0 (*ns*) to .66 ($p < .001$), were statistically different from .80 in all samples and suggested only moderate associations. In view of this evidence, we concluded that the thematic model was superior to the other solutions.

Predictive Power of Beliefs Models

We also analyzed the variance accounted for by the models to determine whether the findings from goodness-of-fit analyses were accompanied by differences in predictive power. Thus, we regressed attitudes, intentions, and condom use on summary variables representing each model, which we created by taking the average of the relevant belief scores for either main or occasional partners (see Table 1), reverse scoring when necessary. (The variance in the summary variables suggested that correlational analyses were adequate.)

The analyses summarized in Table 3 allowed us to perform pairwise comparisons of the variance in attitudes, intentions, and behavior accounted for by each hypothetical model. We specifically compared the R from the four-factor model with those obtained from the two- and three-factor models in a pairwise fashion for the three dependent variables in the study (i.e., attitude, intention, and behavior) using Z_1^* and $\bar{Z}_1^*$ (Steiger, 1980). Z_1^* and $\bar{Z}_1^*$ were developed for comparing dependent correlations and were found to have satisfactory statistical performance from Monte Carlo simulation experiments and asymptotic normal distributions. For each pairwise comparison, we computed predicted values from the four-factor regression model and another regression model, and then correlated these two predicted values. In addition, we correlated predicted and observed values from each of the two models. Finally, the three correlations were used to compute Z_1^* and $\bar{Z}_1^*$ based on Steiger's (1980) Equations 12 and 14. Because of the large amount of comparisons involved (27 altogether), Bonferroni adjustment was used to control Type I error rate. Significance level

Table 3

Predictive Power of Hypothetical Models: Cross-Sectional Analyses

	Attitudes		Model		Intentions		Model		Behavior		Model	
Model	B	β	R	R^2	B	β	R	R^2	B	β	R	R^2
					Baseline							
Two factor												
Personal	1.15	0.46***			1.44	0.42***			0.63	0.22***		
Social[a]	−0.36	−0.22***	.58	.33	−0.33	−0.14***	.48	.24	−0.45	−0.24***	.37	.14
Two factor												
Pros	0.71	0.28***			1.08	0.31***			0.40	0.14***		
Cons[a]	−0.89	−0.47***	.61	.37	−0.69	−0.26***	.46	.21	−0.62	−0.29***	.35	.12
Three factor												
Physical	0.51	0.23***			0.45	0.15***			0.26	0.10***		
Self-evaluative	0.64	0.29***			1.02	0.33***			0.36	0.14***		
Social[a]	−0.41	−0.25***	.58	.33	−0.41	−0.18***	.50	.25	−0.47	−0.25***	.37	.14
Four factor												
Protection	−0.03	0.00			−0.05	−0.02			−0.01	0.00		
Self-concept	0.68	0.31***			1.19	0.39***			0.46	0.18***		
Interaction[a]	−0.16	−0.09***			−0.36	−0.16***			−0.45	−0.24***		
Pleasure[a]	−0.71	−0.42***	.64	.41	−0.28	−0.12***	.50	.25	−0.15	−0.08***	.37	.14
					12-month follow-up							
Two factor												
Personal	0.99	0.44***			1.01	0.30***			0.59	0.22***		
Social[a]	−0.48	−0.31***			−0.62	−0.26***			−0.52	−0.28***		
Intervention	−0.07	−0.02	.65	.42	−0.07	−0.02	.49	.24	−0.04	−0.01	.43	.19
Two factor												
Pros	0.62	0.29***			1.01	0.32***			0.576	0.22***		
Cons[a]	−0.99	−0.55***			−0.89	−0.33***			−0.68	−0.32***		
Intervention	−0.07	−0.02	.70	.49	−0.06	−0.01	.52	.27	−0.03	−0.01	.45	.20
Three factor												
Physical	0.51	0.23***			0.17	0.05			0.11	0.04		
Self-evaluative	0.56	0.30***			1.04	0.37***			0.59	0.26***		
Social[a]	−0.53	−0.34***			−0.69	−0.29***			−0.56	−0.30***		
Intervention	−0.06	−0.02	.68	.46	−0.05	−0.01	.56	.32	−0.03	−0.01	.48	.23
Four factor (modified)												
Protection	−0.01	−0.01			−0.06	−0.02			−0.03	−0.02		
Self-concept	0.63	0.33***			1.11	0.39***			0.63	0.28***		
Interaction[a]	−0.27	−0.17***			−0.64	−0.27***			−0.53	−0.29***		
Pleasure[a]	−0.69	−0.41***			−0.17	−0.07**			−0.10	−0.05*		
Intervention	−0.06	−0.02	.72	.52	−0.05	−0.01	.56	.32	−0.03	−0.01	.48	.23

Note. Table entries correspond to raw (B) and standardized (β) regression weights predicting baseline or 12-month attitudes, intentions, and behavior from the baseline or 12-month factors predicted by each model. Variables representing each factor correspond to the mean of the beliefs from each factor collapsed across type of partner (see Table 1), after reverse scoring as necessary.

