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Enhancing Motivation to Reduce the Risk of HIV Infection for Economically Disadvantaged Urban Women

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Abstract

This research evaluated a motivation-based HIV-risk-reduction intervention for economically disadvantaged urban women. Participants completed a survey that assessed HIV-related knowledge, risk perceptions, behavioral intentions, sexual communication, substance use, and risk behavior. A total of 102 at-risk women (76% African-American) were randomly assigned to either the risk-reduction intervention or to a waiting list. Women were reassessed at three and twelve weeks. Results indicated that treated women increased their knowledge and risk awareness, strengthened their intentions to adopt safer sexual practices, communicated their intentions with partners, reduced substance use proximal to sexual activities, and engaged in fewer acts of unprotected vaginal intercourse. These effects were observed immediately and most were maintained at follow-up.

Acquired immunodeficiency syndrome (AIDS) may be the most serious threat to public health in the world. According to the World Health Organization (1995), there have been 4.5 million AIDS cases worldwide and 18 million adults infected with the human immunodeficiency virus (HIV). In the United States, more than 500,000 people have been diagnosed with AIDS and, of these, 62% have died (Centers for Disease Control and Prevention [CDC], 1995); 650,000 – 900,000 people were infected with HIV in the US in 1992, the most recent year for which reliable estimates are available (Karon et al., 1996).

The rate of infection with HIV continues to increase faster among women than among men (Ellerbrock, Bush, Chamberland, & Oxtoby, 1991; Karon et al., 1996). AIDS has become a leading cause of death among women between 25 and 44 years of age (CDC, 1993a), and it is the leading cause of death in African American women in this age range in New York (Chu, Buehler & Berkelman, 1990). Women living in poverty, especially in urban settings, face a disproportionately higher risk of becoming infected with HIV. Approximately 73% of mothers with HIV-infected children receive public assistance (Shayne & Kaplan, 1991). Women of color, who are more likely than Caucasian women to be economically disadvantaged, represent more than three-quarters of all AIDS cases even though they make up less than one-quarter of the population (CDC, 1993b). Seroprevalence rates for African-American women are estimated to be 6 to 15 times higher than those for Caucasian women (Gwinn et al., 1991). The HIV prevalence rate for African-American women applicants to the Job Corps exceeded rates

found for Caucasian and Hispanic women, as well as for African-American men (Conway et al., 1993).

In the absence of an effective vaccine or cure for AIDS, efforts to reduce the incidence of AIDS must focus on behavioral risk-reduction, which begins with an understanding of the determinants of risk behavior. Prominent among the models that have been proposed to explain HIV-related risk behavior is the Information-Motivation-Behavioral Skills model (IMB; Fisher & Fisher, 1992). According to Fisher and Fisher (1992), “AIDS-risk reduction is a function of information about AIDS transmission and prevention, motivation to reduce AIDS risk, and behavioral skills for performing the specific acts involved in risk reduction” (p. 455, emphasis added). They have provided empirical support for the model, and suggest that it is generalizable (Fisher, Fisher, Williams, & Malloy, 1994).

Nonetheless, most intervention programs provide only education (i.e., information) about HIV-related transmission and prevention to help participants to reduce their risk of infection (Choi & Coates, 1994). Several investigators have improved upon purely educational approaches by providing both information and behavioral skills training. Kelly et al. (1994) and Hobfoll, Jackson, Lavin, Britton, and Shepard (1994) were the first to demonstrate that interventions that provided training in interpersonal skills could serve to reduce HIV-related risk among inner-city women. DiClemente and Wingood (1995) replicated these findings whereas Kalichman, Rompa, and Coley (1996) demonstrated that both sexual communication and self-management skills were beneficial in skills-based risk-reduction programs. The interventions evaluated by these authors contained both HIV-related educational and skills building components, recruited at-risk urban women, provided culturally sensitive and gender appropriate material, and employed rigorous research methods. However, these interventions have not included motivational enhancement strategies as a central or primary component.¹

The absence of a strong motivational component in an HIV-risk-reduction program is striking given data indicating that urban women underestimate their risk for infection with HIV. Kalichman, Hunter, and Kelly (1992) reported that ethnic minority women, even those identified as at-risk on the basis of their behavior, perceived themselves to be at low risk for infection. Sikkema et al. (1995) reported that high-risk urban women had lower perceptions of personal efficacy of behavior change, were less committed to using condoms, and perceived risk-reduction strategies as less socially normative. Hobfoll, Jackson, Lavin, Britton, and Shepherd (1993) also reported that urban women did not consider themselves at risk for HIV infection. Prior research has also established that AIDS is perceived to be a less important problem than other competing life stressors, such as employment, crime, and drugs (Kalichman et al., 1992; Kalichman, Adair, Somlai, & Weir, 1995). These data suggest that a comprehensive HIV-risk-reduction program for women would be enhanced by a strong motivational component.

