Stage of Behavior Change for Condom Use: The Influence Of Partner Type, Relationship and Pregnancy Factors

By John S. Santelli, Anthony C. Kouzis, Donald R. Hoover, Michele Polacsek, LaWanda G. Burwell and David D. Celentano

A theoretical model was used to examine the influence of relationship factors, pregnancy intentions, contraceptive behavior and other psychosocial characteristics on stages of behavior change in condom use among heterosexual black women of reproductive age. Data from an inner-city street survey compared women who were not contemplating condom use, women who were attempting to use condoms or had used them consistently for short periods of time, and those who had achieved long-term consistent use. Women's relationship with their main partner appears to be an important factor in understanding their use of condoms both with main partners and with other partners. For condom use with the main partner, factors such as emotional closeness and partner support were significant predictors of the likelihood that women would be attempting to use condoms rather than not contemplating use. Cohabitation and the belief that condom use builds trust were significant predictors of long-term consistent condom use. Having a regular or main partner was strongly associated with intentions to use condoms with other partners. Women who wanted to become pregnant were much less likely to intend to use condoms with their main partner, and women using oral contraceptives were less likely to be long-term consistent condom users. (Family Planning Perspectives, **28**:101–107)

The stages-of-behavior-change model[1] is a useful measurement tool for understanding such behavioral changes as the adoption of condom use. The model suggests that people move through five stages in adopting a health-related behavior: precontemplation, contemplation, ready for action, action and maintenance. (It is also possible to relapse to prior stages.)

Precontemplation is defined by the lack of an intention to adopt a particular kind of behavior. Those in contemplation express an intention to begin at some time in the near future. Those classified as ready for action may have already begun but engage in the behavior inconsistently, or they may have practiced the behavior consistently for less than one month. The action stage is typified by consistent practice in the recent past, while maintenance is defined as consistent practice for an extended period of time (greater than six months).

The stages-of-behavior-change model originally was developed to measure cessation of cigarette smoking, and it was adapted for the AIDS Community Demonstration (ACD) projects to measure the adoption of consistent condom use.[2] The stages of behavior change can be used to assess an individual's or a community's adoption of a specific preventive behavior, and the model has been used to measure the effects of preventive interventions.[3]

Specific psychosocial factors may be involved in transitions from one stage to another.[4] The ACD projects are testing a theoretical model that borrows from the Theory of Reasoned Action, Social Learning Theory and Prochaska's Transtheoretical Model (which uses the stages of behavior change) to explain condom use in diverse, hard-to-reach populations. The essential elements of the ACD behavioral model are self-efficacy, perceived social support, outcome expectancies (i.e., the outcomes one would expect if one engaged in a particular behavior) and perceived risk. For example, increased risk perceptions may be important in moving individuals from precontemplation to contemplation; self-efficacy, on the other hand, may be important in moving people (or in helping them move) from contemplation through the ready-for-action and action stages into maintenance. Perceived social support may be important at a number of transition points.

Among gay and bisexual men, the transition to higher stages of behavior change has been associated with increases in perceived self-efficacy, in safer-sex skills and in perceived social support.[5] A new group of human immunodeficiency virus (HIV) prevention projects funded by the Centers for Disease Control and Prevention are testing the efficacy of stage-based interventions, using behavioral messages adapted to a person's individually-assessed stage of behavior change.[6]

Since 1988, the Perinatal HIV Reduction and Education Demonstration Activities (PHREDA) projects have evaluated a variety of approaches to preventing perinatal HIV infection.[7] The PHREDA project based in Baltimore on which this article reports used several key ideas that were shared with or adopted from the ACD projects: a focus on community-wide change, the use of "small media materials" (such as comic books and newsletters) to provide role-modeling of specific behaviors and the use of indigenous outreach workers. A report on interim outcomes from Baltimore suggested that the PHREDA project produced significant increases in condom use among women.[8]

Even though women do not "wear" male condoms, a number of characteristics of women themselves or of their relationships with men may be important determinants of condom use by women and their partners.[9] These include type of partner (main partner vs. someone other than the main partner), number of partners, the main partner's HIV risk status, the quality of the woman's relationship with her sexual partner, her childbearing intentions or desires and the extent of their communication within the relationship. Just as partners influence women's use of oral contraceptives,[10] so the use of nonbarrier contraceptives may also influence condom use.[11] Furthermore, gender and type of partner have been shown to influence the stage of behavior change in condom use for male and female patients in sexually

John S. Santelli is an adjunct assistant professor and LaWanda G. Burwell is an associate in the Department of Maternal and Child Health, Anthony C. Kouzis is a research associate in the Department of Mental Hygiene, Donald R. Hoover is an assistant professor in the Departments of Epidemiology and Biostatistics and David D. Celentano is a professor in the Department of Health Policy and Management, all at the Johns Hopkins School of Hygiene and Public Health, Baltimore. Michele Polacsek is an assistant professor in the Department of Communication and Journalism, University of New Mexico, Albuquerque, N. M. The research on which this article is based was supported by Centers for Disease Control and Prevention Cooperative Agreement U62/CCU203006-05, which supports the Baltimore Perinatal HIV Reduction and Education Demonstration Activity.

Table 1. Variables examined as possible predictors of stages of behavior change, by category, Baltimore, 1993

Category and variable

DEMOGRAPHIC
Age; education; marital status; religious participation; working outside the home; length of time living in the neighborhood; and residence in the intervention or comparison community.

