

# Project ÔRÉ: A Friendship-Based Intervention to Prevent HIV/STI in Urban African American Adolescent Females

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There is an urgent need for continued innovation in the design of HIV/STI prevention interventions for African American females, a group at high risk for STIs and HIV. In particular, attention to social development and to culture is needed. The present study reports on a group randomized controlled trial of a friendship-based HIV/STI prevention intervention delivered at community-based centers in four San Francisco neighborhoods ( $n = 2$ , experimental;  $n = 2$ , control). This brief program focuses on youth and their friendship group ( $N = 264$ ). Program outcomes vary by age at 3-month follow-up, evidencing decreases in risky sex in the oldest group ( $p \leq .05$ ), decreases in multiple partners in the middle age group ( $p \leq .05$ ), and increases in HIV testing in the youngest group ( $p = .05$ ). Findings extend recent work on the efficacy of interventions to reduce sexual risk for racial and ethnic minority youth.

**Keywords:** African Americans; adolescents; HIV/STI prevention; community-based prevention

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The path to a healthy adolescence requires attention to potential threats to adolescent transitions including the risks associated with sexual activity (Schulenberg, Maggs, & Hurrelmann, 1997). Concern over the ongoing epidemic of STIs (Centers for Disease Control and Prevention [CDC], 2007a) and increasing rates of HIV (CDC, 2007a) among adolescents and young adults has led to the development of programs to reduce adolescents' risk of contracting these health conditions. African American adolescent females have disproportionately high rates of STIs (CDC, 2006a, 2006b) and HIV (CDC, 2007a) relative to females of other racial and ethnic minorities. The primary route for HIV infection in this group is heterosexual contact (CDC, 2007b). Thus, efficacious programs for heterosexual female African American adolescents are sorely needed to stem the tide of these infections and their sequelae (CDC, 2007b).

The development of programs that target African American youth must take into account cultural factors that are unique to African Americans and the developmental needs of this age group (Pedlow & Carey, 2004; Vera, Reese, Paikoff, & Jarrett, 1996; Wilson & Miller, 2003). Such programs should also address youth living in communities with a high burden of STIs and HIV. In an effort to contribute to the growing body of literature on HIV/STI prevention in youth, the current study describes the development and evaluation of a group randomized controlled trial of a brief friendship-based HIV/STI prevention intervention that was developed specifically for urban African American females living in communities with a high prevalence of STIs.

Reviews of existing interventions have shown that social factors, such as perceived norms and social connectedness, are key factors in successful interventions targeting STI and pregnancy prevention in adolescents (Kirby, 2001; Pedlow & Carey, 2004). Research suggests that perceived norms may operate on multiple levels including through social or behavioral norms that either discourage or condone behavior (Horne, 2001). Norms will have a greater impact if an adolescent is closely connected to the person or group expressing those norms. Peer group and friendship norms may be especially salient during adolescence (Brown, 1990; Brown, Dolcini, & Leventhal, 1997; Dolcini, Harper, Watson, Catania, & Ellen, 2005). Prior research with African American friends in low-income urban communities shows similarity in norms (Catania & Dolcini, 2006) and behavior (Catania & Dolcini, 2006; Fang, Stanton, Li, Feigelman, & Baldwin, 1998) with regard to sex and substance use. Our prior work also suggests that norms are verbally expressed through conversations about dating and sexual issues and that friends are involved in selection, procurement, and dissolution of romantic relationships (Harper, Dolcini, Gannon, Watson, & Catania, 2004). Thus, friends are an important social influence during adolescence for African American youth.

## **INTERVENTION STRUCTURE**

Group-based prevention and health promotion programs that incorporate friends into the intervention have promise for increasing protective behaviors. Friendship interventions are designed to incorporate social and cultural factors into the structure and the content of programs (Dolcini et al., 2008; Stanton et al., 1996) and to influence behavior through the engagement of the social group in the intervention process.

Stanton and colleagues (1996) demonstrated that a multisession HIV intervention targeting friendship groups of low-income African American youth can reduce sexual risk behavior. One feature of the intervention that presented challenges was the multisession nature of the program; only 40% of the participants attended five of the