Empirically-validated therapies focusing on motivational enhancement have recently emerged in the context of substance use reduction. These approaches have gained great favor for several reasons. First, motivation for change is regarded as a crucial factor in treatment success (Miller, 1985; Miller & Rollnick, 1991; Prochaska & DiClemente, 1982). Second, clients tend to be more committed to a behavior change plan that they perceive as their own, an outcome

¹Several interventionists have recognized the importance of motivation in developing HIV-risk-reduction interventions. For example, Kelly (1995) has discussed the importance of threat personalization (i.e., accurate appraisal of personal risk based upon one's own behavior) and includes a risk sensitization component in his interventions (Kelly et al., 1989; 1994). Hobfoll et al.'s (1994) intervention, guided by the Conservation of Resources theory (Hobfoll, 1988), addressed women's general coping resources (e.g., self-esteem) as well as task-specific resources (e.g., interpersonal skills). Our use of the term “motivation,” however, implies a more comprehensive approach that includes key motivational components (i.e., risk sensitization, personalized feedback, and construction of personal action plans) delivered with a non-directive therapeutic style designed to foster client independence and minimizes resistance.

facilitated by motivational enhancement strategies (Miller, 1989). Third, resistance to change is lessened by an approach that elicits change goals from the client rather than imposing them. Fourth, evidence suggests that action-oriented treatments are appropriate for only a small percentage of clients who seek treatment (Prochaska, DiClemente, & Norcross, 1992); it is reasonable to expect an even lower percentage in the HIV-risk reduction, or any prevention context. Finally, motivational approaches avoid moral judgments regarding socially sensitive behaviors. Miller and his colleagues have demonstrated that motivational enhancement techniques reduce alcohol consumption among problem drinkers (Miller, Benefield, & Tonigan, 1993; Miller, Sovereign, & Krege, 1988), but the value of this approach for the HIV-related risk-reduction remains unexplored.

Motivational enhancement approaches typically do not include a behavioral skills component because it is assumed that people already have the skills needed to change their behavior; what they lack is the motivation to enact their skills. This assumption may be valid when intervening to change substance use patterns, especially when substance dependence is not evident. However, in the context of HIV-risk-reduction, there is ample evidence that (a) many people do not have the interpersonal and condom use skills needed to enact safer sexual practices (e.g., Kelly et al., 1994; Forsyth, Carey & Fuqua, in press), (b) behavioral skills are an important determinant of HIV-related risk (Fisher et al., 1994), and (c) skills improvement approaches have considerable therapeutic value (cf. Kalichman, Carey, & Johnson, 1996). For these reasons, and consistent with the IMB model (Fisher & Fisher, 1992), we suggest that a comprehensive risk-reduction intervention should include both motivation enhancement and skills training to optimize behavior change.

Therefore, the purpose of this research was to advance further the effectiveness of existing HIV-risk-reduction interventions by combining motivational enhancement strategies with behavioral skills training. Our view was that it would be premature to directly compare these two approaches. Rather, in this initial clinical trial, we sought to determine whether the integration of these two approaches was feasible, acceptable, and effective. To facilitate the cultural relevance of the intervention, formative research (i.e., focus groups and elicitation interviews) was completed prior to this investigation (Carey, McLean, Gordon, & Morrison-Beedy, 1995). To guide the active components of our intervention, we followed the theoretical model proposed by Fisher and Fisher (1992), which emphasizes information, motivation, and behavioral skills as determinants of HIV-related risk behavior. Finally, we adapted motivational enhancement strategies from the substance abuse field and integrated them with informational and skills building components developed by Kelly and his colleagues (1989, 1994). We predicted that, relative to participants in the control condition, treated participants would increase their HIV-related knowledge, risk perception, and behavioral intentions to adopt safer sexual practices while reducing HIV-risk-related behavioral practices. Consistent with prior research (Kalichman, Carey, & Johnson, 1996), we also predicted that the effects of the intervention would be stronger at the immediate post-intervention assessment relative to a longer-term follow-up assessment.

Method

Research Setting

The research was conducted in Syracuse, NY, a metropolitan area located approximately 250 miles (402km) from New York City, an AIDS epicenter. Syracuse is considered by demographers to be representative of the United States (Schmaltz, 1984). Surveillance data (Onondaga County Health Department, 1991a) indicate that Syracuse is representative of the second wave of the epidemic, in which residents of smaller urban areas will be at greater risk for infection with HIV (cf. Kelly, Murphy, Sikkema & Kalichman, 1993; Miller, Turner, & Moses, 1990; O'Leary & Jemmott, 1995). All activities took place at a community-based

organization long known for its service to communities of color. This site serves residents of the most economically disadvantaged census tracts in the city (i.e., more than 40% of the population having incomes below the US poverty guidelines). Social and health problems also are common. For example, rates of school dropout (28%), adolescent pregnancy (23%), and area households headed by a single, female parent (24%) are three times that of the state average (Onondaga County Health Department, 1991b).

Participants

Two hundred-ten women responded to a recruitment flyer and attended a screening session. At this session, each woman completed a pre-intervention survey in small group and then met individually with a team member who provided an overview of the intervention study. To be eligible for the intervention study, women had to report at least one of the following risk markers: lifetime history of injection drug use (IDU); sexually transmitted disease (STD); sex trading; multiple partners in the past year; non-monogamous partner; or partner who had used injection drugs. Women were excluded from the study if they presented with unintelligible speech, obvious literacy problems, overt psychiatric illness or substance use, or native language other than English. The first 102 women who met the inclusion criteria and who did not meet the exclusion criteria were invited to participate in the study; all agreed and were enrolled in the study.

