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Predicting HIV Testing in Low Threshold Community Contexts among Young African American Women Living in the Southern United States

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Abstract

African American women in the Southern United States have disproportionately high HIV infection rates, and increasing HIV testing is a prevention priority in communities of color. Research suggests that optimal conditions for promoting testing involve reaching out to community members and offering free tests in private, supportive contexts with minimal delays to receiving results. These conditions were implemented with young African American women (N = 223, M age = 20.4 years) living in disadvantaged areas of a Southern U.S. city to identify participant characteristics associated with declining and accepting testing in this low threshold context. Participants were recruited using Respondent Driven Sampling, a peer-driven method useful for recruiting young adults in community settings. Structured field interviews assessed personal and social network characteristics, sexual practices, substance use, and behavioral impulsivity (assessed by a delay discounting task). A free HIV test was then offered. Participants were free to accept or decline testing, which was the outcome variable. Testing was accepted by 69%, which exceeded the national lifetime test rate for this population by 7.4% ($p < .05$). All were sero-negative. Test refusal (31%) was associated with poorer educational performance, higher delay discounting rates indicative of greater impulsivity, less social network encouragement to use birth control (ps < .05), and lower engagement in sexual risk behaviors ($p < .10$). Substance involvement did not differ as a function of test choice. Thus, low threshold community testing promoted acceptance among the majority of the priority population, but a sizeable minority with specific characteristics likely need additional incentives to fulfill the prevention potential of “know your status” through HIV testing.

Keywords

HIV/AIDS; community HIV testing; African-American women; young adults; choice architecture; delay discounting

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Introduction

For the U.S. “High Impact Prevention” program to succeed (U.S. Centers for Disease Control & Prevention [CDC], 2016), individuals’ knowledge of their sero-status through HIV testing is fundamental (Kay, Batey, & Mugavero, 2016). Improving testing rates is particularly important among young African American women living in the Southern United States where new HIV/AIDS cases continue to rise among women of color (CDC, 2016, 2017). However, clinic-based HIV testing is limited in reach and impact with this population because of racial and economic inequities and infrastructure barriers to clinical services in disadvantaged Southern communities (Reif, Pence, Hall et al., 2015). Moreover, younger women often do not have access to a regular physician or preventive health care, despite improvements since the implementation of the Patient Protection and Affordable Care Act (Transamerica Center for Health Studies, 2018).

For these reasons, community-based HIV testing programs that involve active outreach are promising alternatives to clinic-based testing for younger adults and have received some favorable empirical attention (e.g., Johns, Bauermeister, & Zimmerman, 2010; Murray, Hussen, & Toldedo, 2018), but further work is needed. Key issues in developing effective community testing programs for young African American women, our target group of interest, involve how best to reach them in the community and then offer a testing context that facilitates test acceptance. With respect to reaching them, peer social networks are highly valued among adolescents and young adults and influence many health behaviors, including HIV-relevant behaviors (Davies, Cheong, Lewis, Simpson, Chandler, & Tucker, 2014; Hahm, Kolaczyk, Jang, Swenson, & Bhindarwala, 2012). Thus, community outreach using peer social networks should be an effective engagement approach.

With respect to creating contexts conducive to HIV testing, we were guided by “choice architecture” approaches that seek to promote beneficial behavior and reduce problem behavior by crafting decision-making contexts in ways that promote good choices without restricting freedom of choice (Loewenstein, Brennan, & Volpp, 2007; Thaler & Sustein, 2008). A basic strategy is to accept, rather than attempt to remediate, biased decision-making, such as the normative tendency to devalue or discount delayed rewards in favor more immediate rewards, and to create decision-making contexts that use the biases to increase the likelihood of healthier choices (Tucker, Chandler, & Cheong, 2017). In applying choice architecture to promote HIV testing, which is a form of health-related help-seeking, we considered the established range of influences on service utilization for health and behavioral health problems, namely, social network responses, stigma, access to services, monetary and time costs of services, and the extent to which individuals’ decision-making is sensitive to shorter versus longer-term consequences (Evangeli, Paddy, & Wrote, 2016; Mechanic, 1986; Morrisey, 1993; Tucker, Simpson, & Khodneva, 2010). Particular attention was given to the fact that young people tend to be relatively impulsive and to heavily discount future consequences, including but not limited to those related to health (Madden & Bickel, 2010).

