Examining Partnership and Health
in Multiple Samples of Gay and Bisexual Men

BY

STEVE N. DU BOIS

B.A., University of Michigan, 2005

M.A., University of Illinois at Chicago, 2009

THESIS

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Defense Committee:

David McKirnan, Chair and Advisor
Larry Grimm
Jon Kassel
Sheela Raja, Pediatric Dentistry
Brian Mustanski, Northwestern University
DEDICATION

This thesis is dedicated to the many mentors, colleagues, and friends who have challenged and inspired me to be my best.
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<tr>
<th>Abbreviation</th>
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<tr>
<td>ACASI</td>
<td>Audio Computer-assisted Self-interview</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
</tr>
<tr>
<td>ANCOVA</td>
<td>Analysis of Covariance</td>
</tr>
<tr>
<td>ARBA</td>
<td>AIDS Risk Behavior Assessment</td>
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<td>ASR</td>
<td>Adult Self-report</td>
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<tr>
<td>AUDIT</td>
<td>Alcohol Use Disorders Identification Test</td>
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<tr>
<td>BSI</td>
<td>Brief Symptom Inventory</td>
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<tr>
<td>CDC</td>
<td>Centers for Disease Control</td>
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<tr>
<td>CES-D</td>
<td>Center for Epidemiological Studies – Depression Scale</td>
</tr>
<tr>
<td>GEE</td>
<td>Generalized Estimating Equation</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>LGB</td>
<td>Lesbian, Gay, Bisexual</td>
</tr>
<tr>
<td>LGBT</td>
<td>Lesbian, Gay, Bisexual, Transgender</td>
</tr>
<tr>
<td>MSM</td>
<td>Men who have Sex with Men</td>
</tr>
<tr>
<td>RAS</td>
<td>Relationship Assessment Scale</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for the Social Sciences</td>
</tr>
<tr>
<td>STI</td>
<td>Sexually Transmitted Infection</td>
</tr>
<tr>
<td>TAP</td>
<td>Treatment Advocacy Program</td>
</tr>
<tr>
<td>UAI</td>
<td>Unprotected Anal Intercourse</td>
</tr>
<tr>
<td>YMSM</td>
<td>Young Men who have Sex with Men</td>
</tr>
<tr>
<td>YSR</td>
<td>Youth Self-report</td>
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SUMMARY

Compared to single heterosexuals, partnered heterosexuals tend to show greater physiological, psychological, and behavioral health benefits. We conducted three studies to examine if these partnership benefits extended to gay and bisexual men, who as a group are vulnerable to aversive health outcomes. Study One tested the Stress-buffering hypothesis among HIV positive men (n=312). Stress-buffering proposes individuals facing multiple stressors, e.g. being gay/bisexual and having HIV, will cope better if they have a high quantity or quality of social support. We hypothesized partnered men would be healthier across several indices than would single men, and that emotional and instrumental support would mediate the partnership–health relation. Results did not support the general hypothesis, although partnered men used hard drugs less than single men, and trended toward reporting higher emotional and instrumental support. Study Two used a sample of young gay and bisexual men (n=354) to compare the health of single and partnered young men; and to test the Social Strain hypothesis. Social Strain states stressful relationships can lead to negative health outcomes. We hypothesized that partnered young men would be healthier than single ones, and that lower relationship satisfaction scores would be associated with individual health decrements. Men whose most recent anal intercourse partner was serious were more likely to have risky sex than men whose most recent partner was casual. We found no other group differences in health. Relationship satisfaction inversely related to depression and anxiety, and positively related to binge drinking. Study Three used longitudinal data from a sample of
behaviorally risky gay and bisexual men (n=1,542) to compare single and partnered men on various health indices; and to test the Selection versus Protection hypotheses. Selection proposes that individuals are selected into partnerships because they are healthy, whereas Protection proposes that being partnered itself leads to individual health increases. Partnered men used hard drugs less, but engaged in unprotected sex more, than did single men. We found little support for both Protection —men reported decreases in depression, but increases in anxiety and sexual risk, as they entered partnerships; and Selection – only increases in anxiety and sexual risk predicted entering partnerships. Across studies, we found very limited support for our primary hypothesis that partnership related to comprehensive health benefits among gay and bisexual men. Two specific partnership benefits were replicated across studies: less depression and less drug use. Simultaneously, sexual risk prevalence was higher among partnered men in two of three studies. Potential explanations for our findings, study limitations, and suggestions for future research are discussed.
I. INTRODUCTION

A. Project Overview and Significance

Social support consistently relates to increased health in multiple domains (Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Among heterosexuals, the presence of a partnered relationship, specifically, relates to psychological, physiological, and behavioral health benefits (Horwitz et al., 1996; Robles & Keicolt-Glaser 2003; Wilson & Oswald, 2002). However, the association between partnership status and health is underexplored among gay or bisexual men (Parsons, Starks, Du Bois, Grov, & Golub, 2013). Like heterosexuals, these men commonly engage in serious relationships (LaSala, 2005), and many hope to marry in their future (D’Augelli, Rendina, Grossman, & Sinclair, 2008; Lannutti, 2005).

Converging evidence suggests gay and bisexual men have an unhealthier psychological and behavioral health profile than heterosexual men (Alvy et al., 2011; McKirnan et al., 2006). Currently, we do not know if partnership is associated with health benefits among gay and bisexual men. It is possible that, consistent with research on partnership and health among heterosexuals, partnered gay and bisexual men report better psychological, physiological, and behavioral health than single men. At the same time, primary partnerships among gay and bisexual men may differ from heterosexual partnerships in several important ways, e.g. mutually agreed upon sexual non-monogamy as a core feature (Hoff et al., 2010). These differences make it plausible that partnerships among gay and bisexual males are not simply a same-sex version of heterosexual partnerships that promote health.
Here, we review evidence for the association between health and social support, focusing on partnership specifically as a means of support. Next, we review literature on health, partnership, and their intersection, among gay and bisexual men. We then conduct three related studies in this population. The first two each test a unique social support theory, while the third tests two competing theories. Taken together, results from these studies will elucidate the association between partnership status and health among gay and bisexual men.

B. The Stress/Social Support Model

The stress/social support model states that the emotional and instrumental resources provided by others influence individual health outcomes (Coyne & Syme, 1985; Graham, Christian, & Kiecolt-Glaser, 2007; House, Landis, & Umberson, 1988). Converging evidence indicates social relationships can influence important physiological measures, e.g. disease progression, blood pressure, and cardiovascular functioning (House et al.). These physiological changes relate to health outcomes both directly, e.g. decreased mortality, and indirectly, through mediating psychological or behavioral mechanisms that affect mortality (Cohen & Willis, 1985).

An overwhelming amount of evidence supports the stress/social support model. For humans and non-humans alike, the presence of social support relates to increases in important health outcomes (e.g., Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Those with a high quantity and quality of social support have lower morbidity and mortality levels than those with lower quantity and quality of support, even after controlling for age, increased income, and initial health status (House, Landis, & Umberson, 1988; Johnson,
Backlund, Sorlie, & Loveless, 2000). In fact, social isolation, often operationalized as the absence of social support, is tantamount to morbidity and mortality risk factors such as smoking, limited physical activity, obesity, and high blood pressure (House, Landis, & Umberson, 1988; Kiecolt-Glaser & Newton, 2001). In terms of physiology, increased social support relates to better cardiovascular, endocrine, immune, and psychoneuroimmunological functioning, across multiple studies (for a review, see: Uchino, Cacioppo, & Kiecolt-Glaser, 1996). Regarding behavioral health, social support is linked positively to behaviors that promote disease management such as treatment adherence and diet regulation (Gallant, 2003). And, social support relates to better mental health functioning; individuals with high levels of support report fewer symptoms of depression, anxiety, anger, and general psychological distress, than those with low levels of support (George, Blazer, Hughes, & Fowler, 1989; Turner, 1981).

Social support can come from multiple sources – family/parents, peers/friends, co-workers, and romantic partners (Halbesleben, 2006; Walen & Lachman, 2000). Multiple studies indicate that the provider of social support moderates how much the support protects against stress. For example, in a study of 2,348 men and women, family and partner support were associated positively with multiple measures of well-being, while friend support was not (Walen & Lachman, 2000). In another study, individuals in both heterosexual and homosexual couples perceived friends to provide more emotional support than family. Those perceiving relatively high levels of emotional support from friends reported less psychological distress than those reporting low levels (Kurdek & Schmitt, 1987). In a qualitative study of 20 gay male couples in which one or both individuals had HIV, participants listed partner support as more important than family or
friend support (Haas, 2002). Consistent with this finding, research on heterosexuals points to one’s romantic partner – the person who someone feels intimate with, passionate for, and committed to (Sternberg, 1997) – as a primary source of social support.

C. Partnership Status and Health

Among heterosexuals, the presence of a primary partner relates to increased behavioral (Ross et al. 1990), psychological (Horwitz et al., 1996), and physiological (Robles & Keicolt-Glaser, 2003; Wilson & Oswald, 2002) health. Married individuals live longer than unmarried ones; single men have mortality rates 250% higher than married men, and single women have morality rates 50% higher than married women (Johnson et al., 2000). Mete (2005) used longitudinal data to demonstrate that, at one assessment point, married individuals were 5% more likely than unmarried ones to be alive seven years later. In another longitudinal study, Murray (2000) found a 47% decrease of within-period mortality risk for married versus unmarried individuals. In another study, of all participants alive at age 48, married men and women were 90% likely to live to age 65, compared to only 60% likelihood for single men and 80% for single women (Waite & Gallagher, 2000). Relatively low mortality rates for partnered versus single individuals may be attributable to differences in physiological, psychological, and behavioral health across groups.

The presence of a primary partnership seems to boost the physiological functioning of those involved. For example, married individuals are at lower risk for several causes or contributors to death – cardiovascular disease, respiratory disease, cancer, pneumonia and influenza, chronic obstructive pulmonary disease, and liver
disease (Berkman & Breslow, 1983; Berkman & Syme, 1979; Litwak et al., 1989; Ross, Mirowsky, & Goldstten, 1990; Tamakoshi, 2007). Further, being married relates to better chances of survival when diagnosed with or recovering from many of the above medical conditions, even after controlling for stage of disease and delays in seeking treatment (Atzema et al., 2011; Neale, Tilley, & Vernon, 1986).

Partnered heterosexuals also report better psychological health than single ones (e.g. Willitts, Benzeval, & Stansfeld, 2004). This finding is robust; it has been replicated across studies using attitudinal well-being measures, symptom inventories, mental health hospitalization rates, and suicide rates (Mastekaasa, 1992). In an early cross-sectional study, Gove and colleagues (1983) found marriage status, above other demographic variables, was the biggest predictor of happiness. Related, Mastekaasa found that partnered heterosexuals reported overall greater life satisfaction than single heterosexuals. Compared to single individuals, partnered individuals are less likely to be depressed (Rich-Edwards et al., 2006), distressed (Mills et al., 2004), anxious, and to meet criteria for several mental health disorders (Helbig, Lampert, Klose, & Jacobi, 2006). Lastly, married men are approximately half as likely to commit suicide as single men (Smith, Mercy, & Conn, 1988).

Partnered individuals are less likely to engage in some health behaviors that relate to mortality, e.g. alcohol use (Leonard & Rothbard, 1999), smoking (Graham, Francis, Inskip, & Harman, 2006), and heavy substance use (Helbig, Lampert, Klose, & Jacobi, 2006). Findings regarding the association between partnership and diet, exercise, and obesity are mixed; some researchers have found partnered individuals are less likely than single individuals to eat unhealthy foods (Borland, Robinson, Crozier, Inskip, & SWS
Study Group, 2007), whereas others have found that the likelihood of obesity increases as one transitions from single to partnered (The & Gordon-Larsen, 2009).

Of course, not all partnered individuals are happy in their relationships, nor do they all report better health than single individuals. Research asserts that, just as many romantic partnerships relate to health increases for those involved, some romantic partnerships relate to health decreases (Coyne et al., 2001; Friedman, Tucker, & Schwartz, 1995; Kiecolt-Glaser & Newton, 2001; Rook & Pietromonaco, 1987; Ross, Mirowsky, & Goldsteen, 1990). Individuals in partnerships containing spousal strain – stress experienced with or because of a romantic partner – more often report negative health outcomes than individuals in partnerships with no spousal strain. These outcomes include personal distress (Major, Zubek, Cooper, Cozzarelli, & Richards, 1997), negative affect (DeLongis, Capreol, Holtzman, O’Brien, & Campbell, 2004), and negative well-being and health problems (Walen & Lachman, 2000). We further discuss spousal strain, and the potentially negative effects of romantic partnership on individual health, later.

**D. Shortcomings of Current Research**

*Protection versus Selection:* The above findings indicate that for most heterosexuals, being partnered relates to increased health. However, the question remains: Is partnership serving a *protective* function for the individuals involved, or are the individuals involved *selected* into partnerships because they are healthy in the first place? The vast majority of studies investigating the association between partnership status and health have used cross-sectional designs and statistical analyses that prohibit causal interpretation (e.g. Helbig, Lampert, Klose, & Jacobi, 2006; Rich-Edwards et al., 2006). Therefore, the direction of the pathway connecting partnership status to health is
uncertain. Consequently, there is no consensus response to the question of protection versus selection.

Marriage emphasized over partnership: Much of the research on romantic partnership and health outcomes focuses on marriage status. This research compares married and single individuals, but does not include the subset of individuals who is partnered but not married. This focus on marriage status may not represent recent and current cultural trends. Marriage rates are continually decreasing in the U.S. (Centers for Disease Control and Prevention [CDC], 2011). This changing partnership climate may lead to a higher prevalence of serious romantic relationships that do not culminate in marriage, but that still relate to individual health outcomes. Further, the exclusive reliance of current research on “marriage” status excludes non-heterosexual individuals who may be unable to marry legally in their state or country, but who are involved in romantic partnerships that influence their health. For these reasons, we believe health researchers should investigate partnership generally instead of marriage specifically.

Some existing research does investigate partnership, and the related concept of cohabitation, instead of marriage. In fact, some research goes further to distinguish between multiple groups of partnered individuals – married, non-married cohabitating, and non-married, non-cohabitating (e.g. Blackwell & Lichter, 2000; Stets & Straus, 1989). Findings point to marriage providing the most salient health benefits compared to cohabitating but not being married, and being partnered but not cohabitating (Nock, 1995; Stack & Eshleman, 1998; Waite, 1995). However, there is reason to believe that partnership status, in itself, may relate to the same health benefits as marriage or cohabitation status. Rindfuss and Vanden Heuvel (1990) assert that partnered individuals
likely experience intimacy, regular sexual activity, social support, and even some benefits of shared incomes, like married and cohabitating individuals. In a longitudinal study of 4,430 British citizens, being partnered, but not necessarily being married or cohabitating, was associated with less depression, anxiety, and psychological distress (Willitts, Benzeval, & Stansfeld, 2004). Overall, very few studies have compared partnered, cohabitating, and married individuals on health outcomes. Further, the association between partnership status and health remains underexplored compared to the association between marriage status and health.

*Heterocentric literature:* The prevalence of non-heterosexual couples in the U.S. is increasing (Gates, 2006); yet, these couples are underrepresented in research on partnership and health. In 2005, there were 777,000 same-sex couples in the U.S., including at least one couple in every U.S. congressional district (Gates). Given the increasing frequency, and/or recognition, of non-heterosexual couples, it is important to understand if partnership relates to health benefits for these couples, or if these benefits are exclusive to heterosexuals.

Moreover, research on the health benefits of partnership among non-heterosexuals is socially and politically relevant. An increasing number of states are approving legislation recognizing same-sex civil unions and marriages (Soule, 2004), but the majority does not. Therefore, most non-heterosexuals are limited to partnership instead of marriage. Demonstrating that partnership status relates to health benefits may provide further support for the legalization of civil unions and marriage among non-heterosexuals. This idea is supported by past research. One study found that lesbian, gay, and bisexual (LGB) individuals in legally recognized relationships reported less
internalized homophobia, depression, and stress; and higher “meaning of life” scores, than LGB in committed relationships (Riggle, Rostosky, & Horne, 2010). Another study reported that LGB individuals reported symptoms that met criteria for psychiatric disorders significantly more after the states in which they lived passed legislation explicitly banning same-sex marriage. In contrast, LGB individuals living in states without these bans did not demonstrate significant increases in psychiatric disorders over time (Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010). Just as the mental health of LGB individuals worsened after the passing of legislation that limited their rights, the mental health of these individuals may improve after the passing of legislation that extends their rights. In sum, findings from this project may add to the bank of evidence supporting pro-LGB legislation.

Notably, the significant association between partnership status and increased health outcomes is not culture-specific; it has been found in the U.S., in European countries such as Belgium, the Netherlands, Germany, Italy, and Denmark (Di Tella, MacCulloch, & Oswald, 2003), and in Asian countries such as Japan (Goldman & Hu, 1993), and Bangladesh (Rahman, 1993). Diener and colleagues (2000) used data from 59,169 individuals who completed the World Values Survey II. They found that, among heterosexuals, the association between marital status and subjective well-being was similar in various cultures around the world. Just as the benefits of partnership generalize across cultures, it is possible they also generalize across sex and sexual orientation of the partners.
E. Gay and Bisexual Men / Men who Have Sex with Men (MSM)

It is important to distinguish between men who identify as gay and bisexual, and men who, regardless of their sexual identity, engage in same-sex behavior (men who have sex with men; MSM). In this proposal, when reviewing studies that analyzed samples of MSM, as opposed to men who identify as gay or bisexual, we deferred to the MSM label. But, our primary interest is in men who identify as “gay and bisexual,” given that these men are arguably more likely to seek partnerships with other men than those who solely engage in same-sex sexual behaviors but do not identify as gay or bisexual. Accordingly, when conducting data analyses we removed all participants who did not identify as gay or bisexual.

It is important to know if partnership status relates to health benefits among gay and bisexual men, for at least three reasons. The first is listed above – potential sociopolitical progress. Second, compared to general population men, gay and bisexual men are vulnerable to several aversive psychological states and more likely to engage in unhealthy behaviors (e.g. Alvy et al., 2011; Herek & Garnets, 2007). For example, compared to heterosexuals, gay and bisexual men more commonly report experiencing mental health problems, e.g. psychological distress (Mills et al., 2004), mood and anxiety disorders, and past suicidal ideation and attempts (Herek & Garnets, 2007; Remafedi, French, Story, Resnick, & Blum, 1998). Further, compared to heterosexuals, MSM/gay and bisexual men more commonly engage in detrimental health behaviors, e.g. substance use and sexual risk (Colfax et al., 2004; Grov et al., 2008), and smoking (McKirnan et al., 2006). Related, research suggests MSM are more likely than heterosexual men to report high levels of sexual compulsivity (Coleman et al., 2009) and exhibit high rates of HIV
Lastly, gay and bisexual men are more likely than general population men to report barriers to healthcare access, and fewer healthcare visits (Alvy et al., 2011). These health risks make it exceedingly important to explore possible avenues of health improvement among gay and bisexual men.