[a] Higher numbers indicate higher likelihood of unfavorable outcomes.

* $p < .05$. ** $p < .01$. *** $p < .001$.

was thus set to .002 for each comparison (critical Z value = ±3.08).

Analyses using Steiger's (1980) procedures suggested that the four-factor model was superior to the other models. For example, the baseline analyses in the first panel of Table 3 indicate that the thematic model accounted for more variance in attitudes than each of the other models (in all cases, $p < .01$ for contrasts). The four-factor model also had more power to predict intentions than each of the two-factor models and more power to predict behavior than the pros and cons model (in all cases, $p < .01$ for contrasts). The same analyses at 12 months, which appear in the second panel of Table 3 and include intervention effects (standard or enhanced counseling versus educational intervention), replicated the pattern. That is, the four-factor model did better at predicting attitudes than

each of other three models and was also better at predicting intentions and behavior relative to the two-factor models ($p < .01$ for contrasts).

Because cross-sectional analyses of the kind presented in Table 3 may be biased by random error or study demands that increase when predictors and dependent variables are measured at the same time, we replicated the regression analyses predicting attitudes, intentions, and condom use at 12 months from the variables representing the different models measured at baseline. These data appear in Table 4 and suggest that the four-factor model accounted for more variance in attitudes and intentions than each of the other solutions ($p < .01$ for contrasts). Although, given the large amount of time elapsed, the effect sizes for longitudinal analyses were smaller, the nonsignificant differences across mod-

Table 4
Predictive Power of Hypothetical Models: Longitudinal Analyses of Attitudes, Intentions, and Behavior at 12-Month Follow-Up Predicted From Belief Factors at Baseline

Model	Attitudes				Intentions				Behavior			
	B	β	R	R^2	B	β	R	R^2	B	β	R	R^2
Two factor												
Personal	0.73	0.30***			0.74	0.20***			0.52	0.18***		
Social[a]	−0.11	−0.07**			−0.08	−0.04			−0.09	−0.05*		
Intervention	0.00	0.00	.33	.10	0.00	0.00	.22	.05	0.02	0.00	.20	.04
Two factor												
Pros	0.49	0.20***			0.57	0.16***			0.40	0.14***		
Cons[a]	−0.49	−0.26***			−0.35	−0.12***			−0.27	−0.12***		
Intervention	−0.04	0.00	.37	.14	0.09	0.00	.22	.05	0.02	0.01	.21	.04
Three factor												
Physical	0.27	0.13***			0.24	0.08***			0.22	0.09**		
Self-evaluative	0.47	0.22***			0.51	0.16***			0.32	0.12***		
Social[a]	−0.14	0.09***			−0.12	−0.05*			−0.11	−0.06**		
Intervention	−0.02	−0.01	.34	.11	−0.01	0.00	.23	.05	0.02	0.00	.21	.05
Four factor (modified)												
Protection	−0.03	0.00			−0.04	−0.01			0.07	0.03		
Self-concept	0.45	0.21***			0.52	0.16***			0.32	0.13***		
Interaction[a]	0.06	0.04			−0.01	0.00			−0.03	−0.02		
Pleasure[a]	−0.54	−0.32***			−0.33	−0.13***			−0.23	−0.12***		
Intervention	0.01	0.00	.42	.17	0.01	0.00	.24	.06	0.02	0.01	.22	.05

Note. Table entries correspond to raw (B) and standardized (β) regression weights predicting attitudes, intentions, and behavior at the 12-month follow-up from the factors predicted by each model at baseline. Variables representing each factor correspond to the mean of the beliefs from each factor (see Table 1), after reverse scoring as necessary.

[a] Higher numbers indicate higher likelihood of unfavorable outcomes.

* $p < .05$.   ** $p < .01$.   *** $p < .001$.

els obtained for behavior were identical to that obtained for attitudes and intentions.