Taken together, these concepts and findings suggest that optimal conditions for promoting HIV testing include active community outreach using peer networks and offering free testing

in private, supportive contexts with minimal delays to receiving results. The present study implemented these conditions with young African American women living in economically disadvantaged areas of a Southern U.S. city. We sought to identify personal, behavioral, and social network characteristics of participants for whom this low threshold context was and was not sufficient for test acceptance. We predicted that acceptance would be associated with social network encouragement of HIV risk reduction and reproductive health behaviors and with greater sensitivity to future (delayed) outcomes when making decisions. We explored associations among sexual behaviors, substance use, and testing decisions because prior reports are mixed (Decker et al., 2015; Evangeli et al., 2016; Johns et al., 2010).

Materials and Methods

Participant Recruitment and Characteristics

African American women ages 15-25 years (N = 223, M age = 20.4 years, SD = 2.5) were recruited as a supplemental sample to a larger parent study of sexual and other health risk behaviors in African American emerging adults living in economically disadvantaged areas of a Southern U.S. city (Tucker, Simpson, Chandler, et al., 2016). As in the parent study, the supplemental sample was recruited using Respondent Driven Sampling (RDS) (Heckathorn, 1997; Johnston & Sabin, 2010), a chain referral method that corrects limitations of snowball sampling while maintaining benefits of peer-driven access to community groups. U.S. Census data from 2000 were used to identify disadvantaged neighborhoods for sample recruitment that had high percentages of young African Americans and household incomes below federal poverty guidelines. In addition to age, race, and gender eligibility criteria, participants were required to have telephone access, no plans to move within the next six months, lifetime misuse of any substance, and any sex with a partner in the past 90 days.

Research staff similar in age, gender, and/or race to the target sample recruited initial “seed” participants who met eligibility criteria in person. Seeds were trained to recruit peers “like you,” who then recruited peers in an iterative process (excluding blood relatives). Seeds and recruits received three time-limited coupons to distribute to peers that provided a toll free study number to call if they wished to enroll, which provided freedom of choice to participate. All participants received $30 for an initial 1.5-hour data collection interview and $15 for each peer recruit who enrolled in the study (up to $45). The sample included 81 seeds and 142 recruits who recruited an average of 1.76 peers (SD = 1.90; range = 0 to 7 recruitment waves); seeds directly recruited 49 peers, who in turn recruited 93 peers. Recruitment chains were allowed to continue until they naturally stopped.

Procedures

The research received university Institutional Review Board approval and a federal Certificate of Confidentiality and adhered to STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines for cross-sectional studies (Von Elm et al., 2007). Supplemental and parent (Tucker et al., 2016) study procedures were the same, with one exception: At the end of 1.5-hour data collection interviews conducted in safe, private community locations, participants were offered free voluntary HIV counseling and

testing (OraQuick) with guaranteed referral for confirmatory testing and HIV care if results were positive. Test choice was the outcome variable.

In addition to demographic characteristics, predictors of test choice were derived from four measures:

An adapted *Youth Risk Behavior Surveillance System Questionnaire* (CDC, 2009) assessed variables associated with HIV risk and reproductive health, including age of first intercourse, condom use during last sexual intercourse, substance use before last intercourse, ≥ 2 sexual partners during last 90 days, sex with an injection drug user, birth control use, and sex in exchange for food, shelter, money, or drugs. A binary sex risk variable was created for analysis (1 = ≥ 1 risk variable; 0 = none). Binary variables also were created for any prior HIV testing (1 = yes; 0 = no) and sexually transmitted infection (1 = any STI; 0 = none).

The *Alcohol, Smoking and Substance Involvement Screening Test* (ASSIST v 3.0; World Health Organization, 2010) assessed lifetime and past 90-day alcohol, illicit, and non-medical prescription drug use and yielded a Global Continuum of Risk score (range = 0 to 280) that was used for analysis. Higher scores indicate greater substance involvement.

Delay discounting of future outcomes in favor of more immediate rewards was assessed using a computerized hypothetical money choice task (Richards, Zhang, Mitchell, & de Wit, 1999). Participants made repeated choices between a smaller money amount available immediately and a larger amount available at 5 delays (1, 2, 30, 180, and 365 days from now; e.g., $2 now or $10 in 30 days; $50 now or $100 in 180 days). An equivalence point was determined for each delay, estimating the amount of immediate money that was subjectively judged equivalent to the larger later amount. These equivalence points were used to derive a discount rate (log k) for analysis that modeled the nonlinear trajectory of changes in the devaluation of future rewards as a function of delay to receipt. Higher values indicate more immediate reward preferences. It was not necessary to incentivize choices because hypothetical and real money ranging from small to large amounts generate equivalent delay discounting rates in diverse populations, including among emerging adults (e.g., Dixon, Lik, Green, & Myerson, 2013; Johnson & Bickel, 2002; cf. Madden & Bickel, 2010).

