

The Committed Intimate Partnerships of Incarcerated African-American Men: Implications for Sexual HIV Transmission Risk and Prevention Opportunities

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Abstract Incarceration is thought to influence HIV transmission by disrupting partnerships that provide support and protect against sex risk-taking. Current correctional facility-based family-strengthening programs focus on marital partnerships, a minority of inmates' partnerships. Research on the sex partnerships of incarcerated African-American men and the types of partnerships most likely to protect against HIV-related sex risk is limited. Improved understanding can inform expansion of correctional facility-based family-strengthening programs to a greater proportion of protective partnerships and HIV risk reduction programs to partnerships vulnerable to sex risk. Project DISRUPT is a cohort study of African-American men being released from prison in North Carolina who were in committed heterosexual partnerships

at prison entry. Using baseline survey data ($N = 189$), we conducted latent class analysis (LCA) to identify subgroups of participants with distinct relationship profiles and measured associations between relationship characteristics and multiple partnerships of inmates and their partners in the six months before incarceration. LCA indicated a two-class solution, with relationships distinguished by satisfaction/stability (satisfied/stable class: 58.0%; dissatisfied/unstable class: 42.0%); each class had comparable relationship length and levels of marriage and cohabitation. Dissatisfied/unstable relationships were associated with multiple partnerships among participants (AOR 2.93, 95% CI 1.50, 5.72) and partners (AOR 4.95, 95% CI 1.68, 14.58). Satisfaction indicators—versus length, marriage, or cohabitation—were the strongest independent correlates of inmates' and partners' multiple partnerships. Pre-incarceration economic deprivation, mental disorder symptoms, substance use, and violence in relationships were associated with dissatisfaction/instability. Prison-based programs designed to maintain healthy partnerships, strengthen relationship skills, and reduce HIV risk-taking and violence in relationships are warranted and should be targeted to both marital and non-marital partnerships. Programming also should address the poverty, mental illness, and substance use factors that threaten relationship satisfaction/stability and increase HIV risk.

Keywords Incarceration · Committed partnerships · Sexual risk behavior · HIV

Introduction

HIV incidence among African-American men is seven times that of white men and twice that of Latino men (Centers for Disease Control and Prevention, 2014). Incarceration, which disproportionately affects African-American men, is thought to play a role in this race disparity (Harawa & Adimora, 2008). Members of

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our group and others have documented the strong, independent associations between a history of incarceration—both personal history of incarceration and having a partner who has an incarceration history—and sexual risk behaviors and sexually transmitted infection (STI) including HIV (Adimora et al., 2006; Epperson, El-Bassel, Chang, & Gilbert, 2010a; Epperson et al., 2010b; Khan et al., 2009, 2011c, 2013a). These findings provide support for the hypothesis that incarceration is an important social determinant of STI/HIV and may contribute to the race disparity in infection.

A number of pathways may mediate the relationship between arrest/incarceration and HIV, with incarceration-related disruption of social ties including committed partnerships hypothesized to play an important role in the relationship between incarceration and risk-taking and infection (Khan, Epperson, & Comfort, 2012). Specifically, because involvement in committed partnerships is associated with protection against multiple and concurrent in general population and inmate samples (Adimora et al., 2002; Adimora, Schoenbach, & Doherty, 2007; Khan et al., 2011a, b), incarceration—disruption of committed partnerships may play a role in the strong consistent relationship between incarceration and multiple partnerships. During the incarceration, partners left behind in the community may seek new partners for companionship or financial reasons. Upon release, absence from a partner combined with freedom from restriction on sexual behavior may lead the former inmate to new and multiple partners.

Protection of committed partnerships may therefore be important for the well-being and health of those who pass through jails and prisons and their community partners. Given a substantial proportion of inmates—50–80%—enter prison in committed partnerships, such programming potentially could be offered to many couples affected by incarceration (Grinstead, Zack, & Faigeles, 2001; Grinstead et al., 2005; Khan et al., 2011a, b). Prison-based family-strengthening programs have been implemented to help families maintain and strengthen ties during incarceration with the purpose of reducing negative patterns and promoting relationship commitment (U.S. Department of Health and Human Services, 2008); such programming may be a critical component of STI/HIV prevention for inmates and their partners. A limitation of current family-strengthening programs, however, is the focus on marital partnerships given low rates of marriage among jail/prison detainees (Centers for Disease Control and Prevention, 2013; Khan et al., 2011b). We need to understand the broader range of inmates' relationships that protect against STI/HIV risk, while understanding the relationships most vulnerable to STI/HIV risk behavior will improve our ability to target STI/HIV prevention programs.

A number of types of inmate relationships may protect against key STI/HIV risk behaviors such as multiple partnerships, while other relationship characteristics may promote risk. While marital and cohabiting partnerships are associated with protection against multiple partnerships in general population samples (Adimora