Participants' mean age was 32.46 years (range = 16 - 64; $SD = 9.45$); 76% were African-American, 12% Caucasian, 6% Native American, 4% Hispanic, and 2% Other. Ninety percent reported a family income of less than \$20,000 and 65% reported an income of less than \$10,000 per year. Eighty percent had children ($M = 2.13$; $SD = 1.66$). The mean level of education was 11.8 years; 57% had earned a high school degree and 3% had earned a college degree. Risk markers were common, including a history of STDs (63%), a bisexual partner (30%), injection drug use (12%), a partner who had injected drugs (36%), sex trading (39%), and partners who had other partners (56%). Seventy-three percent had been tested for HIV, and 60% reported that they knew a person who was infected with HIV.

Measures

Participants completed a self-administered survey that measured demographics, HIV-related knowledge, motivation (attitudes and risk perception), behavioral intentions, and sexual risk behavior. To protect participant privacy and ensure candid self-reporting, each participant generated a code number that was used to match her responses across assessment occasions.

Information—The HIV Knowledge Questionnaire (HIV-K-Q), a 45-item measure, was used to assess knowledge related to HIV transmission and prevention. This instrument was designed to address knowledge relevant to women on the basis of qualitative research (Carey et al., 1995). Factor analyses with diverse samples indicated that the scale contains a single factor, is internally consistent ($\alpha = .91$), and is stable over 2-week ($r = .91$) and 12-week ($r = .90$) intervals (Carey, Morrison-Beedy, & Johnson, in press). Ample evidence for the validity of the HIV-K-Q has been assembled using content analyses and known groups. HIV-K-Q scores for this sample were reliable at pre-intervention ($\alpha = .90$), post-intervention (.92), and follow-up (.95).

Motivation—Two motivational indices were administered. First, participants completed five items designed to assess risk perception. These items asked participants to rate their risk for infection based upon past behavior and future expectations, the risk of the “average” woman and man, and the seriousness of the AIDS problem in their community. Pilot research with the target population indicated that this risk perception index was reliable (Carey et al., 1995). Risk

perception scores for this sample achieved adequate levels of reliability at pre-intervention ($\alpha = .67$), post-intervention (.75), and follow-up (.71).

Second, because theories of behavior change propose a close relationship between intentions to change behavior and actual behavior change (Fisher & Fisher, 1992), participants responded to a 7-item scale assessing intentions to engage in risk-reducing behaviors. Participants read details of a high risk situation and indicated how likely they would be to enact several risk-reducing interpersonal and behavioral self-management strategies. This scale has been used widely in previous research (e.g., Kalichman, Rompa, & Coley, 1996). Scores for this sample were reliable at pre-intervention ($\alpha = .90$), post-intervention (.93), and follow-up (.88).

Risk-related behavior—Three items were used to assess sexual communication. Participants indicated whether they had (a) talked with a sexual partner about safer sex, (b) talked with a partner about getting tested for HIV, and (c) refused to have sex with a partner because he would not use a condom. Communication scores for this sample were reliable at pre-intervention ($\alpha = .83$), post-intervention (.79), and follow-up (.62).

Prior research has suggested that substance use prior to sexual activity may increase the likelihood of high-risk sexual behavior (Gordon & Carey, 1996). Therefore, two items were used to determine whether participants had used alcohol or drugs prior to sexual activity during the past two weeks. These two items were combined to yield a single index of substance use before sex (i.e., whether or not the participant used substance before sex).

Five items were used to record the frequency of unprotected and protected anal and vaginal intercourse, and the number of male partners during the past two weeks. These items, used previously by Kalichman, Rompa, and Coley (1996), employed an open response format and a brief time interval to reduce unreliability due to memory distortion (Kauth, St. Lawrence & Kelly, 1991; Catania, Gibson, Chitwood, & Coates, 1990).

Procedures

Formative research—To facilitate the cultural relevance of the intervention, formative research (i.e., focus groups and elicitation interviews) was completed prior to this investigation (Carey et al., 1995). We also pilot-tested the measures and consulted with community residents regarding marketing of the program, optimal recruitment sites, and incentive systems.

Recruitment—Flyers with a culturally relevant graphic and a brief description of the project were distributed at a variety of health (e.g., Family Planning, STD), social service (e.g., Welfare and WIC offices), recreational (e.g., cultural fairs), and business (e.g., beauty shops, laundromats) settings that serve economically disadvantaged urban women. The intervention site endorsed the project, providing enhanced credibility among women living in the community. The flyers announced a “Women’s Health Study”, and indicated that participants would be compensated for their time; women were invited to telephone for further information.

Screening, pre-intervention assessment, and random assignment—Women who responded to the flyer were invited to a screening session, staffed by a ethnically diverse research team. At this session, women completed the survey and then met individually with a team member who provided an overview of the intervention study. The first 102 women who met the inclusion criteria (described previously) were randomly assigned to one of two conditions. Fifty-three women were assigned to the experimental intervention, whereas 49 women were assigned to the wait-list control group.

