# RELATIONSHIP POWER, SOCIODEMOGRAPHICS, AND

# THEIR RELATIVE INFLUENCE ON SEXUAL

# AGREEMENTS AMONG GAY

# MALE COUPLES

by

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ABSTRACT


Recent research suggests that men in primary relationships engage in condomless sex both within and outside their relationships, and a majority of human immune deficiency virus (HIV) transmission risk may actually occur within primary relationships. Sexual agreements regarding nonmonogamy among men who have sex with men (MSM) are a critical component to understanding HIV prevention in male couples. Consistent associations have been found between relationship factors and sexual agreements. Relationship power is one dyadic construct that likely shapes how sexual agreements function, but has been unexplored. Multilevel modeling was used in a cross-sectional sample of gay male couples ($N$=566 couples) to examine associations between demographic characteristics of partners traditionally used to define relationship power, a scale of decision-making power, and outcomes related to sexual agreements, including investment, agreement breaks, and break disclosure. Results indicated that decision-making power relative to one's partner was not associated with any agreement outcome, contrary to hypotheses. However, controlling for power, sociodemographics, including age, income, race, and HIV status, were variably associated with sexual agreements' functioning. Specifically, older partners were more invested in and less likely to break their agreements. Lower-earning partners broke their agreements more frequently, but also disclosed breaks more often. White men in interracial relationships broke their

agreement more often than their partners. Concordant HIV-positive couples were less

invested in their agreements and HIV-positive men disclosed breaks more frequently.

HIV prevention efforts for same-sex couples must attend to the social, developmental,

and cultural mechanisms that affect sexual nonmonogamy agreements among diverse,

same-sex couples.

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INTRODUCTION

HIV in a Dyadic Context

HIV is currently a global epidemic, burdening healthcare systems both

internationally and domestically. Within the US, the Centers for Disease Control and

Prevention estimated that in 2010 over 1.1 million people were living with HIV and

approximately 47,500 individuals had been newly infected that year (Centers for Disease

Control and Prevention, 2012a). Risk for HIV acquisition and transmission remains high

among men who have sex with men (MSM), who represent nearly two-thirds of new

infections in recent surveillance (Centers for Disease Control and Prevention, 2012a).

MSM are also the only group whose incident infections continue to rise, whereas rates

are either stabilizing or declining in other traditional risk groups (e.g., heterosexual

African American women; Centers for Disease Control and Prevention, 2012b).

HIV transmission among MSM occurs almost exclusively through sexual

behavior (Baggaley, White, & Boily, 2010), and recent calls have suggested that focusing

on the dyadic context of risk might enhance HIV prevention among MSM (Burton,

Darbes, & Operario, 2010; El-Bassel et al., 2010; Karney et al., 2010). In particular,

studies indicate that MSM in primary relationships are at high risk for HIV (Davidovich,

Wit, & Stroebe, 2004; Elford, Bolding, Maguire, & Sherr, 1999; Moreau-Gruet, Jeannin,

Dubois-Arber, & Spencer, 2001; Mustanski, Newcomb, & Clerkin, 2011). Further,

mathematical modeling proposes that a substantial proportion of transmission risk

behavior may actually occur between primary partners (Goodreau et al., 2012; Sullivan et al., 2009).

Sexual minority men in primary relationships are at risk for HIV to the extent that they are having unprotected sex with a primary partner who is HIV-infected, or that either partner has unprotected sex with men outside their relationship. Rates of negotiated nonmonogamy among same-sex male couples are relatively high (Blasband & Peplau, 1985; Gass, Hoff, Stephenson, & Sullivan, 2012; Hoff & Beougher, 2010) and these dynamics certainly contribute to HIV transmission (and prevention) within couples. Couples may choose to navigate sexually nonmonogamous relationships by having explicit sexual agreements regarding acceptable extradyadic behaviors, and it would appear that the majority do (Hoff & Beougher, 2010; Kippax, Crawford, Davis, Rodden, & Dowsett, 1993; Kippax et al., 1997; Mitchell, 2014a).

Research on sexual agreements is only now emerging. Although research on the potential for agreements to reduce sexual risk has previously been mixed (Crawford, Rodden, & Van de Ven, 2001; Elford et al., 1999; Kippax et al., 1997), more recent evidence suggests that sexual agreements that are operating well for partners may reduce HIV transmission risk within the couple (Hoff, Beougher, Chakravarty, Darbes, & Neilands, 2010; Hoff, Chakravarty, Beougher, Neilands, & Darbes, 2012; Mitchell, Champeau, & Harvey, 2013; Mitchell, Harvey, Champeau, Moskowitz, & Seal, 2012; Mitchell, Harvey, Champeau, & Seal, 2012). Such agreements, in turn, are likely to be shaped by aspects of a couple's relationship, such as levels of positive communication, trust, and intimacy (Hoff et al., 2010; Hoff et al., 2012; Mitchell, Harvey, Champeau, Moskowitz et al., 2012). Understanding the function of sexual agreements within couples is a critical component of incorporating dyadic dimensions to HIV prevention among

MSM.

<div align="center">Sexual Agreements and HIV Risk Among Gay Male Couples</div>

Sexual agreements among MSM shape the rules around what behaviors are permissible with a sexual partner outside the relationship and, therefore, have strong significance for HIV risk. However, sexual agreements take on varied forms in terms of which behaviors with outside partners are permissible and the circumstances under which they are allowed (Grov, Starks, Rendina, & Parsons, 2014; Hoff & Beougher, 2010; Hoff et al., 2009; Mitchell, 2014a; Parsons, Starks, DuBois, Grov, & Golub, 2013). Given this variety, their functioning is likely specific to each couple and the unique context of their relationship. Moreover, a number of these agreement-related characteristics have been shown to influence HIV risk within and outside the relationship.