Third, relationships between gay and bisexual men may differ from heterosexual relationships in several ways. These differences may attenuate the association between being partnered and increased health found among heterosexuals. For example, in contrast to heterosexual partnerships, gay and bisexual male partnerships may not include sexual fidelity as a core or “automatic” feature. Accordingly, unlike most heterosexuals, partnered gay and bisexual men may engage in difficult conversations about intimacy, trust, and negotiated safety – agreements between partners that reduce probability of HIV seroconversion by advocating monogamy within the relationship or only safe sex with individuals outside the relationship (Hoff et al., 2010; LaSala, 2005). Related, HIV is often a pervasive issue in gay and bisexual male couples, and its accompanying topics of status disclosure, sexual safety, and support also influence these partnerships (Haas, 2002). Specifically, HIV and related issues may relate to decreased relationship length, and in some cases quick partner turnover, among some gay and bisexual men (Eaton, West, Kenny, & Kalichman, 2009). This quick turnover may decrease the health benefits associated with more enduring relationships.

Disclosure of sexual orientation to family members and friends also provides another potential barrier to gay and bisexual male relationship success (Haas & Stafford, 1998). Individual gay and bisexual men also may experience internalized homophobia while partnered with another man, and engaging in same-sex relationship behaviors such
as sexual intercourse or public displays of affection may exacerbate an individual’s self-perception as stigmatized (Mohr & Daly, 2008). Globally, the lack of consistent and equal rights, as well as the lack of healthy or “normative” media representation, may undermine some health benefits related to partnership for gay and bisexual men. Equally possible, perhaps, is that partnered gay and bisexual men reciprocally support each other to overcome the above barriers. This could lead to strengthened emotional and physical bonds between the partners, which eventually manifest as positive individual psychological health, health behaviors, and physiological functioning.

**F. Partnership and Health among Gay and Bisexual Men**

*Between-group comparisons:* Research comparing heterosexual and homosexual relationships indicates similarly high levels of partner love and relationship satisfaction in both (Kurdek, 1998; Peplau & Cochran, 1980; Peplau & Fingerhut, 2007). Kurdek (2004) extended his 1998 study by comparing cohabitating same-sex and married heterosexual couples on various measures of individual well-being and relationship functioning. For both sets of partners, relationship quality was predicted by the same factors – perceptions of equality and autonomy. Members of same-sex couples did not differ from their heterosexual counterparts on measures of psychological distress or maladaptive personality traits. Moreover, compared to heterosexual married couples, cohabitating same-sex couples reported *more positive* working relationship models and *greater* relationship satisfaction. These findings add to our general hypothesis that partnership may relate to health increases among gay and bisexual men, as it does among heterosexuals.
HIV and Sexual Risk: While HIV certainly affects heterosexual couples, it is a critical issue in gay and bisexual male relationships. The CDC estimate that although MSM account for only 4% of the population, they represent 53% of new HIV infections annually, and 53% of total HIV infections in 2006 (CDC, 2010). New research points to serious MSM relationships as the primary venue for HIV transmission. This research has shown consistently that men in same-sex relationships report more unprotected anal intercourse (UAI) with their primary partner than single MSM report with their casual partners (Crepaz et al., 2000; Koblin et al., 2003). Related, researchers found most HIV transmissions occur in the context of relationships, with 68% of seroconversions among MSM due to one’s primary sex partner (Sullivan, Salazar, Buchbinder, & Sanchez, 2009). These findings are supported by other research indicating that, for younger MSM (YMSM), HIV infection is trending toward acquisition from a steady, not casual, partner (Davidovich et al., 2001).

Follow-up research has been conducted to investigate the mechanisms underlying sexual risk in MSM relationships. Mustanski, Newcomb, & Clerkin (2011) found that, among YMSM ages 16-20, considering a romantic relationship to be serious related to almost eight times the likelihood of having UAI with that partner. Other factors that related to increased likelihood of UAI within a relationship included having an older partner, using drugs before sex, physical violence or forced sex within the relationship, and relationship duration (six months or longer). These findings suggest that, among at least some subsets of MSM, being partnered does not protect against all health risks and in fact may promote some risks. For this reason, researchers should investigate gay and
bisexual male/MSM relationships further, particularly in the contexts of sexual risk, HIV, and other health outcomes.

*Psychological and Behavioral Health:* Research is scant on the association between partnership and other domains of gay and bisexual male health. Completed research points to a positive association between being partnered and better psychological and behavioral health. For example, Mills and colleagues (2004) found that partnered MSM reported less distress and depression than single MSM. A 2010 study of 2,677 aggregated LGB individuals reported that participants in committed relationships reported less internalized homophobia, depression, and stress; and higher “meaning of life” scores, than did single participants (Riggle, Rostosky, & Horne, 2010). In one of the only studies comparing single gay and bisexual men to those in various relationship arrangements (monogamous, open, and monogamish – somewhat sexually open), researchers found that single participants reported higher depression scores than monogamish men and lower life satisfaction than monogamous and monogamish men. There were no differences between groups in terms of proportion of UAI acts under the influence of alcohol or drugs. However, a significantly higher proportion of single men (36.4%) reported UAI with a recent casual partner compared to monogamish men (18.6%). Single men also were more likely than men in monogamous relationships to use alcohol/drugs in the past three months, and engage in recent sex under the influence of several specific drugs (Parsons et al., 2013). Overall, and in contrast to past HIV research, these results indicate the presence of a partnered relationship confers several health benefits to gay and bisexual men. Given these encouraging findings, as well as little overall research on these topics, more investigation is needed.
G. Study Descriptions

For this project, we attempted to answer three related research questions, in three studies. Table I describes the theoretical premise, core research questions, variables tested, data sets used, and analyses in each conducted study.

<table>
<thead>
<tr>
<th>Study topic</th>
<th>Theory</th>
<th>Core question(s)</th>
<th>IV(s)</th>
<th>DV(s)</th>
<th>Data (N), sample, design</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Partnership benefits for HIV+ men</td>
<td>Stress-buffering</td>
<td>1. Partnered HIV+ men healthier than singles? 2. Emotional, instrumental support as mediators?</td>
<td>Partnership status</td>
<td>Clinically-obtained viral load and CD4; depression, anxiety; sexual behavior, substance use, HIV treatment adherence</td>
<td>TAP (312); HIV+ sample; cross-sectional</td>
</tr>
<tr>
<td>2. Relationship satisfaction</td>
<td>Social strain</td>
<td>1. Relationship satisfaction relates to health outcomes?</td>
<td>Partnership status; relationship satisfaction</td>
<td>Depression, anxiety; sexual behavior, substance use</td>
<td>Project Q2 (106) &amp; Crew 450 (248); youth samples ages 16-20; cross – sectional</td>
</tr>
<tr>
<td>3. Protection versus selection</td>
<td>Marriage protection; social selection</td>
<td>1. Partnership promotes health, or healthier men selected into partnership?</td>
<td>Partnership status; changes in status over time</td>
<td>Self-reported viral load and CD4; depression, anxiety; sexual behavior, substance use</td>
<td>MIX (1,542); substance-using, sexually risky men; longitudinal</td>
</tr>
</tbody>
</table>
**H. Sample Selection**

To answer our three research questions, we used four data sets that represent three subgroups of gay and bisexual men. These subgroups are distinct – a group of exclusively HIV positive men, two groups of young men (that we combine into one data set), and one group of behaviorally risky men. Yet, these samples are similar: Each is racially/ethnically diverse, and importantly, each is vulnerable to physiological, behavioral, and psychological health sequelae, compared to general-population gay and bisexual men (e.g. Ciesla & Roberts, 2001; Hatzenbuehler, McLaughlin, & Nolen-Hoeksema, 2008; Marshal, Friedman, Stall, & Thompson, 2009; Rambaut, Posada, Crandall, & Holmes, 2004). Individuals from these subgroups are more likely to report lower baseline health indicators, e.g. substance use and depressive symptoms (Ciesla & Roberts, 2001), than other gay and bisexual men. Accordingly, individuals in these subgroups could experience disproportionate partnership benefits compared to other gay and bisexual men. These benefits could have important implications for individual health, e.g. increased mood and physical well-being; and, for organized healthcare, e.g. less utilization of emergency room services by gay and bisexual men (Sanchez, Hailpern, Lowe, & Calderon, 2007). In sum, these men specifically may benefit from partnership, so we asked our research questions in these samples.

Moreover, testing our research question among different groups of gay and bisexual men, and at various points in the lifespan, helped elucidate the generalizability of our findings. For example, our results demonstrate if partnership benefits are exclusive to adult gay and bisexual men, young gay and bisexual men, both, or neither. This is an important contribution to the literature given that research points to both similarities and
differences between adult and youth male, same-sex partnerships (Mustanski et al., 2011). More generally, testing our hypothesis among multiple subgroups has added robustness to our findings. Each subgroup is discussed further in the following studies.

I. Summary of Literature Review and Studies Proposed

Years of social science research demonstrates the positive association between social support and behavioral, psychological, and physiological health. Among heterosexuals, the presence of a primary partnership, particularly, relates to increases in these health domains. Additionally, relationship satisfaction, not solely partnership status, relates to health. Several theories have been tested to explain and illuminate the association between partnership status, relationship satisfaction, and health among heterosexuals. These include Stress-buffering, Social Strain, and Protection and Selection. Each theory has limited, but not consistent, empirical support.

Among gay and bisexual men, the association between partnership status, relationship satisfaction, and health outcomes has not been studied extensively. It is important to study these constructs in this population, for several reasons: gay and bisexual men have poorer psychological and behavioral health patterns than heterosexual men; gay and bisexual male relationships may differ from heterosexual relationships in ways that have implications for the health of those involved; and, this research may add to the sociopolitical movement associated with gay marriage / civil union legalization. The small amount of research that has been done on partnership and health among gay and bisexual men indicates that being partnered relates to health increases in most health domains. But, much more research is necessary to illuminate the association between partnership and health within this population.
To accomplish this goal, we have conducted three studies of vulnerable subgroups of gay and bisexual men: Study One, of HIV patients, testing Stress-buffering; Study Two, of youth, testing Social Strain; and, Study Three, of behaviorally risky men, testing Protection versus Selection. We hoped our findings, taken together, would accomplish three goals: First, to demonstrate that partnership benefits extend across multiple health domains in gay and bisexual men; second, to illuminate the underlying mechanisms of the association between partnership status and health outcomes in these samples; and third, to influence future health research, interventions, and legislation pertaining to gay and bisexual men.
II. STUDY ONE: PARTNERSHIP STATUS AND HEALTH AMONG HIV POSITIVE MEN: TESTING THE STRESS-BUFFERING HYPOTHESIS

A. Aims and Hypotheses

Our first aim is to test the extent to which partnership buffers the stress of HIV infection on health, by comparing single and partnered HIV positive gay and bisexual men. Our second aim is to test if emotional and instrumental support each mediate any partnership status-health relation. We hypothesize that Stress-buffering will be supported, i.e., partnered men will report health benefits compared to single men. Emotional and instrumental support each will mediate the partnership status-health relation.

B. Introduction

A variety of researchers have suggested that the presence of a primary partnership is associated with better overall health. One theory that may explain this phenomenon, and that was tested in this study, is stress-buffering.

1. Stress-buffering

Over 30 years ago Cobb (1976) proposed that, among people who have higher baseline stress levels, social support moderates the association between acute stressful life events and reactions to these events. That is, people who are vulnerable because of exposure to long-term stress, and who face an additional, acute psychosocial stressor, will be buffered against the effect of the acute stressor – insofar as they have social support. If these already-vulnerable individuals do not have a high quantity or quality of social support, acute psychosocial stress may lead to negative behavioral and emotional health consequences. Stress-buffering remains a prominent and frequently tested theory of
social support. Increasingly, researchers are defining stress-buffering more liberally than Cobb originally did. Many researchers (Burton, Stice, & Seeley, 2004; Moskowitz, Vittinghoff, & Schmidt, 2013; Windle, 1992) have tested stress-buffering in the context of two simultaneous stressors, but not necessarily with one chronic and one acute stressor. Koopman and colleagues (2000) tested stress-buffering among HIV patients, defining the concept broadly as “…protection that social support provides against the effects of stressful events and situations” (p. 664). We follow this trend here – testing stress-buffering in the context of multiple stressors, with a lack of emphasis on one being chronic and one being acute.

Studies testing this model have reported mixed findings. An early study reported that working class women who experienced a severe life event, e.g. the death of a loved one, were less likely to demonstrate psychiatric disturbances if they perceived their male romantic partner to be a confidant – someone with whom they could discuss troubling topics. Working class women experiencing a severe life event who reported no such tie to their male partner reported a significant increase in pathology (Brown, Bhrolchain, & Harris, 1975). Similarly, in a study of Japanese women who simultaneously held professional positions and contributed to caregiving for their children, husband support buffered the stress experienced by occupying these dual roles (Matsui, Oshawa, & Onglatco, 1995). Nurses working in high-stress workplace environments, and who faced additional stressors, reported less stress when they were partnered rather than single (Tyler & Cushway, 1992). Moreover, they reported discussing work-related problems with a partner as one of their active coping mechanisms to deal with their stress (Tyler & Ellison, 1994). In another study, a subset of depressed women who thought about a close
relationship before engaging in a speech stress test demonstrated decreases in blood pressure relative to women who did not think about a close relationship prior to the stress test (Cyranowski, Hofkens, Swartz, & Gianaros, 2011).

A number of larger, longitudinal studies have not supported the stress-buffering perspective. Holt-Lunstad, Birmingham, and Jones (2008), for example, found a supportive social network did not buffer against the stress of being single or in an unhappy marriage. In a longitudinal study of adolescents, Windle (1992) found peer and family support did not moderate the relationship between stressful life events and internalizing (e.g. depressive symptoms) or externalizing (e.g. substance use) symptoms. A more recent longitudinal study of African American adolescents replicated these results (Zimmerman, Ramirez-Valles, Zapert, & Maton, 2000). Finally, results of a recent five-year study indicated stress-buffering does not consistently protect against health decrements among urban, impoverished individuals (Moskowitz, Vittinghoff, & Schmidt, 2013).

In sum, some studies assessing Stress-buffering have demonstrated support for the model. Simultaneously other, primarily longitudinal studies have not supported Stress-buffering. The vast majority of studies testing Stress-buffering have been on heterosexuals. We predict that the Stress-buffering hypothesis may be borne out in a sample of HIV positive gay and bisexual men. Specifically, partners of gay or bisexual HIV positive men may provide support that is absent or lacking from family or friends, who are unaware of the man’s sexual preference, HIV status, or both (Meyer, 2003).
2. Minority Stress

In his 2003 paper, Meyer described minority stress as a process by which minority group members adopt a minority identity that can itself be stressful or that may exacerbate other life stressors. LGB individuals, specifically, may have several experiences that relate to their adoption of a minority identity and accompanying stress. For example, LGB individuals may be rejected from family or friends, may be discriminated against in the workplace or school, may have to conceal their sexual identity, and may internalize society’s anti-homosexual sentiment (Meyer, 2003). Meyer’s minority stress model is consistent with findings that gay and bisexual men report higher levels of psychological distress and negative health behaviors than do general population men (Alvy et al., 2011; Herek & Garnets, 2007). Being gay or bisexual man may be a chronic stressor in itself.

3. Stress Associated with HIV/AIDS

Acquiring and living with HIV/AIDS can be interpreted as an acute stressor (Antoni et al., 1991). In 2004, the case fatality rate of AIDS, i.e., the proportion of people who will eventually die from the disease if diagnosed with it, was near 100% (Rambaut, Posada, Crandall, & Holmes, 2004). Therefore being diagnosed with HIV/AIDS, and subsequent health complications, can be perceived catastrophically, as if death is imminent. CD4/T-cell counts are important outcome variables related to HIV/AIDS. HIV attacks CD4/T-cells, which play a critical role in the body’s immune response (Rambaut). Accordingly HIV/AIDS can lead to neuropsychological impairment, compromised immune system functioning, and vulnerability to acquiring additional central nervous system and immune system diseases (Grant & Heaton, 1990). HIV infection also is
associated with increased likelihood of being diagnosed with Major Depressive Disorder (Ciesla & Roberts, 2001), Posttraumatic Stress Disorder (Katz & Nevid, 2005) and other Anxiety Disorders (Kemppainen, MacKain, & Reyes, 2013), and Bipolar Disorder (Chandler, Himelhoch, & Moore, 2006). Overall, the health consequences of HIV/AIDS are many and severe – enough to consider having HIV as a stressor that could exacerbate other stressors.

Compared to general population members, HIV/AIDS continues to affect MSM/gay and bisexual men disproportionately. Incidence rates among these groups of men continue to increase, while incidence rates among other groups decrease (CDC, 2010). Further, HIV positive gay/bisexual men engage in behaviors that may contribute to their worse psychological and behavioral health relative to their uninfected counterparts. As one example of this, HIV infected gay and bisexual men are more likely to use drugs frequently and to be polydrug users, compared to uninfected gay and bisexual men (Greenwood et al., 2001). This drug use may interfere with adherence to the HIV treatment regimen, further compromise cognitive or immune-system functioning, or lead to sexual risk behaviors that relate to acquiring additional STI. However, among HIV positive gay and bisexual men, having a primary partner may reduce the likelihood of engaging in behaviors such as frequent drug use, limit the negative health consequences of this drug use, or both.

4. Stress-buffering among Gay and Bisexual Men

Little research has been conducted on Stress-buffering among gay and bisexual men. This is despite HIV positive gay and bisexual men fitting the theoretical criteria for Stress-buffering – facing both a chronic stressor (being gay/bisexual) and an acute
stressor (acquiring HIV, then dealing with associated complications). Researchers investigating Stress-buffering among HIV positive MSM have found that personal coping strategies such as behavioral activation lead to improved psychosocial adjustment, whereas support from others buffers against the pathogenic effects of HIV (Britton, Zarski, & Hobfoll, 1993; Pakenham, Dadds, & Terry, 1994). Haas (2002) demonstrated that among gay and bisexual men, partner support buffered against the negative emotional consequences of HIV more than did support from others. Therefore, it is reasonable to think a primary partner might buffer against these and other pathogenic HIV effects, e.g. lowered T-cell count. This study will address this hypothesis, as well as underlying mechanisms of stress-buffering.

5. Mechanisms of Stress-buffering

Studies vary significantly in their operationalization of social support (Cohen & McKay, 1984). Included in each proposed definition is a set of constructs that underlie support. For example, Cohen and Willis (1985) proposed a dichotomous operationalization of social support – structural and functional. Structural support refers to the simple presence of supportive figures such as a spouse or partner. Functional support describes how satisfied one is with his/her support mechanisms. Other researchers more finely distinguish between four types of social support – instrumental, emotional, informational, and appraisal (Cohen & McKay, 1984; Helgeson & Cohen, 1996). Instrumental support includes services or items that are provided by one person to another, e.g. transportation to doctors’ offices for medical care (Wortman & Dunkel-Schetter, 1987). Emotional support is comprised of nonverbal and verbal communication of concern, sympathy, or care (Helgeson & Cohen, 1996). Informational support includes
the provision of information related to the task at hand (Helgeson & Cohen, 1996). Appraisal support describes assistance received by others that helps assess the threat at hand and the individual’s capacity to cope with that threat (Cohen & McKay, 1984).