et al., 2002, 2007; Adimora, Schoenbach, Taylor, Khan, & Schwartz, 2011) and among inmates (Khan et al., 2011b), some evidence suggests marriage may be linked to elevations in multiple partnerships (Khan, Scheidell, Gaydos, Coatsworth, & Latimer, 2013b); the importance of marriage and cohabitation as protective against non-monogamy should hence be examined. Longer relationships are associated with relationship stability (e.g., the partnership remaining intact), and relationship duration is one of the strongest predictors of distress due to relationship dissolution (Simpson, 1987). Since distress and resulting psychopathology are linked to sex risk behavior (Mazzaferro et al., 2006), it may be important to protect long-term relationships during incarceration—even if they are nonmarital non-cohabiting—to best protect against multiple partnerships. Since parenting relationships are associated with relationship stability and duration (Wilson & Stuchbury, 2010), the role of parenting in relationship stability also should be explored among couples affected by incarceration. Early studies among couples affected by incarceration have indicated that incarceration of a partner leads to financial stress among those left behind in the community, which in some cases results in sexual risk-taking (Browning, Miller, & Lisa, 2001). Likewise, our findings that financially interdependent partnerships are associated with protection against pre-incarceration multiple partnerships and sex trade (Khan et al., 2011b) highlighted the need to explore the degree to which partners' financial interdependence is associated with protection against STI/HIV risk. The literature from the fields of family science and psychology indicates measures of relationship satisfaction that assess perception of whether things are going well, communication and confiding in partner, level of happiness, and stability/instability (e.g., discussion of separating) are consistent correlates of reduced distress and relationship stability (Sabourin, Valois, & Lussier, 2005), suggesting we should consider indicators of self-reported satisfaction when describing inmates' relationships that confer stability and protection against non-monogamy. Finally, there is an important need to understand levels of intimate partner violence in the committed partnerships of inmates to address violence in relationships and, given the link between partner violence and multiple partnerships in non-inmate samples (Raj et al., 2006; Zhan et al., 2012), to understand the association between violence and multiple partnerships among inmates and their partners.

While committed partnerships of inmates may offer protection against STI/HIV risk, partnerships are vulnerable to instability and dissolution during incarceration. In our prior studies demonstrating high prevalence of relationship dissolution during incarceration, the most commonly cited reasons for partnership dissolution included pre-incarceration poverty, mental disorders, and substance use, and the incarceration itself, with commonly cited barriers to relationship maintenance being high cost of calling and visiting during incarceration (Khan et al., 2011a, b). Improved understanding of the factors associated with relationship instability prior to incarceration and incarceration-related factors that limit maintenance of ties during incarceration are needed to best design

family-strengthening programs for couples affected by incarceration.

The purpose of this study was to characterize the committed intimate partnerships of inmates at the time of incarceration among those enrolled in Project Disruption of Intimate Stable Relationships Unique to the Prison Term (DISRUPT). DISRUPT is a cohort study conducted among HIV-negative African-American men incarcerated in the North Carolina Department of Public Safety (NCDPS) who were soon to be released and who reported having a committed intimate partnership with a woman at the time of incarceration. This paper aims to: describe characteristics of inmates' partnerships and subgroups of participants with distinct relationship characteristic profiles identified by latent class analysis (Magidson & Vermunt, 2004), identify the relationship factors associated with protection against multiple partnerships, and assess factors associated with relationship dissatisfaction/instability before incarceration (e.g., indicated by frequent discussion of ending the relationship) and barriers to maintaining relationships during incarceration. We hypothesize that both marital and non-marital partnerships protect against pre-incarceration STI/HIV risk; that pre-incarceration factors including poverty, substance use, and mental illness stress partnerships of inmates are linked to relationship instability/satisfaction; and that numerous incarceration-related factors constitute barriers to maintaining contact during the incarceration.

Method

Participants

We recruited participants from September 2011 through January 2014 from prisons in the North Carolina Department of Public Safety (NCDPS) (Khan et al., 2015). Eligible participants were: (1) African-American; (2) male; (3) at least 18 years old; (4) scheduled to be released from a NCDPS prison within 2 months of recruitment to an unrestricted environment (e.g., no pending charges); (5) in committed intimate partnerships with women at the time of prison entry; (6) incarcerated in a NCDPS nonsegregation unit for < 36 months; (7) HIV-negative test at prison intake; (8) not currently incarcerated for forcible rape, murder 1, murder 2, and kidnaping and not considered a risk to research staff safety based on review of infractions during the current incarceration; (9) living free in the community for ≥ 6 months before the current incarceration; (10) able to communicate in English; (11) willing to provide informed consent and post-release contact information. Of the 1480 inmates who met preliminary eligibility criteria, 1426 agreed to be screened for further eligibility, and of those, 477 met all eligibility criteria. Having been incarcerated for more than one month in the six months before the current incarceration and lack of a committed partner were the most common reasons for ineligibility. A total of 207 of the 477 eligible potential participants enrolled in the study. We restricted the sample to HIV-negative individuals because we

sought to understand factors associated with preventing HIV acquisition, and relationship dynamics may vary by HIV status. We defined a committed intimate partner, based on results of our pilot work, as a woman with whom the participant was having sex regularly at the time of incarceration, to whom he felt committed, and who was an important part of his day-to-day life.

At the baseline study visit, participants completed an Audio-Computer Assisted Self Interview survey assessing participant individual- and relationship-level characteristics. This analysis includes 189 participants with valid baseline survey data. No compensation was provided for the baseline study visit, per current NCDPS policy. Each participant had the possibility of being reimbursed up to \$200 total for cohort study participation after release.

Measures

Male Participant Characteristics

We assessed participant age; race; employment in the six months before incarceration; concern about having enough money for housing or utilities in the six months before incarceration; homelessness in the six months before incarceration; prior history of incarceration; and current incarceration sentence length. We measured depressive symptoms using a modified version of the Center for Epidemiologic Studies Depression (CES-D) (Radloff, 1977). Scores for the five-items were summed and dichotomized at ≥ 4 , based on the original CES-D calibrated cut-point (Coogan et al., 2014), with higher scores indicating increasing depressive symptoms. Antisocial personality disorder was assessed using the Structured Clinical Interview for DSM-IV Axis II (SCID-II) (First, Spitzer, Gibbon, & Williams, 1995). We assessed male participants' lifetime history of illicit drug use including non-injection (crack, cocaine, or ecstasy use) and injection drug use.