For example, investment in or commitment to the sexual agreement has been shown to be protective against unprotected sexual intercourse outside the relationship, both contemporaneously (Hoff et al., 2012; Mitchell et al., 2013; Mitchell, Harvey, Champeau, Moskowitz, et al., 2012; Mitchell, Harvey, Champeau, & Seal, 2012) and longitudinally (Darbes, Chakravarty, Neilands, Beougher, & Hoff, 2014). Positive relationship factors such as quality, stability, and intimacy have also been associated with increased agreement investment (Hosking, 2013, 2014; Mitchell, 2014b).

In contrast, facets of lower relationship functioning, such as reduced commitment to the relationship and lower social support, have been associated with breaking agreements (Gomez et al., 2012). Breaks in the agreement (i.e., incidents of non-adherence to rules of the agreement) constitute a type of infidelity and may threaten relationship health (Martell & Prince, 2005). If breaks in the agreement involve HIV risk

and then are not disclosed between partners, this also greatly increases the potential for partners to unknowingly acquire HIV in the context of their primary relationship. Underscoring this risk among same-sex couples, recent studies have documented very low rates of HIV testing among MSM in primary relationships, even following unprotected sex with an outside partner (Chakravarty, Hoff, Neilands, & Darbes, 2012; Mitchell & Petroll, 2012). This literature provides evidence for the association between relationship factors and sexual agreements. Given this evidence, the field would benefit from extending these efforts to other facets of intimate relationships.

<center>Potential for Power to Influence Sexual Agreements</center>

One dyadic concept that is likely to determine the formation, function, and maintenance of sexual agreements is relationship power. In relationship science, power has been construed as an inherently dyadic process between two partners (Huston, 1983), characterized by the ability of one partner to influence the other toward a desired outcome.

Cross-sectional research on heterosexual men and women has linked power to intentions to engage in infidelity from one's spouse and actual past engagement in infidelity (Lammers, Stoker, Jordan, Pollmann, & Stapel, 2011). These associations were partially mediated through increased confidence and through emotional distance from one's partner (for infidelity intentions only). Other research has demonstrated that power relative to one's romantic partner differentiated distress in reaction to sexual or emotional infidelity (Berman & Frazier, 2005), such that lower power partners were more distressed by emotional unfaithfulness, whereas higher power partners were affected by sexual infidelity. Although these studies were conducted with heterosexual couples, this

literature suggests that relationship power may be generally associated with sexual dynamics within romantic relationships.

Studies have already documented that sexual agreements within gay male couples are influenced by aspects of the dyadic context, including intimacy, trust, positive communication, and overall quality (Gass et al., 2012; Hoff et al., 2010; Mitchell, 2014b; Mitchell, Harvey, Champeau, Moskowitz et al., 2012). Separately, associations between intimate relationship power and other relationship factors suggest that imbalances in power may be associated with relationships that are less satisfied and committed, and relationships in which communication follows a distinctive pattern (Gray-Little & Burks, 1983). These correlates, in addition to the role of relationship power being in achieving a desired end from one's partner (Huston, 1983), indicate that intimate relationship power likely influences the sexual agreements of male couples.

<div align="center">Defining Intimate Relationship Power and Its Function</div>

One consideration in evaluating the nature of intimate relationship power is that it has been variably defined within the literature (Huston, 1983). A complicating factor is the idea that relationship power is conceptually a latent variable, which shapes other relationship processes through its presence, but is difficult to directly observe. Common approaches to measuring power in relationships include behavioral observation of decision-making during laboratory paradigms (Lindahl, Malik, Kaczynski, & Simons, 2004; Loving, Heffner, Kiecolt-Glaser, Glaser, & Malarkey, 2004), self-report questionnaires of domains of control (e.g., "In general, who makes most of the decisions about money in your relationship?" (Gray-Little & Burks, 1983; Peplau & Fingerhut, 2007)), or the use of social status variables to categorize partners as high or low power

(e.g., using gender as a proxy for power (Tichenor, 1999).

## Power in Gay Male Couples

A challenge in extending theories of power to gay couples is that relatively few studies have evaluated its role in same-sex couples (Peplau & Fingerhut, 2007; Peplau & Spaulding, 2000). The existing literature suggests that gay and lesbian couples rate their ideal relationship as equal in power (Kurdek, 1995; Peplau & Spaulding, 2000), although fewer couples report actually perceiving their relationship as egalitarian (Harry & DeVall, 1978; Reilly & Lynch, 1990). There is also some evidence for the role of individual personal resources in determining which partner holds power in gay couples. Harry and colleagues (Harry, 1984; Harry & DeVall, 1978) showed that older men and men with greater income tended to have more power in their relationships. Blumstein and Schwartz (1983) also reported financial income as a significant determinant of power for gay male couples. However, we know far less about the role of other indicators, such as HIV status or race. This is despite some qualitative (Remien & Carballo-Dieguez, 1995) and quantitative (Diaz, Ayala, & Bein, 2004) evidence that these indicators are likely to be salient in the construction of power for gay men.

In recent research on gay male couples, these demographic characteristics, such as age, race, and HIV status, are commonly included as covariates to be controlled for (Mitchell, 2014a; Mitchell et al., 2013; Mustanski et al., 2011; Parsons et al., 2013; Parsons, Starks, Gamarel, & Grov, 2012). In some instances, these demographic variables are significant predictors of unprotected sex (Mitchell et al., 2013; Mustanski et al., 2011; Parsons et al., 2013), sexual decision-making (Parsons et al., 2013), and sexual satisfaction (Parsons et al., 2012). However, in their role as atheoretical covariates, their

impact is underemphasized. By conceptualizing these effects as bases of power in the dyadic context, we might begin to better understand their influence.

<u>Current Study</u>

Sexual agreements regarding extradyadic sex among gay male couples are common and have significant implications for sexual health within and outside the relationship (Hoff et al., 2009; Hoff et al., 2012). Existing research has associated correlates of relationship health with the functioning of sexual agreements (Hoff et al., 2012; Mitchell et al., 2013), underscoring the importance of the relationship context in understanding such agreements. The current study aims to expand on this effort to understand dyadic influences on sexual agreement function among same-sex male couples. One untested construct that is likely to be influential on sexual agreements is relationship power, in part because intimate relationship power is generally defined as the ability to exert influence on a partner (Huston, 1983).