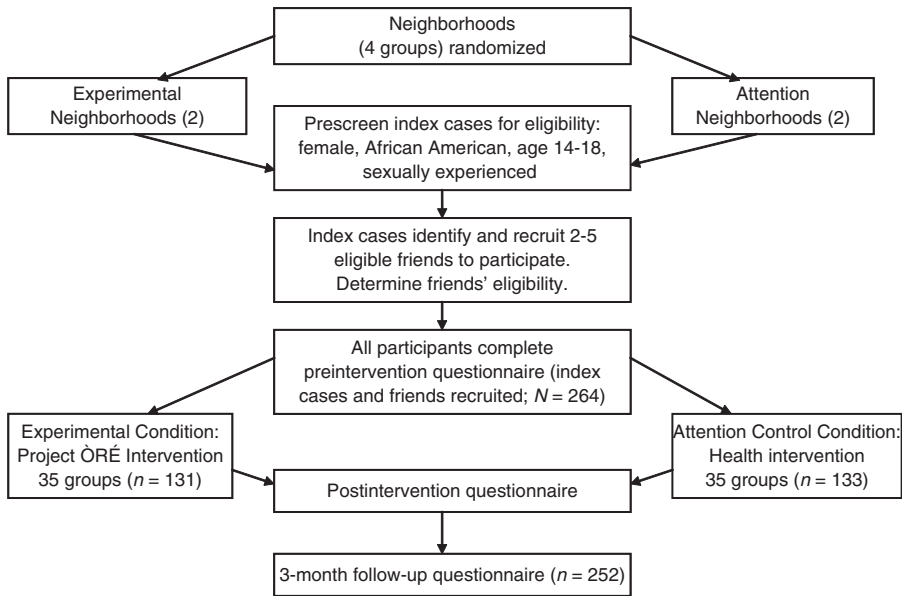
eight sessions. Thus, the majority of youth failed to fully benefit from the program. Recent data provide evidence that single-session interventions can influence racial and ethnic minority adolescents' beliefs and HIV risk behavior (Jemmott, Jemmott, Braverman, & Fong, 2005; Royce, Perlmuter Silverman, & Krauss, 2007), but these programs have not been based on friendship. The current study fills a gap in the literature through the development of a single-session intervention delivered to friendship groups.

Drawing on past research assessing determinants and structure of friendships among African American youth and on existing intervention research, we developed and pilot tested a friendship-based HIV/STI prevention intervention designed to influence social norms and behavior related to HIV/STIs (Dolcini et al., 2008). We chose to focus on the close-friendship group in our program. Finally, we aimed to develop a brief program that could more easily be translated into practice and incorporated developmental and cultural factors in the design of the intervention (Pedlow & Carey, 2004; see Intervention Format section). The intervention is based on the AIDS risk reduction model (ARRM; Catania, Kegeles, & Coates, 1990), which has been shown to be a strong theoretical foundation for HIV prevention interventions (e.g., Boyer, Tschann, & Shafer, 1999; Peterson, Coates, & Catania, 1996). To the best of our knowledge, the present study is the first brief HIV/STI friendship-based prevention intervention developed for urban African American females.

## METHODS

### Study Enrollment

With approval from the Institutional Review Board for the University of California, San Francisco, African American female adolescents in four separate communities were approached by trained study staff, or approached the staff themselves, for voluntary screening to determine eligibility to participate in the study. Contact with youth took place at participating community-based organizations and through street outreach in the surrounding community. Verbal screening was conducted with those expressing interest in participating in this research. Eligibility for participation as an index case included being female, sexually experienced, African American or mixed African American race, aged 14 to 18 years, and willing to nominate two to five close female friends to participate in the study. These index cases were required to be living in the target community and to recruit friends for participation. Eligibility criterion for friends was age in the range of 14 and 21 years, with no restrictions placed on ethnicity or residence (69% of recruited friends lived in the communities assigned to the arm of the study in which they were enrolled, 13% lived in the communities designated as the opposite arm of the study, and 12% lived in other communities within the larger city). Eligibility for nonindex participants was determined by research staff during the initial encounter. A total 16% ( $n = 15$ ) of youth screened as index cases were ineligible, most frequently because they were not sexually active. Less than 2% ( $n = 4$ ) of friends screened were ineligible. Written, informed parental consent and youth assent were obtained for youth under age 18; respondents aged 18 years and older provided written, informed consent. The participation rate for eligible index cases was 90% and was 93% for eligible friends. Workshops took place over a 12-month period between 2005 and 2006.



**Figure 1.** Randomization and participants' progress through the trial.

### Study Design and Procedures

A group randomized controlled trial was used to evaluate the efficacy of the experimental intervention (see Figure 1). Four neighborhoods in San Francisco were randomly assigned to the experimental ( $n = 2$ ) or control ( $n = 2$ ) condition. Thus, only one condition was delivered in each neighborhood to avoid contamination. Both experimental and control interventions consisted of a 5-hour, single-session intervention delivered to the small friendship group ( $n = 3-6$ ) by trained African American female health educators. Youth in the experimental condition received the Project *ORÉ* friendship-based HIV/STI prevention intervention (Dolcini et al., 2008). In the control condition, participating youth received a nutrition/exercise health promotion intervention designed for this population. A total of five community-based organizations served as sites for intervention delivery (both experimental and control conditions).

Prior to implementation of the intervention, participants completed a baseline self-administered questionnaire. Two postintervention questionnaires were conducted immediately following the intervention and, on average, 3 to 4 months after completion of the intervention (median = 105 days).