HIV-risk reduction intervention—Intervention sessions were facilitated by two trained therapists (an African-American female with her doctorate in social work, and a multiracial

male doctoral student in clinical psychology) who had facilitated a pilot group prior to this study; both the pilot group and the current project were supervised by the two senior authors, both licensed clinical psychologists. The therapists followed an intervention manual (Carey & Maisto, 1996) written for this study. Groups ranged in size from 8 to 13 participants. The intervention was designed to reduce HIV-related risk behaviors primarily by enhancing motivation for behavior change. Women so motivated were then offered the opportunity to increase their HIV-related knowledge and sharpen the interpersonal skills needed to adopt safer sexual practices.

Two key tenets of the motivational enhancement approach should be mentioned. First, “motivation” refers to a state of readiness-for-change, rather than a static trait (Miller & Rollnick, 1991). Therefore, a key therapeutic challenge involves encouraging clients toward a greater readiness-for-change. Second, motivational enhancement requires a therapeutic style that is purposely different from both skills training and non-directive (e.g., Rogerian) approaches. Skills training approaches assume that a client is already in an “action” stage of change and emphasizes teaching a client how to change; in contrast, motivational approaches focus on building a commitment to change, and emphasize helping a client develop an appreciation of why she should change. In contrast with non-directive therapeutic approaches, motivational approaches are directive, in the sense that the facilitator typically has a clear goal (e.g., reducing risk of HIV infection), and pursues systematic strategies to accomplish this goal (Miller & Rollnick, 1991).

Implementation of the motivational approach is aided by five therapeutic guidelines (Miller & Rollnick, 1991; Miller, Zweben, DiClemente, & Rychtarik, 1992): (a) Express empathy (i.e., non-judgmental listening, acceptance of the client, and recognizing that ambivalence about change is normal); (b) develop discrepancy (i.e., highlighting the difference between the client’s current behavior and her goals); (c) avoid argumentation (in contrast to confrontational approaches); (d) roll with resistance (i.e., offering but not forcing new perspectives, looking for opportunities to reinforce accurate perceptions); and (e) support self-efficacy (i.e., enhancing the client’s confidence in her ability to cope with the task of risk-reduction). Prior research on motivational enhancement approaches has focused on interventions for changes in substance use that were conducted in individual sessions. We sought to extend the motivational approach in three ways: First, to apply the approach to HIV-risk-reduction; second, to employ the therapeutic strategies in a group rather than individual format; and, third, to integrate a purely motivational approach with a traditional skills training approach. The group format was preferred because it provided the opportunity to foster social support, to practice role-playing, to generate additional risk-reducing alternatives, to begin to modify social norms regarding sexual practices, and to make the intervention accessible to a larger number of participants. The skills training component was included because of prior research indicating that skills training can effectively reduce HIV-related risk behaviors (Kalichman, Carey, & Johnson, 1996).

Education regarding HIV transmission and prevention, as well as about the consequences of infection, consisted of state-of-the-science material provided by the CDC, New York State Department of Health, American Red Cross, and other public health resources.

Behavioral skills training included self-management skills and sexual assertiveness training (Kelly, 1995; Kelly et al., 1989, 1994). Consistent with social-cognitive theory, this approach involves preparing clients to buy, keep, and use condoms; to identify high risk situations (e.g., negative affect, substance use); to alter cognitions related to behavior change (e.g., strengthening of efficacy beliefs, countering negative condom attitudes); and, importantly, to negotiate condom use with partners. Group members received opportunities to practice during role-play sessions, and reinforcement and feedback for their efforts (Kelly, 1982). At all times,

these skills were presented as but one option available to the women, and one that they might find helpful in some situations.

To enhance the public health value of the intervention, a relatively brief, four-session (90 minutes per session) intervention was developed. In the first session, the facilitators provided the rationale for the motivational enhancement approach, elicited self-motivational statements, summarized women's concerns regarding HIV-risk, encouraged risk sensitization through presentation and discussion of a videotaped interview of a local woman infected with HIV, summarized concerns and motivational statements, provided personalized feedback on HIV-risk, elicited reactions to risk feedback, and summarized the discussion. Personalized feedback was based upon each participant's pre-intervention responses, and presented with normative data from the initial sample of 210 women who responded to the recruitment flyers. Due to the use of the screening criteria, all participants were "at risk" for at least one of the behavioral indicators. Most women were "at risk" on the basis of more than one of these.

The second session began with a review of Session 1, including member concerns or reflections. The facilitators then provided feedback regarding the women's own concerns regarding problems facing the community. Leaders elicited reactions to this feedback, and then summarized the discussion. Next, educational material was delivered through a culturally sensitive videotape and facilitators elicited reactions to the videotape. Facilitators then provided personalized feedback about women's HIV-related knowledge, summarized the educational information, and elicited reactions from members. As previously, the personalized feedback was based on participants' responses to the HIV-K-Q administered at the pre-intervention assessment; each participant's summary score was provided and compared with a larger sample of more than 1,000 respondents in a previous study (Carey et al., in press). In addition, each item that was answered incorrectly was identified. Next, facilitators provided personalized feedback on risk situations (e.g., involving alcohol or drug use), elicited reactions to feedback of risk situations, and summarized the group process. Finally, facilitators prepared participants for the development of an action plan in the next session by eliciting risk-reduction strategies, summarizing the session, and affirming women's commitments to change.