Using an expanded *Norbeck Social Support Questionnaire* (Norbeck, Lindsey, & Carrieri, 1981; Tucker, Cheong, Chandler, Crawford, & Simpson, 2015), participants listed up to 12 network members by first name and relationship and then rated the extent to which each member encouraged health behaviors, including safer sex practices and birth control use (1 = not at all and 5 = a great deal). Member feedback ratings for each health behavior were averaged across network members to yield scores for analysis that reflected overall network encouragement to practice safer use and use birth control, which adjusted for individual differences in network size (M = 7.43 members, SD = 2.83).

Data Analysis

Analyses were conducted using SAS 9.4. First, participants who did and did not accept HIV testing were compared on demographic characteristics, HIV risk variables related to

substance involvement and sexual practices, delay discounting, and social network feedback (see Table 1). To increase power for analysis, seeds and recruits were combined because the only difference found on eligibility criteria was that seeds were about a year older (M = 20.08) than recruits (M = 21.06; $t(1, 221) = 2.88$, $p < 0.005$). Second, variables of conceptual significance (sex risk indicators, substance involvement, log k, network feedback) and/or that differed significantly among HIV testing groups in the bivariate comparisons were included together in a logistic regression analysis to evaluate predictors of HIV testing decisions. A dichotomous age variable (age < 21 years or age ≥ 21 years) also was included to control for any effects of age (e.g., on parent status; access to alcohol, tobacco, and adult entertainment venues; differences in impulsivity). Of 223 participants, 33 had missing values on predictor and outcome variables and 14 had invalid response patterns on the discounting task and were excluded in the final logistic regression (n = 176). Finally, an exploratory analysis evaluated whether our testing context improved testing rates over the national prevalence for young African American women. A z-test compared the proportion of study participants who accepted testing to the unweighted proportion of lifetime HIV testing prevalence in the representative U.S. National Health Interview Survey (National Center for Health Statistics, 2017) matched for age, gender, race, and data collection period (2012-2014).

Results

As summarized in Table 1, consistent with study recruitment goals, the sample as a whole was economically disadvantaged and reported HIV risk behaviors; i.e., 73% lived in households receiving government assistance, 44% were unemployed, 71% reported one or more sexual risk factors (e.g., no condom use during last sex, 41%; ≥ 2 sexual partners in last 90 days, 19%), and 78% reported substance use in the last 90 days. Furthermore, 28% were mothers; mothers were older (M = 22.05 years) than participants without children (M = 19.81; $\chi^2(1) = 34.9$, $p < .0001$, and 78% of mothers were unmarried.

Of the 223 participants, 69.1% accepted testing, and 30.9% declined. No participant tested positive. The sample proportion that accepted testing was significantly higher than the national lifetime testing rate of 61.7% for African American women ages 18-25 (z = 2.07, p < .05; 95% CI: .004, .143). This is a 7.4% increase in test acceptance compared to the matched national sample.

Table 1 presents the bivariate comparisons between participants who did and did not accept HIV testing. Significant personal characteristics associated with test acceptance included high school completion/in progress, higher average grades during the last two school years, and lower frequency of motherhood. As predicted, lower delay discount rates indicative of greater self-control and greater social network feedback to use birth control also were associated with test acceptance. However, with one exception, the test choice groups did not differ significantly with respect to substance use, sexual risk indicators, or social network feedback encouraging safer sex. Participants who had not been tested for HIV before were more likely to accept testing.

Table 2 presents the results of the logistic regression analysis, which included all significant variables in the bivariate comparisons, the non-significant variables of sexual risk behaviors and substance involvement because of their emphasis in HIV testing research, and age (< 21 or ≥ 21 years). Test acceptance was predicted by higher school achievement ($p < .05$), lower behavioral impulsivity ($p < .05$), and higher network encouragement to use birth control ($p < .01$). Also consistent with the bivariate findings, substance use was not a significant predictor. But in the multivariable model, higher frequency of endorsement of sexual risk behaviors was marginally associated with test acceptance ($p < .10$).