Female Partner Characteristics

Female partners were not interviewed. Hence, indicators of female partners were based on report by male study participants. Participants reported on the female partner's age; race; any prior incarceration for ≥ 24 h; and illicit drug use (e.g., crack, cocaine, heroin) with the participant in the six months before the incarceration.

Relationship Characteristics

Demographic and Socioeconomic Relationship Characteristics

We assessed relationship length in years and dichotomous indicators of the following: currently being married to the partner; cohabitation at any time in the six months before incarceration; financial interdependence defined as the participant paying for needs (i.e., food, housing or clothing) of his partner and/or his partner paying for his needs in the six months before incarceration; and any history of co-parenting or raising children

together defined as “This means that you were both involved in the parenting, such as by providing financial or emotional support to the children or by spending time with them.”

Relationship Quality Indicators Relationship quality in the six months before the incarceration was assessed using items derived from the validated brief (4-item) version of the Dyadic Adjustment Scale (DAS) (Sabourin et al., 2005; Spanier, 1976). Participants were asked how often the couple discussed breaking up, the participant thought “things were going well,” and the participant confided in his partner. Response options ranged from “All of the time” to “Never.” Participants reported how happy they were in their relationship with possible responses ranging from “Extremely unhappy” to “Perfect.” We assessed physical violence using one item based on the Conflict Tactics Scale (CTS2) (Straus, Hamby, BoneyMcCoy, & Sugarman, 1996) that asked how often “did you slap, hit, kick, drag, push, shove, choke, or throw something at your partner that could hurt her.” Response options included “Never,” “Once,” “Twice,” “3–5times,” “6–10times,” and “More than 10 times.”

Male Participant and Female Partner Multiple Partnerships

A respondent who reported having vaginal or anal sex with at least two partners (female and/or male) in the six months before incarceration was considered to have multiple partnerships. The committed partner was considered to have multiple partnerships if the participant reported she definitely or probably was having sex with another person during the course of her partnership with him in the six months before his incarceration.

Barriers to Maintaining the Relationship During Incarceration

We assessed methods of contact during incarceration (e.g., phone conversations or visits) and whether inmates wanted more phone contact and visits. We assessed barriers to more frequent phone calling by asking respondents who desired more phone contact to endorse the following applicable barriers: “Partner was not on call list,” “Partner was not available when you called,” “It was too expensive,” “I was not allowed to call out,” “Time to talk was limited,” or “Partner did not want to talk.” We also assessed the desire for more frequent visits and barriers to visiting among those who had remained in touch. Possible responses included: “Partner did not have enough time to come more often,” “Partner did not have child care,” “Too far for partner to come more often,” “Too expensive for partner to come more often,” and “Partner did not want to come.”

Data Analyses

Using SAS, version 9.3 (SAS Institute Inc., Cary, NC), we calculated univariable frequencies of participant, committed partner, and relationship characteristics.

Using Mplus software for survey data (Version 7.11) (Muthén & Muthén, 1998–2007), we conducted analyses to identify latent classes of relationships based on the indicators of relationship characteristics. Relationship length was entered as a count variable, relationship quality and participant violence variables were ordinal, and all other relationship characteristic indicators were dichotomous. We estimated two and three class solutions and identified the optimal class solution using the Lo-Mendell-Rubin test, for which low values are desired. Model fit also was determined by class interpretability and entropy, for which high values are desired.

Using SAS, we estimated logistic regression models to measure unadjusted and adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for associations between relationship characteristics—examining each relationship characteristic and relationship latent class membership separately as predictors—and participant and committed partner multiple partnerships outcomes. We dichotomized relationship length, quality, and violence variables, assessing: relationship length of five years or longer, whether the couples discussed breaking up at least occasionally, whether they considered things were going well most/all of the time, whether they confided in their partners most/all of the time, and whether they were at least “very happy” in the relationship, and any history of participant violence against his partner in the six months before incarceration. In models predicting participant multiple partnerships, covariables included participant age, employment status, and antisocial personality disorder. In models predicting female partner’s multiple partnerships, covariables included female partner’s age, an indicator of female partner financial insecurity (whether the participant helped his female partner pay for needs), and female partner’s antisocial risk (history of incarceration). Covariables were identified as potential confounders based on bivariable analyses suggesting an association with relationship factors and/or multiple partnership outcomes, as well as a priori hypotheses. Specifically, unemployment was chosen as a poverty control over homelessness or concern about bills given its higher prevalence and the strong relationship observed previously between joblessness and multiple concurrent partnerships (Khan et al., 2015). We controlled for antisocial personality symptom risk since we observed in a prior study on relationship disruption among incarcerated men that incarceration for a violent crime was strongly linked to relationship instability during incarceration (Khan et al., 2011b).

Fully adjusted models also controlled for marital status and cohabitation in the six months before incarceration. Given many family-strengthening programs focus on marital and/or cohabiting partnerships (U.S. Department of Health and Human Services, 2008), we wished to examine whether other relationship indicators are linked to protection against risk independent of marriage/cohabitation in order to identify the range of inmate relationships that may protect health.

To identify factors that may underlie involvement in dissatisfied/unstable relationships, we measured unadjusted and adjusted ORs and 95% CIs for associations between participant and partner

characteristics and relationship satisfaction/stability as indicated by latent class analyses.

We calculated univariable frequencies to describe methods of and barriers to staying in touch during incarceration.