The third session began with a review of prior sessions, and the facilitators solicited members' reflections. The facilitators introduced a decisional balance exercise in which the pros and cons of behavior change were elicited and discussed. Next, group members developed action plans to reduce risk of infection; the leaders facilitated this development by asking group members to respond to stems such as "The changes I want to make are ...," and "The most important reasons I want to make these changes are" These plans were summarized and the group members' commitment to them was affirmed. The facilitators then introduced the behavioral skills component by offering that some participants might want to use such skills to help them to reach their goals. The skills training included condom acquisition and use as well as skills for eroticising safer sex. The facilitators ended by summarizing the session and congratulating members on their progress.

The final session began with a review of prior sessions and participants' concerns. The majority of this session was devoted to enhancing women's communication and interpersonal skills, using extensive role-play rehearsal and feedback. The session ended with a review of important motivational statements, members' commitments to change, reaffirmation of members for commitments and progress made so far, support of members' self-efficacy for change, and addressing of any special concerns members had.

Participants were paid \$10 for each session to offset child care and transportation expenses, as well as a \$10 bonus if they attended all four intervention sessions.

Post-intervention and follow-up assessments—The post-intervention assessments occurred three weeks after the pre-intervention assessment. The research team attempted to reach all participants by telephone prior to their scheduled appointment to remind them of the assessment.

Approximately 2 months after the post-intervention assessment, greeting cards were mailed to all participants thanking them for participating in the project and reminding them that we would contact them in three weeks to schedule the follow-up assessment. The research team attempted to reach participants by telephone in the week prior to the follow-up assessments to schedule an appointment with them for the follow-up. Those who could not be reached by phone (usually because the telephone service had been discontinued) were sent a letter inviting them to visit the intervention site, or call the Project Director (using a public telephone). Participants were paid \$15 and thanked for each survey they completed. Participants in the wait-list control condition were then invited to attend an educational and motivational workshop regarding HIV-risk-reduction.

Results

Preliminary Analyses

First, we compared women assigned to the intervention condition ($n = 53$) to those assigned to the waitlist ($n = 49$) on all demographic, screening, and dependent measures collected at pre-intervention. The only difference between conditions was that participants assigned to the intervention condition perceived themselves to be at somewhat higher risk for infection with HIV ($M = 3.72$, $SD = 0.93$) relative to controls ($M = 3.25$, $SD = 0.96$), $F(1, 100) = 6.22$, $p < .05$.²

Second, we compared women who attended the post-intervention and/or follow-up assessments (completers; $n = 81$) with those women who attended only the baseline assessment (drop-outs; $n = 21$).³ Results indicated that the number of completers and drop-outs did not differ as a function of condition, $\chi^2(1, 102) = .20$, *ns*. Completers were significantly older [$M = 33.58$ vs. 27.90 years; $t(99) = 2.36$, $p < .05$] and better educated [$M = 11.98$ vs. 11.00 years; $t(100) = 2.32$, $p < .05$]. There were no differences between completers and drop-outs on any of the other demographic, screening, or dependent measures.

Third, we examined attendance patterns of the women who were assigned to the intervention. Eleven elected not to participate in the intervention. Among the 42 women who did participate, 4 women attended only one session, 3 women attended two sessions, 3 women attended three sessions, and 32 women attended all four intervention sessions. Comparison of the women who came to at least one treatment session (attendees; $n = 42$) to those who came to none (non-attendees; $n = 11$) on the baseline variables revealed no significant differences between groups. Among the 42 attendees, the mean number of sessions attended was 3.5 sessions.

Fourth, we examined all dependent measures for skewness; skewed variables were re-expressed as suggested by Mosteller and Tukey (1977) and Winer (1971). The decision to employ a particular transformation was determined by use of a ladder program (StataCorp, 1995), which searches a subset of the ladder-of-powers (Tukey, 1977) for a transformation that best converts the variable in question into a normally distributed variable (Buchner & Findley,

²Analyses of covariance (ANCOVAs) were used to determine the influence of baseline perceived risk on all outcome measures. The only effect influenced was the Time effect for communication with partners (see Footnote 5). Because no Condition or Interaction effects were altered, we report the more straightforward ANCOVAs later.

³Of the 102 women who attended the pre-intervention session, 60 returned to both assessments, 15 returned to the post-intervention session only, 6 returned to the follow-up only, and 21 did not return for either the post-intervention or follow-up.

1990; Hamilton, 1992). For the analyses reported later, the transformation employed is identified; if no transformation is described, then raw data were used.

Finally, to avoid the listwise deletion of participants who attended only 2 of the 3 assessments, we imputed missing values for those participants who attended the post-intervention but not the follow-up, or the follow-up but not the post-intervention session. The estimated value was the prediction obtained from linear regression by using the present data within groups. Thus, for example, a post-intervention score was estimated based upon the participant's pre-intervention and follow-up score (see Little & Rubin, 1987; StataCorp, 1995). Nineteen of 306 possible data points (6%) were estimated.⁴

Primary Analyses

Summary statistics were calculated for those subjects who completed 2 of the 3 assessment sessions (consistent with the repeated measures analyses that are reported later). Group means and standard deviations for all measures are presented in Table 1. Group comparisons were conducted for each continuous variable using repeated measures analysis of covariance (ANCOVA), with the pre-intervention scores as the covariate. Variables measured at the nominal level (i.e., proportion of participants using alcohol or other drugs before sexual activity) were analyzed using contingency table, chi-square tests. Estimates of effect sizes were calculated for significant findings. Effect sizes for the between-subjects analyses were obtained by computing d as an effect size index (Cohen, 1988; Hedges & Olkin, 1985; Johnson, 1989).