### Intervention Content and Format

The experimental intervention was based on our prior qualitative and quantitative research in the study community, existing literature, input from community youth, and was grounded in the ARRM (Catania, Kegeles, et al., 1990). The ARRM considers issues related to sexual health risk by focusing on three processes (or stages): first, recognition that one's behavior is placing one at risk (labeling); second, making a

decision to modify, or not to modify, sexual behavior (commitment); and third, attempting to carry out that decision (enactment). Modules 1 to 3 of the experimental intervention address labeling (Stage 1) of the ARRM, Module 4 addresses commitment (Stage 2), and Modules 5 to 6 focus on issues of relevance to enactment (Stage 3). Module 7 addresses enactment and reaffirmation of commitment (see Table 1). The experimental intervention was pilot tested in a similar community (Dolcini et al., 2008), minor modifications were made, and time-sensitive information updated prior to implementation.

We attended to adolescent developmental (Pedlow & Carey, 2004) and African American cultural issues in the construction of the program, meeting criteria described by Wilson and Miller (2003) as including cultural factors in intervention content. Some features are highlighted below. The intervention focused on local HIV/STI rates and utilized a variety of educational strategies (e.g., didactic teaching, interactive group discussion and exercises, and self-risk appraisal). A series of DVD clips was developed specifically for this intervention. These DVD clips consisted of candid interviews with youth from the target community on issues related to HIV/STIs and were used to stimulate group discussions. The intervention began with an African rite of passage exercise and ritual, which focused on increasing connection to culture, preparing for growth and development, and formalizing renewed commitments for HIV/STI prevention within the friendship group. The concept of connectedness to friends and community introduced in this opening cultural exercise was woven throughout the intervention and culminated in a closing ritual marked by a contract pledging to protect the sexual health of self and friends. All modules had an individual and group prevention objective, thus the friendship component was woven throughout. Table 1 describes the overall goals and specific educational objectives of the experimental intervention.

### **Control Intervention**

The control intervention was identical to the experimental intervention with regard to the cultural issues, time frame, and educational strategies, but it was designed to increase awareness of the role of diet and exercise in health and to improve participants' physical condition through healthier food choices and exercise. Youth in the control condition completed the African rite of passage noted above.

### **Incentives**

Participants received \$50 cash for participating in either intervention and for completing the baseline and immediate postintervention questionnaires. Food was provided during a break in the 5-hour workshop. Participants received \$25 cash for completing the 3-month follow-up questionnaire.

### **Study Outcomes**

Self-administered questionnaires assessed sociodemographic risk markers and behavioral risk factors associated with acquisition of STIs and HIV. The questionnaire was based on instruments used in our prior studies (Dolcini et al., 2008; Dolcini et al., 2005) and was pilot tested with youth from the study communities prior to implementation. The baseline questionnaire contained items on standard demographics; friendship quality; substance use (lifetime and past 3 months); HIV and STI testing and results;

Table 1. Overview and Prevention Objectives of Friendship-Based HIV/STI Intervention Program

Module	Prevention Objectives		
	Overall goal	Individual	Group
Module 1	<p>Provide participants with information on process and content of workshop</p> <p>Obtain participants' commitment to learn about HIV/STIs</p> <p>Build cohesion among group members attending workshop</p>	<p>Explore the contents of the workshop</p> <p>Stimulate discussion of HIV/STIs (using a DVD with local youth)</p> <p>Obtain personal affirmations from participants confirming commitment to learn about HIV/STIs</p>	<p>Engage in Africentric rites of passage (Adrinka stone) exercise focused on increasing connection to culture and preparation for growth and development</p> <p>Formalize connections within the friendship group through Adrinka stone exercise</p>
Module 2	<p>Increase knowledge about HIV/STIs epidemiology, transmission, and testing</p>	<p>Increase knowledge, awareness, and understanding of HIV/STIs rates of African American youth relative to other racial and ethnic groups</p> <p>Change attitudes and encourage behavior change through discussion of HIV/STI rates and personal relevance of rates among African American youth (using a video with local youth)</p> <p>Increase knowledge about HIV/STI transmission and testing</p>	<p>Discuss ways that friends can support each other in getting tested for HIV/STIs</p>
Module 3	<p>Increase knowledge about risks associated with various sexual behaviors</p> <p>Increase knowledge about personal sexual risks</p> <p>Increase ability to perform a personal risk assessment and identify barriers to prevention</p>	<p>Provide information that facilitates categorization of sexual activities by level of transmission risk</p> <p>Have participants complete a personal risk assessment</p> <p>Identify barriers and facilitators to practicing safer sex/abstinence (using DVD with local youth)</p>	<p>Work as a team to categorize sexual risks</p> <p>Discuss ways to help friends avoid or overcome obstacles to abstinence or safer sex</p>

*(continued)*

Table 1. (continued)