These various forms of support may buffer against stress equally or differentially. In support of differential buffering, past research in the general population has shown emotional support is more consistently and strongly related to health than is instrumental support (Heaney & Israel, 1997). Nonetheless, receiving instrumental support does relate to positive health outcomes, including lessened depression and enhanced morale (Schaefer, Coyne, & Lazarus, 1981), less hypertension (Strogatz & James, 1986), and lower blood pressure (Strogatz et al., 1997). Israel et al. (2002) found instrumental support to be a more significant stress-buffer than emotional support. These researchers investigated the relationship between stress and health among 679 African American mothers from Detroit. Results indicated that both emotional (e.g. “somebody you could trust to help you solve...problems”) and instrumental (“somebody [to] take you wherever you needed to go”) support were independently associated with health, although instrumental supported emerged as a most significant predictor of general health.

We plan to test emotional and instrumental support as mediators of the association between partnership status and health outcomes (See Figure 2.1). We believe partnership may relate to increased emotional and instrumental support, which themselves strongly relate to health outcomes. We expect emotional and instrumental support to meet criteria for mediation (Baron & Kenny, 1986): The distal variable (partnership) will relate independently to both the mediating (emotional/instrumental support) and dependent (health outcomes) variables; and, the mediating variables will relate to the dependent
variables after controlling for the distal variable. Given that past findings are mixed regarding the influence of emotional versus instrumental support, we do not hypothesize differential effects across mediators and health outcomes.

6. **Study One Summary**

This first study tested the stress-buffering hypothesis by comparing partnered and single HIV positive MSM on several health indices. To elucidate potential mechanisms underlying support, we proposed to test emotional and instrumental support as separate mediators of any significant partnership-health relation. Consistent with the original Stress-buffering hypothesis, our sample is faced with multiple stressors – being gay or bisexual, and being infected with HIV. Our results indicate whether being partnered helps buffer against the negative effects of these stressors, and if so, what type of support underlies this buffering effect.

7. **Hypotheses**

Partnered participants will report less depression and anxiety, better HIV medication and appointment adherence, less substance use, higher T-cell count, and lower viral load, than will single participants. Emotional and instrumental support will be independent mediators of the association between partnership status and these health outcomes. The effects of partnership on sexual behavior and STI may be paradoxical: Proportionally, more partnered participants will report risk and recent STI than will single participants.
C. Method

1. Overview

Data were collected as part of the Treatment Advocacy Program (TAP), a longitudinal behavioral intervention aimed to increase HIV treatment adherence and sexual safety among MSM. HIV positive participants volunteered for a 12-month cohort study during which they received four mandatory and four optional one-on-one education sessions from HIV positive, peer advocate paraprofessionals (see: Raja, McKirnan, & Glick, 2007).

2. Participants

Our sample is comprised of HIV positive men who attended their HIV provider visits at three clinics in the Chicago area between May 17, 2004 and February 24, 2005 (N=311). Project screeners approached each potential participant during his medical visit, to assess interest in participating in the study and to determine if he met study inclusion criteria. Inclusion criteria consisted of being male, HIV positive, 18 or older, having sex with another man within the past six months, and receiving HIV care at a participating clinic. Participants were excluded if they did not indicate engaging in sexual behavior with a man in the last six months.

3. Procedure

Participants were randomly assigned to the intervention or contrast group. All participants completed an audio computer-assisted self-interview (ACASI) at baseline, and then again at their six- and 12-month follow-up visits. Participants were given a stipend of $25 after completing each visit. The intervention group received a set of peer-delivered, motivational interviewing-based modules. The foci of these modules included
sexual safety, HIV treatment adherence, communication skills, garnering social support, and self-efficacy for healthcare. The control group was a delayed treatment arm and received the intervention after the 12-month follow-up. Institutional Review Boards at the CDC and each local institution – Howard Brown Health Center, Uptown Clinic of the Chicago Department of Public Health, and Klein, Slotten, & French Medical Associates – approved all study procedures. Intervention group members completed the intervention by February 2006.

4. Measures

a. Demographics

We used standard, face-valid items to assess race/ethnicity, age, education, annual income, participants’ HIV clinic, and years since HIV diagnosis.

b. Sexual Orientation

To assess this, we used a single, face-valid item: “How do you usually identify yourself?” Participants chose from straight/heterosexual, gay/ homosexual, bisexual, other, and refuse to answer.

c. Partnership Status

We assessed this using a single, dichotomous, face-valid item: “In the past 6 months, did you have or have you had one primary or main male partner, that is, a partner you would call your boyfriend, spouse, significant other, or life partner?”

d. Physiological Outcomes

_Viral Load and CD4/T-cell Count_: Participants’ viral load and CD4/T-
cell count were obtained during each combined HIV care/TAP visit, via blood draw by a qualified medical professional. We express viral load using a continuous $\log_{10}$ viral load index and CD4/T-cell count using a cumulative index.

**e. Psychological Outcomes**

*Depression:* We assessed depressive symptoms with the 15 negative items from the 20-item Center for Epidemiological Studies Depression (CES-D) scale. Items such as “Over the past week, I felt sad” and “Over the past week, I felt lonely,” were rated on a 4-point frequency scale ranging from “Rarely or none of the time” to “Most or all of the time.” The CES-D correlates highly to the Beck Depression Inventory (Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995) and has shown internal consistency within the general population (Cronbach’s $\alpha = .74$; Corcoran & Fischer, 1997). The 15 items we used are reliable at $\alpha = .93$. Mean scores were calculated to produce a depression composite score.

*Anxiety:* We assessed anxious symptoms in the past week with six items from the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983), e.g. “…I felt nervous or shaky inside.” Participants rated each question on a scale of 0=Rarely or none of the time (less than 1 day) to 3=Most to all of the time (5 to 7 days). Item showed strong reliability ($\alpha = .90$). Mean scores were calculated to produce an anxiety composite score.

**f. Behavioral Outcomes**

*Sexual Behavior:* We assessed sexual behavior with several questions, e.g. “Of those times you had anal sex with men…how often was it without a condom?” Participants responded on a seven-point Likert scale ranging from 0=Never to 6=Every time. We used these responses to create a dichotomous transmission risk variable. We
defined risk as *any* recent UAI, either within or outside a partnership, given recent evidence that UAI within partnerships is a primary risk factor for HIV transmission (Sullivan, Salazar, Buchbinder, & Sanchez, 2009).

*Sexually Transmitted Infections (STI):* We used one question to assess the presence of STI: “[In the last 12 months] were you told you had Chlamydia, syphilis, or gonorrhea?” Participants used a checklist to indicate any of these and other STI diagnoses. We used responses to create a dichotomous index – any recent STI versus no recent STI.

*Alcohol and Drug Use:* To assess alcohol use we used the CAGE, a psychometrically sound instrument that is valid for detecting alcohol abuse and dependence (Dhalla, & Kopec, 2007). The CAGE consists of four questions, e.g., ”Have you ever felt you should cut down on your drinking?” and “Have people annoyed you by criticizing your drinking?” CAGE scores represented the number of items the participant endorsed, out of four. Scores were dichotomized at 0 or 1 (non-abusers) versus 2 or more (abusers; Buchsbaum, Buchanan, Centor, Schnoll, & Lawton, 1991).

We assessed the frequency of participants’ use of powdered cocaine, crack cocaine, heroin, methamphetamine, club drugs, e.g. LSD or Special K, and poppers during the prior six months with individual measures on a 5-point frequency scale ranging from 0=Never to 4=About every day. We used mean scores to calculate a substance use composite score. We also created a dichotomous variable representing any versus no hard drug use.

*Medication Adherence:* To determine each participant’s medication adherence level, we divided his total number of doses missed in the last week by his total number of
weekly doses (both self-reported via ACASI). This produced a decimal that we subtracted from one and multiplied by 100, yielding a percentage representing each participant’s medication adherence rate. This method of calculation and the result are known as percent prescribed doses taken (PDT; Williams et al., 2006). Published clinical recommendations for ART call for a 95% adherence rate (Paterson et al., 2000). We thus created a dichotomous variable reflecting at or above 95% adherence, or below 95%.

**Appointment Adherence:** To determine each participant’s appointment adherence level, we used two items – one to assess number of scheduled HIV care visits within the last 12 months and one to assess number of these scheduled appointments that were missed, if any. Consistent with our medication adherence variable, we used a dichotomous appointment adherence index classifying each participant as adherent – missing no scheduled appointments in the last 12 months – or non-adherent – missing one or more scheduled appointments in the last 12 months.

g. **Support Variables**

**Emotional Support:** We operationalized this as the mean rating for five items from the Social Relationships survey. Each question stem read: “How satisfied are you with the extent to which you can really count on others to…” followed by, e.g., “…help you feel more relaxed when you are under a lot of pressure,” “care about you in both good times and bad” and “talk about any aspect of being infected with HIV?” Participants responded using a scale ranging from 1=Very Dissatisfied to 5=Very Satisfied. The support items were highly reliable (α =.82).

**Instrumental Support:** We assessed instrumental support using a single item from the Social Relationships survey: “How satisfied are you with the extent to which you can
really count on others to help you with activities related to your HIV care, getting to appointments, helping with treatments, etc.? Participants responded using a five-point scale ranging from 1=Very Dissatisfied to 5=Very Satisfied. We coded participants as having adequate instrumental support if their response was greater than 3.

**HIV Related Support:** We assessed support specific to coping with HIV via nine items. Each item assessed whether the participant was able to discuss coping with HIV with each of nine people, e.g., his HIV care provider, a professional other than his HIV care provider, and a support or counseling group. An example question is, “In the last year, have you discussed how to take your HIV meds on schedule with any of the following? Please check all that apply”. We coded HIV Support as the number of items the participant indicated feeling supported on (range 0-9). We will control for HIV-specific support to isolate the independent effect of partnership on health.

5. **Data Analysis**

These analyses were secondary to an intervention study. There were no differences in the inclusion criteria for our study and the intervention. We reported three levels of analysis: the first, baseline demographics and bivariate associations between partnership status and each physiological, behavioral, and psychological health outcome, using descriptive statistics and multivariate regressions; the second, a comparison of partnered and single participants on these health outcomes using analysis of covariance (ANCOVA); and the third, a cross-products mediation test of emotional and instrumental support on significant associations found in the first and second levels of analyses (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). This approach tests mediating effects against a sample-dependent rather than normal sampling distribution. Confidence
intervals for the cross-product mediation effect are produced at a given alpha level. If that interval excludes zero, the effect is statistically significant at the specified alpha. We proposed to test all mediation effects at \( p < .05 \).

The variables of age, ethnicity, education, income, time since HIV diagnosis, clinic, and HIV support were entered as covariates in all regression, ANCOVA, and mediation analyses. Statistical analyses were conducted using SPSS 20.0 (SPSS Inc., Chicago, IL, USA). Missing data were excluded from analyses. Participants who did not identify as gay/homosexual or bisexual were removed from analyses.

D. Results

1. Sample

Of all participants screened, 411 were eligible. Of these, 320 chose to enroll in TAP. Eight participants did not complete the baseline assessment due to death or disqualification, leaving 312 participants that completed the baseline ACASI. Of these, 10 participants (3.2%) were removed from analyses because they reported a sexual identity other than gay or bisexual, and 35 participants (11.2%) were removed because they did not respond to the ACASI question regarding partnership status. This left N=267 in the final analytic sample. The 45 removed participants did not differ significantly from the remaining sample men on any demographic variable (\( p \)’s > .05).

2. Baseline Demographics and Health Indicators

Table II presents participant demographics and baseline health indicators. The mean participant age was 39.6 years (SD=8.6), and mean time since HIV diagnosis was 7.7 years (SD=6.1). Approximately half the sample was partnered. Exactly half of partnered participants reported their significant others to be HIV positive. Most
participants were taking HIV medication, a significant percentage of whom did not meet the 95% criterion for full adherence. Drug use other than marijuana was reported commonly, as was sexual risk. Most men had viral loads below 10,000, and CD4 counts below 500. Moderate to high depression was common, while moderate to high anxiety was not.
## TABLE II. SAMPLE DEMOGRAPHICS AND HEALTH INDICATOR FREQUENCIES.

<table>
<thead>
<tr>
<th>Demographic</th>
<th>n (%)</th>
<th>Health indicator</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td><strong>Viral load</strong></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>79 (29.6)</td>
<td>Below 10,000</td>
<td>180 (67.4)</td>
</tr>
<tr>
<td>White</td>
<td>128 (47.9)</td>
<td>10,000+</td>
<td>87 (32.6)</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>47 (17.6)</td>
<td><strong>CD4 count</strong></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>11 (4.1)</td>
<td>Below 500</td>
<td>146 (54.7)</td>
</tr>
<tr>
<td><strong>Sexual Orientation</strong></td>
<td></td>
<td>500+</td>
<td>121 (45.3)</td>
</tr>
<tr>
<td>Gay</td>
<td>245 (91.8)</td>
<td><strong>Taking HIV</strong></td>
<td></td>
</tr>
<tr>
<td>Bisexual</td>
<td>22 (8.2)</td>
<td>medication</td>
<td></td>
</tr>
<tr>
<td><strong>Partnership Status</strong></td>
<td></td>
<td>Yes</td>
<td>187 (70.0)</td>
</tr>
<tr>
<td>Single</td>
<td>135 (50.6)</td>
<td>No</td>
<td>80 (30.0)</td>
</tr>
<tr>
<td>Partnered</td>
<td>132 (49.4)</td>
<td><strong>Medication adherence</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Partner’s HIV status</strong></td>
<td></td>
<td>95% or above</td>
<td>133 (71.1)</td>
</tr>
<tr>
<td>Positive</td>
<td>50 (37.9)</td>
<td>Below 95%</td>
<td>54 (28.9)</td>
</tr>
<tr>
<td>Negative</td>
<td>66 (50.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>16 (12.1)</td>
<td><strong>Appointment adherence</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td>Missed none</td>
<td>177 (66.3)</td>
</tr>
<tr>
<td>18-29</td>
<td>38 (14.2)</td>
<td>Missed 1 or more</td>
<td>90 (33.7)</td>
</tr>
<tr>
<td>30-39</td>
<td>85 (31.8)</td>
<td><strong>Depression symptoms</strong></td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>117 (43.8)</td>
<td>0-1</td>
<td>106 (39.7)</td>
</tr>
<tr>
<td>50+</td>
<td>27 (10.1)</td>
<td>2-7</td>
<td>115 (43.1)</td>
</tr>
<tr>
<td><strong>Time Since HIV Diagnosis</strong></td>
<td></td>
<td>8-15</td>
<td>46 (17.2)</td>
</tr>
<tr>
<td>0-3 years</td>
<td>86 (32.7)</td>
<td><strong>Anxiety symptoms</strong></td>
<td></td>
</tr>
<tr>
<td>4-9 years</td>
<td>77 (29.3)</td>
<td>0-1</td>
<td>210 (78.7)</td>
</tr>
<tr>
<td>10+ years</td>
<td>100 (38.0)</td>
<td>2-4</td>
<td>42 (15.7)</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td>5-6</td>
<td>15 (5.6)</td>
</tr>
<tr>
<td>None</td>
<td>9 (3.4)</td>
<td><strong>CAGE symptoms</strong></td>
<td></td>
</tr>
<tr>
<td>$1-9,999</td>
<td>71 (26.6)</td>
<td>0 or 1</td>
<td>182 (68.2)</td>
</tr>
<tr>
<td>$10,000-19,999</td>
<td>71 (26.6)</td>
<td>2+</td>
<td>85 (31.8)</td>
</tr>
<tr>
<td><strong>Drugs used</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>167 (62.5)</td>
<td><strong>Any unprotected sex</strong></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100 (37.5)</td>
<td>Yes</td>
<td>148 (55.4)</td>
</tr>
<tr>
<td><strong>Any recent STI</strong></td>
<td></td>
<td>No</td>
<td>119 (44.6)</td>
</tr>
<tr>
<td>Yes</td>
<td>49 (18.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>218 (81.6)</td>
<td><strong>Emotional support M score</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Emotional support M score</strong></td>
<td></td>
<td>1-3</td>
<td>113 (42.3)</td>
</tr>
<tr>
<td>3-5</td>
<td>164 (57.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>123 (46.1)</td>
<td>133 (49.8)</td>
<td>11 (4.1)</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>Full/partial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occasional</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV-related supports</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a N<267 due to missing data
b Participants indicated each of these symptoms occurred “a moderate amount…” or “most…” of the time
c Excluding marijuana
3. **Bivariate Associations Between Partnership Status and Health Outcomes**

Table III presents results of linear and logistic regression analyses testing the association of partnership status with each physiological, behavioral, and psychological health outcome. Being partnered was significantly related to less drug use. Emotional and instrumental support each showed non-significant but trend-level associations with being partnered.

<table>
<thead>
<tr>
<th><strong>Outcome variable</strong></th>
<th><strong>Primary partnership as predictor β, test-statistic</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physiological outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Viral load</td>
<td>.03, .43</td>
</tr>
<tr>
<td>CD4/T-cell count</td>
<td>-.02, -.33</td>
</tr>
<tr>
<td><strong>Behavioral outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Drug use</td>
<td>-.55, -3.56**</td>
</tr>
<tr>
<td>CAGE score</td>
<td>-.16, -.97</td>
</tr>
<tr>
<td>Unprotected sex</td>
<td>-.19, .53</td>
</tr>
<tr>
<td>Any STI</td>
<td>-.30, -.80</td>
</tr>
<tr>
<td>Taking HIV medication</td>
<td>-.34, 1.30</td>
</tr>
<tr>
<td>Adherent at/above 95%</td>
<td>.16, .20</td>
</tr>
<tr>
<td>HIV appointment adherence</td>
<td>-.26, .82</td>
</tr>
<tr>
<td><strong>Psychological outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Depression symptoms</td>
<td>-.13, -1.41</td>
</tr>
<tr>
<td>Anxiety symptoms</td>
<td>.01, .05</td>
</tr>
<tr>
<td>Emotional support M score</td>
<td>.11, 1.70*</td>
</tr>
<tr>
<td>Instrumental support</td>
<td>.11, 1.74*</td>
</tr>
</tbody>
</table>

*aAll Fs (1, 254). *p < .10, **p < .01
4. Comparison Between Partnered and Single Men

We used ANCOVA to compare partnered and single men on each of the 13 health outcomes. Consistent with results from our regression analyses, only drug use differed significantly between partnered and single men, $F(1, 261) = 12.74, p < .01$, $M_{\text{partnered}} = .19(\text{SE}=.03)$; $M_{\text{single}} = .32(\text{SE}=.03)$. Two variables trended toward differing across groups; emotional support, $F(1, 261) = 2.90, p < .10$, $M_{\text{partnered}} = 3.42(\text{SE}=.10)$; $M_{\text{single}} = 3.18(\text{SE}=.09)$; and instrumental support, $F(1, 261) = 3.02, p < .10$, $M_{\text{partnered}} = 3.45(\text{SE}=.12)$; $M_{\text{single}} = 3.15(\text{SE}=.12)$. No other outcome variables differed significantly across groups.

5. Mediation Analyses

Our proposed mediation model did not meet criteria for mediation (Baron & Kenny, 1986). The proposed mediators (instrumental and emotional support) trended toward significance, but did not relate significantly, to our proposed independent variable (primary partnership). Therefore, the proposed mediation analyses were not run.