SOCIAL
Relationship with main partner
Cohabitation with main partner; length of relationship; partner's support for condom use; emotional closeness; having had sex with other partners since the start of the relationship with the main partner; and having a main partner who has had sex with others since the start of the relationship.

Perceived social support
Partner's support for condom use; friends' support of condom use by main partner; friends' perception of condoms ("fun" and "ease of use"); friends' belief that condom use is important; perceived use of condoms by friends; and perceived use of condoms by others.

PREGNANCY INTENTIONS & CONTRACEPTION
Ever pregnant before; last pregnancy ended in a birth; trying to get pregnant now; pregnant now; would be happy if became pregnant now; having a baby now would be a problem; want another baby at some time; surgically sterilized; using the pill; and using the hormonal implant.

OUTCOME EXPECTANCIES AND HIV RISK
Outcome expectancies
It is wise to use condoms; it is unpleasant to use condoms; using condoms protects against HIV; and use of condoms builds trust.

Perceived risk
Worried about HIV; chances of getting HIV in next 12 months; and could get HIV from main partner if condom were not used.

Self-reported risk behavior in the past year
Injection drug use; crack use; STD treatment; number of sex partners; any risk behavior; and any partner's involvement in HIV risk behavior.

HIV testing
Ever tested.

RESPONSE EFFICACY/SELF-EFFICACY
Response efficacy
Belief that condoms build trust (this variable can also be seen as a relationship variable); belief that condoms slip; and belief that condoms prevent HIV.

Self-efficacy
Easy to talk to partner about condoms; easy to get a partner to use condoms; was able to refuse sex at some time in the past 12 months when no condom was available; was able to refuse sex at some time in past 12 months because of fear of STD infection; and asked a partner about STDs in past 12 months.

transmitted disease (STD) clinics.[12]

Relationship factors and pregnancy-related intentions and behavior have not been studied using the stages of behavior change. Women may face difficulty in negotiating with their sexual partners about condom use because of economic dependence on their partner, social norms that discourage an active role in sexual interaction and even fear of physical violence.[13] Because poor women and minority women often live in communities where the prevalence of HIV and STDs is higher than average, barriers to condom use put them at particularly high risk.

This article explores the influence of relationship factors, pregnancy intentions, contraceptive use and psychosocial factors on the stage of behavior change for condom use among heterosexual women of reproductive age. We have conducted separate analyses for condom use with a main sexual partner and for condom use with partners other than a main partner.

Methods

In 1993, a street survey was used to interview women aged 17–35 from two inner-city, minority neighborhoods in Baltimore about their condom use within relationships. This survey represented the final round of data collection in a three-year intervention program testing the use of small media and street outreach to reduce sexual risk factors related to perinatal HIV prevention.

To be eligible for the study, women had to be neighborhood residents (determined by their reported zip code and the name by which they referred to their community). A modified street-intercept approach was used for sampling.[14] Each neighborhood was divided into geographic segments reflecting city blocks or natural boundaries and population density, based on residency data from the U. S. census. Five teams consisting of a pair of black female interviewers were randomly assigned to segments of the neighborhoods on a daily basis, with the number of interviews being proportional to population size.

The interview teams filled a daily quota in their segments, with equal proportions of interviewees selected from among 17–20-year-olds, 20–24-year-olds and 25–35-year-olds; a total of 625 women were interviewed. Women were approached on the street in the afternoon and early evening, to correspond with the timing of street outreach activities; interviewing extended over approximately two months, between April and June 1993. All women were compensated for their participation in the 20–30-minute interview, receiving either $5 in cash or a $5 gift certificate. The refusal rate was 5%.

Study participants were asked about their HIV knowledge, attitudes and self-reported risk behavior, based on items from national surveys and questions developed by the evaluation team, with input from focus groups. (All survey instruments were reviewed and approved by the project's community review panel and by the Committee on Human Research of the Johns Hopkins School of Hygiene and Public Health.) To test the stages-of-behavior-change model, we added items to street surveys that had been used in previous years (1990–1992). Women were asked if they had a regular sexual partner and if they had sex with other partners. They were also asked separately about their condom use with their main (or regular) partner and their condom use with other partners. Women who had not had sex in the past year were excluded from our analyses. (In addition, some variables had missing data, so sample sizes for some analyses may be reduced.)

The stages of change in condom use were assessed using questions adapted from the ACD projects. Three questions were used to evaluate condom use: The first was "When you have sex with your regular partner [other partner(s)] how often do you use a condom?"

The second question, which was asked of women who were using condoms at every or almost every act of intercourse, read: "How long have you been using a condom every time [almost every time] when you have sex with your regular partner [other partner(s)]?" If a woman had been using condoms at every act of intercourse for more than six months, she was classified as being in the maintenance stage. If she had been doing so for less than six months, she was considered to be in the action stage. Women who had done so for less than one month were classified as ready for action. The latter group also includes those who said they used condoms "almost every time."

Finally, those who had been using a condom less often than "almost every time" were asked: "In the next six months, how likely do you think it is that you will start using a condom every time you have sex with your regular partner [other partner(s)]?" Those who answered "very likely" or "somewhat likely" were considered to be in the contemplation stage; those who said they were "unsure" or "unlikely" were classified as being in the precontemplation stage.