Because relationship power has been broadly and variably defined, the current study includes multiple definitions and clearly outlines their connection when aiming to clarify its scope. The selected power-relevant characteristics are informed by resource models of power (e.g., age, income; Thibault & Kelly, 1959), as well as specific understudied variables that may be relevant to gay male couples (e.g., HIV status, race). We anticipate that differences in these demographics between partners would be associated with decision-making power, as a function of discrepancies in resources or social status. We also expect these differences will be associated with important outcomes relevant to the sexual agreement (e.g., investment, breaks, and disclosure of breaks).

<center>Hypotheses</center>

Based on the empirical research reviewed here, I hypothesize the following with respect to couples' relationship power and their sexual agreements:

Hypothesis 1. *Within couples* partners with lower social status or decision-making power will be more invested in their agreement. Individuals who are younger, report lower income, or report less decision-making power than their partner will have higher levels of agreement investment, as will HIV-positive and non-White men.

Hypothesis 2. *Within couples* partners with higher social status or decision-making power will report breaking their agreements more often, whereas partners with less social status or decision-making power will be less likely to break their agreements.

Hypothesis 3. *Within couples* partners with higher social status or decision-making power will disclose breaks in their agreements more often, whereas partners lower in status or decision-making power will be less likely to disclose.

Hypothesis 4. When examined separately, within-couple differences in age, race, HIV status, and income will be significantly associated with the agreement outcomes (Hypotheses 1-3). When examined in a multivariable equation that includes all demographic predictors, as well as decision-making power, the associations between demographic characteristics and agreement outcomes will be partially explained by decision-making power.

METHOD


Procedure

Data for the current study come from a larger study of HIV risk among sexual minority men in primary relationships. Couples were recruited in the San Francisco Bay Area between 2005 and 2007. Research staff used both active (e.g., community outreach at MSM-identified social venues and health centers) and passive (e.g., advertisements in gay newspapers and websites) recruitment strategies.

Eligibility criteria included each partner being over 18 years old, having been in a primary relationship together for at least 3 months, being fluent in English, and being a resident of the San Francisco Bay Area. "Primary partner" was defined for eligible participants as a man one is "committed to above anyone else and with whom he has had sex." Each partner also needed to have knowledge of his own and his partner's self-reported HIV status. However, HIV status was not independently confirmed through testing.

Eligible couples were then scheduled to complete self-report batteries at the local research offices in San Francisco. Both partners provided written informed consent and then completed self-report questionnaires via audio computer-assisted interview (ACASI) independently, but simultaneously. Each partner received $40 for completing the self-report battery. Questionnaires took approximately 70 minutes to complete.

## Participants

One thousand one hundred and thirty-two men (566 couples) completed study procedures. The sample was racially and economically diverse: 47% of couples identified as interracial, 45% as White, 5% as African-American, 2% as Latino, 1% as Asian-American/Pacific Islander, and less than 1% Native-American. Sixty-five percent of men identified as White, 11.3% as Hispanic/Latino, 9.5% as Black, 6.7% as Asian/Pacific Islander, 4.8% as mixed race, 1% as Native American/Alaskan Native, and <1% as other race. For individual partners, 45% reported earning less than $30,000 per year, 30% earned $30,000-59,999, 16% earned $60,000-99,999, and 9% earned $100,000 or more.

With regards to HIV status, efforts were made to specifically recruit dyads that represented the spectrum of dyadic HIV status (concordant HIV-negative, concordant HIV-positive, and "serodiscordant" where one partner is HIV-positive and the other is HIV-negative). Three hundred and ten couples identified as concordant HIV-negative, 124 couples identified as concordant HIV-positive, and 132 couples identified as HIV-serodiscordant. The average length of relationship was 6.9 years ($SD = 8.5$; median = 4 years), with 77% of partners reporting they were living together at the time of the study. Forty-five percent of the couples identified their relationship as open and 55% identified their relationship as closed or monogamous. A local institutional review board approved all procedures where the data were collected.

## Measures

### Demographics

Single items assessed participants' self-reported age, income, racial identity, and HIV status. Age was a continuous variable, and income, HIV status, and race were

categorical variables. Individual's annual income was reported as the following: <$10,000; $10,000-19,999; $20,000-29,999; $30,000-39,999; $40,000-59,999; $60,000-79,999; $80,000-99,999; $1000,000-149,999; $150,000-199,999; ≥ $200,000. HIV status was reported as HIV-positive or negative.

Race was reported as American Indian/Alaskan Native, Asian/Pacific Islander, Black, White (non-Hispanic), Hispanic, Mixed Race, or Other Race. Because of small cell sizes in some of the racial categories (e.g., American Indian/Alaskan Native, $n$=15), and the theoretical reasoning that non-White men are generally socially disadvantaged compared to White men, participants were categorized as 0 ("Non-White") or 1 ("White").

Relationship Power

A psychometrically sound scale developed to measure sexual relationship power in heterosexual women (Pulerwitz, Amaro, Jong, Gortmaker, & Rudd, 2002) was adapted for the larger study. Several items relevant to MSM were added (e.g., regarding unprotected anal sex) and some of the original scale items were removed to reduce participant burden (e.g., those that loaded less strongly onto their respective factor in the original factor analysis (Pulerwitz, Gortmaker, & DeJong, 2000). In preliminary factor analyses of the adapted 12-item scale, three subscales emerged: "Lack of power about barebacking", "Power in condom negotiation" and 'Power in decision-making" (Hoff, unpublished data).

Given the theoretical basis for the current study and the proposed outcomes (i.e., sexual agreement investment and maintenance), only the power in decision-making subscale was used. This resulted in a final 7-item scale, showing good internal consistency (Cronbach's α = .80).