Results

Male Participant and Female Committed Partner Characteristics

DISRUPT participants were on average 34 years old (Table 1). Approximately 40% were unemployed, 31% reported difficulty in paying bills, and 18% were homeless in the six months before incarceration. Participants had been previously incarcerated in jail/prison on average approximately nine times, and the average length of the current incarceration was about 221 days (7 months). Approximately 40% of participants reported depressive symptoms before incarceration, and 15% met criteria for antisocial personality disorder. Illicit drug use was reported by 55%; over half (54%) reported non-injection drug use, and 4.8% had ever injected drugs.

Committed partners were on average 33 years old, and 76% were African-American. Nineteen percent had ever been incarcerated, and 13% had used illicit drugs with their male partners.

Relationship Characteristics

The median length of their relationships at the time of the incarceration was three years (Table 2). Approximately 19% were married to their partners. In the six months before incarceration, 61% lived with partners, 87% helped their partner pay for needs, and 83% received help paying for needs from partners. Over half (62%) had raised at least one child with their partners. In the six months before incarceration, approximately one-quarter (24%) indicated he and his partner had discussed breaking up. The majority considered “things were going well” (66%) and confided in partners (68%), and 34% were very happy in the relationship. A substantial proportion (35%) had been violent with partners.

Relationship Latent Class Membership

We identified a two-class solution distinguished primarily by relationship satisfaction (Fig. 1; satisfied/stable relationships: 58%, dissatisfied/unstable relationships: 42%). Those in the satisfied/stable relationship class were significantly more likely than those in the dissatisfied/unstable class to report never/rarely discussing breaking up with their partners (97 vs. 44%; $p < .0001$), things were going well (93 vs. 30%; $p < .0001$), confiding in their partners (91 vs. 45%; $p < .0001$), and feeling very happy in the relationship (56 vs. 4%; $p < .0001$). In addition, 76% of men in satisfied/stable relationships reported never being violent with their partners versus

Table 1 Baseline demographic, mental health, and substance use characteristics of male participants and their female committed partners (Project DISRUPT, North Carolina, $N = 189$)

Characteristics	Mean (SD)	N (%)
<i>Male participant demographic, mental health, and substance use characteristics</i>		
Age	34.4 (9.6)	
Race		
African-American		189 (100.0)
White		0 (0.0)
Other		0 (0.0)
Employed full/part time		
No		70 (37.0)
Yes		112 (59.3)
Concern about ability to pay bills		
No		119 (63.3)
Yes		58 (30.9)
Homelessness		
No		148 (78.7)
Yes		34 (18.1)
Number of times in jail/prison ^a	8.6 (11.4)	
Current incarceration sentence length (days)	220.9 (231.9)	
Depressive symptoms		
No		113 (60.1)
Yes		74 (39.4)
Antisocial personality disorder		
No		159 (84.6)
Yes		28 (14.9)
Lifetime non-injection drug use		
No		83 (44.2)
Yes		102 (54.3)
Lifetime injection drug use		
No		176 (93.6)
Yes		9 (4.8)
Lifetime illicit drug use		
No		81 (43.1)
Yes		104 (55.3)
<i>Female committed partner demographic and substance use characteristics</i>		
Age	32.7 (9.8)	
Race		
African-American		142 (75.5)
White		27 (14.4)
Other		17 (9.0)
Ever been incarcerated		
No		148 (78.7)
Yes		35 (18.6)
Used illicit drugs with participant		
No		161 (85.6)
Yes		25 (13.3)

^a Not including current incarceration, among those who have been incarcerated previously

47% of men in dissatisfied/unstable relationships ($p < .0001$). Men in satisfied/stable relationships were somewhat more likely than those in dissatisfied/unstable relationships to report marriage (23 vs.

Table 2 Relationship characteristics among African-American men aged 19–60 years in committed partnerships at time of incarceration (Project DISRUPT, North Carolina, $N = 189$)

Characteristics	N^a	Percent
Number of years with partner		
≥5 years	67	35.6
<5 years	103	54.8
Married to committed partner		
No	153	81.0
Yes	35	18.5
Lived together before incarceration		
No	57	30.2
Yes	116	61.4
Male participant help committed partner pay for needs		
No	20	10.6
Yes	165	87.3
Female partner help participant pay for needs		
No	28	14.8
Yes	157	83.1
Raised children together		
No	59	31.2
Yes	118	62.4
Discussed breaking up		
No	138	73.0
Yes	46	24.3
Considered things were going well		
No	63	33.3
Yes	124	65.6
Confided in partner		
No	52	27.5
Yes	128	67.7
Very happy in partnership		
No	122	64.6
Yes	64	33.9
Intimate partner violence		
No	115	60.3
Yes	66	35.1

^a Totals may not sum to 189 due to missing values

13%; $p = .07$) and living together (73 vs. 59%; $p = .05$). All other relationship indicators were not significantly different between the satisfied/stable and dissatisfied/unstable class membership.

Relationships Associated with Multiple Partnerships

Multiple Partnerships among Male Participants

Demographic and Socioeconomic Factors Approximately 42% of male participants reported multiple partnerships. In analyses

adjusting for age, employment, and antisocial tendencies, being in a nonmarital partnership was associated with over twice the odds of multiple sex partnerships (adjusted OR 2.56, 95% CI 1.05, 6.23) (Table 3). While participants who were not living with their partner were more likely to report multiple partnerships (OR 2.09, 95% CI 1.08, 4.04), in adjusted analyses, associations between living together and multiple partnerships no longer remained (fully adjusted OR 1.58, 95% CI 0.76, 3.27). Length of relationship, being in a financially interdependent partnership, and co-parenting with the committed partner did not appear to be associated with male participants' multiple partnerships.