Predictors of the stages of change were divided into five conceptual groupings: demographic variables; social factors concerning the woman's relationship with her main partner and perceived social support; items related to pregnancy intentions and contraception; outcome expectancies, HIV risk and receipt of HIV testing; and items concerning response efficacy and self-efficacy (Table 1).

With the exception of age and an emotional closeness scale, all variables were

treated as dichotomous. The scale for emotional closeness (a four-point Likert scale) was created from responses to five questions; Cronbach's alpha for this scale was .77. Because there appeared to be a U-shaped relationship between emotional closeness and the stages of behavior change, we divided the scores into deciles and then grouped them into a lower 50%, a middle 30% and a top 20% to correspond with the U-shaped relationship. We then created two dummy variables for use in a logistic regression. In addition, we combined data from the two neighborhoods (one an intervention site and one a comparison site), and treated intervention status as an independent variable in the regressions.

We conducted separate analyses for condom use with the main partner and use with other partners, and used cross-tabulations and bivariate correlations to identify potential independent predictors. We compared the variable of interest and the stage of change, then used logistic regression to define independent predictors within each of the five conceptual groupings. All variables tested in the regressions were those that proved statistically significant in the bivariate comparisons at $p<.10$. In a final, combined logistic model, we tested all predictors that had been significant at $p<.05$ in the separate logistic equations.

In creating each logistic model, we entered all variables from the domain of interest into each initial model. Variables that were nonsignificant in the initial model were eliminated serially from subsequent models. We continued this process of elimination until all variables were significant at $p<.05$. Four final models were created based on the two partner types and a reduced model of stages of behavior change.

Results

Table 2 describes the demographic characteristics of the 625 women who were interviewed. The age distribution reflects the population of women encountered on the street and the sampling plan. The sample was predominantly black, unmarried and of low socioeconomic status (as evidenced by the low rate of employment, the low level of education and the high rate of living in subsidized housing). Women with a main partner were more likely to be currently married, to have completed high school and to be currently employed than were women with other partners.

In total, 393 women (63%) reported a main sexual partner and 263 (42%) reported other partners. Among the 263 women reporting other partners, 87 women (33%) had both a main partner and at least one other partner; the remaining 176 (67%) said they had no main partner but had sex with some other type of partner. A total of 56 women (9% overall) had neither a main partner nor some other type of partner.

In terms of condom use with their main partner, most women (50%) were in the precontemplation stage; only 14% were in the maintenance phase (Figure 1). Among women with other types of partners, relatively fewer respondents were in precontemplation (18%) and more were in maintenance (41%). Among women who had both a main partner and other partners, only 6% were in precontemplation for condom use with other partners, while 37% were in maintenance (not shown).

Figure 1 suggests that women tended to cluster into three groups—precontemplation, ready for action and maintenance. In contrast, relatively small numbers of respondents were classified as being either in contemplation or in action. For this reason, and as a strategy for simplifying the statistical analyses and increasing sample sizes, we reduced the five stages of behavior change to three, by combining the women classified as in the contemplation, ready-for-action and action stages into a single "middle stages" group.

These three stages correspond to two important comparisons, or "transitions." The first transition compares women who lack the intention to use condoms (i.e., who are in precontemplation) with those who are at various stages of intending, attempting or achieving short-term behavior change. The second transition compares women in this middle group to those who have achieved long-term behavior change. We consider the comparison of those in precontemplation with those in the middle stages as determining the odds of "developing intentions," while the comparison of those in the middle stages with those in maintenance reveals the odds of "using consistently."

Tables 3 and 4 present variables that were statistically associated ($p<.05$) with at least one stages-of-change comparison. In the cross-tabular analysis, variables

Table 2. Percentage distribution of inner-city women aged 17–35, by characteristic, according to type of partner

Characteristic	All† (N=625)	Main partner (N=393)	Other partners (N=263)
Age			
17–19	29	28	27
20–24	35	38	34
25–29	23	23	25
30–35	13	11	14
Race			
Black	99	99	99
Other	1	1	1
Marital status			
Never-married	84	84	85
Married	7	10	3
Divorced/separated/ widowed	9	6	12
Ever pregnant			
Yes	58	60	62
No	42	40	38
Completed education (in yrs.)			
<12	40	34	50
≥12	60	66	50
Currently employed			
Yes	45	52	34
No	55	48	66
Living in subsidized housing			
Yes	53	50	59
No	47	50	41
Total	100	100	100

†Includes 56 women who had neither a main partner nor other partners, and 87 women had both a main partner and other partners.

Figure 1. Percentage distribution of women with main partners or with other partners, by stages of change in condom use behavior
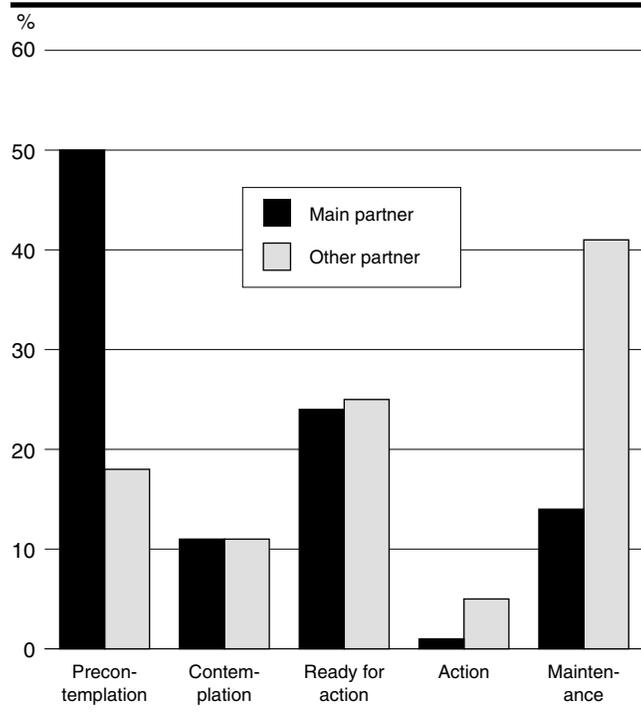
Table 3. Percentage distribution of women who are at various stages of behavior change with a main partner, and bivariate odds ratios (with 95% confidence intervals) of likelihood of being in certain stages of behavior change, by statistically significant characteristics