Nonetheless, we ran standard linear regressions to test the associations between the proposed mediators and the sole health outcome variable that significantly related to partnership status – drug use. In these analyses we controlled for age, education, income, time since HIV diagnosis, intervention group, and HIV related support. Drug use trended toward relating to emotional support, $F(1, 253) = -1.72, p < .10$, and did not relate to instrumental support, $F(1, 253) = .47, ns$. 
E. Discussion

1. Summary

This study addressed two questions: Is partnership status related to health outcomes among HIV positive gay and bisexual men; and, do emotional and instrumental support explain any differences between partnered and single sample men?

Overall, this analysis did not support our larger hypothesis that having a primary partner would be associated with greater health among HIV positive gay and bisexual men. Partnered men reported significantly less drug use, and trended toward reporting higher ratings of emotional and instrumental support, compared to single men in the sample. However, given that we included 13 dependent variables in our analyses, we must view even these results as tentative, and in the context of alpha inflation. Therefore, overall the Stress-buffering hypothesis is not supported in this sample of gay and bisexual HIV positive men. Further, because our proposed mediators only trended toward relating to our independent variable, our mediation hypotheses were not borne out. Therefore, we cannot state with confidence what mechanisms underlie the association between partnership and decreased drug use in this sample.

2. Comparing our Findings with Current Research

This is not the first study to report such findings within a sample of HIV positive gay and bisexual men. Pakenham and Rinaldis (2001) also found limited support for stress-buffering effects in a similar sample, in their study of coping strategies used in adjusting to HIV/AIDS. Related, Pakenham (1998) reported that support received by someone with HIV/AIDS may be perceived as overprotective, and may encourage dependency to the sick role instead of buffer against the negative effects of the sick role.
Similarly, mixed results for stress-buffering among HIV positive heterosexuals have been reported (Andrews, 1995; Koopman et al., 2000; Murphy, Moscicki, Vermund, & Muenz, 2000). Therefore, stress-buffering is not consistently supported within HIV populations.

Conversely, several studies of HIV negative or aggregated (both HIV positive and negative) gay and bisexual men do support stress-buffering. For example, in a sample of Asian and Pacific Islander gay men, conversations about discrimination with gay friends and family buffered against the effect of experienced discrimination on engagement in UAI (Yoshikawa, Wilson, Chae, & Cheng, 2004). Another study investigated disclosure of sexual orientation and subsequent substance use among LGB youth. Results indicated the number of “accepting reactions” to sexual orientation disclosure buffered against subsequent alcohol, cigarette, and marijuana use by the disclosing youths (Rosario, Schrimshaw, & Hunter, 2009). A recent study of 2,677 LGB individuals compared those that were single, dating, in a committed relationship, and in a legally recognized relationship. Significant group differences were found, with individuals in legally recognized relationships reporting less internalized homophobia, depression, and stress; and more well-being, than did non-coupled participants (Riggle, Rostosky, & Horne, 2010). These results are consistent with our hypothesized, but not our actual results. Sample differences may explain why stress-buffering was supported in this study, but not ours. For example, we have a relatively small sample, thus lower power to detect significant group differences. Also, as mentioned, our sample is comprised solely of HIV positive gay and bisexual men, not an aggregated LGBT, HIV positive and negative sample; and our sample is more racially/ethnically diverse than is typical in this research area.
Overall, our study adds support for stress-buffering occurring among gay and bisexual men generally, but not HIV positive gay and bisexual men specifically. That said, ours is the first study to test whether partnership is a stress-buffer among the specific population of gay and bisexual HIV positive men. Further studies are necessary to test the role of partnership in this and related populations, before drawing any conclusions about partnership and health among gay and bisexual men. Studies with analogous designs are recommended particularly, i.e., those investigating stress-buffering effects specifically from the romantic partners of gay and bisexual males with HIV. Until such studies are conducted, we are left comparing our findings with studies that investigated stress-buffering using either a similar population (gay and bisexual men; Yoshiwaka et al., 2004), chronic disease profile (HIV positive; Pakenham, 1998), or potential stress-buffers (romantic partners; Matsui et al., 1995), but none that match our study on all indices. These comparisons arguably are less powerful than those with similarly designed studies; and, they highlight our lack of understanding of stress-buffering from partners of gay and bisexual men with a chronic disease.

Our primary significant finding that partnered men used fewer hard drugs than single men is consistent with past empirical and theoretical research. Empirically, our findings replicate those of past studies that similarly indicated partnered individuals use fewer hard drugs than do single people (e.g. Helbig, Lampert, Klose, & Jacobi, 2006). Theoretically, our findings may lend support to Role Incompatibility Theory (RIT). RIT states that holding “traditional” social roles such as a partner in a romantic relationship is inconsistent with engagement in socially deviant individual behaviors such as substance use. In relationships with substance-using individuals, individual role conflict may arise
that leads to modification of the substance use, modification of relationship, or
dissolution of the relationship (Fals-Stewart, Birchler, & O’Farrell, 1999). Our finding
that partnered men use fewer hard drugs than single men may reflect an incompatibility
between being partnered and being a hard drug user, among gay and bisexual men.

3. Explanations for Current Study Findings

One emergent question from our findings, of course, is why partnered gay and
bisexual men do not seem “healthier” than single men. Virtually all of the studies
reviewed that compared partnered and single individuals reported more “benefits” to
partnership than did our study (e.g. Robles & Keicolt-Glaser 2003; Tamakoshi, 2007;
Willitts, Benzeval, & Stansfeld, 2004). Possibly, moderating analyses by race/ethnicity,
age, HIV status, or relationship type would have uncovered subgroup-specific health
benefits. For example, recent research points to differential health benefits across open
and monogamous gay male relationships; men in monogamous relationships reported less
substance use before sex than did men in open relationships (Parsons et al., 2013). In our
analyses, we aggregated men of different demographic- and relationship-type groups,
potentially masking such effects in this sample. We encourage researchers to run such
moderating analyses in future studies investigating partnership status and health.

Another potential explanation for our null findings is sample limitations. Men in
our study represent a convenience sample recruited from an LGBT community/health
center. These men were actively engaged in care; in fact, they were asked to participate in
the study during an HIV medical care visit. Further, LGBT community/health centers are
not utilized equally by all racial/ethnic and socioeconomic groups of gay and bisexual
men (McKirnan, Du Bois, Alvy, & Jones, 2013). Therefore, some subsets of gay and
Bisexual men may be underrepresented in our study, e.g. individuals not scheduling/attending healthcare appointments, and those with health insurance and medical providers outside this community health clinic setting. For this same reason, our findings are not generalizable to all gay and bisexual men, but instead only those both receiving services at LGBT community/health centers, actively engaged in their healthcare, and willing to participate in year-long behavioral intervention.

Alternatively, HIV positive gay and bisexual men may engage in unhealthy behaviors (Greenwood et al., 2001), suffer from immunological vulnerability (Rambaut, Posada, Crandall, & Holmes, 2004), and/or experience co-occurring mental health problems (e.g. Ciesla & Roberts, 2001), more than their HIV negative counterparts. The combined effect of these individual difference vulnerabilities may be difficult to “cancel out” by partnership benefits; or, partnership benefits may be attenuated by these vulnerabilities. Additionally, partnership benefits may be difficult to capture with the measures used in this study. TAP was not designed to assess for partnership benefits, specifically; therefore, our ACASI lacked partner-specific measures that could more precisely assess the association between partnership and health outcomes. Use of supplemental or alternative measures that better capture acute stressors and transient life events, e.g. daily diaries, ecological momentary assessment, or psychosocial measures of individual- and partner-level stressors, may illuminate the association between day-to-day partnership exchanges and individual health outcomes (Quittner, Modi, Lemanek, Ievers-Landis, & Rapoff, 2008). Such measures also may help us understand how partnership relates to individual-level approach versus avoidance coping strategies for health practices.
Relationship-specific characteristics may account for a relative lack of partnership benefits within this sample. Gay and bisexual male relationships often differ from heterosexual relationships in several important ways that may contribute to attenuated/absent partnership benefits. These include the conventional sexual fidelity model being replaced by a sexually “open” model in which one or both partners permissibly engage in sex with individuals outside the relationship (Hoff et al., 2010); HIV and related topics being pervasive (Haas, 2002); and relatively short relationship length/fast partner turnover (Eaton, West, Kenny, & Kalichman, 2009). One or some combination of these may explain our null findings. Future research is encouraged to investigate these potential explanations more thoroughly.
FIGURE 2.1. The proposed mediation model, in which emotional and instrumental support mediate the associations between primary partnership status and health outcomes.
III. STUDY TWO: PARTNERSHIP STATUS, RELATIONSHIP SATISFACTION, AND HEALTH AMONG YOUNG GAY AND BISEXUAL MEN: TESTING THE SOCIAL STRAIN HYPOTHESIS

A. Aims and Hypotheses

Our first aim is to compare single and partnered young gay and bisexual men on various health indices. Our second aim is to test the Social Strain hypothesis within young gay and bisexual male partnerships, answering the question: Does relationship satisfaction relate to psychological and behavioral health? We hypothesize that partnered young men will report health benefits compared to single young men. Low relationship satisfaction will relate to decreased psychological and behavioral health.

Study One attempted to understand if partnership relates to better health outcomes, and if so, what mechanisms mediated these relationships, among a sample of HIV positive gay and bisexual men. Study Two asks a related question, among another sample of gay and bisexual men: Is relationship satisfaction associated with health, among gay and bisexual male youth? It is plausible that high relationship satisfaction relate to positive health outcomes, and low relationship satisfaction strains the individuals in those partnerships, and relates to negative health outcomes. We use Social Strain as a theoretical foundation for this study. To test our hypotheses, we combine data from two studies of gay and bisexual youth.

B. Introduction

1. The Social Strain Model

Over a decade into the theoretical and empirical investigation of social
support on health, researchers began exploring the idea that social relationships can have detrimental effects on health (e.g. Eckenrode & Gore, 1981). Indeed, researchers found the negative impact of social relationships on health and well-being can exceed the positive impact (Rook & Pietromonaco, 1987). Several terms have been used to describe this phenomenon – social conflict (Abbey, Abramis, & Caplan, 1985), social hindrance (Ruehlman & Wolchik, 1988), negative social support (Revenson, 2003), and Social Strain (Rook, 1990). Social Strain describes any actions by an individual’s social network members that relate to adverse health consequences for the individual (Rook). Stress within relationships is most commonly implicated in explaining social strain (Friedman et al., 2012).

Social strain is empirically supported to contribute to an individual’s negative physiological, psychological, and behavioral health outcomes (Friedman et al., 2012; Okun & Keith, 1998). For example, an individual’s cardiovascular and immune system functioning can suffer when he/she is experiencing social strain (Ewart, Taylor, Kraemer, & Agras, 1991; Kiecolt-Glaser et al., 1993). Spousal strain, specifically, is associated with negative health outcomes. This strain is related to personal distress (Major, Zubek, Cooper, Cozzarelli, & Richards, 1997), negative affect (DeLongis, Capreol, Holtzman, O’Brien, & Campbell, 2004), and negative well-being and health problems (Walen & Lachman, 2000). An individual can experience spousal strain under two circumstances – directly, from spousal conflict; and indirectly, as a result of one’s spouse being strained, and that strain crossing over to his/her partner. Regarding crossover of strain: In a study of 101 heterosexual couples, researchers found that when either the husband or the wife experienced “burnout” – job-related physical and emotional exhaustion – their partner did
too (Westman & Etzion, 1995). Findings from another study support the crossover effect. Researchers found that a husband’s increased job stress related to his wife’s increased emotional stress (Rook, Dooley, & Catalano, 1991). This evidence indicates that multiple pathways may lead to social strain in a relationship, and this strain relates to negative health outcomes for the individuals involved.

2. Social Strain Among Youth

Social strain has been studied among youth, partly because youth may be more vulnerable to peer thoughts and behaviors than older individuals. Many years ago, researchers proposed social strain explained why some male youth gravitated toward gang membership and participated in illicit activities while in those gangs (Cloward, 1960). Empirical support was later found for this assertion. In one study comparing young male gang members to young males not involved in gangs, gang members were more likely to report social strain. They were also more likely to report a lack of family, peer group, and school norms to follow, and engagement in delinquent behaviors, including substance use (Esbensen, Huizinga, & Weiher, 1993; Wills et al., 2004). Adolescent mothers are vulnerable to social strain when the adolescent father of their children is absent (Gee & Rhodes, 2003). In a cross-sectional study conducted in Denmark, youth experiencing social strain, in the form of bullying by members of their social network, reported using medicines to treat headaches, nervousness, and stomachaches more than their counterparts who were not bullied, even though symptom counts were equal across bullied and non-bullied students. Use of these medications, especially in excess or over the long-term, can have adverse health effects on these youth (Due, Hansen, Merlo, Andersen, & Holstein, 2007). Overall, social strain researchers
remain interested in youth, given that past empirical evidence indicates they experience strain in multiple contexts and are vulnerable to the negative effects of it.

3. **Young Gay and Bisexual Men**

This subgroup, often aggregated with the related subgroup young men who have sex with men (YMSM), arguably faces more challenges than heterosexual youth. For example, young gay and bisexual men remain one of the most vulnerable populations to HIV acquisition. Over two-thirds of all youth who acquire HIV do so through male-to-male sexual contact (CDC, 2008). Of all sexual minority subgroups, YMSM demonstrated the greatest increase in HIV prevalence from 2001-2006. And, up to 84% of YMSM who are infected with HIV are unaware of their HIV positive status (Valleroy et al., 2000). Partnered young gay and bisexual men have become a critical target for reducing HIV transmission, especially given the new focus on gay male relationships as a context for transmitting HIV.

Regarding psychological health, young gay and bisexual men have demonstrated increased risk for depressive symptoms (Hatzenbuehler, McLaughlin, & Nolen-Hoeksema, 2008), and suicidal ideation and attempts (Garofalo, Wolf, Wissow, Woods, & Goodman, 1999), compared to other youth. Multiple studies have indicated a high prevalence (up to 53%) of suicide attempts among these young men (e.g., Savin-Williams, 2001). Regarding health behaviors, young gay and bisexual men are more likely than heterosexual youth to use alcohol and illicit drugs, initiate drug use earlier, and use substances increasingly over time (Garofalo, Wolf, Kessel, Palfrey, & DuRant, 1998; Marshal et al., 2008; Marshal, Friedman, Stall, & Thompson, 2009). These aversive psychological states and behaviors may be attenuated by the presence of a
partnered relationship in itself, or more specifically by the presence of a highly satisfying relationship.

YMSM commonly report engaging in sexual risk while in partnerships, especially when they consider the partnership to be serious and when the relationship has lasted six months or longer (Mustanski, Newcomb, & Clerkin, 2011). It is important to understand what relationship dynamics underlie the health and behaviors of the young gay and bisexual men involved in these relationships, given that these dynamics may influence individual differences in HIV transmission behaviors and mental health. Further, studying young gay male relationship patterns may provide insight into the formation of future relationship dynamics that relate to health outcomes, e.g. establishing equal power dynamics, negotiating safe-sex standards, and reducing victimization. This assertion is bolstered by research on partnered youth that states a lack of understanding of relationship dynamics is associated with increased risk for relationship distress, lack of active decision-making, and relationship continuation instead of dissolution (Venuous & Fincham, in press).

4. **Relationship Satisfaction**

One way to assess strain in a relationship is by measuring the level of relationship satisfaction of partnered individuals. High relationship satisfaction ratings may relate to increases in health status, whereas low relationship satisfaction ratings may relate to decreases in health status. Converging evidence supports this assertion.

Generally, negativity within relationships relates to higher mortality rates of individuals in the relationship (Friedman, Tucker, & Schwartz, 1995). Individuals who report being unhappily married, in the form of lower relationship satisfaction or
partnership quality, are less likely to experience many aforementioned health benefits of marriage. Conversely, those who report happiness in their marriage are more likely to experience these health benefits (Coyne et al., 2001; Ross, Mirowsky, & Goldsteen, 1990). Research indicates these benefits can be both physiological and psychological in nature. In a study of 303 married and single individuals, those who reported high, not low, marital quality had lower clinical measures of ambulatory blood pressure (ABP), as well as lower self-reported measures of stress and depression, and higher satisfaction with life. Further, participants who rated their relationships as lowest in quality had higher ABP than single individuals (Holt-Lunstad, Birmingham, & Jones, 2008). In a study of 600 male cardiac patients and their spouses, men who reported poorer marriage ratings and lower intimacy levels with their partners had lower subjective well-being scores after their heart attack, compared to men reporting higher marriage ratings (Waltz, 1986). Low marital quality/relationship satisfaction also has been associated with poor immune functioning (Kiecolt-Glaser, Ogrocki, Stout, Speicher, & Glaser, 1987) and low objective (Walen & Lachman, 2000) and subjective (Waltz, 1986) measures of well-being. In fact, after conducting a literature review on marriage and health, Kiecolt-Glaser and Newton (2001) found that marital satisfaction contributed to an individual’s happiness more than any other investigated variable, e.g. health habits, depression, and trait-level hostility.

Hibbard & Pope (1993) investigated the underlying components of relationship satisfaction and their association with health. For both men and women, relationship satisfaction was strongly, positively correlated with perceived companionship and relationship equality. However, only among married women, equality in decision-making
and companionship protected against mortality. Among men, no tested factors (marital satisfaction, equality in decision-making, or companionship) related to health outcomes such as morbidity or mortality. This study indicated that men and women share similar underlying values of relationship satisfaction, but that these values relate differentially to health outcomes by sex.

5. **Measurement of Relationship Satisfaction**

Relationship satisfaction, and its underlying components, have been operationalized various ways. Historically, researchers have used the Marital Adjustment Test (MAT, e.g. “Do you and your mate engage in outside interests together?”, 10=All of them, 0=None of them; Locke & Wallace, 1959), the Dyadic Adjustment Scale (DAS, e.g. “How often do you and your partner agree on handling family finances?” 0=always disagree, 5=always agree; Spanier, 1976), and the Commitment Scale (e.g. “How likely is it that your relationship will be permanent?”, 1=not at all, 7=a great deal; Lund, 1985; Mohr & Fassinger, 2006),

A recent review of relationship satisfaction measures used meta-analysis to compare several prominent surveys (Graham, Diebels, & Barnow, 2011). Researchers reported on several scales including the Relationship Assessment Scale (RAS; Hendrick, Dicke, & Hendrick, 1998), a seven-item questionnaire. The RAS was found to have high reliability ($\alpha = .87$) across studies, and to be more reliable among primarily non-White samples. Further, the RAS is useful among younger populations, as it was originally normed on a youth dating population. We use the RAS in our study of primarily non-White youth, and will describe it further later.
6. **Study Two Summary**

In sum, Study Two examined the Social Strain hypothesis by testing relationship satisfaction as a predictor of health among partnered gay and bisexual young men. We predicted low relationship satisfaction ratings would relate to negative health outcomes. Study Two used two samples of young gay and bisexual men, each recruited using respondent driven/snowball sampling techniques. We combined these samples because each study had similar inclusion criteria, the measures used across studies were similar, and this yielded increased power to answer our research question. It is important to understand the association of relationship satisfaction and health among these young men, specifically, given past research indicating they are at risk for engaging in unhealthy behaviors based on variables that may relate to their relationship satisfaction (Mustanski et al., 2011; Vennum & Fincham, in press).