Module	Overall goal	Prevention Objectives	
		Individual	Group
Module 4	Increase willingness to commit to behavioral change	Reaffirmation of desire to learn about HIV/STI prevention Express commitment to help friends learn about HIV/STIs	Make a formal commitment (sign contract) to self and friends to remain sexually healthy
Module 5	Increase knowledge about barrier methods Provide information about the benefits of consistent and correct condom use Practice skills in correct condom use Modify attitudes about effects of alcohol and its relationship to effective condom use	Discuss reasons why people don't use condoms Examine strategies to overcome barriers to condom use Describe and practice correct condom use Discuss barrier contraceptives including use of dental dams and female condoms Describe effects of alcohol/drug use on sexual decision making Participate in an exercise that simulates coordination difficulties that result from alcohol/drug use	Share strategies to increase condom use Assist friends with condom-use-practice skills Discuss strategies to help friends avoid sexual risks associated with alcohol/drug use
Module 6	Build communication skills to prevent unwanted/unsafe sexual behavior	Identify effective communication approaches to use with partners about HIV/STIs Generate effective verbal and behavioral responses to prevent unwanted/unsafe sex	Identify effective strategies for communication with friends about HIV/STI prevention issues Discuss effective strategies to help friends prevent unwanted/unsafe sex
Module 7	Reflect on lessons learned and skills to act on new information Reaffirm commitment to protect self and friends from HIV/STIs	Facilitate discussion of highlights of program to reinforce program goals Develop and discuss concrete plan to put information into action	Reaffirm formal commitment to self and friends to engage in protective sexual behaviors including abstinence Develop concrete plan to assist friends in engaging in protective sexual behaviors

and history of vaginal, anal, and oral sexual behavior (lifetime and past 3 months), including number of sexual partners and condom use. Substance use prior to sex was assessed for the past 3 months. The questionnaire also contained items on perceived social norms related to safer sexual behavior, although these data will not be presented here. The follow-up questionnaire was virtually identical to the baseline instrument with the exception that items on sexual behavior and on HIV and STI testing only queried about the past 3 months. We did not query about returning for test results.

### Sample Size

A priori power analysis set the target sample size at 116 per condition, which would define an increase in consistent condom use by experimental participants of 15 percentage points or larger as statistically significant (Diggle, Heagerty, Liang, & Zeger, 2002; Diggle, Liang, & Zeger, 1994). Assumptions underlying this calculation include Type I error set to 0.05, power set to 80%, a baseline prevalence of 35%, a correlation between repeated observations of .37, and an intracluster correlation of .05 (Dolcini et al., 2008).

### Statistical Analyses

Previous research suggests that interventions may have a greater impact on some participants than on others (e.g., Boyer et al., 2005; Kirby, 2008) and that it is important to understand the conditions under which an experimental intervention works (e.g., Green & Glasgow, 2006). With this in mind, we anticipated that three possible factors might moderate the impact of the experimental intervention. These factors were age, friendship quality, and prior sexual risk. Because these three factors are correlated, their effects were analyzed separately, rather than in a single analysis.

*Age.* We anticipated developmental differences across the relatively wide age range of adolescents included in this study. A variety of developmental advances occurs as youth move from late childhood into adolescence and continue during the adolescent years (Keating, 1990). These advances include increased sophistication in critical thinking and in decision making. Thus, we categorized participants in one of three age categories: 14 to 15 years, 16 to 17 years, 18 to 21 years. Age categories were selected to represent significant developmental markers (e.g., driving at age 16, adult status at age 18) that reflect expectations of increased decision-making abilities, and social and sexual development.

*Friendship Quality.* We also anticipated that friendship quality may influence the impact of the intervention. Participants received the intervention with their friendship group and the program addresses both individual- and group-level prevention goals. Research addressing the influence of friendship quality on intervention outcomes is virtually nonexistent. However, one unique aspect of the current program was the focus on a single friendship group. Evidence that friendship quality varies across friendships (Dolcini et al., 2005) suggests that relationships between participants will show some variation in terms of intimacy and trust. Closer friendships may result in more comfort with and more openness to the intervention messages, thus influencing how youth respond to the program.

Friendship quality was operationalized as a scale score (Dolcini et al., 2005) that was computed by summing the responses to seven questions asked about the friends participating in the intervention. This measure was developed based on prior research

in a similar community and reflects several aspects of friendship, including trust (e.g., Do you trust these friends?), emotional support (e.g., Would you ever talk to these friends about family problems or really personal problems?), and instrumental support (e.g., Would you lend these friends money if you had it? Would these friends ever back you up?). Each item was scored 1 = *no*, 2 = *yes, some of them*, or 3 = *yes, all of them*.

*Prior Sexual Risk.* Previous studies have found that prior sexual experience influences the impact of an HIV/STI intervention (Boyer et al., 2005; Villarruel, Jemmott, & Jemmott, 2006). We expected that prior sexual behavior will be predictive of risk and that the experimental intervention's efficacy will vary by the participants' sexual experience. Based on prior work we expected that those with less sexual experience/outcomes at baseline would be more likely to demonstrate positive behavioral outcomes at follow-up.

Respondents were placed in one of four risk groups based on their prior sexual activity, any history of pregnancy or STI diagnosis, and specific characteristics of their sexual activity in the 3 months prior to baseline. The "never-active" group had never engaged in vaginal, oral, or anal sex. The "active-safe" group had been sexually active but had no history of pregnancy or STI diagnosis and did *not* report having more than one sexual partner, sex without a condom, or sex under the influence of alcohol or marijuana or other drugs in the prior 3 months. The "active-unsafe" group had been sexually active with no history of pregnancy or STI diagnosis, but *did* report either multiple sexual partners or sex without a condom or sex under the influence in the 3 months prior to baseline. The "history" group reported either a past pregnancy or STI diagnosis.