Characteristic	Stage of change (N=393)				Odds ratio	
	Precon-templation	Middle stages	Main-tenance	Total	Precontemplation vs. middle stages (N=339)	Middle stages vs. maintenance (N=196)
Demographic						
Age (in yrs.)†,‡						
17–19 (reference)	39	49	13	100	1.00	1.00
20–24	53	34	12	100	0.51 (0.29–0.91)	ns
25–29	51	33	16	100	ns	1.80 (0.70–4.67)
30–35	66	16	18	100	0.19 (0.07–0.52)	4.41 (1.19–16.73)
25–35	56	28	16	100	0.39 (0.22–0.72)	2.29 (0.97–5.46)
Married	85	10	5	100	0.14 (0.05–0.42)	ns
Works outside the home	54	36	9	100	ns	0.51 (0.27–0.98)
Social						
With regular partner for ≥2 yrs.	56	32	12	100	0.44 (0.28–0.71)	ns
Cohabits with regular partner‡	64	32	4	100	0.49 (0.32–0.76)	0.25 (0.12–0.55)
Regular partner supports condom use†,‡	16	56	28	100	12.48 (7.59–20.54)	3.03 (1.36–6.76)
My friends think it's important to use condoms	46	38	15	100	2.23 (1.21–4.10)	ns
Everyone I know uses condoms all of the time‡	32	42	26	100	2.27 (1.41–3.66)	2.69 (1.42–5.09)
My friends support condom use with my regular partner†,‡	39	45	16	100	4.53 (2.60–7.90)	ns
My friends think it's easy to get used to condoms	44	38	19	100	ns	2.20 (1.09–4.44)
Emotional closeness score						
Low	53	34	13	100	ns	ns
Medium (reference)	43	45	12	100	1.00	1.00
High†	56	24	21	100	0.41 (0.19–0.85)	3.34 (1.23–9.11)
Pregnancy intentions/contraception						
Is pregnant now	75	25	0	100	0.40 (0.22–0.75)	0.07§,††
Tried to get pregnant in past year	74	11	16	100	0.19 (0.04–0.83)	ns
Would be happy if became pregnant now†	52	31	17	100	0.53 (0.32–0.86)	ns
Having baby now would be problem	41	43	15	100	1.98 (1.18–3.33)	ns
Ever pregnant before	48	35	17	100	ns	2.03 (1.02–4.04)
Used pill at last intercourse‡	38	56	6	100	2.46 (1.47–4.13)	0.20 (0.08–0.51)
Used implant at last intercourse	50	50	0	100	ns	0.14§,††
Had operation to prevent pregnancy	60	21	19	100	0.46 (0.22–0.96)	2.64 (1.03–6.74)
Outcome expectancies/HIV risk						
Believes that it is wise to use condoms†	44	40	16	100	7.19 (2.98–17.37)	ns
Believes that condoms will build trust†,‡	24	49	28	100	5.97 (3.69–9.68)	9.44 (2.80–31.82)
Used cocaine in the past year	67	23	10	100	0.41 (0.22–0.75)	ns
Could get HIV from main partner if he didn't use a condom	45	41	14	100	2.97 (1.66–5.30)	ns
Ever tested for HIV	60	24	16	100	0.27 (0.18–0.43)	3.66 (1.88–7.12)
Response efficacy/self-efficacy						
Refused sex in past year when no condom was available†	36	40	24	100	1.86 (1.16– 2.99)	2.38 (1.26–4.48)
Refused sex in past year because of fear of STDs‡	41	33	26	100	ns	3.09 (1.60–5.94)
Believes that condoms are easy to use with main partner†	40	42	18	100	5.25 (2.85–9.64)	6.26 (1.02–58.29)
Believes that condoms slip‡	51	40	9	100	ns	0.22 (0.11–0.42)
Believes that condom use with main partner is protective	48	36	16	100	ns	3.63 (1.05–12.58)
Could use condoms everytime with main partner if she wanted	43	40	16	100	5.24 (2.57–10.70)	ns
Easy to talk about condoms with main partner	46	39	15	100	3.77 (1.69–8.39)	6.26 (1.02–38.29)
Condoms are unpleasant	67	27	6	100	0.30 (0.19–0.47)	ns

†Independently significant in the within-domain logistic regression for precontemplative vs. middle stages. ‡Independently significant in the within-domain logistic regression for middle stages vs. mainte-nance. §To calculate the odds ratio where one cell contained a zero, we added 0.5 to the empty cell. ††Confidence interval could not be calculated, as at least one cell had a zero in it. *Notes:* Middle stages consist of contemplative, ready for action and action. Except where multiple responses are specifically presented (i.e., age and emotional closeness score), all independent variables were dichotomous, and all reference groups are omitted. This table shows only potential correlates that were significant at p<.05 in at least one comparison. na=not applicable. ns=not significant.

from all five conceptual areas were associated with the three-stage model for condom use with the main partner (Table 3). Relationship and pregnancy variables were important correlates both for developing intentions and using consistently. For example, being with a regular partner for two or more years and cohabiting with a regular partner each reduced the likelihood of developing intentions to use condoms by about half (odds ratios of 0.44 and 0.49, respectively). On the other hand, having a regular partner who supports condom use significantly increased the odds of developing intentions to use con-

doms (12.48), as well as the odds of using condoms consistently (3.03).