**C. Method**

1. **Overview**

Data used for these analyses came from two longitudinal studies – Project Q2 and Crew 450 – that investigated the sexual and mental health among Chicago youth (see: Mustanski, Garofalo, & Emerson, 2010).

2. **Participants**

For both Project Q2 and Crew 450, participants were a community-based convenience sample of racially diverse, 16-20 year old Lesbian, Gay, Bisexual, Transgender (LGBT), queer, and/or “questioning” Chicago youth. Participants were incentivized to recruit demographically similar individuals into these studies using snowball/respondent driven sampling techniques. Such recruitment approaches have been
successful with young, difficult-to-recruit populations (Heckathorn, Semaan, Broadhead, & Gughes, 2001).

For Q2, participants were recruited over 18 months from 2007-2008 from four sources: another participant, staff member, community event or flyer or e-mail advertisement, or other. Inclusion criteria for Project Q2 included being age 16-20 and answering “yes” to the following: “Project Q2 is a study for lesbian, gay, bisexual, transgender, and other youths who have same-sex attractions but who do not use these terms. Does this include you?” To encourage peer-recruitment, participants were given palm cards with contact information for the study and were compensated $10 for each eligible youth they referred that scheduled an assessment interview.

For Crew 450, project staff recruited an initial sample of participants through community and organizational outreach. These individuals served as the initial “seeds” in the respondent driven sampling recruitment approach (see: Frost, Brouwer, & Firestone Cruz, 2006). Each seed was given three coupons. The seed received $15 for each individual to whom he gave a coupon, met the study inclusion criteria, and participated in the baseline assessment. These individuals, in turn, were given three coupons each and offered the same incentive for distributing their coupons. Inclusion criteria for this study included: biological male, age 16-20, able to communicate in English, available for 24 months, not involved in any other HIV or drug use intervention, completed informed consent, and identified as gay or bisexual or ever had sex with a man.

3. Procedures

For both studies, prior to enrollment, trained staff used a two-step process
to determine each potential participant’s decisional capacity to consent. The first step involved a determination of the participant’s understanding of the study goals as previously explained by staff during a review of the procedures. In step two, potential participants were asked questions designed to assess their capacity to understand, appreciate, reason with, and express a choice about participation in the specific protocol using a modified version of the Evaluation to Consent (Du Bois, Emerson, & Mustanski, 2011).

Project Q2 baseline surveys, from which data for this study are drawn, were administered in a private room at a youth center affiliated with a large LGBT community-based health center, or at the University of Illinois at Chicago. Measures were completed using an ACASI, which lasted approximately one hour. Participants received $40 for completing the baseline interview.

Crew 450 baseline assessments included two visits for each participant. The first included an initial ACASI on mental health, HIV, substance use, etc.; provision of other, potential participant names; and, provision of a urine sample for STI screening. This visit lasted approximately two hours, and participants were paid $25. The second visit was 7-10 days later, and included provision of STI test results; a psychological interview; a rapid, oral HIV test; and pre- and post-HIV testing counseling. This visit lasted approximately 90 minutes, and participants received $45 for completion.

The second Crew 450 assessment point, from which data for this study are drawn, occurred approximately six months after the baseline visit. This visit included a shortened version of the baseline ACASI. This ACASI included a measure of relationship satisfaction excluded from the baseline assessment. Participants received $45 for
completing this visit. At this time participants also received $15 for each successfully recruited participant.

4. Measures

a. Demographics

For both studies, we assessed demographics including race/ethnicity, education, socioeconomic status, biological sex, and gender identity, using standard categorical measures. Participants typed their age into the ACASI program.

b. Sexual Orientation

To assess this in Project Q2, we used a single, face-valid item: “Which of the following best describes you?” Participants chose from gay, bisexual, heterosexual, questioning/unsure, and don’t know. To assess this in Crew 450, we used a similar item: "Recognizing that sexual identity is only one part of your identity, how do you define your sexual identity?" Participants chose from only gay/homosexual, mostly gay/homosexual, bisexual, mostly heterosexual, heterosexual, and other.

c. Partnership Status

In Project Q2, we assessed this using two face-valid items. The first read, “Are you currently in, or have you ever been in, a romantic relationship?” Those who responded yes were directed to describe this relationship. The second question confirmed which relationship participants were describing: “Please indicate which relationship you are thinking about while answering the following questions – current or most recent past.” Those who responded “current” were used in our analytic sample, given we know they were in a relationship at the time of assessment. Crew 450 participants were asked if
they were currently in a romantic relationship with someone. Those who answered yes were included in the analytic sample and received follow-up questions.

d. Psychological Outcomes in Project Q2

Brief Symptom Inventory: We assessed psychological outcomes using the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983). This instrument was originally comprised of 53 questions measuring nine symptom dimensions, e.g. somatization, obsessive-compulsive, interpersonal-sensitivity, and psychoticism ($\alpha = .95$). Subsequently an abbreviated measure, the BSI 18, was created ($\alpha = .89$; Derogatis, 2002). Researchers have performed a factor analysis on the BSI 18, which has yielded four distinct factors – depression, anxiety, somatization, and suicidal ideation (Zabora et al., 2001). Questions comprising the depression and anxiety factors served as our measures of depression and anxiety. Each BSI question begins with the stem “How much has this distressed or bothered you in the last seven days, including today…?” and is answered on a five-point Likert scale ranging from 0=Not at all to 4=Extremely.

Depression: Questions from the BSI depression index were used. These included “feelings of worthlessness,” “feeling no interest in things,” and “feeling hopeless about the future” ($\alpha = .79$). Summed scores were calculated to produce an overall depression score, with higher scores representing more depressive symptomology.

Anxiety: Questions from the BSI anxiety index were used. These included “feeling fearful,” “nervousness or shakiness inside,” and “feeling tense or keyed up” ($\alpha = .80$). Summed scores were calculated to produce an overall anxiety score, with higher scores representing more anxiety symptomology.
e. Psychological Outcomes in Crew 450

ASR and YSR: All participants were asked questions from the Adult Self-report (ASR), used for adults ages 18-59. Participants 18 and under were asked supplemental questions from the Youth Self-report (YSR), used for youth ages 11-18 (Achenbach, 2009). This totaled 112 questions that can be broken down into Syndrome Scales, including one titled “Anxious/Depressed.”

Participants were directed to describe themselves, in terms of these constructs, in the last six months. While this differs from the specified assessment window used in Project Q2 (seven days), research demonstrates adolescents accurately self-report information from both recent (two weeks) and less recent (two months) assessment periods (McFarlane & St. Lawrence, 1999). Further, at least one past study has used our analytic strategy – aggregating BSI and ASR/YSR data to study adolescent mental health (Bryden et al., 2001).

Depression: This was assessed using 14 questions from the Anxious/Depressed Syndrome Scale. Items included “I cry a lot,” “I feel worthless or inferior,” and “I am unhappy, sad, or depressed” ($\alpha = .86$). Participants answered each item by choosing a response from a 3-point scale whereby 1=Not true, 2=Somewhat or sometimes true, and 3=Very true or often true. Total scale scores were calculated by summing responses to these items.

Anxiety: This was assessed using seven questions from the Anxious/Depressed Syndrome Scale. These included “I worry about my future,” “I am too fearful or
anxious,” (α = .75). Participants used the same response options (1-3) as above. Total scale scores were calculated by summing responses to these items.

f. Behavioral Health Outcomes in Project Q2 and Crew 450

The AIDS-Risk Behavioral Assessment (ARBA): We used an adapted ARBA to assess sexual and substance use behaviors associated with HIV infection (Donenberg, Emerson, Bryant, Wilson, & Weber-Shifrin, 2001). Because this is a computerized interview, participants did not have to respond to sensitive questions directly to the interviewer.

Smoking: We assessed smoking behavior with one face-valid, dichotomous question: “Do you currently smoke cigarettes?”

Alcohol Use: To assess recent heavy alcohol use we used a standard, face-valid item regarding frequency of binge drinking (Fillmore & June, 2011). The item read, “Over the last six months, on how many days did you drink five or more drinks in a row, that is, within a couple hours?” Participants chose a response from a seven-point Likert scale ranging from 1=Never to 7=Every day or almost every day.

Drug Use: To assess recent drug use, we asked participants how many days in the last six months they used the following: marijuana, powdered or crack cocaine, heroin, inhalants, methamphetamines (e.g. crystal meth), stimulants (e.g. Ritalin), psychedelics (e.g. PCP), and club drugs (e.g. Ecstasy). Participants typed in their responses for each. Responses to each question were used to create a dichotomous variable indicating any versus no drug use, and summed to create a continuous variable indicating total number of drugs used (range 0-8).
**Sexual Behavior:** In both *Project Q2* and *Crew 450*, participants identified each of their last several sexual partners by answering the prompt, “Enter the initials of the most recent sexual partner you had in the last 6 months. If you do not know this partner’s name, pick two letters that will help you remember.” Participants also characterized the type of relationship with each partner, answering the question, “What was your relationship with ___?” Participants chose “Serious relationship,” “Casually dating but not serious,” “Sleeping with this person but not dating”, “One night stand,” or “Stranger or anonymous person.” Then participants answered questions related to sexual behavior with each partner, e.g. “How many times did you have anal sex with this partner during the last 6 months?,” and “Thinking about those times, how many times did you use a condom during anal sex with this partner?” We used responses to these questions to create a dichotomous index for relationship type (serious versus casual), and a dichotomous index for sexual risk (any UAI with most recent partner versus no UAI with most recent partner).

**STI:** We also assessed sexual behavior and risk using an STI outcome variable. In both studies we assessed the presence of any recent STI with one question: “In the last six months, have you been told by a doctor or nurse that you had a Sexually Transmitted Infection, such as Chlamydia, trichomonas (trich), syphilis, gonorrhea (clap), genital herpes, genital warts (HPV), or pubic lice (crabs)?” We used responses to create a dichotomous index – any recent STI versus no recent STI.
g. Relationship and Support Variables

Relationship Satisfaction: Six of seven items from the Relationship Assessment Scale (Hendrick, Dicke, & Hendrick, 1998) were used to measure relationship satisfaction. One item was not used in both Project Q2 and Crew 450, and therefore was not used in our analyses. Each question on this scale has the same stem: “On a scale of 1 to 5…” and is followed by, e.g., “…how well does your partner meet your needs?” and “how satisfied are you with your relationship?” Reliability ratings were high for this scale (α = .81 in Project Q2; α = .65 in Crew 450). Two questions from this scale were reverse coded (“…how often do you wish you hadn’t gotten into this relationship?” and “…how many problems are there in your relationship?”). We summed responses to all items to create a total score variable representing overall satisfaction with the relationship.

Social Support: In both Project Q2 and Crew 450, social support was assessed using the Multidimensional Scale of Perceived Social Support (Mitchell & Zimet, 2000). This 12-item scale assesses social support from family, friends, and significant other (α = .84). A 7-point Likert response scale is used, 1=Very strongly disagree to 7=Very strongly agree. Participants’ individual item responses were summed to create an overall social support score. We controlled for perceived social support from family and friends when analyzing data, to find the independent effect of partnership and relationship satisfaction on health.

5. Data Analysis

We combined data from each study to increase our overall sample size (N=354; Project Q2 n = 106; Crew 450 n = 248). Because different anxiety and depression
measures were used across studies, we used z-scores to standardize these variables in each study. We created three groups for each variable: “high,” representing scores above the 66th percentile, “medium,” representing scores in the 33-66th percentiles, and “low,” representing scores below the 33rd percentile. Then we aggregated participants from each study so that, e.g., those “high” in depression in Project Q2 were in the same group as those “high” in depression in Crew 450.

We conducted two levels of analysis. First, we used descriptive statistics to report demographics, and ANCOVA comparing mean health outcome scores across single and partnered participants. These health outcomes included psychological (depression, anxiety) and behavioral variables (smoking, alcohol and drug use, sexual behavior, STI). Second, using only the subsample of participants reporting current primary partnership, we used standard linear and logistic regression models to test associations of relationship satisfaction with each health outcome.

Statistical analyses were conducted using SPSS 20.0 (SPSS Inc., Chicago, IL, USA). Demographics (e.g. age, race/ethnicity) and social support were controlled for in ANCOVA and regression analyses. Missing data were excluded from analyses. Participants who did not identify as gay or bisexual were removed from analyses.

6. Hypotheses

We expected partnered participants to report better psychological and behavioral health than single participants. We predicted one exception to this – that, proportionally, participants whose most recent anal intercourse partner was serious would report sexual risk more than those whose most recent partner was casual. Next, consistent with the Social Strain hypothesis, we expected partnered individuals reporting lower relationship
satisfaction to report more smoking, more alcohol and drug use, and more depression and anxiety, than participants reporting higher relationship satisfaction. Lastly, we predicted relationship satisfaction ratings would relate positively to participation in risky sexual behavior and presence of any recent STI.

D. Results

1. Sample characteristics

Table IV provides sample demographic information. A total of 354 young men completed either the Q2 baseline (n= 106, 29.9%) or Crew 450 T2 (n= 248, 70.1%) interview. We removed from the sample participants who reported a sexual orientation other than gay or bisexual, or who did not report a sexual orientation (n= 17, 4.8%). The remaining 337 self-reported gay (n=265, 78.6%) and bisexual (n=72, 21.4%) young men comprised the final analytic sample. The mean participant age was 18.85 years (SD=1.34). Our sample was racially diverse. Nearly three-quarters of the sample reported ever having been in a romantic relationship. About one-third of the sample reported a current primary partner. Few participants reported low relationship satisfaction. A significant proportion of participants reported high rates of depression and anxiety; cigarette smoking, recent binge drinking, and hard drug use; and any unprotected sex.
### TABLE IV. SAMPLE DEMOGRAPHICS AND HEALTH INDICATOR FREQUENCIES.\(^a\)

<table>
<thead>
<tr>
<th>Demographic/Indicator</th>
<th>n (%)</th>
<th>Demographic/Indicator</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td><strong>Deception score</strong></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>57 (16.9)</td>
<td>Low</td>
<td>140 (41.5)</td>
</tr>
<tr>
<td>Black</td>
<td>175 (51.9)</td>
<td>Medium</td>
<td>114 (33.8)</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>63 (18.7)</td>
<td>High</td>
<td>83 (24.6)</td>
</tr>
<tr>
<td>Asian/Pac Islander</td>
<td>10 (3.0)</td>
<td><strong>Anxiety score</strong></td>
<td></td>
</tr>
<tr>
<td>Native American</td>
<td>4 (1.2)</td>
<td>Low</td>
<td>139 (41.2)</td>
</tr>
<tr>
<td>Multi-racial</td>
<td>24 (7.1)</td>
<td>Medium</td>
<td>91 (27.0)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (1.2)</td>
<td>High</td>
<td>107 (31.8)</td>
</tr>
<tr>
<td><strong>Sexual Orientation</strong></td>
<td></td>
<td><strong>Recent binge drinking</strong></td>
<td></td>
</tr>
<tr>
<td>Gay</td>
<td>265 (78.6)</td>
<td>Yes</td>
<td>128 (45.6)</td>
</tr>
<tr>
<td>Bisexual</td>
<td>72 (21.4)</td>
<td>No</td>
<td>153 (54.4)</td>
</tr>
<tr>
<td><strong>Ever partnered</strong></td>
<td></td>
<td><strong>Smoker</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>243 (73.2)</td>
<td>Yes</td>
<td>159 (50.5)</td>
</tr>
<tr>
<td>No</td>
<td>89 (26.8)</td>
<td>No</td>
<td>156 (49.5)</td>
</tr>
<tr>
<td><strong>Current Partnership Status</strong></td>
<td></td>
<td><strong>Hard drugs used</strong></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>220 (66.3)</td>
<td>Yes</td>
<td>193 (57.3)</td>
</tr>
<tr>
<td>Partnered</td>
<td>112 (33.7)</td>
<td>No</td>
<td>144 (42.7)</td>
</tr>
<tr>
<td><strong>Most Recent Anal Sex Partner Status</strong></td>
<td></td>
<td><strong>Any recent UAI</strong></td>
<td></td>
</tr>
<tr>
<td>Serious</td>
<td>106 (50.7)</td>
<td>Yes</td>
<td>108 (41.4)</td>
</tr>
<tr>
<td>Casual</td>
<td>103 (49.3)</td>
<td>No</td>
<td>153 (58.6)</td>
</tr>
<tr>
<td><strong>Highest Education Level</strong></td>
<td></td>
<td><strong>Any recent STI</strong></td>
<td></td>
</tr>
<tr>
<td>Some/all high sch.</td>
<td>216 (64.1)</td>
<td>Yes</td>
<td>52 (15.4)</td>
</tr>
<tr>
<td>Some/all college</td>
<td>119 (35.3)</td>
<td>No</td>
<td>285 (84.6)</td>
</tr>
<tr>
<td>Some/all grad sch.</td>
<td>1 (0.3)</td>
<td><strong>Relationship satisfaction</strong>(^b)</td>
<td></td>
</tr>
<tr>
<td><strong>Student status</strong></td>
<td></td>
<td>0-7</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Student</td>
<td>251 (74.5)</td>
<td>8-15</td>
<td>1 (1.1)</td>
</tr>
<tr>
<td>Not student</td>
<td>86 (25.5)</td>
<td>16-23</td>
<td>55 (59.1)</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td>24-30</td>
<td>37 (39.8)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>92 (27.3)</td>
<td><strong>Social support score</strong></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>245 (72.7)</td>
<td>1.00-2.99</td>
<td>22 (6.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.00-4.99</td>
<td>124 (47.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.00-7.00</td>
<td>191 (46.4)</td>
</tr>
</tbody>
</table>

\(^a\) n’s vary based on specific item  
\(^b\) Includes only participants rating their current relationship
2. **Comparisons Between Partnered and Single Men**

Table V presents results of ANCOVA tests comparing partnered and single young men on various health outcomes. There was only one significant group difference – men whose most recent anal intercourse partner was serious were more likely to report sexual risk with this partner than men whose most recent partner was casual, $F(1, 209) = 16.81 \ p < .001$. No other significant group differences emerged in psychological or behavioral health outcomes.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>M(SE) single</th>
<th>M(SE) partnered</th>
<th>F-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Psychological outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety score</td>
<td>-.01 (.07)</td>
<td>-.03 (.10)</td>
<td>.03</td>
</tr>
<tr>
<td>Depression score</td>
<td>-.01 (.07)</td>
<td>.01 (.10)</td>
<td>1.29</td>
</tr>
<tr>
<td><strong>Behavioral outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Binge drinking</td>
<td>.41(.04)</td>
<td>.54(.05)</td>
<td>1.69</td>
</tr>
<tr>
<td>Smoking</td>
<td>.54(.04)</td>
<td>.43(.05)</td>
<td>.25</td>
</tr>
<tr>
<td>Total hard drugs used</td>
<td>.73(.06)</td>
<td>.79(.09)</td>
<td>.52</td>
</tr>
<tr>
<td>Any sexual risk</td>
<td>.33(.05)</td>
<td>.61(.05)</td>
<td>16.81*</td>
</tr>
<tr>
<td>Any STI</td>
<td>.16(.03)</td>
<td>.15(.04)</td>
<td>.32</td>
</tr>
</tbody>
</table>

*a Group n’s vary based on specific item
* $p < .001$
3. Bivariate Associations: Relationship Satisfaction and Health

Table VI presents results of linear and logistic regression analyses testing the association of relationship satisfaction with each psychological and behavioral health outcome. Two variables related significantly to relationship satisfaction – binge drinking, Wald $X^2 (1, N = 97) = 6.74, p < .01$, with lower relationship satisfaction scores predicting less binge drinking; and depression, $F (1, 104) = 4.42, p < .05$, with lower satisfaction scores predicting higher depression scores. One trend-level association was found, between low satisfaction and high anxiety, $F (1, 104) = 3.50, p < .10$.