Sexual Agreement Investment

Investment in the sexual agreement was measured with the Sexual Agreement Investment Scale (Neilands, Chakravarty, Darbes, Beougher, & Hoff, 2010). The original exploratory factor analyses indicated that the three subscales (Satisfaction, Commitment, and Value subscales) loaded onto one factor: Sexual Agreement Investment. The measure consisted of 13 items scored on a 5-point Likert scale from "Not at all" to "Extremely." The scale showed excellent internal consistency in the current sample (Cronbach's α = .97).

Sexual Agreement Breaks

Breaks to participants' current sexual agreements were assessed with a single-item count of the number of times participants reported violating their current agreement in the past 12 months.

Disclosure of Sexual Agreement Breaks

Disclosure of breaks was measured with a single-item count of the number of reported breaks to their current agreement in the past year that participants informed their primary partner about.

## Analysis Plan

The current study uses a dyadic dataset, with data from both partners. In most cases, data from romantic partners is highly correlated (i.e., responses from one individual are expected to be more similar to those of their partner than those of another

random participant). This interdependence in the data within couples violates assumptions about the independence of the data necessary for various analytical approaches, such as ordinary least squares (OLS) regression. Using such approaches in violation of the assumptions can bias standard errors and lead to inaccurate conclusions regarding statistical significance (Raudenbush & Bryk, 2002). Therefore, models accounting for the nesting in the data, such as multilevel models, are necessary.

Demographic Predictors

For the first aim of our data analysis plan, we separately tested the association between each demographic variable and decision-making power and agreement outcomes (Hypothesis 1-3). For continuous demographic variables (e.g., age, income, decision-making power), we included the couples' average on the variable across partners at Level 2. These variables were centered on the average for all couples (i.e., grand mean centered). For individual partners, we included each partner's difference from the couple's average (or delta) at Level 1 (i.e., group mean centered). By doing so, partners who are older or make more money had a positive delta, whereas younger partners or partners who make less money had a negative delta.

For dichotomous variables (HIV status, race), we included a couple-level variable (Level 2) denoting whether couples are the same or different on the variable of interest. For example, HIV-concordant couples were coded 0 and HIV-serodiscordant couples were coded 1. Similarly, couples were coded as being either both White or both non-White (i.e., minority couples), or a White male partnered with a non-White male. We also included an individual variable at Level 1 (e.g., respondent's HIV status or race). Respondent's HIV status and race were coded as 0 (HIV-negative; non-White) and 1

(HIV-positive; White). HIV status and race are unique in that both concordant positive and concordant negative couples, as well as couples across specific racial groups (i.e., White-White and minority-minority), have the same score on the couple-level variable. However, a cross-level interaction (couple-level x partner-level) allowed us to decompose the specific effects of HIV status and race across couples' concordance.

Testing the Effects of Demographics and Decision-making Power

To assess the associations between demographic variables, perceived power, and agreement outcome, we used a series of multilevel equations. For count outcomes (e.g., breaks in agreements), we used an overdispersed Poisson distribution to avoid violating assumptions of the distribution of the outcome (Atkins & Gallop, 2007). An example set of such equations for Hypothesis 1 with income as the predictor would be:

> Level 1: Sexual Agreement Investment$_{ij}$ = $\beta_{0j}$ + $\beta_{1j}$\*Couple mean-centered individual income+ $r_{ij}$

> Level 2: $\beta_{0j}$ = $\gamma_{00}$ + $\gamma_{01}$\*Couple Average Income + $u_{0j}$
> $\beta_{1j}$ = $\gamma_{10}$ + $\gamma_{11}$\*Couple Average Income

Here, our hypothesized effects are embedded within the above equations, with $i$ denoting individuals and $j$ denoting couples. $\gamma_{00}$ is the intercept for all couples. $\gamma_{10}$ is the coefficient representing the effect of a respondent's income on sexual agreement investment. $\gamma_{01}$ is the coefficient representing the effect of the couples' average income on sexual agreement investment. $\gamma_{11}$ is the coefficient term representing a cross-level interaction where the couple-level income is multiplied by the respondent's income ($\beta_{1j}$). $r_{ij}$ represents the variability in the outcome for individual partners in a couple around the average for the couple. $u_{0j}$ represents the variability in sexual agreement investment around the average for all couples.

According to Hypothesis 1, as an individual's social status (e.g., income) increases their agreement investment will decrease. Within this equation, the group-centered income coefficient ($\gamma_{10}$) would then be expected to have a significant, negative association with agreement investment. For hypotheses 1-3, these models will look similar to the example equation, although with different outcomes and exchanging income for another demographic variable. For hypothesis 4, the three outcomes (investment, breaks, disclosure) will be tested separately, but each model will include all demographic characteristics together.

Our final analysis tested cross-level interactions (between x within-couple levels) of the demographic predictors. These interactions were computed as the product term of the same predictor at each level, such as respondent's income (group mean-centered) with the couple's average income (in our sample equation, this interaction term is $\gamma_{11}$). This interaction term was used to examine the potential for the magnitude of the impact of within-couple differences in demographics on sexual agreements to change, as a function of the couples' demographics. This was used for dichotomous predictors to separate effects for different types of couples that were identical on the responses of individual partners. Specifically, this was used to separate HIV-concordant negative from HIV-concordant positive couples and to separate White couples from minority men partnered with other minority men. Exploratory analyses also examined cross-level interactions for continuous predictors (i.e., age, income, decision-making power), but we did not hypothesize a priori about specific effects for these interactions.

All multilevel models were run in HLM 7.0 (Bryk, Raudenbush, & Congdon, 1996) and all results are reported with robust standard errors

RESULTS


Descriptive statistics and intercorrelations among study variables are reported in

Table 1. We first describe the results of the independent multilevel models for each

outcome. We then report the results of the multivariable multilevel model for each

outcome, which included all predictors significantly associated with the respective

outcome in independent models.