Thematic Criteria for Attitudes, Intentions, and Behavior

Finally, critical evidence in support of the four-factor model came from the finding that the four themes were not related to attitudes, intentions, and behavior in the same way (see Table 3). Thus, self-concept was highly correlated with attitudes, intentions, and behavior, whereas protection had a negligible, nonsignificant influence ($p < .01$ for contrasts using z tests). The decrease in pleasure associated with condom use was a very important predictor of attitudes, whereas interaction concerns had lesser impact on attitudes but often a larger influence on actual condom use (e.g., $p < .01$ for contrasts on attitudes).

To test whether regression weights varied as a function of gender and type of partner, we implemented hierarchical regression procedures (see, e.g., Neter, Wasserman, & Kutner, 1996). For example, to study the effect of gender, the baseline model regressed attitudes, intentions, and behavior on protection, self-concept, interaction, and pleasure as well as gender, type of partner, and the interaction between type of partner and one particular theme. (Analyses at 12 months also included type of intervention [standard or enhanced counseling vs. the educational intervention] as an indicator variable.) Next, we added the interaction between gender and the particular theme being considered (i.e., self-concept, pleasure, or interaction) and compared this more complex equation with the baseline model. A comparison of the R^2 of the baseline model with the model that includes the interaction between gender and the theme of interest indicates whether the impact of one particular theme on attitudes is contingent on gen-

der. Similar hierarchical procedures were used to examine the influence of partner type on the associations between a particular theme and attitudes, intentions, and behavior. Furthermore, we tested the interaction among gender, partner type, and each particular theme by comparing a model with all main effects and two-way interactions versus a model that also included the three-way interaction term.

The hierarchical regression analyses suggested some systematic effects of type of partner. Thus, the self-concept theme and the protection theme were more strongly associated with attitudes and intentions when participants had a main partner than when they had an occasional partner. Moreover, interaction outcomes were generally weighted more heavily when the partner was main, and pleasure outcomes were often more important when the partner was occasional. Although the effects of partner type were significant in 18 of 24 cases, only one interaction accounted for 1% of the variance, whereas the percentage of variance accounted for in each of the remaining 17 analyses ranged from .01 to .07%.

Discussion

To investigate how beliefs about the outcomes of condom use are organized, we drew from several models of behavioral prediction. One model suggests that beliefs may be divided into personal and social considerations (see Miniard & Cohen, 1981). A second possibility, which follows from Prochaska's transtheoretical model, is that beliefs about condom use are structured according to the pros and the cons of the behavior. A three-factor model was implied by Bandura (1997), who argued that outcome expectancies are organized as physical, social, and self-evaluative outcomes. We proposed a behavior-specific, thematic structure that sug-

gests that beliefs about condom use are organized according to the beliefs' content. Of the four models, our results point to the thematic representation of condom use beliefs as the most viable and suggest that beliefs are differentiated according to predictions into protection, self-concept, interaction, and pleasure implications.

One contribution of this work is showing that not all condom use themes are used as a basis for attitudes to the same extent. In fact, some themes do not matter much. Whereas the self-concept theme is a crucial criterion for people's feelings about condom use, protection expectations appear to have no influence whatsoever. Second in importance to self-concept implications are pleasure expectations. That is, the less persons believe that using condoms will decrease their sexual pleasure, the more positive the attitudes toward condom use they develop. Finally, as judged by longitudinal analyses, the interaction theme is associated with intentions and behavior, but this association is much smaller than that of the self-concept and pleasure themes.

It is presently unclear why the influence of the protection theme is negligible (see, e.g., Table 3). To our knowledge, this finding has not been reported before and has important implications for our understanding of condom use behavior and preventive efforts in high-risk samples like the one examined here. We see at least three possible explanations for this finding. First, the protection theme is likely to be based predominantly on health messages, whereas the other themes may have an experiential basis. These condom use messages, relative to information coming from personal experience, could be well comprehended but poorly accepted by the target communities. To the extent that the health information coming from the media and from health services is not used as a basis for attitudes, HIV-preventive campaigns that are centered around discussing risks and prevention methods may continue to have a little, if any, impact as reported elsewhere (see J. D. Fisher & Fisher, 1992).

Alternatively, perceptions that condoms prevent infection with HIV and STDs may be contaminated by fear, and this fear could have a negative impact on condom use decisions or prevent the information contained in this belief from being processed further (for the effects of affect on judgment and decision making, see Schwarz & Clore, 1996). If this hypothesis is true, our population of clients of STD clinics may be particularly prone to fear, and the influence of the protection theme could thus be greater among individuals at lower risk for infection with HIV. For optimal generalizability, our conclusions should be replicated in other populations.