We evaluated the efficacy of the experimental intervention by analyzing differences in prevalence of HIV/STI risk behavior (multiple sex partners and vaginal, oral, or anal intercourse without a condom) and testing behavior (HIV testing and STI testing) during the 3 months prior to the 3-month follow-up. The bivariate relationship between intervention condition and each outcome was assessed for the overall sample of respondents who completed the 3-month follow-up ( $n = 252$ ) and stratified by each of the three factors believed to have an impact on the efficacy of the intervention (age, friendship quality, and sexual risk behavior prior to the intervention). In each case, the CROSSTABS procedure in SPSS (Version 6) was used to compute a Fisher's exact test statistic and  $p$  value.

Each bivariate finding was replicated using the LOGISTIC procedure in Stata (Release 9) in which robust standard errors were calculated to accommodate for clustering by friendship group (defined by the index case). In the case of a stratified analysis, the model included the appropriate intervention group-by-stratification variable interaction term so that the proper post hoc comparison, one that parallels the bivariate comparison, could be calculated (i.e., the odds ratio for intervention group at each level of the stratifying variable).

## RESULTS

### Baseline Assessments

Participants were 264 adolescent females between the ages of 14 and 21 ( $n = 131$ , experimental;  $n = 133$ , control) representing 70 friendship groups ( $n = 35$ , groups in the experimental condition;  $n = 35$ , groups in the control condition).<sup>1</sup> On average, the groups included three to four friends ( $M = 3.8$ , median = 3.0). Table 2 presents the baseline

Table 2. Baseline Characteristics of the Study Participants by Intervention Group

Baseline Characteristics	Experimental Intervention Group Variable: <i>n</i> (%)	Control Intervention Group Percentage: <i>n</i> (%)	Total Percentage: <i>N</i> (%)
	131 (49.6)	133 (50.4)	264 (100)
<b>Age</b>			
14-15	50 (38.2)	34 (25.6)	84 (31.8)
16-17	41 (31.3)	47 (35.3)	88 (33.3)
18-21	40 (30.5)	52 (39.1)	92 (34.8)
<b>Race</b>			
African American	126 (96.2)	117 (88.0)	243 (92.0)
Hispanic	1 (0.8)	7 (5.3)	8 (3.0)
Asian/Pacific Island	2 (1.5)	3 (2.3)	5 (1.9)
Mixed race	2 (1.5)	6 (4.5)	8 (3.0)
<b>Household composition</b>			
Parent(s)/guardian(s)	100 (76.3)	94 (70.7)	194 (73.5)
Other relatives	19 (14.5)	27 (20.3)	46 (17.4)
Other	12 (9.2)	12 (9.0)	24 (9.1)
<b>School status</b>			
In school	101 (77.1)	101 (75.9)	202 (76.5)
Not in school	30 (22.9)	32 (24.1)	62 (23.5)
<b>Job status</b>			
Has job	52 (39.7)	40 (30.1)	92 (34.8)
No job	79 (60.3)	93 (69.9)	172 (65.2)
<b>Religious services</b>			
Attends frequently	47 (36.4)	54 (40.6)	101 (38.5)
Attends few times a year	49 (38.0)	47 (35.3)	96 (36.6)
Never/almost never attends	33 (25.6)	32 (24.1)	65 (24.8)
<b>History of vaginal sex</b>			
Has a child	22 (16.8)	9 (6.8)	31 (11.7)*
Tested for HIV (ever)	66 (50.4)	65 (48.9)	131 (49.6)
Tested for STIs (ever)	57 (43.5)	79 (59.4)	136 (51.5)*
STI diagnosis (ever)	9 (6.9)	18 (13.5)	27 (10.2)
<b>Behavior past 3 months</b>			
Ecstasy or party drugs	19 (14.5)	12 (9.0)	31 (11.7)
Alcohol binging <sup>a</sup>	17 (13.0)	17 (12.8)	34 (12.9)
Marijuana use	81 (61.8)	65 (48.9)	149 (56.4)
Vaginal sex	69 (52.7)	74 (55.6)	143 (54.2)
Oral sex	20 (15.3)	36 (27.1)	56 (21.2)*
Anal sex	2 (1.5)	4 (3.0)	6 (2.3)
Multiple partners	20 (15.5)	13 (9.8)	33 (12.6)
Risky sex <sup>b</sup>	47 (36.2)	52 (39.1)	99 (37.6)
Alcohol use prior to sex	20 (15.4)	26 (19.5)	46 (17.5)
Marijuana use prior to sex	33 (25.4)	34 (25.6)	67 (25.5)

NOTE: *N* = number of participants (*n* stands for number of participants within a subgroup). All categories of race/ethnicity are defined as non-Hispanic, except for the Hispanic category.

a. Defined as five or more drinks in one day.

b. Defined as unprotected vaginal, oral, or anal sex.