Relationship Quality In analyses adjusting for employment, age, antisocial personality disorder, and marriage/cohabitation, indicators of dissatisfaction, including discussing breaking up in the six months before incarceration and being less than very happy in the relationship, were strongly associated with participant's multiple partnerships (discussed breaking up: fully adjusted OR 2.41, 95% CI 1.09, 5.35; less than happy: fully adjusted OR 3.11, 95% CI 1.46, 6.64). Considering the relationship was going well, confiding in his partner, and violence against partners were not strong correlates of multiple partnerships.

Dissatisfied/Unstable Latent Class Membership In both unadjusted and adjusted analyses, dissatisfied/unstable relationship class involvement was strongly associated with multiple partnerships (adjusted OR 2.93, 95% CI 1.50, 5.72).

Multiple Partnerships Among Female Partners

Demographic and Socioeconomic Factors Approximately 11% of participants reported their female partner had multiple partnerships. In analyses adjusted for female partner age and incarceration history, male participants' lack of financial assistance was strongly associated with female partner multiple partnerships (adjusted OR 3.86, 95% CI 1.15, 12.94) (Table 3). When further adjusting for marital/cohabitation status, the association appeared to remain but was not significant at the .05 level (fully adjusted OR 3.01, 95% CI 0.87, 10.39). Other demographic and socioeconomic relationship factors were not associated with female partner's multiple partnerships.

Relationship Quality In fully adjusted analyses, male participant reports that things were not going well in the relationship that was associated with over four times the odds of female partners' multiple partnerships (fully adjusted OR 4.80, 95% CI 1.61, 14.31). Other quality indicators were not associated with female partner's multiple partnerships.

Dissatisfied/Unstable Latent Class Membership In unadjusted and adjusted analyses, dissatisfied/unstable relationship class involvement was associated with approximately five times the odds of female partner's multiple partnerships (adjusted OR 4.95, 95% CI 1.68, 14.58).

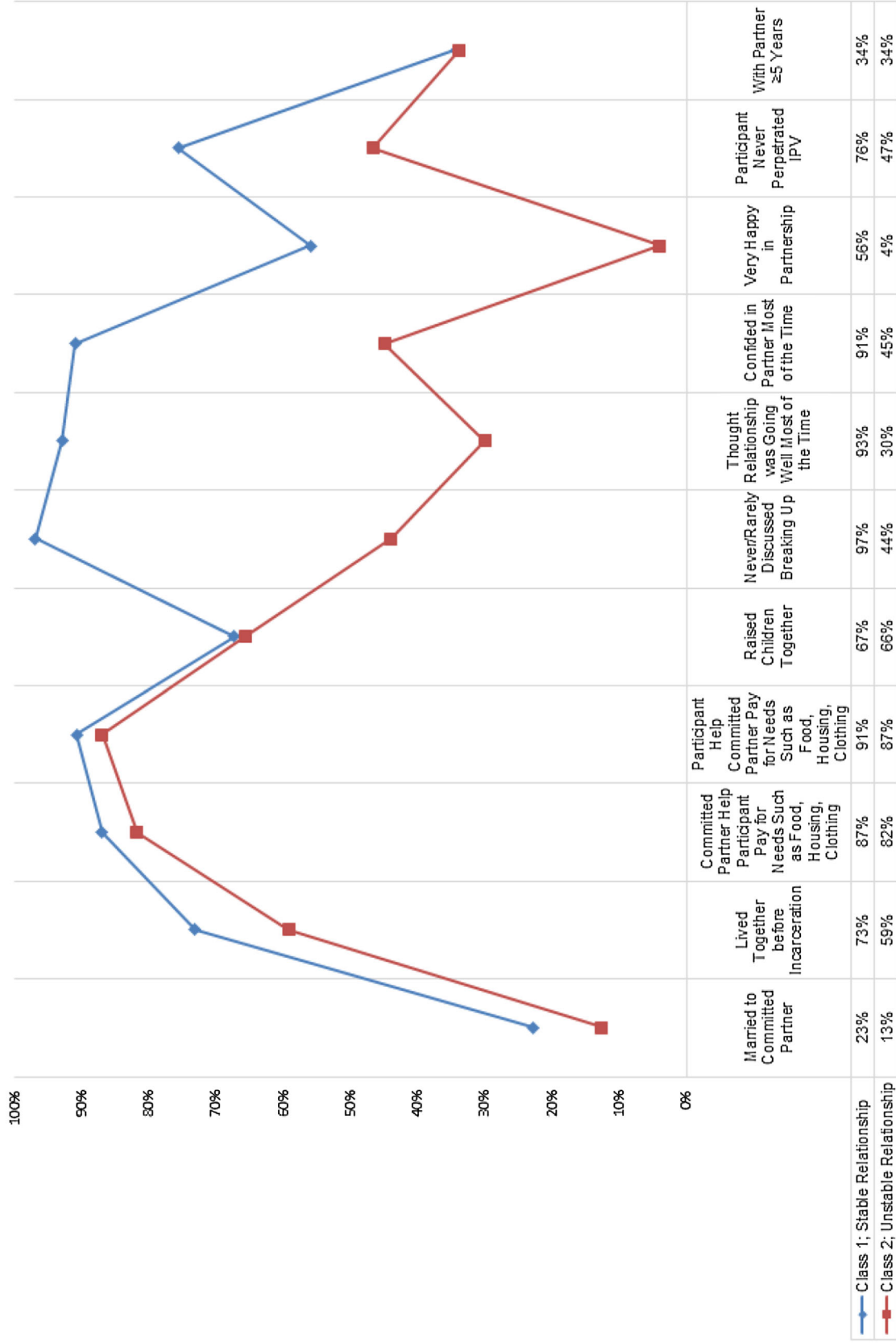


Fig. 1 Latent classes of relationships of incarcerated African-American men in committed heterosexual partnerships (Project DISRUPT, North Carolina, N = 189)