HIV-related knowledge—A 2 (group: treated vs. control) $\times$ 2 (time: post-intervention vs. follow-up) repeated measures analysis of covariance (ANCOVA), using pre-intervention scores as the covariate, was used to compare treated and control participants on HIV-K-Q scores. Results indicated a main effect for group, $F(1, 78) = 37.93$, $p < .0001$, $d = 1.36$; the main effect for time and the interaction of time with group were non-significant. Compared to controls, treated participants had higher HIV-K-Q scores at both the post-intervention and follow-up assessments (see Figure 1).

Risk perception—A 2 (group) $\times$ 2 (time) repeated measures ANCOVA, using pre-intervention scores as the covariate, was used to compare treated and control participants on risk perception scores. Results indicated a main effect for group, $F(1, 77) = 14.25$, $p < .001$, $d = 0.84$; the main effect for time and the interaction of time with group were non-significant. Compared to controls, treated participants had higher risk perception scores at both the post-intervention and follow-up assessments (see Table 1).

Behavioral intentions—The behavioral intention scores were negatively skewed; cubic transformations provided the best correction toward normality and were used in subsequent analyses. Results of the 2 (group) $\times$ 2 (time) repeated measures ANCOVA, using pre-intervention scores as the covariate, indicated a main effect for group, $F(1, 78) = 9.75$, $p < .005$, $d = 0.69$; the main effect for time and the interaction of time with group were non-significant. Compared to controls, treated participants had safer behavioral intention scores at both the post-intervention session and follow-up assessments (see Figure 1).

Communication with partners—The communication scores were positively skewed at all three occasions; $\log_{10}(x + 1)$ transformations provided the best correction toward normality and were used in subsequent analyses. Results indicated significant main effects for group, F

⁴Analyses were performed both with and without imputed values. The analyses without the imputed values resulted in a very similar pattern of statistically significant findings, with F values attenuated modestly by the lessened statistical power. The effect sizes, d , which are the more important consideration (Rosenthal, 1995), remained equivalent across the analyses.

(1, 77) = 4.51, $p < .05$, $d = 0.47$, and time, $F(1, 77) = 7.47$, $p < .01$, $d = 0.30$. As Table 1 shows, there was more communication with partners during the post-intervention interval than during the follow-up interval.⁵ And, individuals in the treatment group communicated more with their partners than individuals in the control group. However, both of these patterns were qualified by the time x group interaction, $F(1, 77) = 4.63$, $p < .05$. Subsequent comparisons revealed that the treatment group communicated more during the post-intervention interval than did the control group, $F(1, 77) = 6.57$, $p < .025$, $d = 0.57$, but that this difference was not statistically significant at the follow-up interval $F(1, 77) = 0.26$, ns , $d = 0.11$. For treated individuals, the amount of communication declined between the post-intervention and follow-up assessments, $F(1, 77) = 18.87$, $p < .001$, $d = 0.65$, whereas the control group remained stable, $F(1, 77) = 1.59$, ns , $d = 0.20$.

Substance use before sex—Chi-square analyses were used to determine whether treated participants were less likely to use alcohol and other drugs before sexual activity than were controls. Results indicated that, compared to controls, treated participants were less likely to use substances prior to sex during the post-intervention interval, $\chi^2(1, 75) = 11.31$, $p < .001$, $d = 0.84$; however, there were no differences between groups during the follow-up interval, $\chi^2(1, 66) = 0.31$, ns , $d = 0.14$.

Sexual risk practices—Due to the low levels of anal intercourse reported by this sample (i.e., fewer than 6% of participants reported anal sex at any occasion), this variable was not analyzed. The vaginal intercourse data were positively skewed and were transformed with the formula $\log_{10}(x + 1)$. For protected vaginal intercourse, a repeated measures ANCOVA, using pre-intervention scores as the covariate, revealed a main effect for time, $F(1, 75) = 4.05$, $p < .05$, $d = 0.23$; the main effect for group and the interaction of time with group were non-significant. The time effect indicated that all participants reported more occasions of protected intercourse at the post-intervention than they did during the follow-up interval (see Table 1). For unprotected vaginal intercourse, a separate ANCOVA, controlling for pre-intervention scores, indicated a main effect for group, $F(1, 77) = 7.07$, $p < .01$, $d = 0.59$, and an interaction between group and time, $F(1, 77) = 4.40$, $p < .05$; the effect of time was non-significant. The simple main effect of group at post-intervention was significant, $F(1, 77) = 6.67$, $p < .05$, $d = 0.57$, but not at the follow-up assessment, $F(1, 77) = 0.16$, ns , $d = 0.09$. Thus, treated participants reported less unprotected vaginal intercourse than did controls at the post-intervention assessment. However, the control group improved across time, $F(1, 77) = 4.05$, $p < .05$, $d = 0.32$, whereas the treated group remained the same, $F(1, 77) = 1.26$, ns , $d = -0.17$ (see Figure 1).