Many social variables were also associated with the stages of change. The odds for developing intentions were significantly enhanced when friends supported condom use with a regular partner and when the respondent perceived that everyone she knows uses condoms. Likewise, use of condoms among acquaintances and friends' perceived ease of using condoms significantly raised the odds of becoming a consistent condom user.

Notably, two variables that reflect the exclusivity of the main relationship were

not associated with the stages of change in condom use: the woman's report of having had sex with other partners since starting a relationship with the main partner, and her report that her main partner has had sex with other partners since the start of their relationship. Another notable exception was the lack of an association between the stages of change in condom use and many personal or partner HIV risk behaviors, such as injection drug use, a large number of sexual partners or the presence of HIV risk factors in a partner.

For women with partners other than a main partner, the relationship variables as-

Table 4. Percentage distribution of women who are at various stages of behavior change with a partner other than a main partner, and bivariate odds ratios (with 95% confidence intervals) of likelihood of being in certain stages of behavior change, by statistically significant characteristics

Characteristic	Stage of change (N=263)				Odds ratio	
	Precon-templation	Middle stages	Main-tenance	Total	Precontemplation vs. middle stages (N=156)	Middle stages vs. maintenance (N = 216)
Demographic						
Age (in yrs.)†,‡						
17–19 (reference)	18	52	30	100	1.00	1.00
20–24	11	43	46	100	ns	1.90 (0.90–4.04)
25–29	17	36	47	100	ns	ns
30–35	35	27	39	100	0.27 (0.08–0.86)	2.47 (0.84–7.32)
25–35	22	33	44	100	0.52 (0.21–1.28)	2.33 (1.10–4.98)
Ever attends church	12	43	46	100	2.47 (1.23–4.98)	ns
≥3 yrs. spent in neighborhood	17	45	38	100	ns	7.50 (1.34–41.88)
Social						
Has a main or regular sexual partner†	6	57	37	100	6.86 (2.74–17.15)	ns
Friends support condom use†	13	43	43	100	4.21 (1.93–9.21)	ns
Everyone uses condoms all of the time‡	6	30	63	100	2.42 (0.93–6.32)	4.33 (0.94–19.97)
Friends think condom is easy to use†	9	42	49	100	3.30 (1.61–6.77)	ns
Outcome expectancies/HIV risk						
Used IV drugs in past year	42	29	29	100	0.21 (0.09–0.49)	ns
Had >2 partners in past month†	33	34	33	100	0.32 (0.16–0.67)	ns
Had >2 partners in past year	24	37	39	100	0.15 (0.05–0.44)	6.75 (1.23–36.93)
Received care for an STD in past year†	43	35	22	100	0.22 (0.11–0.46)	ns
Had one or more HIV risk factors	22	39	39	100	0.18 (0.06–0.56)	6.72 (1.39–32.49)
Had partner with one or more risk factors	29	36	36	100	0.36 (0.18–0.74)	ns
Perceived risk of getting HIV in next 12 months	23	23	55	100	0.35 (0.15–0.84)	ns
Could get HIV from main partner if didn't use a condom	3	56	42	100	11.8 (1.50–78.00)	ns
Response efficacy/self-efficacy						
Refused sex in past year when no condom was available†	6	44	50	100	5.61 (2.44–12.91)	ns
It is easy to talk about condoms with main partner†	4	64	32	100	15.67 (2.43–101.0)	ns

†Independently significant in the within-domain logistic regression for precontemplative vs. middle stages. ‡Independently significant in the within-domain logistic regression for middle stages vs. maintenance. *Notes:* Middle stages consist of contemplative, ready for action and action. Except where multiple responses are specifically presented (i.e., age and emotional closeness score), all independent variables were dichotomous, and all reference groups are omitted. This table shows only potential correlates that were significant at p<.05 in at least one comparison or that were significant in the logistic regression models. na=not applicable. ns=not significant.

sociated with the stages of behavior change differed from those identified for women with a main partner (Table 4). Having a main partner was a particularly prominent correlate of developing intentions to use condoms with other partners (odds ratio of 6.86). No pregnancy-related variables influenced the stages of change in condom use with other partners.

Many self-reported risk factors, such as intravenous drug use and multiple sexual partners in the past year, were associated with a reduced likelihood of developing intentions to use condoms. Having two or more partners in the past year and having one or more HIV risk factors were positively associated with the likelihood of consistent condom use (odds ratios of 6.75 and 6.72, respectively).

Next, we computed separate logistic regressions for the two stages-of-change comparisons within each of the five conceptual domains and separately for women with a main partner and for those with other partners.* Independent predictors from the within-domain logistic regression analyses are indicated in Tables 3 and 4. Relationship factors were impor-

tant predictors of condom use both with a main partner and with other partners, but the specific relationship factors that predicted stages of change in condom use differed by type of sexual partner. Pregnancy-related variables were significant predictors, but only with the main partner.