Table 3 Odds ratios (ORs) and 95% confidence intervals (CIs) for the associations between relationship factors and male participant and female partner multiple partnerships in six months prior to incarceration (Project DISRUPT, North Carolina, $N = 189$)

	Male participant multiple partnerships six months before incarceration ^a			
	Percent	Unadjusted	Adjusted ^c	Fully adjusted ^d
Length of relationship				
≥5 years ($N = 67$)	37.9	Ref	Ref	Ref
<5 years ($N = 103$)	47.9	1.51 (0.80, 2.86)	1.27 (0.65, 2.50)	0.95 (0.45, 1.97)
Married to committed partner				
Married to CP ($N = 35$)	22.9	Ref	Ref	Not applicable
Not married to CP ($N = 153$)	46.4	3.21 (1.36, 7.56)	2.56 (1.05, 6.23)	
Living together^b				
Yes ($N = 116$)	36.2	Ref	Ref	Ref
No ($N = 57$)	54.4	2.09 (1.08, 4.04)	1.82 (0.90, 3.66)	1.58 (0.76, 3.27)
Male participant help committed partner pay for needs^b				
Yes ($N = 157$)	40.8	Ref	Ref	Ref
No ($N = 28$)	53.6	1.68 (0.74, 3.83)	1.78 (0.73, 4.32)	1.22 (0.41, 3.59)
Female partner help participant pay for needs^b				
Yes ($N = 165$)	41.2	Ref	Ref	Ref
No ($N = 20$)	55.0	1.60 (0.63, 4.08)	1.47 (0.55, 3.96)	1.59 (0.60, 4.20)
Raised children together				
Yes ($N = 118$)	39.0	Ref	Ref	Ref
No ($N = 59$)	49.2	1.53 (0.81, 2.90)	1.41 (0.72, 2.76)	1.01 (0.47, 2.15)
Discussed breaking up^b				
No ($N = 138$)	37.7	Ref	Ref	Ref
Yes ($N = 46$)	56.5	2.38 (1.18, 4.82)	2.88 (1.35, 6.13)	2.41 (1.09, 5.35)
Considered things were going well^b				
Yes ($N = 124$)	38.7	Ref	Ref	Ref
No ($N = 63$)	49.2	1.62 (0.86, 3.03)	1.66 (0.85, 3.25)	2.03 (0.98, 4.17)
Confided in partner^b				
Yes ($N = 128$)	43.0	Ref	Ref	Ref
No ($N = 52$)	44.2	1.13 (0.58, 2.19)	0.96 (0.48, 1.94)	0.94 (0.45, 1.96)
Very happy in relationship^b				
Yes ($N = 64$)	26.6	Ref	Ref	Ref
No ($N = 122$)	50.8	2.85 (1.46, 5.57)	3.32 (1.61, 6.85)	3.11 (1.46, 6.64)
Intimate partner violence^b				
No ($N = 115$)	43.5	Ref	Ref	Ref
Yes ($N = 66$)	49.2	1.26 (0.68, 2.33)	1.30 (0.67, 2.52)	1.57 (0.75, 3.29)
Dissatisfied/unstable latent class membership				
No	34.3	Ref	Ref	Not applicable
Yes	58.7	2.72 (1.47, 5.03)	2.93 (1.50, 5.72)	
Female partner multiple partnerships six months before incarceration^e				
	Percent	Unadjusted	Adjusted ^f	Fully adjusted ^g
Length of relationship				
≥5 years ($N = 67$)	7.5	Ref	Ref	Ref
<5 years ($N = 103$)	14.6	2.11 (0.73, 6.12)	1.64 (0.53, 5.06)	1.02 (0.30, 3.46)
Married to committed partner				
Married to CP ($N = 35$)	2.9	Ref	Ref	Not applicable
Not married to CP ($N = 153$)	13.3	5.19 (0.67, 40.06)	3.74 (0.46, 30.56)	

Table 3 continued

	Female partner multiple partnerships six months before incarceration ^e			
	Percent	Unadjusted	Adjusted ^f	Fully adjusted ^g
Living together^b				
Yes (<i>N</i> = 116)	8.6	Ref	Ref	Ref
No (<i>N</i> = 57)	14.3	1.77 (0.66, 4.76)	0.96 (0.30, 3.15)	0.88 (0.27, 2.86)
Female partner help participant pay for needs^b				
Yes (<i>N</i> = 157)	9.6	Ref	Ref	Ref
No (<i>N</i> = 28)	22.2	2.69 (0.94, 7.69)	1.91 (0.50, 7.33)	1.59 (0.32, 7.77)
Male participant help committed partner pay for needs^b				
Yes (<i>N</i> = 165)	9.8	Ref	Ref	Ref
No (<i>N</i> = 20)	26.3	3.30 (1.05, 10.37)	3.86 (1.15, 12.94)	3.01 (0.87, 10.39)
Raised children together				
Yes (<i>N</i> = 118)	9.3	Ref	Ref	Ref
No (<i>N</i> = 59)	13.8	1.56 (0.59, 4.11)	1.18 (0.41, 3.38)	0.45 (0.12, 1.75)
Discussed breaking up^b				
No (<i>N</i> = 138)	9.5	Ref	Ref	Ref
Yes (<i>N</i> = 46)	17.4	2.01 (0.77, 5.21)	1.97 (0.72, 5.38)	2.22 (0.75, 6.54)
Considered things were going well^b				
Yes (<i>N</i> = 124)	7.3	Ref	Ref	Ref
No (<i>N</i> = 63)	19.1	2.98 (1.18, 7.52)	3.04 (1.16, 7.93)	4.80 (1.61, 14.31)
Confided in partner^b				
Yes (<i>N</i> = 128)	10.2	Ref	Ref	Ref
No (<i>N</i> = 52)	15.4	1.59 (0.62, 4.11)	1.60 (0.60, 4.28)	2.09 (0.73, 5.96)
Very happy in relationship^b				
Yes (<i>N</i> = 64)	6.5	Ref	Ref	Ref
No (<i>N</i> = 122)	13.9	2.35 (0.75, 7.31)	2.38 (0.74, 7.66)	2.67 (0.72, 9.94)
Intimate partner violence^b				
No (<i>N</i> = 115)	8.8	Ref	Ref	Ref
Yes (<i>N</i> = 66)	16.7	2.08 (0.83, 5.20)	1.99 (0.76, 5.20)	2.12 (0.72, 6.22)
Dissatisfied/unstable latent class membership				
No	4.7	Ref	Ref	Not applicable
Yes	20.3	5.18 (1.81, 14.84)	4.95 (1.68, 14.58)	