The 2 (group) x 2 (time) repeated measures ANCOVA conducted on the number of male partners, using pre-intervention scores as the covariate, indicated a marginal interaction between group and time, $F(1, 78) = 3.00$, $p = .09$; the main effects for group and time were non-significant. Planned contrasts revealed a significant group effect at the post-intervention assessment, $F(1, 78) = 4.97$, $p < .05$, $d = 0.49$, but not at the follow-up assessment, $F(1, 78) = 0.08$, ns , $d = -0.04$. Similarly, contrasts revealed a decrease across time in the number of male partners for the control group, $F(1, 78) = 5.31$, $p < .05$, $d = 0.37$; the number of male partners for the treated group remained constant across time, $F(1, 78) = 0.08$, ns , $d = -0.04$ (see Table 1).

To facilitate comparison of the current findings with prior research, we calculated an overall effect size for the behavior outcome measures. Consistent with Kalichman, Carey, and Johnson (1996), we used data from the first reporting period (i.e., post-intervention) and calculated the

⁵This main effect disappeared when baseline perceptions of risk were covaried out.

arithmetic mean of the behavioral dependent measures (i.e., sexual communication, protected and unprotected vaginal intercourse, number of partners, and substance use prior to sexual activity); these procedures yielded a mean effect size of 0.56. We then corrected for the inter-correlations of measures (mean $r = .19$; see Rosenthal & Rubin, 1986), and obtained a mean d of 0.94. The mean d for related studies and literatures appear in Table 2.

Discussion

The results demonstrate that a comprehensive small-group intervention employing motivational enhancement strategies can assist women in their efforts to reduce their risk of infection with HIV. Intervention participants increased their HIV-related knowledge, became more sensitized to their risk for infection with HIV, expressed intentions to avoid unsafe sexual practices, communicated their intentions with sexual partners, reduced substance use before sexual activities, and were less likely to engage in unprotected vaginal intercourse. These changes were observed following the intervention, and most were sustained during the three-month follow-up interval. The overall pattern of findings suggests that the motivational approach has considerable promise for HIV-risk-reduction.

This intervention integrated behavioral skills training with motivational enhancement. Supplementing the motivational enhancement approach with behavioral skills has not occurred in prior applications, primarily because such skills were often assumed to be present. Thus, it is often assumed that clients know “how” to change, but they do not know “why” they should. A second reason why skills training is typically not included is because such training can be highly prescriptive (i.e., offering specific directions, instructions, and assignments), a therapeutic style that is not compatible with the motivational approach (cf. Miller & Rollnick, 1991). In the current intervention, we provided skills training in a manner consistent with motivational approaches. Thus, rather than prescribe specific strategies, we elicited possible change strategies from participants, facilitated behavioral rehearsal, and encouraged group feedback. Participants determined which risk-reduction goals were right for them, and which skills would allow them to achieve their goals.

Implementation of the motivational approach in a group context also represents a novel application. To protect the privacy of group participants, we provided feedback about risk status in individual reports and planned to discuss risk status and behaviors in a general way (i.e., less personally than is typically done in individual sessions). However, participants were willing to disclose risk appraisals, interpersonal relationship details, and safer sexual strategies with each other in a way that served to enhance the discussion. The group was also quite supportive of individual participants’ efforts at risk-reduction. We suspect that the group process provided additional motivational influences that facilitated individual change.

The design of the current study does not allow for direct comparisons between this combined intervention (viz., motivational enhancement and behavioral skills) and the skills-oriented interventions that have been investigated previously (e.g., DiClemente & Wingood, 1995; Hobfoll et al., 1994; Kalichman, Rompa, & Coley, 1996; Kelly et al., 1994). However, given the similarity of the populations studied, it is possible to obtain an indirect comparison by examining the effect sizes achieved in this and other studies.⁶ The mean effect size obtained in this study with a motivational approach ($d = 0.57$, before correcting for inter-correlations among the dependent measures) exceeds those obtained previously with skills-based approaches in samples of urban women (see Table 2), and compares very favorably to effect sizes obtained with skills-based HIV-risk reduction programs in a variety of populations ($d =$

⁶A comparable effect size could not be calculated for Kalichman et al. (1996) due to the absence of a comparable control group in that study.

0.25; cf. Kalichman, Carey, & Johnson, 1996). In addition, the effect sizes observed here compare favorably to those obtained in other health-behavior change contexts ($d = 0.12$; cf. Johnson, Carey, Kalichman, & Muellerleile, 1996). The nature of these cross-study comparisons precludes strong inferences, and we do not mean to imply that motivational approaches are necessarily superior. However, the effect sizes obtained in this study clearly suggest that the motivational approach warrants further investigation with larger samples and advanced designs.

Although this study was not designed to provide a formal test of the Information-Motivation-Behavioral Skills (IMB) model (Fisher & Fisher, 1992), the results are consistent with it. Together with results obtained recently with college students (Fisher et al., 1996), these data indicate that the IMB model can be used heuristically to guide intervention development. Whether the IMB or other models best explain the results of this study will require further investigation. As leading theorists have recognized, the overlap among existing theoretical models is considerable (Fishbein et al., 1992).