**TABLE VI. ASSOCIATIONS OF PSYCHOLOGICAL AND BEHAVIORAL HEALTH OUTCOMES WITH RELATIONSHIP SATISFACTION.**

<table>
<thead>
<tr>
<th>Outcome variable</th>
<th>Relationship satisfaction as predictor</th>
<th>$\beta$, test-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Psychological outcomes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety score</td>
<td>-.05</td>
<td>3.50*</td>
</tr>
<tr>
<td>Depression score</td>
<td>-.06</td>
<td>4.42**</td>
</tr>
<tr>
<td><strong>Behavioral outcomes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Binge drinking</td>
<td>.20</td>
<td>6.74***</td>
</tr>
<tr>
<td>Smoking</td>
<td>.07</td>
<td>1.06</td>
</tr>
<tr>
<td>Total hard drugs used</td>
<td>.00</td>
<td>.05</td>
</tr>
<tr>
<td>Any sexual risk</td>
<td>.07</td>
<td>1.73</td>
</tr>
<tr>
<td>Any STI</td>
<td>.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

*p < .10, **p < .05, ***p < .10
E. Discussion

1. Summary

This study combined data from two convenience samples of young gay and bisexual men recruited through respondent driven/snowball sampling techniques. We tested two hypotheses: First, we predicted that partnered, young gay and bisexual men would be psychologically and behaviorally healthier than their single counterparts. We predicted one exception to this trend – that participants who had sex most recently with a serious partner would be more likely to have had UAI than participants who had sex with a casual partner. Second, consistent with the Social Strain hypothesis, we predicted that individuals reporting low relationship satisfaction scores would report poorer psychological and behavioral health than individuals reporting high relationship satisfaction.

Overall, partnered young men did not report better psychological and behavioral health than single young men; and, partnered young men who were less satisfied with their relationship were strained insofar as they reported worse psychological ratings. Baseline comparisons of partnered and single young men revealed no significant group differences in health, except regarding UAI; men who most recently had sex with a serious partner were more likely to have had UAI than men whose most recent partner was casual. Lower satisfaction scores related significantly to higher depression scores, and trended toward an association with higher anxiety scores. Providing counter-evidence for social strain, we found a significant association between lower satisfaction and lower binge drinking frequency.
2. Comparing Partnered and Single Participants

We expected partnered men to report better psychological and behavioral health than single men, based on research on both heterosexuals and homosexuals that indicates partnered individuals are healthier than single ones. Across studies, partnered individuals have reported less anxiety (Helbig, Lampert, Klose, & Jacobi, 2006), depression (Rich-Edwards et al., 2006), alcohol consumption (Leonard & Rothbard, 1999), cigarette smoking (Graham, Francis, Inskip, & Harman, 2006), and drug use (Helbig et al., 2006), compared to their single counterparts. We did not replicate these findings here. There are several potential explanations for our null findings – each representing a testable hypothesis for future researchers.

First, our lack of reported benefits may be due to measurement error borne from imprecise survey items regarding partnership. Alternately, a lack of moderating analyses in our studies may explain our null findings. Parsing our large samples into smaller subgroups based on race, HIV status, or relationship length may have illuminated partnership benefits specific to these subgroups. Second, young gay and bisexual men may define “primary partner” differently than heterosexuals, e.g. as one’s most frequent sexual partner, not the partner from which one receives emotional and instrumental support. This differential definition may engender unique partnership benefits, but not ones uncovered here. Lastly, it is possible that a young gay or bisexual male’s individual developmental experience is stressful enough to mask or cancel out perceived partnership benefits.

Consistent with much recent research (Crepaz et al., 2000; Koblin et al., 2003; Mustanski, Newcomb, & Clerkin, 2011; Newcomb, Ryan, Garofalo, & Mustanski, in
press), our results indicated participants whose most recent partner was serious were more likely to have had UAI with that partner, compared to participants whose most recent partner was casual. In a recent study of partnered MSM, Hoff and colleagues (2012) found that 65% of the sample engaged in UAI with their primary partner. Clearly UAI and related acquisition of HIV and other STI remain critical points of focus and intervention within this population. Newcomb and colleagues (in press) investigated the association between sexual risk and multiple types of variables – relationship type, sexual partner characteristics, and relationship dynamics – among young MSM. Their results point to several intervention targets to reduce sexual risk in this population, including serious/familiar sexual partnerships. Fortunately, researchers are developing novel, empirically-supported approaches to intervening on sexual risk among younger MSM, e.g. online HIV prevention interventions (Mustanski, Garofalo, Monahan, Gratzer, & Andrews, 2013). We encourage researchers to continue to develop and test novel approaches to sexual risk intervention among younger MSM, and then to implement those approaches found to be effective.

3. Social Strain and Relationship Satisfaction

   Social strain was supported as it regards to psychological health. Lower relationship satisfaction scores were associated significantly with increased depression scores. This is consistent with past studies of MSM (Mills et al., 2004) and gay and bisexual men (Parsons, Starks, Du Bois, Grov, & Golub, 2013); and, heterosexuals (Rich-Edwards et al., 2006; Walen & Lachman, 2000). Related, our results indicated lower relationship satisfaction scores were associated at trend-level with increased anxiety scores. This is consistent with past research on partnered heterosexuals (Birnbaum, 2007;
Butzer & Campbell, 2008; Whisman, Uebelacker, & Weinstock, 2004). Research is sparse investigating the association between relationship satisfaction and mental health among same-sex attracted individuals. The little research that has been completed reports, consistent with our findings, inverse associations between relationship satisfaction and mental health variables such as depression and anxiety (e.g. Otis, Riggle, & Rostosky, 2006).

We found no significant association between relationship satisfaction and sexual risk with most recent partner. However, due to data limitations, this finding should be interpreted provisionally. Our data did not allow us to specify that participants were reporting on relationship satisfaction and recent sexual activity with the same partner. Therefore, participants may have reported on satisfaction with one partner, and recent sexual activity with another. Past research is mixed on relationship satisfaction and sexual risk. Some studies report low satisfaction is associated with higher sexual risk both within (Davidovich, De Wit, & Strobbe, 2006) and outside (Bradley, Remien, & Dolezal, 2008) the relationship. Other research has demonstrated the opposite – increased relationship satisfaction is associated with increased frequency of unprotected sex among heterosexuals (Costa & Brody, 2012; Strachman & Impett, 2009) and gay men (McNeal, 1997). Further research on this topic is warranted, particularly carefully designed studies with precise measures of satisfaction and risk.

Surprisingly, increased relationship satisfaction strongly predicted increased frequency of binge drinking. We expected to find an inverse association between these variables, such that low satisfaction predicted increased drinking frequency. Our hypothesis is consistent with past research demonstrating low relationship satisfaction
relates to increased frequency of individual-level binge drinking episodes (Fischer, Fitzpatrick, & Cleveland, et al., 2005; Homish & Leonard, 2007; for a review, see: Marshal, 2003). Our unexpected finding may be explained by the “partner effect” (Kenny & Cook, 1999). Partner effects occur when an individual’s behavior or psychological state influences those of his/her partner. Partner effects can be positive or negative. In the case of smoking, research indicates that pregnant women attempting to quit smoking are more likely to be successful if their partner reduces or quits smoking concurrently (Appleton & Pharoah, 1998).

In this case, one partner in the gay/bisexual male relationship may be binge drinking, and the other partner may adopt this behavior. Disparate lines of research converge to support this explanation for our finding. Relationship research indicates high relationship satisfaction ratings by an individual are associated with increased frequency of communicating (Emmers-Sommer, 2004) and engaging in behavioral activities such as having sex (Costa & Brody, 2012) with a partner. Research on risk-taking behaviors indicates substance use is normative during adolescence/emerging adulthood (Johnston, O’Malley, & Bachman, 2002). And, between-group research indicates homosexuals drink alcohol more than heterosexuals (Greenwood et al., 2001). This was replicated in our sample; young gay and bisexual men reported a high prevalence of binge drinking (54.4%) compared to that in the general population (14.3%, Naimi et al., 2003). Taken together, these findings indicate that young gay and bisexual men are relatively likely to binge drink; and, those who are satisfied with their relationships likely spend more time engaging in activities with their partners, who also are relatively likely to be binge drinkers. A binge-drinking, young, gay or bisexual male is essentially a peer that could
“affect” his romantic partner by increasing the partner’s likelihood of binge drinking, because of common exposure to another binge drinker (Ali & Dwyer, 2010).

4. Limitations

This study should be interpreted in the context of its limitations. First, participants are young, and from a convenience snowball/respondent-driven sample recruited initially from LGBT/community centers in a large U.S. city. Therefore, results are not generalizable to some subsets of gay and bisexual men, e.g. older men, rural men, or those obtaining healthcare or community resources from other venues, e.g. private hospitals or clinics. Simultaneously our sample was diverse – comprised primarily of non-White participants. And, this group represents an important intervention target for future behavioral interventions aiming to improve the health and well-being of community-connected gay and bisexual male youth. Second, our analyses are cross-sectional, despite data coming from two longitudinal studies (Project Q2, Crew 450) of sexual minority health. We were limited to cross-sectional analyses due to relationship satisfaction being assessed only at one time point in Crew 450. Consequently our results indicate significant associations, but not causal links, between key study variables. We encourage future researchers investigating relationship satisfaction and health outcomes to use longitudinal, repeated measures designs. These will help determine if changes in relationship satisfaction lead to changes in individual health, or vice-versa. Lastly, our primary independent variable – relationship satisfaction – may suffer from a restricted range of variance, as evidenced by almost half of participants reporting upper-quartile satisfaction ratings. This may have made it difficult to detect differences in health
outcomes. Nonetheless we did find one significant and two trend-level associations when running regression analyses involving this variable.

Limitations notwithstanding, this study provides important preliminary information about the association between partnership status, relationship satisfaction, and health outcomes among young gay and bisexual men.
IV. STUDY THREE: PARTNERSHIP STATUS AND HEALTH OVER TIME AMONG BEHAVIORALLY RISKY GAY AND BISEXUAL MEN: TESTING PROTECTION VERSUS SELECTION

A. Aims and Hypotheses

Our first aim is to compare single and partnered behaviorally risky men on several health indices. Our second aim is to test two competing hypotheses about the relation between partnership and health among gay and bisexual men: “marriage protection” vs. “social selection.” Marriage protection proposes that marriage is actually protective for health, while social selection proposes that healthier men are selected into stable relationships. We hypothesized that partnered men would report health benefits compared to single men. We predicted the protection, not selection, perspective would be supported.

B. Introduction

1. Protection versus Selection

The perspective that high quality partnerships benefit those involved is known as the marriage protection hypothesis (Blekesaune, 2008). While some of the research discussed in this project supports this perspective, an alternative is possible: Healthier individuals may be more likely to enter – or be “selected” into – relationships, than are less behaviorally or psychologically healthy men. This competing perspective is known as the selection hypothesis (Mastekaasa, 1992; Maughan & Taylor, 2001). Study Three therefore addresses the protection versus selection question among behaviorally risky gay and bisexual men.
2. Marriage protection

This perspective proposes that the social benefits of marriage or close partnership protect against unfavorable health behaviors and outcomes. In this view, gay and bisexual males should report increases in health and positive health behaviors when they are partnered compared to when they are single. This perspective has not been adequately tested in the literature due to a paucity of longitudinal designs and statistical analyses that prohibit causal interpretation.

Heterosexual marriage may be protective in several health domains. For example, being married may protect against the physiological consequences of unhealthy behaviors such as smoking (Gardner & Oswald, 2004; Rehm, Fichter, & Elton, 2006). Marriage also may protect against susceptibility to something less deadly for most but unpleasant to all – the common cold (Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997). Marriage may also protect against participating in unhealthy behaviors such as substance use that generally have aversive physical health consequences (Helbig, Lampert, Klose, & Jacobi, 2006).

The protective benefits of marriage may extend to the domain of psychology. Spousal support attenuates the association between economic strain and depression (Lorenz, Conger, Montague, & Wickrama, 1993). Related, married individuals have reported economic hardships less frequently than single individuals (Ross, 1995), which may partially explain lower levels of psychological distress in married versus single persons (Horwitz et al., 1996). These reports are cross-sectional, so they do not actually test whether entering a partnership enhances health. Longitudinally, marriage protects
against depression; Horwitz and colleagues (1996) used longitudinal data from 1,400 participants to show that, after controlling for demographics, depression scores reduced over time for everyone, but most among married individuals.

3. **Social selection**

According to this perspective, partnered individuals report more positive health outcomes because of their favorable psychological and behavioral states prior to entering a partnership. Favorable health status is seen as leading them to select – or be selected for – a long-term partner by someone else (Johnson & Wu, 2002).

This perspective has not been well supported. In a literature review on marital status and well-being, Coombs (1991) found scant evidence to support selection. Later, Chun and Lee (2001) discussed the “wage premium” – the observed phenomenon that married men earn more than unmarried men. Both the productivity hypothesis, that marriage makes men more productive, and the selection hypothesis, that highly productive men are selected into marriage initially, have been proposed to explain this. These researchers used population-level data to test these competing explanations, finding no support for the selection hypothesis.

Notably, most of the research that does not support the selection hypothesis has been cross-sectional, used small sample sizes, and represented short measurement periods (Stutzer & Frey, 2003). The few longitudinal studies on this topic, which attempt to overcome these shortcomings, suggest that the selection hypothesis at least partially explains the association between partnership status and health among heterosexuals (e.g. Mastakaasa, 1992; 2006). In one longitudinal study, only a subset of women – the unemployed – was more likely than others to enter into marriage and stay married. This
same group of women reported better health trends than their employed counterparts (Waldron, Hughes, & Brooks, 1996). Study authors suggest these women were selected into marriage despite being unemployed, because their future husbands perceived them to be healthier.

The competing marriage protection and social selection hypotheses have not been tested among gay and bisexual men. It is important to test these hypotheses here, for three reasons. Support for the protection hypothesis would provide an interpretive lens for the associations of partnership status and health found in Studies One and Two. Partnered men’s greater health may be caused by their partnership status. Alternately, support for the selection hypothesis would call into question the causal role of the relationship itself in understanding greater health among partnered men. Due to our small sample size, limited number of assessment points, and length of assessment period in Studies One and Two (see: Stutzer & Frey, 2003), we could not test the selection hypothesis. In contrast, the data used for this analysis are from a large sample (N=1,542), are longitudinal (one year), with multiple assessment points (four). Finally, gay and bisexual male relationships may differ from heterosexual relationships in important ways, such as a potentially diminished role of sexual monogamy. This study attempts to understand if such culturally-specific partnership variables may attenuate the protective function of partnership among gay and bisexual men.

4. **Behaviorally Risky Gay and Bisexual Men**

Gay and bisexual men who engage in substance use and sexual risk necessarily could improve their health behaviors. Indeed, multiple behavioral interventions have targeted and tried to reduce these unhealthy behaviors among gay and bisexual men who
engage in them (e.g. Project EXPL0RE, Koblin et al., 2003; Project MIX, Mansergh et al., 2008). Reduction of these behaviors is important, because engaging in them is related to increased STI prevalence (Koblin et al., 2003). Moreover, behaviorally risky gay and bisexual men may be vulnerable to other health sequelae, e.g. depression (Alvy et al., 2010). Alcohol-using, HIV-infected MSM are at risk for increased viral load (Parsons, Kutnick, Halkitis, Punzalan, & Carbonari, 2005). Therefore, gay and bisexual men who engage in substance use and sexual risk may have multiple health domains that could benefit from the protective effect of partnership. For this reason, this population of risky men is appropriate for testing the protection effect.

5. **Study Three Summary**

Study Three will use longitudinal data to test the competing protection versus selection hypotheses. These hypotheses have not been tested simultaneously in a sample of behaviorally risky gay and bisexual men. Findings from this study will provide an interpretive lens for findings from Studies One and Two.

C. **Method**

1. **Overview**

The data used in these analyses are from repeated interviews collected as part of Project MIX, a four-city, longitudinal behavioral intervention for sexual safety, delivered to high-risk MSM who reported a history of drug or alcohol use with sex. Project staff collected data from November 2004 through December 2008. Men volunteered for a 12-month cohort study during which they either received six, two-hour group intervention sessions (in the experimental or “attention control” groups), or completed only the ACASI (non-experimental group).
2. Participants

Participants represented a convenience sample of MSM who reported at least two instances of alcohol use or one instance of non-injection drug use during or immediately prior to sex, and reported unprotected anal intercourse (UAI) with a partner whose HIV status was unknown, or known to differ from the participant’s (i.e., “sero-discordant”), within the prior six months. Eligible participants agreed to participate in a six-session, group-based intervention, complete interviews at baseline, three-, six-, and 12-month follow-ups, not have a plan to move from their respective city in the next 15 months, and have no current involvement in another study trial. Project staff recruited participants using both active, e.g. community outreach, and passive, e.g. flyering, methods. Recruitment approaches were designed to elicit a balance between African American, Latino, and Caucasian participants, and between HIV negative and HIV positive MSM (see Mansergh et al., 2008, for a complete description).

3. Procedure

Men either were contacted by project staff through call lists generated during active recruitment, or called a study site themselves. Potential participants were given a brief screening interview to determine eligibility. Project staff scheduled an initial visit with those who screened eligible. This visit consisted of an informed consent procedure, a confirmatory eligibility screening, the baseline ACASI, and HIV testing and counseling. Institutional Review Boards at the CDC and in each local (Chicago, New York, Los Angeles, San Francisco) institution approved all study procedures.
4. Measures

All interviews were completed using audio computer-assisted self-interviews (ACASI). Participants were given information and practice questions in the presence of project staff, then completed the substantive interview alone.

a. Demographics

Demographic characteristics included standard indicators of ethnicity, age, education, annual income, and self-reported HIV status. Respondents reported their date of birth to obtain an exact age, but reported all other demographic characteristics categorically.

Sexual orientation. To assess this, we used a single, face-valid item: “How would you describe your sexual orientation?” Participants chose from straight/heterosexual, gay/homosexual, bisexual, other, and refuse to answer.