^a Prevalence of multiple partnerships among male participants was 42.0%

^b Assessed within the six months prior to incarceration

^c Adjusted for participant unemployment, age, and antisocial personality disorder

^d Adjusted for participant unemployment, age, and antisocial personality disorder, marital status, and cohabiting status (models examining marital status as an explanatory variable did not adjust for cohabitation given all who were married reported cohabiting with the exception of two participants; models examining cohabitation adjusted for marital status)

^e Prevalence of reported multiple partnerships among female partners was 11.2%

^f Adjusted for partner's financial dependence (participant helped partner pay for needs), partner age, and partner's incarceration history

^g Adjusted for partner's financial dependence on participant, age, incarceration history, marital status, and cohabiting status (models examining marital status as an explanatory variable did not adjust for cohabitation given all who were married reported cohabiting with the exception of two participants; models examining cohabitation adjusted for marital status)

Poverty, Mental Health, and Substance Use Correlates of Relationship Satisfaction

Male Participants

Those in the dissatisfied/unstable relationship class were much more likely than those classified as having satisfied/stable relationships to experience poverty as indicated by homelessness (OR 5.18, 95% CI 2.25, 11.92) and inability to pay bills (OR 1.98, 95% CI 1.05, 3.75); psychopathology including depressive symptoms (OR 3.32, 95% CI 1.72, 6.44) and antisocial personality disorder (OR 3.52, 95% CI 1.50, 8.28); and illicit drug use (OR 2.07, 95% CI 1.14, 3.78) (Table 4). Participant incarceration history was not associated with membership in the dissatisfied/unstable relationship class.

Female Committed Partners

Membership in the dissatisfied/unstable relationship class was not associated with female committed partner's poverty or incarceration history (Table 4). Those who reported using illicit drugs together in the six months before incarceration had over three times the odds of being classified as having dissatisfied/unstable relationships (OR 3.41, 95% CI 1.39, 8.39).

Barriers to Maintaining Ties During Incarceration

The majority of participants had been in touch with committed partners during the incarceration (93%; data not shown in tables). Among those who remained in touch with their partners, the most common ways of remaining in touch included writing letters—87% of participants sent letters to their partner and 86% reported their partners wrote letters to them—and talking on the phone, reported by 88% of participants. Of those in touch, the majority wanted to talk on the phone more often (83%). Among those who wanted more frequent phone contact, the most commonly reported barriers to more frequent phone communication included expense of calling (67%) and limitations on the amount of time inmates are allowed to talk (31%). Small proportions also reported partner was unavailable (13%), participant was not allowed to make calls (7%), partner did not wish to talk (6%), and partner was not on the call list (4%).

Among those who remained in touch during the incarceration, 37% reported that the partner visited, and 58% reported they wanted their partner to visit more. The most commonly reported barriers to visitation included distance of the prison (43%) and expense associated with visiting (30%). Some inmates also reported their partner did not have time to visit (17%), did not have childcare (5%), and did not wish to come (6%).

Table 4 Odds ratios (ORs) and 95% confidence intervals (CIs) for the associations between male participant and female partner poverty, mental health, and substance use characteristics and dissatisfied/unstable relationship class membership (Project DISRUPT, North Carolina, $N = 189$)

	% in dissatisfied/ unstable relationship class ^a	Unadjusted OR (95% CI)
<i>Male participant characteristics</i>		
Poverty		
Concern about ability to pay bills ^b		
No	37.0	Referent
Yes	53.5	1.98 (1.05, 3.75)
Homelessness ^b		
No	35.1	Referent
Yes	73.5	5.18 (2.25, 11.92)
Number of times in jail/prison	8.3 ^c	0.99 (0.96, 1.03) ^c
Mental health		
Depressive symptoms ^b		
No	33.9	Referent
Yes	63.0	3.32 (1.72, 6.44)
Antisocial personality disorder		
No	37.7	Referent
Yes	67.9	3.52 (1.50, 8.28)
Substance use		
Lifetime illicit drug use		
No	32.5	Referent
Yes	50.0	2.07 (1.14, 3.78)
<i>Female committed partner characteristics</i>		
Poverty		
Financial interdependence ^b		
No	50.0	1.00
Yes	40.9	0.69 (0.27, 1.75)
Ever been incarcerated		
No	41.6	Referent
Yes	48.3	1.31 (0.59, 2.91)
Substance use		
Used illicit drugs with participant ^b		
No	38.4	Referent
Yes	68.0	3.41 (1.39, 8.39)