Community-based research on high-risk sexual behavior creates challenges that must be recognized, including participant retention, measurement, and analysis of sexual risk behavior (cf. Ostrow & Kessler, 1993). We implemented culturally sensitive recruitment strategies with an ethnically diverse research team, provided monetary incentives to defray the costs of participation, and held sessions in a convenient community-based facility. This careful attention to tracking and retention resulted in 74% of participants returning for the post-intervention assessment and 65% for the follow-up assessment. These retention rates are consistent with those obtained by other researchers (e.g., Kalichman, Rompa, & Coley, 1996; Kelly et al., 1994), and may constitute an upper limit of what can be expected with socially disenfranchised groups.

Assessment of risk behavior also poses challenges. Research has demonstrated that health education and assessment materials are often written at levels that exceed respondents' reading abilities (Meade & Byrd, 1989); low income adults tend to have the lowest functional literacy skills (Williams et al., 1995). We were cognizant of these considerations when assembling our survey, but women still had difficulty completing it. Face-to-face interviews are not an attractive alternative, because respondents tend to report lower levels of socially sensitive behavior with this method (Catania et al., 1990). Use of audiotaped (cf. Boekeloo et al., 1994) or audio compact disc-administered sexual risk surveys warrants further study.

Assessment will remain difficult due to the frailty of memory. Catania et al. (1990) have detailed reasons why respondents may be unable to recall sexual events. We purposely selected a two-week recall interval because it would be easy for participants to recall reliably (see Kauth et al., 1991). Such a brief interval, however, provides few opportunities for sexual events to occur. A longer interval would have offered women additional opportunities to demonstrate their motivation and behavioral skills. Due to the brevity of the assessment interval, our results may underestimate the effectiveness of the intervention.

Finally, the distribution of sexual behavior tends to be inherently non-normal, creating problems for data analysis and interpretation. Development of improved measurement strategies, or more sensitive analytic strategies is needed. Biological outcomes (e.g., incidence of HIV infection) remains impractical due to low incidence, cost, and poor acceptance by participants (Coyle, Boruch, & Turner, 1991). For the present, investigators can supplement sexual behavior measures with a network of measures, including HIV-related knowledge, behavioral intentions, and skills.

The limitations of this study deserve mention. First, not all women included in the sample were sexually active, reducing the sensitivity of our design. Future research might require that risk

behaviors (e.g., an STD) have occurred during the prior 3 months. Second, we did not obtain a direct measure of behavioral skills. Use of role plays would provide a useful measure of the effectiveness of the behavioral skills training. Third, our design did not provide a control for the non-specific factors associated with any intervention. Research might compare the intervention evaluated here against other active interventions for HIV or other important social problems.

Future research might also compare the motivational approach with education or skills building only. Use of a dismantling design will permit inferences about the active ingredients of the intervention. The value of booster sessions, or the effectiveness of a briefer intervention would help to determine whether the intervention can be made more potent, and elucidate its limits. Given the urgency of the AIDS pandemic and the scant resources available for prevention, research exploring economical delivery modes (e.g., paraprofessionals) is warranted.

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Figure 1. Mean (A) HIV knowledge, (B) safer sex behavioral intentions, and (C) unprotected vaginal intercourse by group at preintervention (pre), postintervention (post), and follow-up.

Table 1

Means and Standard Deviations for Analyzed Variables

Variable	Pre-intervention		Post-intervention		Follow-up	
	M	SD	M	SD	M	SD
Knowledge (% correct)						
Experimental	75.19	16.43	86.56	12.02	85.47	12.77
Control	70.35	19.58	71.51	19.69	70.17	21.48
Risk perception						
Experimental	3.69	0.94	4.03	0.98	3.81	0.89
Control	3.21	0.91	3.22	0.82	3.11	0.70
Behavioral intentions						
Experimental	6.35	1.80	7.26	1.32	7.35	0.88
Control	6.65	1.63	6.88	1.41	6.71	1.53
Sexual communication						
Experimental	0.32	0.71	0.95	1.01	0.35	0.52
Control	0.46	0.83	0.57	0.88	0.34	0.53
Protected vaginal intercourse						
Experimental	1.14	3.48	1.26	3.27	0.44	1.08
Control	2.39	8.52	0.84	1.35	1.68	8.10
Unprotected vaginal intercourse						
Experimental	1.79	2.97	0.67	1.73	1.16	2.26
Control	2.35	8.45	2.30	4.78	2.39	8.42
Number of partners						
Experimental	0.77	1.43	0.63	0.98	0.62	0.58
Control	0.87	1.70	0.97	1.24	0.61	0.52
Used alcohol/drugs (%)						
Experimental						
Control						
	19		7		17	
	22		38		26	

Note. The data presented are for participants who attended at least one of the last two assessments ($N = 81$; Experimental condition $\bar{n} = 43$ and Control condition $\bar{n} = 38$).

Mean Effect Size
0.56
0.42
0.43
0.32
0.25
0.12

79), number of partners(0.49), substance use prior to sexual activity (0.84)
(0.80); spermacide acquisition(0.49); number of partners (0.19)
vaginal intercourse partners (0.24), percentage of vaginal intercourse occasions when condoms were used (0.55), number using condoms at any time (0.36), number of male partners with whom condoms were used (0.28)