In the final logistic regression (Table 5, page 106), the independent predictors with the strongest effects on whether a woman would develop intentions to use condoms with a main partner were a high score on emotional closeness, partner support for condom use and the woman's statement that she would be happy to find out that she is pregnant. Partner support was associated with higher stages of change (an adjusted odds ratio of 9.86); emotional closeness and happiness about a potential pregnancy were related to a lower stage of change (odds ratios of 0.37 and 0.35, respectively). Other predictors of a higher stage of change included being younger, believing that it is easy to use condoms, reporting having refused sex in the past year because no condom was available and saying that friends supported condom use.

The independent predictors with the greatest impact on the transition to con-

sistent condom use with the main partner were cohabiting with the main partner, believing that condoms build trust with the main partner and having used oral contraceptives at last intercourse. Belief about condoms building trust was related to a higher stage of change (an odds ratio of 14.77); cohabitation and pill use were associated with a lower stage of change (odds ratios of 0.29 and 0.26). Other predictors of a higher stage of change included being older, believing that condoms do not slip or break, and reporting having refused sex because of fear of getting an STD.

For women reporting partners other than a main partner (Table 6, page 106), having a concurrent main partner was associated strongly with developing intentions to use condoms with other partners (odds ratio of 10.84), even after the effects of other independent predictors were controlled for. Pregnancy intentions and contraceptive use were not predictors for the stages of behavior change with other partners. Other predictors of developing in-

*We initially attempted polychotomous logistic regression. However, because the parallel-lines assumption was violated, this approach had to be dropped.

Table 5. Adjusted odds ratios (and 95% confidence intervals) for stage of behavior transition for condom use with main partner, by predictor

Stage and predictor	Adjusted odds ratio
Precontemplation to middle†	
Age‡	0.87 (0.80–0.94)
High emotional closeness score	0.37 (0.14–0.99)
Regular partner supports condom use	9.86 (4.64–20.99)
Friends support condom use with main partner	1.56 (1.14–2.13)
Believes that condoms are easy to use with main partner	3.23 (1.29–8.11)
Refused sex in past year when no condom was available	2.39 (1.16–4.96)
Would be happy if she were to become pregnant now	0.35 (0.17–0.72)
Middle to maintenance§	
Age‡	1.13 (1.02–1.26)
Used the pill at last intercourse	0.26 (0.08–0.84)
Cohabiting with main partner	0.29 (0.11–0.71)
Believes that condoms build trust with main partner	14.77 (3.01–71.43)
Believes that condoms slip	0.20 (0.08–0.51)
Refused sex in past year out of fear of STD infection	5.21 (2.06–13.16)

†Effective sample size, N=253. ‡Odds ratio represents the odds for a one-year increase in age. §Effective sample size, N=180. *Note:* For dichotomous variables, "Yes"=1.

tentions to use condoms included being younger and having friends who support condom use and who believe that condoms are easy to use, while having received treatment for an STD in the past year was associated with a reduced likelihood of such a transition. Predictors of the transition to the maintenance stage included believing that everyone uses condoms, having been tested for HIV and believing that condoms are effective. (It should be noted that the latter two factors were of borderline statistical significance—.05<p<.10—in the bivariate comparisons, but were statistically significant in this final logistic model.)

Discussion
Factors related to relationship and pregnancy intentions appear to have been central to women's use of condoms with their main partner. High levels of emotional closeness seemingly prevented some women from developing intentions to use condoms, while the male partner's support for condom use facilitated both women's intention to use condoms and their attempts to use them consistently. Believing that condom use builds trust was also important in promoting consistent condom use. Surprisingly, the woman's sexual exclusivity or the known exclusivity of the main partner (factors with direct relevance to HIV and STD transmission) were not associated with the stages of change in condom use.

Consistent with prior research on the influence of partner type on condom use,[15] the stage of change in condom use was profoundly influenced by type of partner. Women were much more likely to be in the maintenance stage with other partners than they were with main partners. Having a main partner had particular salience in regard to condom use with other partners. Women with both a main partner and other partners were least likely to be in the precontemplation stage. Thus, these women were seemingly highly motivated to protect their main partners from STDs or to avoid the potential embarrassment of bringing a disease back to their main partner.

Pregnancy and contraceptive factors were correlates of stages of change, but only with main partners. Part of what may define a "main" or "regular" partner for women (particularly younger women) is the potential for childbearing. For main partners, factors related to higher values on childbearing were related to decreased condom use. In contrast, pregnancy-related considerations were unimportant in condom use with other partners.

Prior research with poor black women has produced differing portraits of their ability to influence their partner's condom use, based on social influence and power dynamics within relationships.[16] While our data support the importance of male partners' influence on couples' use of condoms, they also provide evidence of women's power to affect condom use. Women who said they had been able to refuse sex at some time in the past also reported increased condom use with both main partners and other partners. Still, the most important predictors of the stages of change in condom use were factors related to their partner or the relationship.