It is also possible that protection expectations that are initially formed on the basis of preventive campaigns influence psychological expectations (e.g., anxiety control) that are reflected in the self-concept theme. Thus, protection could have an indirect influence mediated solely by the perceived psychological gratification of preventive methods. If this is the case, preventive campaigns should highlight psychological rewards instead of informing recipients only of the health outcomes of condom use.

Some Implications

This work suggests that researchers in HIV prevention should carefully consider how to model the structure of beliefs about the outcomes of condom use. Our findings in this domain imply that, compared with the thematic model, the two- and three-factor

models are less useful both for prevention purposes and for a better understanding of people's cognitions. The implications that we derived from previous behavioral models were generally indirect and had not been tested empirically, with the exception of the transtheoretical model.

The conclusion that, in our data, the pros and cons model was less plausible than the four-factor model is in apparent disagreement with reports that the pros and cons model is valid (e.g., Prochaska, Velicer, et al., 1994). However, such evidence has always come from exploratory factor analysis, which is not sufficient to assess the fit of a given factor solution or to rule out alternative hypotheses about the structure of a covariance matrix (Bollen, 1989). Therefore, and in the absence of primary data (e.g., correlation matrixes) from reports of such exploratory factor analyses, it is difficult to conclude that the two-factor model was the most reasonable in studies of the transtheoretical model. Research should be conducted to reanalyze data that seemed to support the presence of two factors and thus reach a more definite conclusion.

Most likely, the decisional balance idea remains meaningful as a general model of behavior. It is at the level of the specific behavior (condom use in this study) at which a consideration of specific pros and cons becomes critical. To this extent, the conclusion of Prochaska, Velicer, et al. (1994) that subdividing pros and cons does not make empirical sense needs qualification. That is, although subdividing pros and cons as suggested by Janis and Mann (1977; i.e., utilitarian and symbolic gains and losses for the self and for significant others) might not be reasonable (see Prochaska, Velicer, et al., 1994), distinguishing the themes that people form when they think about condom use appears justified.

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Appendix

Correlation Matrices

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Males with a main partner

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	—																		
2	.818	—																	
3	.709	.666	—																
4	.630	.725	.846	—															
5	.358	.375	.320	.335	—														
6	-.086	-.078	-.074	-.056	-.233	—													
7	-.068	-.040	-.057	-.030	-.217	.499	—												
8	-.120	-.086	-.096	-.065	-.169	.213	.405	—											
9	-.078	-.068	-.053	-.037	-.149	.348	.403	.644	—										
10	.326	.283	.302	.287	.410	-.035	-.120	-.194	-.076	—									
11	-.121	-.097	-.091	-.065	-.156	.302	.399	.487	.432	-.089	—								
12	-.156	-.127	-.125	-.087	-.256	.325	.479	.490	.413	-.161	.603	—							
13	.340	.295	.292	.259	.364	-.095	-.121	-.100	-.086	.382	-.125	-.140	—						
14	.300	.272	.297	.280	.394	-.035	-.097	-.131	-.076	.467	-.085	-.136	.555	—					
15	-.140	-.111	-.165	-.121	-.209	.280	.353	.375	.278	-.115	.396	.467	-.156	-.128	—				
16	.338	.314	.307	.276	.485	-.100	-.231	-.275	-.156	.574	-.205	-.259	.454	.514	-.212	—			
17	-.073	-.060	-.060	-.065	-.188	.454	.276	.210	.261	-.010	.246	.272	-.056	-.043	.249	-.077	—		
18	-.003	-.050	-.016	-.062	-.161	.387	.260	.171	.238	.047	.218	.253	-.020	-.026	.227	-.044	.693	—	
19	.289	.277	.245	.269	.281	-.075	-.049	-.114	-.070	.259	-.072	-.104	.301	.286	-.094	.334	-.041	-.023	—