Discussion

HIV testing was offered to young African American women living in disadvantaged urban communities under conditions highly conducive to accepting it: The test was free, confidential, offered on the spot after interviewers had established rapport with participants, and results were available with minimal delay (20-30 minutes) with assurance of immediate referral for medical care if indicated. These conditions guided by choice architecture resulted in test acceptance by almost 70% of participants. The sample acceptance rate for this single testing opportunity was significantly higher than the cumulative lifetime U.S. testing prevalence for young African American women (National Center for Health Statistics, 2017). Furthermore, our direct observation of test choices lends confidence to study findings (cf. Fan, Fife, Cox, Cox, & Zimet, 2018) and contrasts with many earlier studies that relied on retrospective reports of testing over variable or indeterminate intervals that are susceptible to recall and other reporting biases (Evangeli et al., 2016). Overall, the present approach appears promising for increasing testing rates among young African American women if implemented on a larger scale.

Even under these favorable conditions, about 31% declined testing and had characteristics that may help identify when additional incentives for test acceptance are needed. Compared to test acceptors, refusers had relatively poorer school performance and higher discount rates indicative of greater impulsivity. Refusers also had less social network encouragement to use birth control, which, like HIV testing, is a protective reproductive health behavior. However, network encouragement of safer sex and substance involvement did not differentiate testing decisions. In the multivariable model only, there was a marginal tendency for test refusal to be predicted by lower endorsement of sexual risk behaviors. These largely negative findings replicate other studies using similar samples (e.g., Decker et al., 2015; Jones et al., 2010) and suggest that participants' testing decisions are in line with their more general patterns of choice that vary in the degree of sensitivity to future outcomes. This supports expanding the scope of targeted testing programs beyond young adults known to be engaging in substance use and risky sex.

The study has limitations. First, except for the computerized discounting task, risk predictors were based on verbal reports of sensitive behaviors during structured interviews. This helped establish rapport considered important to promote HIV testing, but verbal reports can be biased. To facilitate accuracy, confidentiality was protected, validated measures were used, and participants and interviewers were of similar age, gender, and race. Second, the sample was drawn from a particular race/ethnicity group living in a southern city, and results may

not generalize to other populations. Third, due to unexpected funding cuts during data collection, the sample size was smaller than originally planned and insufficient to apply RDS analysis procedures to check and adjust for possible recruitment bias due to chain referrals (Johnston & Sabin, 2010). Checks conducted on the larger parent sample showed no evidence of bias (Tucker et al., 2016). Similar results would be expected for the supplemental sample given that the same methods were used to recruit participants of the same race and age range in the same neighborhoods.

With these qualifications, the study supported the utility of peer-driven recruitment and consideration of social and economic factors when crafting appealing testing programs for younger women who are not seeking clinical care. When implemented in community settings, the present testing context promoted test acceptance among the majority of participants. Among the minority who refused testing, participant characteristics were identified that may guide provision of additional incentives to promote testing. This could entail having peers, pharmacists, or community health workers disseminate free or low-cost home test kits that increase convenience and confidentiality (Meyerson, Carter, Lawrence, et al., 2016; Tobin, Edwards, Flath, Lee, Tormohlen, & Gaydos, 2018; cf. Estem, Catania, & Klausner, 2016) and incentivizing HIV testing with commodities of value to young people, such as money, club admission, or free drinks (Murray, Hussen, Toldedo, et al., 2018). Reaching young African American women with agreeable HIV testing options is a vital initial step for the U.S. “High Impact Prevention” program to succeed (CDC, 2016) in Southern communities of color.

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Table 1.