Partnership status. During the ACASI, participants received a prompt: “Now we want to ask you if you have had a primary male partner over the last three months. By "primary" partner we mean a man you have lived with or have seen a lot, and to whom you have felt a special emotional commitment for at least three months.” Participants responded “yes” (coded as ‘1’) or “no” (coded as ‘0’). Thus, for the longitudinal analyses a transition into a relationship across waves would be denoted by a change from ‘0’ to ‘1’, and vice-versa.

b. Social Support

We assessed general social support using five questions related to social
and HIV support ($\alpha = .88$). Questions included “I have someone to share AIDS concerns with” and “I have someone to talk to about alcohol or drug use.” These questions were answered on a scale of 1=Never to 5=All of the time. Mean scores were calculated. We will control for this social support measure when analyzing data, to find the independent effect of partnership on health.

c. **Physiological Health Variables**

*Viral load and CD4/T-cell count:* HIV positive participants self-reported whether they had received a count of clinical value, when the last count was, and the actual count. For CD4/T-cell count, participants chose from “Less than 50, 50-200, 201-350, 351-500, over 500, and Don’t know.” For viral load count, participants chose from “Undetectable, Detectable but less than 5,000, 5,001-10,000, 10,001-30,000, 30,001 or more, and Don’t know.”

d. **Psychological Health Variables**

*Depression.* Seven items from the CES-D, taken from Coyne’s nine-item short version of the scale (Santor & Coyne, 1997), were used. We excluded two positively worded items from Coyne’s scale because of low item-total correlations. Participants were asked to consider the last week and rate how often they, e.g. “[felt] lonely” or “[felt] like everything [they] did was an effort” on frequency scales ranging from 1=Never or rarely to 4=Mostly or always (5-7 days), $\alpha = .88$. We created a mean severity score from responses to all seven items.

*Anxiety.* We assessed anxiety symptoms in the past week with six items adapted from the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983), e.g. “…I felt nervous or shaky inside.” Participants rated each question on a scale of 1=Not at all to
5=Extremely. Items showed strong reliability ($\alpha = .90$). Mean scores were calculated to produce an anxiety composite score.

e. **Behavioral Health Variables**

*Alcohol and drug use.* We assessed alcohol use in the past year using the Alcohol Use Disorders Identification Test (AUDIT), a 10-question survey measuring alcohol intake, dependence, and negative consequences (Allen, Litten, Fertig, & Babor, 1997). A five-point frequency scale ranging from 0=Never to 4=4 or more times a week accompanied each question. Total scores were calculated by summing participants’ responses to each item. Reliability of this scale was high, $\alpha = .85$.

We assessed participants’ use of individual drugs in the last three months with standard, dichotomous, face-valid measures for nine drugs: ecstasy, heroin, methamphetamine, poppers (amyl or butyl nitrate inhalants), powdered cocaine, crack cocaine, special K, barbiturates, and Viagra. We created two variables to assess aggregate drug use – a continuous variable, by summing the number of drugs used by each participant (range 0-9), and a categorical variable, dichotomized as no versus any drug use.

*Sexual behavior.* We assessed sexual behaviors with questions such as “How many times [that you were a top during anal sex] did you use a condom?” Participants entered responses manually, with the ACASI performing validity checks throughout (e.g. participants could not enter one sexual encounter as a top and more than one encounter as a top without a condom). We used these responses to create a dichotomous transmission risk variable. Consistent with prior studies, we defined risk as any recent UAI, either within or outside a partnership.
Sexually Transmitted Infections (STI). We used one question to assess the presence of an STI: “Please indicate if you have had any of the following sexually transmitted diseases (STD) in the past 12 months.” To respond participants used a checklist containing “Chlamydia, syphilis, gonorrhea, urethritis, had a STD but don’t know the name, and none.” We used responses to create a dichotomous index – any recent STI versus no recent STI.

5. Data Analysis

Consistent with other studies that have tested the protection versus selection hypotheses among heterosexuals, we used cross-lagged panel modeling to answer our research question (Wu & Hart, 2002). There are several appropriate analytical methods for this approach, including fixed effects modeling (Blekesaune, 2008), random effects modeling (Johnsnson & Wu, 2002), cross-lagged panel analysis (Kee, Green, Mintz, & Brekke, 2003), structural equation modeling (Burkholder and Harlow 2003), and generalized estimating equations (GEE; Yaffee, 2003). We used GEE, which tests if changes in an independent variable over time predict changes in the dependent variables over time. GEE is an appropriate analytical approach for this study, as it is capable of model estimation with both continuous and binary outcomes, accounts for intracluster correlations, and is potentially a more conservative analysis than other panel modeling approaches (Zorn, 2001).

We reported two levels of analysis. The first was descriptive, detailing the sample baseline demographics, including proportion of partnered and single participants, and reporting baseline health indicator levels. Additionally we reported baseline associations between partnership status and health outcomes (viral load, CD4/T-cell count,
depression, anxiety, alcohol and drug use, sexual behavior, and STI), using standard regressions. The second level consisted of longitudinal analyses, using GEE to test if changes in partnership over time predicted changes in health outcomes over time (protection). We ran the complement of this, using health indicators at baseline as independent variables and partnership status at later waves as the dependent variable (selection). If needed, effect size comparisons were used to determine which predictive relationship was stronger (Rice & Harris, 2005).

For each regression and GEE, measures of age, ethnicity, education, income, HIV status, site, and social support were entered as simple covariates (regressions) or time-varying covariates (GEE). Also, intervention group was entered as a covariate in each GEE. Statistical analyses were conducted using SPSS 20.0 (SPSS Inc., Chicago, IL, USA). We used data from all four MIX assessment points. For two variables – last viral load and last CD4/T-cell count – we had only baseline data; therefore, no longitudinal analyses were run using these as dependent variables. For two variables – AUDIT scores and presence of any STI in the past 12 months – we had only baseline and 12-month data; therefore, for these variables only two waves of data were used in longitudinal analyses. Missing data were excluded from analyses. Participants who failed to make a follow-up appointment were included in analyses but had missing data from their missed assessment point(s). Participants who did not identify as gay/homosexual or bisexual were removed from analyses.

6. Hypotheses

We anticipated that at baseline partnered gay and bisexual men would report lower CD4/T-cell and viral load counts, less depression and anxiety, and less alcohol and
drug use than would single gay and bisexual men. Consistent with the protection perspective, we predicted that men who maintained or entered a partnered relationship during the 12-month follow-up period would report greater physiological, psychological, and behavioral health than would men who exited partnerships or stayed single. We expected the selection hypothesis, wherein baseline health status would predict future partnership status, to not be supported. We predicted that sexual behavior and STI prevalence would be exceptions to the trend that primary partnerships enhance health, given that engaging in UAI generally increases upon entering a primary partnership.

D. Results

1. Sample Characteristics

Table VII provides sample demographic information. At baseline, 1,542 MSM completed the ACASI. We removed from the sample participants who reported heterosexual (n=17, 1.1%) or other sexual orientation (n=14, 0.9%), and those who reported no sexual orientation (n=2, 0.1%). The 33 removed participants did not differ significantly from the remaining sample men on any demographic variable (p’s > .05). The remaining 1,509 self-reported gay and bisexual men comprised the final analytic sample. The mean participant age was 36.5 years, with over half reporting no primary partner at baseline. As is clear from Table 7, the sample was racially diverse. The sample was well-balanced between HIV positive and HIV negative men, with a small percentage reporting unknown status. Finally, most men reported a high level of social support.

Table VII also provides sample health indicator information at baseline. Over half of participants reported moderate to high levels of depression, and one-third reported moderate to high anxiety. While the majority used a hard drug other marijuana recently
(consistent with the study entry criteria), less than half obtained AUDIT scores higher than 10. A high proportion reported a recent STI. A modest percentage of HIV infected men reported a high viral load, and a significant percentage reported low CD4/T-cell count – both primary indicators of poor immunological health. The combined viral load and CD4/T-cell count frequencies may indicate that men in our sample are managing their HIV poorly over the long-term, but are following their regimen more recently.
TABLE VII. SAMPLE DEMOGRAPHICS\(^a\) AND BASELINE HEALTH INDICATOR FREQUENCIES.\(^b\).

<table>
<thead>
<tr>
<th>Demographic</th>
<th>n (%)</th>
<th>Health Indicator</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site</strong></td>
<td></td>
<td>Depression M score</td>
<td></td>
</tr>
<tr>
<td>Chicago</td>
<td>401 (26.6)</td>
<td>1.00-1.99</td>
<td>716 (47.7)</td>
</tr>
<tr>
<td>New York</td>
<td>345 (22.9)</td>
<td>2.00-2.99</td>
<td>599 (39.9)</td>
</tr>
<tr>
<td>San Francisco</td>
<td>356 (23.6)</td>
<td>3.00-3.99</td>
<td>187 (12.4)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>407 (27.0)</td>
<td>4.00-4.99</td>
<td>39 (2.6)</td>
</tr>
<tr>
<td><strong>Sexual Orientation</strong></td>
<td></td>
<td>Anxiety M score</td>
<td></td>
</tr>
<tr>
<td>Gay</td>
<td>1,289 (83.6)</td>
<td>1.00-1.99</td>
<td>991 (65.8)</td>
</tr>
<tr>
<td>Bisexual</td>
<td>220 (14.3)</td>
<td>2.00-2.99</td>
<td>347 (23.1)</td>
</tr>
<tr>
<td><strong>Partnership Status</strong></td>
<td></td>
<td>AUDIT score</td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>848 (56.2)</td>
<td>0-10</td>
<td>775 (51.4)</td>
</tr>
<tr>
<td>Partnered</td>
<td>661 (43.8)</td>
<td>11-20</td>
<td>484 (32.1)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>473 (31.3)</td>
<td>21-30</td>
<td>215 (14.2)</td>
</tr>
<tr>
<td>White</td>
<td>583 (38.6)</td>
<td>31-40</td>
<td>35 (2.3)</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>290 (19.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>163 (10.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HIV status</strong></td>
<td></td>
<td>Drugs used(^c)</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>706 (46.8)</td>
<td>Yes</td>
<td>413 (27.8)</td>
</tr>
<tr>
<td>Negative</td>
<td>674 (44.7)</td>
<td>No</td>
<td>1089 (72.2)</td>
</tr>
<tr>
<td>Unknown</td>
<td>129 (8.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td>Any unprotected sex</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>114 (7.6)</td>
<td>Yes</td>
<td>778 (51.6)</td>
</tr>
<tr>
<td>$1,000-$19,999</td>
<td>687 (45.5)</td>
<td>No</td>
<td>731 (48.4)</td>
</tr>
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<td>$20,000-$39,999</td>
<td>376 (24.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$40,000-$59,999</td>
<td>168 (11.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$60,000+</td>
<td>164 (10.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Highest Educ Level</strong></td>
<td></td>
<td>Any recent STI</td>
<td></td>
</tr>
<tr>
<td>HS not completed</td>
<td>379 (25.1)</td>
<td>Yes</td>
<td>500 (33.2)</td>
</tr>
<tr>
<td>HS Diploma/GED</td>
<td>93 (6.2)</td>
<td>No</td>
<td>1004 (66.8)</td>
</tr>
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<td>Some college</td>
<td>515 (34.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA/BS</td>
<td>333 (22.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post BA/BS</td>
<td>189 (12.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td>Viral load(^b)</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>779 (51.6)</td>
<td>Below 10,000</td>
<td>658 (76.2)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>499 (34.2)</td>
<td>10,000+</td>
<td>205 (23.8)</td>
</tr>
<tr>
<td>Occasional</td>
<td>308 (15.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Soc Support M score</strong></td>
<td></td>
<td>CD4 count(^b)</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>779 (51.6)</td>
<td>Below 500</td>
<td>607 (69.3)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>499 (34.2)</td>
<td>500+</td>
<td>269 (30.7)</td>
</tr>
<tr>
<td>Occasional</td>
<td>308 (15.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean age = 36.4 (SD=9.2)</strong></td>
<td></td>
<td>Soc Support M score</td>
<td></td>
</tr>
<tr>
<td><strong>Lower total n’s due to missing data or skipped question due to HIV negative status.</strong></td>
<td></td>
<td>1.00-1.99</td>
<td>78 (5.2)</td>
</tr>
<tr>
<td><strong>Percentages represent proportion of HIV positive participants.</strong></td>
<td></td>
<td>2.00-2.99</td>
<td>298 (19.7)</td>
</tr>
<tr>
<td><strong>Excluding marijuana</strong></td>
<td></td>
<td>3.00-3.99</td>
<td>534 (35.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.00-4.99</td>
<td>599 (39.7)</td>
</tr>
</tbody>
</table>
2. Bivariate Associations Between Partnership Status and Health Outcomes

Table VIII presents results of linear and logistic regression analyses testing the association of partnership status with each physiological, behavioral, and psychological health outcome. After controlling for demographic variables and social support, being partnered related negatively to drug use, $F(1, 1493) = 7.56, p < .01$, and positively to sexual risk, Wald $X^2 (1, N = 1509) = 5.51, p < .05$.

**TABLE VIII. RESULTS OF REGRESSIONS OF PHYSIOLOGICAL, BEHAVIORAL, AND PSYCHOLOGICAL OUTCOMES ON OUR PRIMARY PARTNERSHIP VARIABLE. EACH ANALYSIS CONTROLS FOR AGE, INCOME, RACE/ETHNICITY, EDUCATION, HIV STATUS, SITE, AND SOCIAL SUPPORT.**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>$\beta$, test statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physiological outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Viral load</td>
<td>.00, -.15</td>
</tr>
<tr>
<td>CD4/T-cell count</td>
<td>.03, .83</td>
</tr>
<tr>
<td><strong>Behavioral outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Number hard drugs used</td>
<td>-.07, -2.75***</td>
</tr>
<tr>
<td>AUDIT score</td>
<td>-.02, -.76</td>
</tr>
<tr>
<td>Any unprotected sex</td>
<td>.06, 2.48**</td>
</tr>
<tr>
<td>Any STI</td>
<td>.00, .21</td>
</tr>
<tr>
<td><strong>Psychological outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Depression mean score</td>
<td>.00, .12</td>
</tr>
<tr>
<td>Anxiety mean score</td>
<td>.05, 1.86*</td>
</tr>
</tbody>
</table>

*p < .10, **p < .05, ***p < .01
3. Comparisons Between Partnered and Single Men

Table IX presents results of ANCOVA tests comparing partnered and single men on various health outcomes. As expected, regression results were replicated. Two variables differed significantly across groups – number of hard drugs recently used, $F(1, 1500) = 7.56, p < .01$; and engaging in recent sexual risk, $F(1, 1507) = 6.13, p < .01$. Partnered men trended toward reporting higher anxiety scores than single men, $F(1, 1503) = 3.44, p < .10$.

TABLE IX: F-VALUES AND GROUP MEANS (SE) OF ANCOVA ANALYSES COMPARING PARTNERED AND SINGLE MEN ON PHYSIOLOGICAL, BEHAVIORAL, AND PSYCHOLOGICAL OUTCOMES. EACH ANALYSIS CONTROLS FOR AGE, INCOME, RACE/ETHNICITY, EDUCATION, HIV STATUS, SITE, AND SOCIAL SUPPORT.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>M(SE) partnered</th>
<th>M(SE) single $^b$</th>
<th>F-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physiological outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viral load $^a$</td>
<td>2.34(.08)</td>
<td>2.36(.07)</td>
<td>.02</td>
</tr>
<tr>
<td>CD4/T-cell count $^a$</td>
<td>3.61(.07)</td>
<td>3.54(.06)</td>
<td>.69</td>
</tr>
<tr>
<td><strong>Behavioral outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hard drug use</td>
<td>.32(.02)</td>
<td>.41(.02)</td>
<td>7.56***</td>
</tr>
<tr>
<td>AUDIT score</td>
<td>11.56(.32)</td>
<td>11.88(.28)</td>
<td>.58</td>
</tr>
<tr>
<td>Unprotected sex</td>
<td>.52(.02)</td>
<td>.46(.02)</td>
<td>6.13**</td>
</tr>
<tr>
<td>Any STI</td>
<td>.67(.02)</td>
<td>.66(.02)</td>
<td>.04</td>
</tr>
<tr>
<td><strong>Psychological outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression $^a$</td>
<td>2.04(.03)</td>
<td>2.04(.02)</td>
<td>.02</td>
</tr>
<tr>
<td>Anxiety $^a$</td>
<td>1.85(.03)</td>
<td>1.78(.03)</td>
<td>3.44*</td>
</tr>
</tbody>
</table>

$^a$ M scaled score

$^b$ Group n’s vary based on specific item

* $p < .10$, ** $p < .05$, *** $p < .01$
4. **Longitudinal Analyses**

We used GEE for these analyses. The underlying correlation matrix was autoregressive, evidenced by higher correlations between measures taken at adjacent time points (e.g. baseline and 3 months) than at non-adjacent time points (e.g. baseline and 6 months). We used maximum likelihood estimators of variances. The variables of age, ethnicity, education, income, HIV status, site, and social support were entered as time-varying covariates; intervention group was entered as a covariate.

**a. Changes in Study Variables Over Time**

Rates of partnership changed over time, $F(3, n=5,611) = 82.32, p < .01$, with significantly more participants reporting a primary partner at baseline than other waves. Table X indicates the number and percentages of participants who were partnered at each wave, and the number and percentages of participants who entered and left partnerships at each wave. Hard drug use increased over waves, $X^2 (1, n=5,577) = 735.66, p < .001$, as did sexual risk, $X^2 (1, n=5,611) = 40.25, p < .001$. However, over time fewer men reported “problematic” alcohol use on the AUDIT, $X^2 (1, n=2,895) = 27.72, p < .001$; fewer symptoms of depression, $X^2 (1, n=5,595) = 33.01, p < .001$, and anxiety, $X^2 (1, n=5,603) = 24.09, p < .001$. Over time men reported higher rates of social support, $X^2 (1, n=5,611) = 43.34, p < .001$; and fewer STI, $X^2 (1, n=3,112) = 15.30, p < .001$. 
TABLE X: SAMPLE PARTNERSHIP (n, %) ACROSS STUDY WAVES.

<table>
<thead>
<tr>
<th>Status</th>
<th>Study wave</th>
<th>Baseline</th>
<th>3 months</th>
<th>6 months</th>
<th>12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently partnered</td>
<td></td>
<td>661, 43.8</td>
<td>456, 30.2</td>
<td>471, 31.2</td>
<td>469, 31.1</td>
</tr>
<tr>
<td>Left relationship</td>
<td></td>
<td>362, 24.0</td>
<td>132, 8.7</td>
<td>173, 11.5</td>
<td></td>
</tr>
<tr>
<td>Entered relationship</td>
<td></td>
<td>157, 10.4</td>
<td>147, 9.7</td>
<td>171, 11.3</td>
<td></td>
</tr>
</tbody>
</table>

b. Testing the Protection Effect

We entered all time-varying covariates, partnership as the independent variable, and one health outcome as the dependent variable, in separate GEEs to test whether changes in partnership over time predicted changes in each health outcome over time. Participants who became partnered over time reported less depression, $X^2 (1, n=5,595) = 3.89, p < .05$, but more anxiety, Wald $X^2 (1, n=5,603) = 4.34, p < .05$. Participants who became partnered over time also reported increases in sexual risk, Wald $X^2 (1, n=5,611) = 195.53, p < .001$. To clarify whether this increase in sexual risk was accounted for by HIV seroconcordance (shared HIV status between relationship partners), we ran another GEE with partner seroconcordance as a time-varying covariate. The original effect remained significant, Wald $X^2 (1, n=5,611) = 72.62, p < .001$. Changes in partnership status did not predict changes in hard drug use, AUDIT scores, or number of recent STIs ($ps > .05$).
c. Testing the Selection Effect

In a reverse analysis, we entered all time-varying covariates, one health outcome as the independent variable, and partnership status as the dependent variable, in separate GEEs to test whether changes in health over time predicted changes in partnership status over time. Increases in sexual risk predicted becoming partnered, $\chi^2 (1, n=5,611) = 194.92, p < .01$. Once again we re-ran this GEE controlling for partner HIV seroconcordance, and the effect remained significant, $\chi^2 (1, n=5,611) = 63.59, p < .001$. Increases in anxiety predicted becoming partnered, $\chi^2 (1, n=5,603) = 6.73, p < .01$. Finally, there was a trend for men who reported a decrease in depression to become partnered, $\chi^2 (1, n=5,595) = 3.05, p = .08$. Changes in hard drug use, AUDIT scores, and number of recent STI did not predict changes in partnership status over time ($ps > .05$).