Females with a main partner

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	—																		
2	.706	—																	
3	.675	.560	—																
4	.544	.719	.724	—															
5	.378	.353	.407	.403	—														
6	.019	-.038	.036	-.028	-.075	—													
7	-.072	-.068	-.054	-.084	-.195	.599	—												
8	-.165	-.114	-.114	-.125	-.204	.247	.367	—											
9	-.107	-.095	-.089	-.099	-.155	.318	.390	.561	—										
10	.327	.242	.281	.236	.336	.087	-.040	-.145	-.090	—									
11	-.169	-.107	-.119	-.115	-.176	.266	.359	.500	.413	-.130	—								
12	-.181	-.147	-.127	-.132	-.195	.295	.407	.508	.432	-.175	.666	—							
13	.336	.275	.320	.228	.333	.019	-.087	-.146	-.081	.371	-.167	-.138	—						
14	.327	.243	.306	.220	.304	.059	-.039	-.100	-.039	.421	-.112	-.090	.507	—					
15	-.096	-.101	-.088	-.101	-.090	.129	.195	.400	.277	-.097	.389	.425	-.156	-.124	—				
16	.360	.299	.337	.280	.416	.022	-.127	-.239	-.189	.578	-.241	-.262	.495	.555	-.185	—			
17	-.085	-.095	-.071	-.105	-.130	.409	.382	.235	.290	.016	.254	.261	-.046	.021	.185	-.039	—		
18	-.024	-.106	-.020	-.120	-.121	.433	.345	.200	.271	.069	.261	.263	.017	.056	.144	.014	.671	—	
19	.304	.285	.304	.268	.201	-.051	-.119	-.137	-.091	.260	-.150	-.156	.255	.266	-.132	.345	-.103	-.078	—

Males with an occasional partner

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	—																		
2	.766	—																	
3	.616	.575	—																
4	.594	.670	.846	—															
5	.314	.273	.302	.310	—														
6	-.039	-.046	-.021	-.040	-.121	—													
7	-.108	-.076	-.087	-.096	-.165	.407	—												
8	-.064	-.055	-.084	-.082	-.112	.203	.371	—											
9	-.035	-.031	-.037	-.067	-.124	.304	.353	.625	—										
10	.253	.217	.309	.285	.329	-.062	-.144	-.134	-.052	—									
11	-.042	-.020	-.036	-.047	-.138	.261	.406	.530	.406	-.138	—								
12	-.064	-.075	-.083	-.087	-.156	.306	.414	.511	.424	-.142	.591	—							
13	.268	.246	.305	.291	.292	-.129	-.156	-.040	-.060	.450	-.067	-.089	—						
14	.220	.214	.312	.275	.235	-.065	-.147	-.079	-.022	.425	-.085	-.058	.569	—					
15	-.093	-.077	-.102	-.101	-.138	.280	.370	.420	.337	-.107	.427	.450	-.102	-.138	—				
16	.289	.239	.299	.269	.414	-.119	-.232	-.260	-.180	.536	-.203	-.260	.442	.448	-.211	—			
17	-.024	-.037	-.024	.000	-.087	.372	.275	.162	.238	-.078	.260	.285	-.093	-.108	.246	-.117	—		
18	-.032	-.050	-.006	-.029	-.110	.310	.189	.176	.214	-.072	.236	.252	-.074	-.061	.199	-.093	.677	—	
19	.360	.296	.346	.327	.266	-.075	-.159	-.099	-.085	.358	-.138	-.133	.359	.320	-.129	.422	-.083	-.039	—

Appendix continues

Appendix (continued)

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
									Females with an occasional partner										
1	—																		
2	.711	—																	
3	.725	.595	—																
4	.620	.754	.803	—															
5	.272	.314	.308	.338	—														
6	−.018	−.073	−.056	−.083	−.151	—													
7	−.055	−.082	−.037	−.058	−.183	.568	—												
8	−.067	−.094	−.081	−.088	−.140	.307	.416	—											
9	−.053	−.062	−.068	−.055	−.186	.344	.382	.517	—										
10	.271	.221	.309	.266	.282	−.014	−.063	−.127	−.095	—									
11	−.092	−.133	−.095	−.126	−.189	.296	.346	.485	.410	−.137	—								
12	−.137	−.157	−.127	−.133	−.208	.316	.393	.463	.365	−.156	.631	—							
13	.245	.207	.288	.245	.219	−.062	−.111	−.086	−.019	.375	−.115	−.154	—						
14	.280	.264	.317	.293	.219	−.043	−.043	−.066	.007	.376	−.078	−.113	.535	—					
15	−.119	−.077	−.119	−.080	−.148	.175	.239	.421	.240	−.129	.381	.401	−.122	−.126	—				
16	.220	.205	.271	.230	.337	−.086	−.143	−.159	−.127	.414	−.181	−.188	.367	.459	−.154	—			
17	−.030	−.045	−.044	−.033	−.127	.372	.354	.236	.232	−.004	.277	.245	−.039	−.014	.162	−.028	—		
18	.008	.018	.022	.032	−.099	.384	.320	.212	.262	.061	.219	.223	−.002	−.002	.170	.015	.655	—	
19	.214	.206	.188	.195	.204	−.087	−.111	−.058	−.034	.173	−.090	−.107	.110	.222	−.115	.291	−.031	.006	—

Note. Item number corresponds to item position in Table 1.