Demographic characteristics and descriptive statistics

Demographic Characteristics	Accepted HIV test (*n* = 154)	Declined HIV test (*n* = 69)	Total sample	Test statistic
	Frequency (%)/Mean (SD)			
High school completed/in progress[a]	150 (97.4)	63 (91.3)	213 (95.5)	χ^2 (1) = 4.14 *
Average grades[b]				
Mostly As	32 (20.8)	8 (11.6)	40 (17.9)	χ^2 (1) = 2.73 +
Mostly Bs	98 (63.6)	35 (50.7)	133 (59.6)	χ^2 (1) = 3.30 +
Mostly Cs or lower	24 (15.6)	26 (37.7)	50 (22.4)	χ^2 (1) = 13.38 ***
Employed[c]	86 (55.8)	38 (55.1)	124 (55.6)	*ns*
Receipt of public assistance	114 (74.0)	49 (71.0)	163 (73.1)	*ns*
Married	14 (9.1)	11 (15.9)	25 (11.2)	*ns*
Have children	37 (24.0)	26 (37.7)	63 (28.3)	χ^2 (1) = 4.38 *
Age in years	20.4 (2.3)	20.5 (2.8)	20.4 (2.5)	*ns*
Health Risk Behaviors				
Substance use[d]				
Alcoholic beverages	139 (90.3)	64 (92.8)	203 (91.0)	*ns*
Tobacco products	92 (59.7)	39 (56.5)	131 (58.7)	*ns*
Illicit drugs	100 (64.9)	39 (56.5)	139 (62.3)	*ns*
Sexual history				
Sexual risk behaviors (yes/no)[e]	112 (72.7)	47 (68.1)	159 (71.3)	*ns*
Any STI (yes/no)	39 (29.3)	17 (31.5)	56 (30.0)	*ns*
Prior HIV testing (yes/no)	114 (76.0)	58 (87.9)	172 (80.0)	χ^2 (1) = 3.99 *
ASSIST global continuum of substance risk score[d]	21.0 (17.3)	19.6 (20.2)	20.5 (18.3)	*ns*
Delay discount rate (log *k*)[f]	−3.4 (2.0)	−2.6 (1.8)	−3.2 (2.0)	*t*(179) = −2.65 **
Network Characteristics				
Network encouragement of safer sex	4.0 (1.8)	4.0 (2.5)	4.0 (2.1)	*ns*
Network encouragement of birth control	3.6 (1.7)	2.9 (1.7)	3.4 (1.7)	*t*(221) = 2.69 **

Note. Descriptive statistics are frequencies (percentages) for categorical variables and means (standard deviations) for continuous variables based on participants who provided data for a given variable. Comparisons among participants who accepted or declined HIV testing are chi-square tests for dichotomous variables and *t*-tests for continuous variables. ASSIST = Alcohol, Smoking and Substance Involvement Screening Test. STI = sexually transmitted infection.

[a] Participants currently in high school or received high school or higher education.

[b] Average grades in the last 2 years in school (1 = mostly As; 2 = mostly Bs; 3 = mostly Cs; 4 = mostly Ds; 5 = mostly Fs).

[c] Employment resulting in at least weekly pay.

[d] Use of specific substances and global risk scores were based on ASSIST reports of lifetime substance use; the Global Continuum of Risk scale also assessed lifetime network concerns about substance use, failed quit attempts, and injection drug use.

[e] Binary variable of endorsing any of seven sexual risk factors (see text; 0 or ≥ 1 factor).

[f] Log *k* was based on 181 participants, excluding 42 with invalid response patterns or missing data on the delay discounting task.

[+] $p < .10$,

[*] $p < .05$,

[**] $p < .01$,

[***] $p < .001$.

Table 2.

Associations among HIV testing decisions and personal, social, and risk behavior characteristics: Logistic regression results

Predictors	B (SE)	OR (95% CI)
Age[a]	−0.57 (0.41)	0.57 (0.24, 1.27)
High completed/in progress	0.56 (1.03)	1.74 (0.24, 12.95)
Have children (yes/no)	−0.27 (0.44)	0.76 (0.32, 1.81)
Average grades[b]	−0.75 (0.29)**	0.47 (0.27, 0.84)
Sexual risk behaviors (yes/no)[c]	0.80 (0.42)+	2.22 (0.97, 5.09)
Prior HIV test (yes/no)	−0.40 (0.56)	0.67 (0.22, 2.02)
Network encouragement of birth control[e]	0.28 (0.11)*	1.32 (1.06, 1.63)
ASSIST global continuum of substance risk score[d]	0.01 (0.01)	1.01 (0.99, 1.03)
Delay discounting log *k*[f]	−0.22 (0.11)*	0.81 (0.65, 0.99)

Note. Odds ratio (OR) with 95% confidence intervals (CI) for binary testing decision (accept = 1; reject = 0).

[a] Dichotomized as age < 21 years or ≥ 21 years

[b] Average grades in the last 2 years in school (1 = mostly As; 2 = mostly Bs; 3 = mostly Cs; 4 = mostly Ds; 5 = mostly Fs).

[c] Binary variable reflecting endorsement of any of seven sexual risk factors (0 or ≥ 1 factor; see text).

[d] ASSIST = Alcohol, Smoking and Substance Involvement Screening Test; higher Global Continuum of Risk scores indicate greater substance involvement.

[e] Encouragement of safer sex and use of birth control (1 = not at all to 5 = a great deal) averaged over ratings for all network members.

[f] Log-transformed to reduce skewness.

+ $p < .10$;

* $p < .05$;

** $p = .01$.