\* $p \leq .05$ .

characteristics of the study participants in each intervention group including sociodemographic information and behavioral risks associated with HIV/STIs. Four comparisons between experimental and control intervention participants on these variables were statistically significant at  $p < .05$ . Compared to the control group, the experimental group was more likely to have a child ( $p < .05$ ) and less likely to have been tested for STIs ( $p < .05$ ). In the 3 months prior to the intervention, the experimental group was less likely to report having oral sex in the past 3 months ( $p < .01$ ) and also less likely to have ever had anal sex ( $p < .05$ ). However, only 6 of the 264 participants reported engaging in oral sex in the past 3 months without also engaging in vaginal sex, and no one reported engaging in anal sex without also engaging in vaginal sex. All participants completed a 5-hour intervention. Intervention groups were conducted for a period of 12 months (2005-2006). The groups did not differ on any other demographic characteristics or on prevalence of substance use.

### **Stratifying Variables**

The age distribution of the sample is slightly positively skewed ( $M = 16.7$ , median = 16, mode = 16) with 33% of participants aged 14 to 15 years, 34% aged 16 to 17 years, and 33% aged 18 to 21 years. Factor analysis of the friendship-quality items confirmed a unidimensional scale with very high internal consistency (Cronbach's  $\alpha = .94$ ). The scale score is negatively skewed (range = 7-21,  $M = 17.2$ , median = 18, mode = 21) with 38.5% of participants ( $n = 101$ ) achieving the maximum score. For analytic purposes the friendship-quality scale score was divided into three approximately equal groups: low (32% of cases, score = 7-14), medium (30%, score = 15-20), and high (38%, score = 21) friendship quality. Participants also distributed fairly evenly across the never-active (28%), active-safe (22%), active-unsafe (30%), and history (21%) risk groups. Tests for intervention group differences on all three stratifying variables were not significant ( $p > .05$ ).

### **Follow-Up Assessments**

In all, 95% of participants completed the follow-up questionnaire ( $n = 252$ ). The minimal attrition rate ( $n = 12$ ) precludes a meaningful statistical comparison between participants and nonparticipants. However, we observed that all but one of the dropouts were friends rather than index cases and that 9 of the 12 dropouts were in the age group of 18 to 21 years. Four dropouts were from the experimental condition, and eight were from the control condition.

### **Behavioral Outcomes**

At 3-month follow-up, 35.7% of participants (experimental participants: 31.5%, control participants: 40.0%) reported any sexual risk (defined as any vaginal, oral, or anal sex without a condom) and 13.3% reported multiple (two or more) sexual partners (experimental: 11.2%, control: 15.3%). With regard to preventive behaviors, 34.1% reported being tested for HIV (experimental: 34.6%, control: 33.6%) and 39.7% reported being tested for STIs in the prior 3 months (experimental: 37.0%, control: 42.4%).

### **Efficacy of the Experimental Intervention**

Ignoring stratification, there were no statistically significant differences between the experimental condition and the control condition on the four outcome variables.

Table 3. Intervention Versus Control Comparisons on Behavioral Outcomes at 3-Month Follow-Up Stratified by Age

Basic Characteristics	Age		
	14-15 Years	16-17 Years	18-21 Years
Level of sexual risk			
Intervention	16.3%	43.9%	37.8%
Control	11.8%	40.0%	60.9%
Adjusted OR (95% CI)	1.46 (0.44, 4.89)	1.17 (0.47, 2.92)	0.39 (0.18, 0.86)
Has multiple partners			
Intervention	14.3%	5.1%	13.5%
Control	9.1%	20.0%	15.2%
Adjusted OR (95% CI)	1.67 (0.38, 7.33)	0.22 (0.05, 0.97)	0.87 (0.29, 2.66)
Was tested for HIV			
Intervention	18.4%	31.7%	59.5%
Control	2.9%	37.8%	52.2%
Adjusted OR (95% CI)	7.43 (0.95, 58.33)	0.76 (0.28, 2.07)	1.34 (0.60, 3.04)
Was tested for STIs			
Intervention	22.4%	36.6%	56.8%
Control	11.8%	46.7%	60.9%
Adjusted OR (95% CI)	2.17 (0.49, 9.63)	0.66 (0.26, 1.70)	0.84 (0.32, 2.24)

NOTE: OR = odds ratio; 95% CI = 95% confidence interval. Effects are statistically significant at the .05 level when the 95% CI for the adjusted OR does not include 1.

However, as anticipated, three primary outcomes of interest varied significantly by age (see Table 3). Among the oldest age group, 38% of participants in the experimental group had engaged in risky sex compared to 61% of those in the control group ( $p < .05$ ). After accommodating for clustering, post hoc contrasts confirmed significantly lower odds of engaging in risky sexual behavior (odds ratio [OR] = 0.39,  $p = .01$ , 95% CI [95% confidence interval] = 0.18-0.86) for the experimental group compared to the control group among 18- to 21-year-olds. We found that 5% of the experimental group aged 16 to 17 reported multiple partners compared to 20% in the control group ( $p < .05$ ). After accommodating for clustering, post hoc contrasts confirmed that among 16- to 17-year-olds the experimental group had a significantly lower proportion of respondents report multiple sexual partners compared to the control group (OR = 0.22,  $p = .04$ , 95% CI = 0.05-0.97). Finally, among those in the youngest age group, we found that 18% of the experimental group compared to 3% in the control group had been tested for HIV ( $p < .05$ ). Again, after accommodating for clustering, post hoc contrasts showed that the 14- to 15-year-olds in the experimental group were more likely to have been tested for HIV than those in the control group (OR = 7.43,  $p = .05$ , 95% CI = 0.95-58.33).