Agreement Investment

Both the independent and full multivariable models for sexual agreement

investment are reported in Table 2. With respect to investment in the sexual agreement,

results from the independent multilevel models indicated that, at the between-couple

level, men in couples with higher average decision-making were significantly less

invested in their agreements. Within couples, older partners reported greater investment

than younger partners. The cross-level interaction between couples' HIV status

composition and respondent's HIV status was also significant. Simple slopes analysis of

this effect demonstrated that men in concordant HIV-negative relationships were

significantly more invested than men in concordant HIV-positive relationships (B=-

4.169, $SE$=.836, $p$<.0001). However, within HIV-serodiscordant relationships, partners

were not significantly different in terms of their investment (B=-.757, $SE$=1.22, $p$=.538).

Neither couple-level nor partner-level race nor income was associated with agreement

Table 1. *Means and individual and dyad-level correlations of study variables (N=566 couples; 1132 men)*[1]

| Variable | Mean (*SD*) | Power | Income | Age | Race | HIV Status |
|---|---|---|---|---|---|---|
| Power | 16.69 (4.42) | -- | -.187** | -.067* | .053 | .031 |
| Income | 4.02 (2.28) | .138** | -- | .101** | -.039 | -.037 |
| Age | 41.74 (11.44) | .016 | .147** | -- | -.211** | .110** |
| Race | .66 (.48) | -.053 | .017 | .134** | -- | -.071* |
| HIV Status | .34 (.47) | .012 | -.063* | .029 | -.063* | -- |
| Agreement Investment | 40.78 (9.09) | -.049 | -.025 | -.079* | -.063* | -.159** |
| Agreement Breaks | 3.15 (7.38) | -.026 | -.094 | -.132** | .037 | .095 |
| Break Disclosure | 1.00 (3.58) | .053 | -.081 | -.007 | .047 | .151* |

\* *p<.05, **p<.01*
[1] Individual-level correlations are reported below the diagonal and dyad-level correlations are reported above the diagonal

Table 1 (continued)

| Variable | Mean (*SD*) | Agreement Investment | Agreement Breaks | Break Disclosure |
|---|---|---|---|---|
| Power | 16.69 (4.42) | -.142* | .126* | .086 |
| Income | 4.02 (2.28) | .040 | -.002 | -.036 |
| Age | 41.74 (11.44) | -.047 | -.119* | .029 |
| Race | .66 (.48) | .026 | -.005 | -.072 |
| HIV Status | .34 (.47) | -.004 | .003 | -.016 |
| Agreement Investment | 40.78 (9.09) | -- | -.244** | -.075 |
| Agreement Breaks | 3.15 (7.38) | -.244** | -- | .374** |
| Break Disclosure | 1.00 (3.58) | -.075 | .374** | -- |

\* *p*<.05, \*\**p*<.01

[1] Individual-level correlations are reported below the diagonal and dyad-level correlations are reported above the diagonal

Table 2. *Independent and multivariable multilevel models of demographic and power predictors of sexual agreement investment*[1,2] (*N=566 couples*)

| | Independent Models | | Multivariable Model | |
|---|---|---|---|---|
| | B | *SE* of B | B | *SE* of B |
| **Level 2 (Between-couple)** | | | | |
| Income | .143 | .176 | -- | -- |
| Age | -.040 | .030 | -.034 | .030 |
| Race | -.048 | .699 | -- | -- |
| HIV status | -.704 | .921 | -.335 | .946 |
| Power | -.398*** | .101 | -.337*** | .101 |
| **Level 1 (Within-couple)** | | | | |
| Income | -.173 | .204 | -- | -- |
| Age | .139* | .055 | .139* | .055 |
| Race | -1.05 | .686 | -- | -- |
| HIV status | -4.103 | .874 | -3.52 | .904 |
| Power | -.135 | .086 | -.140 | .087 |
| **Cross-level interactions (L2 x L1)** | B | SE of B | | |
| Income | .012 | .160 | -- | -- |
| Age | .008 | .006 | -- | -- |
| Race | -.420 | 1.47 | -- | -- |
| HIV status | 3.71* | 1.47 | 3.02* | 1.49 |
| Power | .038 | .027 | -- | -- |

*p<.05 ** p<.01 *** p<.001

[1] When cross-level interactions were not significant, they were removed from the model and independent effects at Level 1 and Level 2 are reported instead.

[2] -- indicates predictors that were not significant in independent models and therefore not carried forward

investment. Additionally, no other cross-level interactions were significant in the independent models.

Results from the full multivariable model indicated that couples' average decision-making power remained a significant predictor of investment, such that partners in couples reporting greater power on average reported less investment in their agreement (see Table 2). Within couples, older partners were more invested in their agreements. Additionally, the cross-level interaction for HIV status remained significant and the pattern of simple slopes remained the same. Men in concordant HIV-negative relationships were significantly more invested than men in concordant HIV-positive relationships (B=-4.169, *SE*=.836, *p*<.0001). In contrast, within HIV-serodiscordant relationships, partners were not significantly different in terms of their investment (B=-.757, *SE*=1.22, *p*=.538).