^a Latent class analyses suggested 42.0% of men were classified as being in the dissatisfied/unstable relationship class

^b In the 6 months prior to incarceration

^c Odds ratio was generated by each 1 unit increase in number of times in jail/prison

Discussion

We observed considerable heterogeneity in the committed partnerships of incarcerated African-American men. While involvement in committed partnerships may offer protection from STI/HIV risk among inmates (Khan et al., 2011a, b), the results of this study suggested some partnerships offer particular stability and protection while others are more vulnerable to STI/HIV risk behaviors such as multiple partnerships. The study highlighted the substantial barriers to maintaining relationships during incarceration. Findings highlight a need for criminal justice policies and programs that support the partnerships of inmates by reducing barriers to maintaining healthy ties during incarceration, strengthening relationship skills during incarceration, and addressing factors underlying dissatisfaction/instability, STI/HIV risk, and violence.

A majority of men in this study—60%—were involved in relationships characterized by high levels of relationship satisfaction/stability and relatively low levels of pre-incarceration sexual risk-taking. Relationship satisfaction/stability appeared to be strong independent correlates of protection against multiple partnerships among male inmates and female partners, holding constant marriage and cohabitation. Marriage also was strongly associated with reduced risk of multiple partnerships, as expected based on the prior literature (Adimora et al., 2002, 2007). In this sample, cohabitation, parenting, financial interdependence, and relationship length generally were not independently associated with protection against multiple partnerships. Many current family-strengthening programs for inmates and their partners focus on marital partnerships (U.S. Department of Health and Human Services, 2008). Our results suggested that criminal justice policies and programming for couples involved in the criminal justice system should expand focus beyond inmates in marital partnerships, a minority of inmates' committed partnerships. A larger segment of the inmate and their partners may benefit from prison-based family-strengthening programs (El-Bassel et al., 2011). Our analyses suggest married couples and marital and nonmarital couples with high levels of relationship satisfaction have high levels of protection against STI/HIV risk prior to incarceration; prison-based programs should help maintain baseline relationship satisfaction and stability by allowing inmates greater contact with partners by phone or through visitation during incarceration. For these couples as well as those who wish to stay together but face risk of non-monogamy, programs should use the time during incarceration to capitalize on existing relationship strengths and build skills such as the ability to listen to partners, to set goals together, and to problem solve challenging situations. Strengthening these skills is important for all couples given the stress that incarceration and re-entry can put on relationships.

Pre-incarceration multiple partnerships were common and observed in diverse types of relationships but were concentrated among couples identified by the LCA as being in dissatisfied/unstable relationships. Men in dissatisfied/unstable relationships

characterized by high levels of multiple partnerships were disproportionately affected by poverty and mental disorders, reported that they and their partners used drugs, and of particular concern, and reported violence against committed partners. Our findings suggested STI/HIV prevention interventions for inmates and their partners should consider the poverty, mental health, drug dependence, and intimate partner violence issues to better ensure programming is effective and healthful for both inmates and their partners. In addition to these factors, effective STI/HIV prevention programming will also likely need to address the complexity surrounding non-monogamy/concurrency, such as the cultural and gender norms and associations between one's own non-monogamy and the perceived non-monogamy of the partner (Carey, Senn, Seward, & Vanable, 2010; Grieb, Davey-Rothwell, & Latkin, 2012; Senn, Scott-Sheldon, Seward, Wright, & Carey, 2011).

Substantial barriers to maintaining contact during incarceration were observed. For example, the expense of calling and limited time to talk were commonly reported obstacles to more frequent phone contact. Given the average cost for a call home from prison is \$15–17 per 15 min (Kukorowski, 2012), current phone call pricing policies hinder maintenance of relationships during incarceration. Public health program planners must work with corrections staff to reduce barriers to contact during incarceration; doing so is likely a critical component of improved efficacy of family-strengthening and HIV prevention efforts for prisoners and their partners.

The most significant limitation of the current analysis was our inability to interview the female partners of study participants. An important next step is to interview female partners to evaluate the degree to which characterizations of committed partnerships are accurate and maintenance of partnerships during incarceration is desired. Another limitation of the current study is reduced generalizability to other African-American inmate populations given our eligibility criteria. Other concerns about validity include the potential for measurement error due to information and social desirability biases. Participant's current relationship status may influence recall; approximately 18% of participants reported they were no longer in a relationship with the committed partner, they were with at prison entry, and 9% did not know their current relationship status. However, we do not have ability to determine whether no longer being in a relationship is associated with increased or decreased recall accuracy. We also had limited power to detect weak to moderate associations, particularly in fully adjusted analyses, as well as low prevalence outcomes given the modest cohort size.

Despite these limitations, we feel that this study fills an important research gap, given the hundreds of thousands of African-American men who leave behind partners in the community as a result of incarceration and the dearth of research on these partnerships. The results suggest that family-strengthening programs and couple-level interventions that improve relationship skills and address STI/HIV risk are appropriate for inmates in a broad

range of marital and nonmarital committed partnerships. Programs that address psychopathology, violence, and substance use, and socioeconomic stressors on relationships and that improve contact between inmates and loved ones in healthy relationships during incarceration are likely critical to improving well-being and reducing STI/HIV risk among inmates and members of their networks.

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Compliance with Ethical Standards

Conflict of interest All authors declare they have no conflicts of interest.

Ethical Approval All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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