The fourth primary outcome, STI testing, did not differ by age. However, preintervention differences in STI testing between the experimental and control conditions may have limited our ability to observe significant effects in STI testing due to the intervention. Unexpectedly, there were no statistically significant differences in the primary outcomes by prior sexual risk or by friendship quality.

## DISCUSSION

The present study responds to calls for developmentally and culturally appropriate interventions to address youth at high risk for HIV/STIs. The findings from this group randomized controlled trial provide support for the efficacy of a brief friendship-based HIV/STI prevention intervention for African American female youth residing in a community with a high STI burden. The evidence suggests that youth at various developmental stages engage in different preventive activities following the intervention.

### Intervention Format

The Project *ÒRÉ* intervention was designed as a brief program for delivery to a single friendship group (Dolcini et al., 2008). The focus on a single friendship group represents a shift from prior group-based interventions that include youth without prior social connections (Jemmott et al., 2005), and the single-session format avoids problems of irregular attendance in multisession programs (Stanton et al., 1996). By limiting the program to a single friendship group, the program provides a safe environment for discussions related to sexuality (Harper, Benhorin, Watson, Anderson, & Dolcini, 2008). Furthermore, because African American adolescent females typically discuss sex and dating with their close friends (Harper et al., 2004), the participants are likely to come to the intervention with shared information about these topics. Our findings suggest high levels of friendship quality among group participants, with the overwhelming majority of groups evidencing trust and shared confidences.

A high priority should be placed on the development and testing of brief interventions for adolescents, given the need for efficient methods of intervening with high-risk populations (Jemmott et al., 2005; Royce et al., 2007) and the desire for programs that can be translated into practice. Brief programs must be able to engage youth efficiently, and inclusion of friends in the intervention group may facilitate this process (Dolcini et al., 2008). In addition, given the decreasing resources available to community agencies for the implementation of HIV/STI prevention programs, interventions that rely on young people recruiting their friends may save agencies the time spent by their staff, which may normally be devoted to participant recruitment. Attending an intervention with friends may also increase the likelihood that youth will appear for prescheduled interventions, as friends may exert social influence over those youth who have forgotten about the intervention appointment or have other competitive activities or demands (Harper et al., 2008). The single-session program tested in this study evidences promise with respect to short-term HIV/STI risk-related behavioral outcomes for African American adolescent females living in an urban environment.

### Behavioral Outcomes

As the field of HIV/STI prevention evolves, there is growing interest in factors that moderate the effects of interventions (e.g., Boyer et al., 2005; Green & Glasgow, 2006; Villarruel et al., 2006). In the current study, we found that age was the primary moderator of behavioral change. Our findings suggest that behavioral change following the intervention was consonant with development; with increasing age, we found increasing complexity in the prevention behaviors performed by participants. The increase in HIV testing in the youngest participants (ages 14 to 15) reflects enactment of an individual-level behavior that requires a concrete action, and the test result

provides a fairly immediate concrete outcome (i.e., negative or positive for HIV). In the middle age group (ages 16 to 17), the behavioral change observed reflects a somewhat more complex set. Reducing multiple partners can be an individual behavior, such as when a person decides in the abstract that she will not have multiple partners and does not place herself in situations where there will be pressure to do so. It can also be a dyadic behavior: a person communicates to a potential partner that she or he does not want to have sex. In the oldest age group (ages 18 to 21), we observed changes in the most complex behavior, reducing unprotected sex. Reducing unprotected sex requires negotiation of condom use and, given the near-universal preference for male condoms, this requires negotiation about an act over which her male partner has more direct control. The age-related differences in behavioral outcomes should not be surprising, given the wide age range of the study participants and the significant development that takes place across adolescence in cognitive, social, and sexual domains. The differential findings by age suggest that, even when presented with the same program, youth at various developmental stages may take away different messages and enact different behaviors. Although the more complex behaviors enacted by the older youth provide greater protection against STIs/HIV (e.g., condom use vs. HIV testing), future studies with longer-term outcomes may provide data on why youth choose to focus on one set of behaviors rather than another.

Data on developmental markers other than age (e.g., cognitive development, decision-making abilities) would enhance our understanding of how youth of different ages respond to programs. Furthermore, although the tools and materials used in this study are developmentally appropriate for adolescents as a whole (Pedlow & Carey, 2004), in the future, the program could be further refined to meet the needs of specific developmental groups (e.g., middle adolescents vs. late adolescents). For example, when the program is delivered to younger adolescents, the material could focus to a greater extent on concrete prevention actions available to youth and more complex behaviors (e.g., condom skills) could be disaggregated into concrete steps. In addition, particular behavioral outcomes may be emphasized based on the developmental stage of the participants. Our findings highlight the importance of incorporating developmental stage into the creation of programs for adolescents and of examining results according to age or developmental stage.