<div align="center">Breaks in Agreements</div>

The independent and full multivariable models of agreement breaks are reported in Table 3. Results from the independent multilevel models for breaks to the agreement demonstrated that as couples' average income increased, so did breaks to their agreements. Additionally, couples whose average age was older reported fewer breaks to their agreements. Within couples, men who earned more than their partner reported fewer breaks to the agreement. Older men also reported breaking their agreement less than their partner. Lastly, couples' racial match (White or minority couples vs. White non-White couples) significantly interacted with a partner's own race to predict breaks. Simple slopes analysis of the interaction effect revealed that non-White men in minority couples and White men in White couples did not significantly differ in their number of breaks

Table 3. *Independent and multivariable multilevel models of demographic and power predictors of breaks to the sexual agreement*[1,2]
*(N=566 couples)*

| | Independent Models | | | Multivariable Model | | |
|---|---|---|---|---|---|---|
| | B | ERR | 95% CI | B | adj. ERR | 95% CI |
| **Level 2 (Between-couple)** | | | | | | |
| Income | .108* | 1.11 | (1.02, 1.22) | .143** | 1.15 | (1.06, 1.26) |
| Age | -.047*** | .95 | (.94, .97) | -.047*** | .95 | (.94, .97) |
| Race | -.716 | .49 | (.23, 1.05) | -.758 | .47 | (.24, .91) |
| HIV status | -.298 | .74 | (.43, 1.27) | -- | -- | -- |
| Power | .101 | 1.11 | (1.00, 1.23) | -- | -- | -- |
| **Level 1 (Within-couple)** | | | | | | |
| Income | -.204* | .82 | (.68, .97) | -.128* | .880 | (.78, 1.00) |
| Age | -0.090*** | .91 | (.87, .96) | -.087*** | .92 | (.88, .95) |
| Race | -.412 | .66 | (.27, 1.60) | -.373 | .69 | (.33, 1.44) |
| HIV status | .533 | 1.70 | (.95, 3.07) | -- | -- | -- |
| Power | -.015 | .98 | (.90, 1.07) | -- | -- | -- |
| **Cross-level interactions (L2 x L1)** | | | | | | |
| Income | -.046 | .95 | (.86, 1.06) | -- | -- | -- |
| Age | .003 | 1.00 | (1.00, 1.01) | -- | -- | -- |
| Race | 1.049* | 2.86 | (1.01, 8.05) | 1.04* | 2.84 | (1.23, 6.57) |
| HIV status | .139 | 1.15 | (.37, 3.56) | -- | -- | -- |
| Power | -.018 | .98 | (.95, 1.01) | -- | -- | -- |

*p<.05 ** p<.01 *** p<.001

[1] When cross-level interactions were not significant, they were removed from the model and independent effects at Level 1 and Level 2 are reported instead.

[2] -- indicates predictors that were not significant in independent models and therefore not carried forward

(B=-.581, *SE*=.342, *p*=.090). However, in interracial relationships, White men broke their agreements significantly more often than non-White men (B=.674, *SE*=.102, *p*<.001).Within- couple decision-making power was not significantly associated with breaks. Additionally, neither couple-level nor partner-level HIV status was significantly associated with breaks to the agreement. Finally, no other cross-level interactions were significant.

Results from the full multivariable model indicated that couples' average income remained a significant predictor of increased breaks to the agreement, and couples' average age remained significantly negatively associated with breaks. Within couples, partners who earned more, as well as older partners, were less likely to break their agreement. Additionally, the cross-level interaction for race continued to be significant and the pattern of results for simple slopes remained the same. White men in relationships with other White men, and minority men partnered with minority men (i.e., White and minority couples) did not significantly differ from one another in the number of breaks (B=-.581, *SE*=.342, *p*=.090). However, in interracial relationships, White men broke their agreements significantly more often in the past year than non-White men (B=.674, *SE*=.102, *p*<.001).

Break Disclosure

Results from both the independent and full, multivariable multilevel models for disclosure of breaks to the agreement are reported in Table 4. Models excluded couples where both partners had either not broken their agreement in the past year or had never broken their agreement. Models also controlled for the number of breaks in the past year. Independent models indicated that couple-level income was significantly negatively

Table 4. *Independent and multivariable multilevel models of demographic and power predictors of sexual agreement break disclosure*[1,2,3] *(N=175 couples)*[4]

| | Independent Models | | | Multivariable Model | | |
|---|---|---|---|---|---|---|
| | B | ERR | 95% CI | B | adj. ERR | 95% CI |
| **Level 2 (Between-couple)** | | | | | | |
| Income | -.139* | .87 | (.77, .98) | -.098 | .91 | (.91, 1.02) |
| Age | .012 | 1.01 | (.99, 1.03) | -- | -- | -- |
| Race | -.116 | .89 | (.55, 1.44) | -- | -- | -- |
| HIV status | -.196 | .82 | (.49, 1.38) | -.166 | .85 | (.54, 1.34) |
| Power | .074** | 1.08 | (1.02, 1.14) | .059* | 1.06 | (1.01, 1.12) |
| **Level 1 (Within-couple)** | | | | | | |
| Income | -.135* | .87 | (.77, 1.00)* | -.159* | .85 | (.74, .99) |
| Age | .003 | 1.00 | (.96, 1.05) | -- | -- | -- |
| Race | .060 | 1.06 | (.74, 1.53) | -- | -- | -- |
| HIV status | .737** | 2.09 | (1.32, 3.32) | .598** | 1.82 | (1.18, 2.81) |
| Power | .056 | 1.06 | (.98, 1.14) | .063 | 1.06 | (.99, 1.15) |
| **Cross-level interactions (L2 x L1)** | | | | | | |
| Income | .013 | 1.01 | (.90, 1.14) | -- | -- | -- |
| Age | -.001 | 1.00 | (1.00, 1.00) | -- | -- | -- |
| Race | -.228 | .80 | (.24, 2.63) | -- | -- | -- |
| HIV status | -.568 | .57 | (.17, 1.89) | -- | -- | -- |
| Power | -.001 | 1.00 | (.98, 1.02) | -- | -- | -- |

*p<.05 ** p<.01 *** p<.001

[1] When cross-level interactions were not significant, they were removed from the model and independent effects at Level 1 and Level 2 are reported instead.

[2] All models controlled for number of breaks in the past year

[3] -- indicates predictors that were not significant in independent models and therefore not carried forward

[4] Models restricted to couples where are least one partner had broken their agreement within the past year

associated with disclosure of breaks. Additionally, couples whose average decision-making power was higher reported more frequent disclosure of breaks to their agreements.