While many studies have documented a decline in condom use with increasing age,[17] we found divergent effects of age in our two comparisons. These age effects on the stages of change were consistent for both main partners and other partners. Younger women were more likely to form intentions to use condoms, while older women were more likely to use condoms consistently. These divergent findings probably reflect two distinct sets of circumstances. Condom use rose during the 1980s, and the largest increases were among adolescents.[18] Given this trend, one might expect intentions to be highest among the youngest women. On the other hand, intentions may not translate into action if social skills and social power are inadequate. Compared with younger

women, older women may be more empowered on both of these dimensions. Older women who are trying to use condoms may therefore be more successful at using them consistently.

A number of classic factors also predicted condom use: self-efficacy (i.e. having refused sex in the past year), perceived social support in using condoms and outcome expectancies about condoms.[19] Condom use was poorly correlated with perceived HIV risk, with a woman's personal risk factors or with knowledge of risk factors in any recent partner. These risk factors had no influence on women's use of condoms with their main partner. Having been treated for an STD in the past year was negatively associated with the transition from precontemplation to the middle stages of change in condom use with other partners. Women in the precontemplation stage may include those with little concern about HIV, but may also include those discouraged by previous attempts to use condoms.

We found little evidence that HIV prevention interventions are efficacious in improving the stage of change in condom use. In bivariate comparisons, HIV testing was negatively associated with the likelihood of developing intentions to use condoms with the main partner, but was positively associated with the likelihood of using condoms consistently in both types of partnerships. The association between HIV testing and stage of change remained in the final logistic regression only for other partners and only for the transition to consistent condom use.

Although residence in the intervention

Table 6. Adjusted odds ratios (and 95% confidence intervals) for stage of behavior transition to condom use with a partner other than a main partner, by predictor

Stage and predictor	Adjusted odds ratio
Precontemplation to middle†	
Age‡	0.88 (0.81–0.95)
Has main or regular sex partner	10.84 (3.35–35.09)
Received care for an STD in the past year	0.35 (0.14–0.88)
Friends support condom use	5.46 (1.96–15.18)
Friends think condoms are easy to use	4.78 (1.90–12.04)
Middle to maintenance§	
Age‡	1.05 (0.98–1.12)
Believes that everyone uses condoms all of the time	3.81 (1.96–7.41)
Ever tested for HIV infection	2.88 (1.48–5.62)
Believes that condoms are very effective††	2.39 (1.27–4.50)

†Effective sample size, N=155. ‡Odds ratio represents the odds for a one-year increase in age. §Effective sample size, N=180. ††Versus somewhat or not at all effective. *Note:* For dichotomous variables, "Yes"=1.

or comparison community was included as a variable in these analyses, no differences in the stages of change for condom use were found. Surveys in these communities in 1990 (prior to intervention activities) demonstrated considerable community concern and mobilization about HIV and STDs, and high levels of knowledge about HIV transmission; many respondents reported that they had already made changes in their personal behavior.[20] By 1992, self-reported condom use was increasing among women from both communities, with a more rapid rise in condom use seen for women in the intervention community. By 1993, at the end of the intervention period, general increases in condom use over time may have overcome intervention effects, although differences remained in attitudes about condom use between the two communities.[21]

Limitations

A number of study limitations must be noted here. Data were ascertained via self-reports, which are difficult to verify. Underreporting is probably more common for sensitive behavior and for individuals engaged in high-risk behavior. Our sample included women from a predominantly inner-city black population with a range of HIV and STD risks; thus, our results cannot be directly extrapolated to other communities, since sexual behavior and ideas about sexual relationships vary across cultural and economic groups.

In addition, the "other" sexual partner category is heterogeneous, including new partners, concurrent casual partners and other nonconcurrent partners. Sample sizes were too small to permit these groups to be analyzed separately. This heterogeneity may obscure some important distinctions. However, patterns of condom use for other partners were quite distinct from condom-use patterns with main partners, suggesting that women in these communities think very differently about condom use with these two types of partners.

We had more difficulty in constructing predictive models for other partners than we did for main partners. In part, this reflects the heterogeneity of the "other" grouping, as well as the fact that many of the questions in our survey inquired about factors related to main partners.

To simplify our analysis, we modified the five-stage model to include only three stages. This decision may have masked some finer distinctions. A more general criticism of the stages of change model is that it includes within the precontemplation stage both those who have not personally recognized a problem such as STD or HIV risk and those who have recognized such a risk but have become discouraged about condom use. Given the high rates of self-reported risk factors and the considerable knowledge of HIV in this population, women in the precontemplation stage may represent predominantly those who have become discouraged.

Implications

Efforts to promote condom use to prevent HIV transmission should focus on both females and their male partners within the context of specific dyadic relationships. It may be much easier to promote condom use with other partners. Our data suggest that increased awareness of personal and partner risk may have little impact in increasing condom use.

Interventions directed to increasing male support, or the support of both partners, for condom use might have a much more powerful effect on condom use than those directed at women alone. The study results suggest that efforts to increase women's skills at negotiating sexual relationships could also increase their ability to use condoms with male partners or to refuse unwanted sexual advances. The stage of change model may prove to be a useful way to understand the process of adopting health behaviors such as condom use.

References

1. J. O. Prochaska et al., "The Transtheoretical Model of Change and HIV Prevention: A Review," *Health Education Quarterly,* **21:**471–486, 1994; and J. O. Prochaska, "In Search of How People Change: Applications to Addictive Behaviors," *American Psychologist,* **47:**1102–1114, 1992.

2. K. R. O'Reilly and D. L. Higgins, "AIDS Community Demonstration Projects for HIV Prevention Among Hard-to-Reach Groups," *Public Health Reports,* **106:** 714–720, 1991.