Unexpectedly, we did not find differences in outcomes based on prior sexual experience in this study. This may be partly because we had fewer sexually active youth in the study than anticipated (at baseline, 28% had never had sex; 46% had not had sex during the prior 3 months), thus limiting the opportunity to observe change in this arena. In this study we also examined the impact of friendship quality on study outcomes and we found no significant impact. Friendship quality was high, as might be expected among close friends (Dolcini et al., 2005). It may be that greater variation in friendship quality is needed to observe an impact on behavioral outcomes. Thus, it may be productive to examine both of these factors in future studies that include larger samples of sexually active youth and greater variation in friendship quality.

### **Limitations**

The present study is limited to short-term follow-up (3 months), so we are unable to examine longer-term maintenance of behavioral outcomes. Future studies will want to follow respondents for 12 months to fully understand the longer-term implications of this program. Long-term follow-up of adolescent HIV/STI programs has shown contradictory outcomes with some evidencing decreases in program impact over time (Royce et al., 2007;

Stanton et al., 1996), whereas a recent study showed increases in preventive behavior at 12 months (Jemmott et al., 2005). Four neighborhoods in a single large city were included in the current study, a group randomized controlled trial. There are advantages and disadvantages to working in a single city. Although this approach allows investigators to more easily tailor the program to the community, it yields little or no information about the generalizability of this program to youth in other geographic areas.

To maintain intact friendship groups, we did not establish residential eligibility criteria for the index cases' friends recruited for this study. Some friends lived in the communities that were assigned to the opposite arm of the study, creating a potential for contamination if they interacted with youth in their neighborhood who were in the opposite arm. This crossover may have reduced our ability to observe intervention effects, although this was not a community-level intervention, and we expect that friendship groups would have a stronger effect than community under these circumstances.

Our data analytic approach focused on moderating variables of the intervention; one of the three hypotheses related to moderation tested was significant. Given the multiple comparisons made, our findings should be replicated in a future study. Furthermore, our study was not designed to formally test the relative impact of a friendship-based intervention compared to a standard group intervention, despite our focus on friendships in the structure and content of the intervention. Future studies will be required to directly test the added value of a friendship-based intervention. A minority of youth do not have friends; such youth may be better served in one-on-one (e.g., clinician) types of interventions.

Study outcomes are based on self-report. Prior research has shown, within the limits of self-reported behaviors, that measures of adolescent sexual behavior are reliable (Catania, Gibson, Chitwood, & Coates, 1990). We did not assess STIs in this study because one of the study outcomes of interest was testing behavior. Future studies may want to add a biological outcome if disease rates are sufficiently high and testing is not a behavioral outcome of the study. Finally, our study was focused on African American females and their friends, and the relevance of this work to males was not addressed. Males were included in a preliminary study of this intervention (Dolcini et al., 2008), but these findings need to be extended in a controlled study.

### **Implications for Practice and Research**

The present study adds to an emerging literature that provides evidence of the potential of brief interventions focused on reducing sexual risk for youth. Two prior single-session interventions were developed for and delivered in primary care settings (Jemmott et al., 2005; Royce et al., 2007), and the current study extends this work to community-based settings. The continued development and refinement of brief interventions will advance our theoretical and practical knowledge of how to maximize impact on adolescents when there is not the luxury of extended contact. A single-session program may be attractive to community-based agencies making decisions about how to use their limited resources. In addition, this line of research provides new avenues for intervening with youth who may not be inclined to participate in more involved, time-intensive programs.

The use of friendship groups as a format for intervention has a number of potential advantages in recruitment and maintenance of adolescent groups, in research and practice settings, although a different research design is required to compare the efficacy of the friendship program against a standard group intervention. Recruitment

and attendance are enhanced when friends are attending a program together (Dolcini et al., 2008; Harper et al., 2008). In addition, the friendship connections may facilitate maintaining contact with participants over time in research studies or maintaining contact with clients in practice. The high follow-up rate obtained in the present study reflects not only the careful work of the study team but also the fact that locating or engaging one adolescent often leads to contact with her friends.

## CONCLUSION

The present study supports the value of the Project ÔRÉ brief friendship-based HIV/STI prevention intervention and suggests some new directions for future tests of the program. Our findings extend the literature on the effects of friendship-based HIV/STI interventions for youth and on single-session interventions. It is critical that friendship studies statistically control for the increased similarity in behavior that exists in close friendship groups, so that the true effect of the program over and above these similarities can be examined. Our findings suggest that future tests of this program are warranted and that the program has the potential to influence preventive behavior among African American adolescent females, a population at high risk for HIV/STIs.

## Note

1. In experimental condition,  $n = 34$  index cases,  $n = 97$  friends; control condition,  $n = 35$  index cases,  $n = 98$  friends.

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