Within couples, men who earned more than their partner reported disclosing breaks less often. HIV-positive men were significantly more likely to disclose breaks to their agreements. Couples' average age, as well as the couples' racial and HIV status composition, were not significantly related to disclosure. Further, men's age and decision-making power relative to their partner, and their own race, were not significantly associated with disclosure. Additionally, no cross-level interactions were significant in independent models.

Results from the full multivariable model indicated that couples' average decision-making power remained a significant predictor of disclosure of breaks to the agreement, such that higher average power predicted more frequent disclosure. However couples' average income did not remain significantly associated with disclosure. Within couples, partners who earned more were less likely to disclose breaking their agreement, whereas HIV-positive men remained more likely to disclose breaks than HIV-negative men. Couples' HIV status and partner's relative power were not significant predictors of disclosure of breaks to the agreement.

DISCUSSION

Findings from the current study suggest that, contrary to hypotheses, relative decision-making power within the relationship was not predictive of sexual agreement functioning in gay male couples. However, differences in demographic background (i.e., age, race, income, HIV status) between partners had significant associations with agreement investment and maintenance above and beyond associations with decision-making control. Specifically, older partners and HIV-concordant negative couples (compared to HIV-concordant positive couples) were more invested in their agreements. Younger partners and men who earned less than their partner reported greater numbers of breaks to their agreement. White men in interracial relationships also broke their agreements more often, although men in White couples and non-White men in minority relationships did not significantly differ from one another. Lastly, men who earned less than their partner were more likely to disclose having broken their agreement, as were HIV-positive men compared to HIV-negative men.

The demographics we explored in the current study are often assumed to create power differentials within couples (e.g., Parsons et al., 2012, Remien et al., 1995), but our findings demonstrated that associations with decision-making power or control did not better explain the influence of demographic characteristics on sexual agreements. Moreover, the overall pattern of associations we observed was also inconsistent with traditional notions about how demographic bases of power operate (e.g., the idea that an

older partner always has more power). Instead, the associations we saw were more likely to reflect specific processes related to social status, development, or culture that influence how gay men manage their sexual agreements within primary relationships.

Specific to HIV status, results indicated that men in concordant HIV-negative couples were more invested in their sexual agreements than concordant HIV-positive men, although partners in serodiscordant relationships did not differ in their investment from one another. Agreements about outside sexual partners likely serve multiple functions for couples, which could vary across couples' HIV concordance. Whereas agreements may focus on relationship protection for all couples, they are also likely uniquely salient to HIV risk and sexual health among concordant HIV-negative couples (e.g., Hoff & Beougher, 2010; Kippax et al., 1993). In contrast, concordant HIV-positive couples likely have fewer concerns related to their sexual health and, thus, would have fewer reasons why their agreements are critical for their well-being, resulting in less investment in those agreements.

There was not a statistically significant difference between HIV-positive and HIV-negative partners' investment within serodiscordant couples. Like the agreements of concordant HIV-negative couples, those of HIV-serodiscordant couples also provide multiple protective benefits, related to both sexual health and relationship health. Although the sexual health needs of each partner differ within serodiscordant relationships, HIV-positive men may still value the protective health benefits the agreement affords their partner. Further, qualitative research among gay men has found that both HIV-negative and HIV-positive partners in serodiscordant relationships were committed to components of their agreements that helped their partner use safer sex strategies outside the relationship (Hoff & Beougher, 2010). It therefore seems likely that

the multiple purposes agreements serve for both men within a serodiscordant partnership can operate to keep both partners equally invested in its maintenance.

HIV-positive men in general (irrespective of couples' HIV status concordance) were also more likely to disclose breaks in an agreement when they occurred. HIV-positive men may have more experience than HIV-negative men with discussing difficult sexual topics, such as disclosure of HIV status. These skills might generalize to skills in disclosure of breaks, facilitating those conversations. Specific to our sample, individuals were required to be aware of their partner's HIV status, suggesting that at least one such conversation had already taken place.

Our findings diverge somewhat from other studies of gay male couples. Mitchell (2014a) did not find an effect for couples' HIV status on agreement investment. However, their sample had relatively few serodiscordant or concordant positive couples, and these serostatus types were combined in analyses. In another study of partnered MSM surveyed online (Gass et al., 2012), no effect was found for an individual's HIV status on agreement investment, but participants did not report on their partner's HIV status. Thus, our results, in conjunction with these other empirical findings, emphasize the importance of understanding how an individual's HIV status affects the sexual agreements of a couple as a function of the couple's HIV-concordance.

Age differences within couples were significantly associated with investment in the sexual agreement and episodes of breaking that agreement, with older partners more invested in and less likely to break their agreements. These results might indicate specific developmental differences that influence perceptions of the agreement. For example, older men may have had more romantic relationship experience, and differently appreciate the value of having such an agreement and its purpose in protecting the

relationship. Alternatively, differences in social status between partners, as a result of the value of youth in the gay community, may also influence engagement in sex outside of the relationship. Older partners may feel that investment in their agreement is a way of strengthening and maintaining their relationship, particularly in the context of the gay community, where youth is highly valued and younger partners may have greater sexual opportunities (Barun & Cramer, 2000).

Similar processes may be operating to explain the finding that older partners break agreements less frequently. Specifically, older men may simply have fewer opportunities to engage in sex with other men, relative to their younger partners. Developmental differences may also drive the effect of older partners breaking their agreements less often. Reductions in sex drive with age (Hyde, 2005; McKinney & Sprecher, 1991) may reduce older partners' interest in seeking out sexual partners outside their relationship. Additionally, the co-occurrence of risky behaviors (e.g., substance use, unprotected sex) among young adults, which typically desists with age, may also help explain this relative difference in breaking agreement between older and younger partners (Wells, Kelly, Golub, Grov, & Parsons, 2010).