3. Ibid.; and J. O. Prochaska et al., 1994, op. cit. (see reference 1).

4. K. R. O'Reilly and D. L. Higgins, 1991, op. cit. (see reference 2); J. O. Prochaska, 1992, op. cit. (see reference 1); and J. O. Prochaska et al., 1994, op. cit. (see reference 1).

5. Centers for Disease Control and Prevention (CDC), "Patterns of Sexual Behavior Change Among Homosexual/Bisexual Men—Selected Sites, 1987–1990," *Morbidity and Mortality Weekly Report,* **40:**792–794, 1991.

6. CDC, Division of Reproductive Health and Division of STD/HIV Prevention, "Prevention of HIV in Women and Infants Demonstration Projects: Update October 1993," Atlanta, 1993.

7. K. Armstrong, L. Samost and M. Bencivengo, "Integrating Family Planning Services into Drug Treatment Programs," in U.S. Public Health Service, *Epidemiologic Trends in Drug Abuse: Proceedings from the Community Epidemiology Work Group,* 1992, pp. 548–557; K. Armstrong, R. Kenen and L. Samost, "Barriers to Family Planning Services Among Patients in Drug Treatment Programs," *Family Planning Perspectives,* **23:**264–271, 1991; C. Galavotti, "What We Have Learned from the Perinatal HIV Reduction and Education Demonstration Activities Projects," Report to the Division of STD/HIV Prevention, CDC, Atlanta, Aug. 28, 1991; M. Fordyce et al., "Childbearing and Contraceptive-Use Plans Among Women at High Risk for HIV Infection—Selected Sites, 1989–1991," *Morbidity and Mortality Weekly Report,* **41:**135–144, 1992; and J. S. Santelli et al., "Interim Outcomes for a Community-Based Program to Prevent Perinatal HIV Transmission," *AIDS Education and Prevention,* **7:**210–220, 1995.

8. Ibid.

9. M. M. Dolcini et al, "Demographic Characteristics of Heterosexuals with Multiple Partners: The National AIDS Behavioral Surveys," *Family Planning Perspectives,* **25:**208–214, 1993; O. A. Grinstead et al., "Sexual Risk for Human Immunodeficiency Virus Infection Among Women in High-Risk Cities," *Family Planning Perspectives,* **25:**252–256 & 277, 1993; D. Binson et al., "Multiple Sexual Partners Among Young Adults in High-Risk Cities," *Family Planning Perspectives,* **25:**268–272, 1993; and S. B. Plichta et al., "Partner-Specific Condom Use Among Adolescent Women Clients of a Family Planning Clinic," *Journal of Adolescent Health,* **13:**506–511, 1992.

10. C. S. Weisman et al., "Adolescent Women's Contraceptive Decision-Making," *Journal of Health and Social Behavior,* **32:**130–144, 1991.

11. S. B. Plichta et al., 1992, op. cit. (see reference 9); J. S. Santelli et al., "Combined Use of Condoms with Other Contraceptive Methods," *Family Planning Perspectives,* **27:**74-78, 1995; and C. S. Weisman et al., "Consistency of Condom Use for Disease Prevention Among Adolescent Users of Oral Contraceptives," *Family Planning Perspectives,* **23:**71–74, 1991.

12. CDC, "Distribution of STD Clinic Patients Along a Stages-of-Behavioral-Change Continuum—Selected Sites, 1993," *Morbidity and Mortality Weekly Report,* **42:**880–884, 1993.

13. D. Worth, "Sexual Decision-Making and AIDS: Why Condom Promotion Among Vulnerable Women Is Likely to Fail," *Studies in Family Planning,* **20:**297–307, 1989.

14. J. K. Watters and P. Biernacki, "Targeted Sampling: Options for the Study of Hidden Populations," *Social Problems,* **36:**416–430, 1989.

15. M. M. Dolcini et al., 1993, op. cit. (see reference 9); and S. B. Plichta et al., 1992, op. cit. (see reference 9).

16. D. Worth, 1989, op. cit. (see reference 13); A. Kline, E. Kline and E. Oken, "Minority Women and Sexual Choice in the Age of AIDS," *Social Science and Medicine,* **34:**447–457, 1992; and E. J. Sobo, "Finance, Romance, Social Support, and Condom Use Among Impoverished Inner-City Women," *Human Organization,* **54:**115–128, 1995.

17. L. Ku, F. L. Sonenstein and J. H. Pleck, "The Dynamics of Young Men's Condom Use During and Across Relationships," *Family Planning Perspectives,* **26:**246–251, 1994; and L. S. Peterson, "Contraceptive Use in the United States: 1982–90," *Advance Data from Vital and Health Statistics,* No. 260, 1995.

18. Ibid.

19. K. Basen-Engquist, "Psychosocial Predictors of 'Safer Sex' Behaviors in Young Adults," *AIDS Education and Prevention,* **4:**120–134, 1992; and M. A. Shafer and C. B. Boyer, "Psychosocial and Behavioral Factors Associated with Risk of Sexually Transmitted Diseases, Including Human Immunodeficiency Virus Infection, Among Urban High School Students," *Journal of Pediatrics,* **119:**826–833, 1991.

20. J. S. Santelli et al., 1995, op. cit. (see reference 7).

21. J. S. Santelli et al., "The Impact of a Community Based HIV/AIDS Intervention for Women: A Quasi-Experimental Evaluation," unpublished manuscript.