Income differences between partners were predictive of breaks to the agreement, as well as disclosure of breaks, such that lower-earning men were more likely to break their agreement and more likely to disclose such breaks. However, income was not significantly associated with investment in the agreement itself. Multiple theories of close relationships, including self-expansion (Aron & Aron, 1986) and social exchange theory (Thibault & Kelly, 1959), suggest that individuals are attracted to and seek out romantic partners with complementary social resources. Thus, we might reasonably expect that men with higher incomes partner with lower earning men because of some other

attractive quality or status that partner possesses (e.g., physical appearance or interpersonal charm). This attractive quality likely also provides the lower earning partner with social status or appeal to others outside the relationship and, therefore, could facilitate breaking his sexual agreement. Following the same reasoning for disclosure of breaks, the lower earning partner may feel more empowered to disclose his breaks to the agreement as a function of his own social resources or status (e.g., physical attractiveness, intelligence).

Alternatively, income and earning potential have frequently been identified as a means for men to contribute to their close relationships (Perry-Jenkins & Crouter, 1990). Much of this research has been conducted among heterosexual men, but income has also been independently related to relationship satisfaction among gay men (Elizur & Mintzer, 2003). Among heterosexual couples, qualitative research has suggested that in couples where men earn less than their wives find ways to arrange their relationship that "hides" such differences (Tichenor, 1999). For example, higher earning partners may make their agreement more permissive, or lower earning partners may break and disclose breaks more often, all as a way of correcting the imbalance of power within the relationship created by their income disparity.

Lastly, an individual's race was only predictive of breaks to the agreement, such that, in interracial relationships, White men broke their agreements more often than their non-White partners. White men in such relationships may break their agreements more frequently if they have an easier time finding partners in the gay community as a result of their higher social status. For example, non-White men often face various forms of discrimination in the gay community (Greene, 1994). This discrimination may also serve as a relative barrier to non-White sexual minority men meeting outside sexual partners.

Alternatively, if White men have more permissive cultural views regarding nonmonogamy and, thus, view committed relationships as more flexible with respect to sex with outside partners, they may commit breaks more easily. Indeed, within our sample, a higher proportion of White men (50.4%) than non-White men (35.3%) reported having a sexually open agreement, which may reflect different cultural views regarding monogamy. However, there is limited research to date on cultural norms regarding monogamy among sexual minority men.

While the current study has identified several characteristics of partnered MSM relevant to the management of their sexual agreements, these findings are best understood within the context of the study's limitations. Although these demographic characteristics have significant associations with sexual agreement outcomes, we did not have data available to test some of the cultural and developmental mediators of these effects that we proposed in discussion of our findings. The cross-sectional nature of the data also precludes any kind of causal inference. Therefore, we can only suggest possible causal mechanisms (e.g., that different perceptions of sexual attractiveness within the gay community explain associations between age differences and agreement breaks). Examining potential mediating variables for our findings certainly deserves study in future research.

Additionally, our variable regarding breaks to the agreement only captured whether men had broken any rule of their agreement in the past year, not which rule they broke. Although many agreements include rules about condomless sex, and breaks to these rules likely comprise some portion of the breaks reported by men in our study, agreements also include rules unrelated to sexual health (e.g., no overnights with a partner). Some of the breaks reported could have been violations of those rules, and

thereby had fewer implications for HIV risk. This limitation is shared with other related studies (e.g., Gomez et al., 2012; Mitchell et al., 2010) and suggests that future research should more explicitly assess which rules are broken and by which partner.

Although models for disclosure of breaks to the sexual agreement included a substantial number of couples (*N*=175), they were less statistically powered than other models in the study because they included only a subsample of MSM (i.e., those who had a break to disclose). Thus, results for those models should be treated with some caution.

Although partners completed questionnaires independently to reduce influence on one another, measurement within the study relied strictly on self-report, so common method variance, as well as other social desirability biases, may have affected the results. Lastly, the study employed a convenience sample that was recruited in a relatively small geographic area with a strong liberal political atmosphere. Thus, our findings might not extend to all same-sex male couples.

## Conclusion

Despite these limitations, the current study offers important information about the function of sexual agreements among diverse, same-sex male couples and has implications for their HIV acquisition and transmission. Couples whose demographic background suggests they may experience difficulty in maintaining investment in their sexual agreements would likely benefit from HIV prevention interventions that incorporate a relationship focus and explicitly address dynamics around nonmonogamy. Similarly, interracial couples and those couples who have large age or income discrepancies may be particularly important to include in HIV prevention efforts given that we found associations between these demographics and breaks to their agreements.

Increasing disclosure of breaks could also be used as a means of promoting HIV testing for same-sex male couples. Recent research has documented that partnered MSM are tested for HIV at very low rates, even following their own engagement in condomless sex (Chakravarty et al., 2012; Mitchell & Horvath, 2013; Mitchell & Petroll, 2012). However, such research has not examined whether discussion between partners about one's own or their partner's sexual risk behavior is related to HIV testing. Prevention efforts could promote discussion between partners about agreement breaks, specifically breaks involving condomless sex with outside partners, to motivate couples to seek out testing together. Our findings suggest that income discrepancies and HIV status, in particular, may play important roles in the process of break disclosure. Testing promotion strategies that specifically target HIV-negative men and income-discrepant couples, who we found disclose less often, may be especially valuable as the rollout of voluntary couples HIV counseling and testing expands (CVCT; Sullivan et al., 2014).

Results from this study suggest that, beyond certain relationship factors, various social, cultural, and developmental processes might influence how same-sex male couples navigate nonmonogamy. HIV prevention strategies designed for partnered MSM must attend to their sexual agreements regarding nonmonogamy, and research that helps scientists better understand factors that affect nonmonogamy agreements may guide adaptations to existing prevention efforts. The current study has highlighted characteristics that may help identify couples that are at risk for experiencing challenges in their agreements and, subsequently, may be at increased risk for HIV transmission. Future research is needed to expand on our findings and identify processes explaining these associations that can be usefully addressed in HIV prevention interventions for same-sex couples.

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