E. Discussion

1. Summary

The primary aim of this study was to compare the marriage protection and social selection hypotheses in a sample of gay and bisexual men. In doing so we attempted to show whether partnership led to health benefits among gay and bisexual men, or if relatively healthier men in the sample were selected into partnerships. This is the first study to ask this question among gay and bisexual men. Overall, our findings were limited and mixed, consistent with mixed research findings in the field generally.

Our baseline findings indicated partnered men used hard drugs less, but had more unprotected sex and trended toward being more anxious, than single men. Past research indicates that partnership relates to decreased hard drug use relative to those who are not partnered, among both heterosexuals (Helbig, Lampert, Klose, & Jacobi, 2006) and gay
and bisexual men (Parsons, Starks, Du Bois, Grov, & Golub, 2013). Single people, particularly LGBT individuals, may use drugs more than partnered ones because they have a higher “bar orientation” (McKirnan & Peterson, 1989). That is, single individuals may use bars as a primary social setting more than partnered individuals (Heffeman, 1998), and the gay bar “scene” may facilitate drug use. Generally, more research has been recommended on the association between substance use and partnership status among gay and bisexual men (Stall & Purcell, 2000). We recommend specifically an examination of couples-level processes that may underlie or facilitate substance use. This is warranted given that some research indicates partnered gay men engage in more substance use than single gay men (Skinner, 1994).

2. **Sexual Risk**

Our finding that partnered men reported more UAI than single men is a replication of much recent research (Crepaz et al., 2000; Davidovich et al., 2001; Koblin et al., 2003; Sullivan, Salazar, Buchbinder, & Sanchez, 2009; Wong et al., 2012). Our finding that partnered men trended toward being more anxious than single men is new. It is possible that these two findings relate – that a significant proportion of partnered men are engaging in UAI, and anxious about potentially resultant STI/HIV transmission. This hypothesis has not been tested in the literature. Researchers have investigated psychological distress, including anxiety, as a function of relationship type (monogamous, open, etc.; Wagner, Remien, & Carballo-Dieguez, 2000). Results indicated no significant differences in psychological distress indices, across relationship type. Hart and Heimberg (2005) reported that social anxiety was a predictor of sexual risk among gay and bisexual young men; however, partnership status was not accounted for in
this study. Future research should investigate further whether there is an association between anxiety and UAI within gay male relationships, and if so, factors underlying the association.

3. Selection vs. Protection

Longitudinal analyses indicated limited support for both selection and protection in this sample. Lending support to the selection hypothesis, decreases in depression trended toward increased likelihood of becoming partnered over time. This finding is supported by research on heterosexuals (Horwitz, Raskin White, & Howell-White, 1996), but has not been replicated among gay and bisexual men. Additionally, we found evidence for selection, but not based on changes in the psychological and behavioral variables we hypothesized. For example, decreases in hard drug and alcohol use did not relate to increased likelihood of becoming partnered, as our selection hypotheses predicted. But, increases in sexual risk and anxiety did predict becoming partnered.

This unique selection process may reflect the phenomenon of gay and bisexual men engaging in UAI with another man prior to being officially partnered with him. This shared sexual experience may prompt individual-level anxiety, due to each partner’s awareness that he may be exposing himself to HIV (Semple et al., 2011). Eventually these two men may become partnered, even in the absence of a shared emotional connection or desire to enter into the partnership, because being partnered with the man may relieve the anxiety of having UAI with him. This explanation is speculative, but may relate to empirical findings regarding high relationship turnover (Eaton, West, Kenny, & Kalichman, 2009) and as mentioned, high prevalence of HIV transmission, in gay male partnerships (e.g., Wong et al., 2012).
There are several alternative explanations for our finding that those reporting increased anxiety were selected into relationships. First, an individual’s anxiety in itself may not decrease his perceived desirability as a romantic partner. Instead, how one copes with his anxiety within a relationship is more important to perceived desirability and relationship longevity (Kashdan, Volkmann, Breen, & Han, 2007). Thus, individuals experiencing anxiety can cope with it in a way that promotes becoming and staying partnered. Second, individuals commonly report “attachment anxiety” when becoming attached to someone romantically, even if the partner and partnership are perceived positively (Marazziti et al., 2006). Our finding may reflect this specific period of our participants’ relationship-building experience. Lastly, low levels of anxiety have been linked with increases in performance-related variables, e.g. creativity and productivity (Byron, Khazanchi, & Nazarian, 2010). These behavioral boosts, borne from increased anxiety, may relate to increases in a potential partner’s desirability.

Men who changed from single to partnered during the study reported less depression when partnered, lending support to the protection hypothesis. Research among heterosexuals corroborates this finding (e.g. Frech & Williams, 2007; Willitts, Benzeval, & Stansfeld, 2004). Ours is the first study among gay and bisexual men to provide evidence that entering a partnership increases mood. Simultaneously, our baseline results indicated partnered men were no less depressed than single men. Taken together, these findings may reflect the proposed “honeymoon effect,” whereby individuals report increased happiness upon entering a partnership. Eventually, this temporary mood increase wanes, and subsequent reports of happiness are similar to those obtained when individuals were single (Zimmerman & Easterlin, 2006).
Recent research among heterosexuals is mixed regarding the honeymoon effect. Some findings indicate married individuals experience persistent, not temporary, increases in happiness (Qari, 2010). Other research has found sharp declines in variables such as life satisfaction, after the “honeymoon period” ends (Stutzer & Frey, 2006). The honeymoon effect has not been tested among gay and bisexual men, but our results indicate at least temporary increases in mood based on entering a partnership. We suggest future studies investigate the honeymoon effect in gay/bisexual male versus heterosexual couples. Potentially, gay and bisexual men are more likely than heterosexuals to exit a partnership after the honeymoon period, because they are less likely to be connected to their partnerships by legal marriage ceremonies or pacts.

Consistent with baseline results, longitudinal results indicated men who entered partnerships reported more anxiety, and more sexual risk, than when they were single. No other significant associations were found between changes in partnership status and health over time, with partnership status as the predictor variable. Therefore, among gay and bisexual men, partnership seems “protective” only in terms of mood. Contrary to our hypothesis, partnership seems to create vulnerability to at least one negative affective (anxiety) and behavioral (sexual risk) health outcome. These outcomes may be associated; engaging in UAI may itself be anxiety-provoking (Semple et al., 2011). Men who have UAI may worry they are going to contract an STI, or that they have an undiagnosed STI and are going to transmit it to a partner. Anxiety may increase as a man enters a partnership and immediately, or eventually, engages in UAI with his primary partner. Alternately, as men enter a partnership they may experience anxiety independent of their sexual behavior. This phenomenon, described by the term “dating anxiety,” has
been reported among heterosexual populations (e.g. Odaci & Kalkan, 2010) but has not been tested among gay and bisexual males.

There are numerous potential explanations for gay and bisexual men increasing frequency of UAI when they become partnered. Among younger gay and bisexual men, these include considering a relationship to be serious, having an older partner, using drugs before sex, physical violence or forced sex within the relationship, and relationship duration of six months or longer (Mustanski, Newcomb, & Clerkin, 2011). Among HIV serodiscordant gay couples, UAI is predicted by the HIV positive partner having an undetectable viral load (Van de Ven et al., 2005). Among mutually HIV negative MSM participating in the Multicenter AIDS Cohort Study (MACS), risk reduction agreements about sex outside the relationship related to an increase in the proportion of UAI within the relationship (Ostrow et al., 2008). In the same study, among mutually HIV positive MSM, decreased HIV concern related to increased UAI frequency. Generally, among gay and bisexual men, partner seroconcordance relates to increased UAI within the relationship (Crawford et al., 2010). Many variables, including those at the individual-difference and couples-process levels, may affect the likelihood of UAI within an MSM partnership. Of course each of these variables is a potential point of intervention to promote safer sex within partnerships.

4. Limitations

Our findings should be interpreted in the context of our study limitations. First, our analytic structure prohibits causal interpretations of significant findings. Our GEEs assessed, e.g., whether a change in partnership status over several months was associated with increased depression during that same period. But, because the measures at each
assessment point were contemporaneous, we cannot conclude that a change in status caused a change in mood. Nor can we state how long any protective effect may have lasted. Although we used a time-lagged analysis to test our hypotheses, causal paths still remain ambiguous. Less widely spaced, and more frequent assessment points would help clarify causal paths.

Our second limitation is a lack of more precise measures of partnership status and characteristics. For example, we asked each participant if he had a primary partner over the last three months, but nothing additional about relationship satisfaction or characteristics that may have informed our findings. Assessment of specific partner-information, e.g. initials of the primary partner, at each time point would help clarify if men are in long-term primary partnerships, or if conversely they are practicing “serial monogamy” – repeated primary partnerships with short breaks in-between. Such data would inform the interpretation of our findings, particularly the anxiety/sexual risk co-occurrence.

Lastly, ours is a convenience-sample comprised of behaviorally risky gay and bisexual men, living in large U.S. cities, willing to participate in a longitudinal research study. Therefore, these results cannot be generalized to other subgroups of gay and bisexual men, e.g. those who have not recently engaged in UAI with a partner of unknown- or opposite HIV status under the influence of drugs or alcohol. Partnered and single men from subgroups unrepresented in this study may compare differently than partnered and single men in our sample.

This study is the first to use longitudinal data to test the competing protection and selection hypotheses in a sample of behaviorally risky gay and bisexual men. Overall,
limited support was found for protection, and an unexpected pattern of selection emerged. These findings can inform future cross-sectional and longitudinal research investigating partnership status and health among gay and bisexual men.
V. SUMMARY OF FINDINGS

A. Overall Findings

Overall, our three studies yielded mixed findings regarding the association between partnership status and health. Our primary hypothesis that partnership was associated with greater health among gay and bisexual men was not wholly supported. Nonetheless, across studies partnered gay and bisexual men reported some health benefits compared to their single counterparts.

B. Study One

In Study One, we tested the Stress-buffering hypothesis among HIV positive gay and bisexual men. Stress-buffering states the combined effect of chronic and acute stressors will be diminished in the presence of a high quality/quantity of social support. We hypothesized that partnership would lessen the effects of stress associated with gay identity and HIV infection, and would confer health benefits by increasing the availability of emotional and instrumental support. We found that partnered men reported less hard drug use than single men. Partnered men also trended toward reporting more emotional and instrumental support compared to single men. Several health outcome variables that we hypothesized would be associated with partnership status were not – viral load, CD4/T-cell count, alcohol use, medication and appointment adherence, and depression and anxiety. Overall, there was no support for Stress-buffering in this sample.

C. Study Two

In Study Two, we tested the Social Strain hypothesis among young gay and bisexual men. Social Strain states stressful relationships can lead to negative health outcomes. We compared single and partnered sample men on a range of health indices, and tested whether
partnered participants’ relationship satisfaction was associated with health. We found only one significant group difference in terms of psychological and behavioral health outcomes: Men whose most recent anal intercourse partner was serious were more likely to have had UAI with that partner, than were men whose most recent partner was casual. Lower relationship satisfaction was associated with less depression and anxiety, and less binge drinking. Overall, in this sample we found no support for partnership benefits, and preliminary support for social strain in terms of mental health, but not substance use.

D. Study Three

In Study Three, we used baseline data from a large intervention study to compare single and partnered behaviorally risky gay and bisexual men. Results replicated the finding from Study One that partnered men reported less hard drug use. We also used longitudinal sample data to test the Protection versus Selection hypotheses – asking whether partnership leads to health increases (protection), or if instead healthy individuals are selected into partnerships (selection). Neither hypothesis was supported strongly. In support of the Protection perspective, men who entered a partnership reported decreases in depression. However, these men also reported increases in anxiety and sexual risk. This finding that new partnerships occasioned both anxiety and sexual risk suggests that men experienced anxiety as they entered a partnership and engaged in unprotected sex with this partner prematurely, i.e., before both partners were unquestionably HIV-free. Only one finding supported our specific Selection hypothesis: a trend for decreases in depression to predict becoming partnered. Otherwise, an unexpected pattern of selection emerged – men who engaged in recent sexual risk and reported increased anxiety over time were selected into partnerships.
E. Alternative Explanations and Future Research

Our finding that partnership did not relate consistently to health benefits across studies should not be interpreted as hard evidence that gay and bisexual male partnerships are not beneficial to individuals in them. Several alternative interpretations for our findings exist. Each represents a testable hypothesis for future research on this topic.

First, more partnership benefits may exist for gay and bisexual men than were reported here. Our lack of reported benefits may be due to measurement error borne from imprecise survey items regarding partnership. Alternately, a lack of moderating analyses in our studies may explain our lack of significant findings. Parsing our large samples into smaller subgroups based on age, race, or HIV status may have illuminated partnership benefits specific to these subgroups. Additionally, adding a qualitative component to this project may have illuminated partnership benefits unmeasured, or poorly measured, in these quantitative studies. Overall, primary partnership among gay and bisexual men may be more a complex phenomenon than our relatively simple partnership measures could indicate.

Related, between-group differences may exist in how “primary partner” is defined for gay and bisexual males versus heterosexuals. Consequently, “primary partnership” may constitute a different set of individual behaviors and dyadic interactions for gay and bisexual men compared to heterosexuals. These distinguishing behaviors and interactions may explain unique associations between partnership status and individual-level psychological and behavioral health variables among gay and bisexual men. We know that many gay and bisexual men act differently than heterosexuals while in primary partnerships, specifically in regard to sexual behavior outside the relationship. This may indicate that for some gay and bisexual men, a primary partner represents someone different than a primary partner for heterosexuals. For
heterosexuals, a primary partner may be an individual’s main source of emotional and instrumental support, as well as an individual’s sole source of sexual satisfaction. For gay and bisexual males, a primary partner may be an individual’s most frequent sexual partner, but not a main source of support. This support may come from other types of relationships, e.g. enduring friendships or close relationships with supportive family members. This would explain why we did not find comprehensive health benefits associated with partnership in these samples.

In support of the above hypothesis, research on several culture-specific variables indicates gay and bisexual male primary partnerships are, in fact, different than heterosexual partnerships. These variables include shorter relationship duration and faster partner turnover than for heterosexuals. These between-group differences in partnerships may relate to between-group differences in partnership benefits. Additionally, the stressful individual experience of being gay or bisexual may confound, attenuate, or even conceal partnership benefits that research has uncovered more easily among heterosexuals. For example, individual negative experiences such as internalized homophobia and rejection from loved ones may weaken partnership-related benefits among gay and bisexual males. Alternately, gay and bisexual male partnerships may be more stressful than heterosexual partnerships, due to factors such as disclosure to family about partnership status, and stressful experiences related to the family “not accepting” the same-sex partner. This stress may attenuate potential partnership benefits.

Additionally, within-group differences may exist in how various gay and bisexual male subgroups define primary partnerships. Warren and colleagues (2008) speculated this in their study of predictors of UAI among African American, Hispanic, and White MSM. They found that in their sample, two-times as many African American MSM reported having a primary partner compared to Hispanic and White MSM. Further, being in a long-term relationship was
associated with engaging in sexual risk only for African American, but not Hispanic or White, participants. These partner-level differences by race/ethnicity are consistent with several individual-level differences reported between African American and other-racial/ethnic MSM, e.g. condom use patterns, gay identification, internalized homophobia, and openness to discussing same-sex relations with others (Du Bois, Emerson, & Mustanski, 2011; O’Leary, Fisher, Purcell, et al., 2007). Other researchers point to potential age-related differences in gay and bisexual males’ definition of main/primary partner. Sullivan and colleagues (2009) suggest younger MSM may consider someone to be a main/primary partner sooner than older MSM, whose partners are more established in terms of relationship longevity. We recommend qualitative research elucidate how gay and bisexual men of various racial/ethnic and age groups define primary partnership. This data will clarify whether gay and bisexual males define primary partnership differently than heterosexuals, and differently within their own subgroups.

Next, more partnership benefits may be reported by general population gay and bisexual men than by the samples of men in these studies – HIV positive, young, and behaviorally risky men, respectively. Each of the gay and bisexual male samples reported on here is unique in that it is vulnerable, in terms of health outcomes, compared to other gay and bisexual males. Studies of those other gay and bisexual men may reveal that they experience more partnership benefits than men from these studies.

Lastly, just as discrepancies exist in partnership benefits between men and women, discrepancies may exist in partnership benefits between heterosexuals and gay and bisexual men. Gay and bisexual men may benefit from partnership, but less than heterosexuals. Studies comparing partnership benefits across heterosexual and gay/ bisexual groups would clarify if this is the case.
In sum, there are many potential explanations for our unsupported hypotheses and null findings. Further, this is a relatively untapped research topic. Therefore, much more research is needed on this topic before concluding that partnership is not associated with health benefits among gay and bisexual men. We hope researchers increasingly ask questions and test hypotheses about partnership and health among gay and bisexual men. This likely will include studies and behavioral interventions designed with couples and couples-level processes in mind. Such research would represent a shift from our current, individually-focused paradigms. This shift is warranted given our incomplete understanding of gay and bisexual male partnerships, recent findings that partnerships are the new primary HIV transmission venue for these men, and increasing sociopolitical attention around the issues of gay marriage and civil union legalization.
CITED LITERATURE


and social psychology 72(6): 1349-1363.


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IRB APPROVALS

STUDY ONE

TREATMENT ADVOCACY PROGRAM (TAP)

UNIVERSITY OF ILLINOIS
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

Approval Notice
Continuing Review

December 20, 2005

David McKirnan, PhD
Psychology
1007 W. Harrison Street
1058-B B.S.B., M/C 285
Chicago, IL 60612
Phone: (312) 413-2634 / Fax: (312) 413-4122

RE: Protocol # 2002-0419
“The Efficacy of HIV Treatment Advocacy for Sexual Safety”

Dear Dr. McKirnan:

Your Application for Continuing Review was reviewed and approved by the Convened review process on December 15, 2005. You may continue your research.

Please note the following information about your approved research protocol:

Please note the following:
1. Please submit a copy of the current Howard Brown IRB approval letter within 60 days of receiving this notification (i.e., no later than February 20, 2006).
2. Please submit a copy of the HIPAA determination letter from each institution from which Protected Health Information will be used or disclosed.
3. Please be reminded that subsequent continuing review applications must include information regarding the progress of follow-up of participants (contacts, etc.).

Protocol Approval Period: January 6, 2006 - January 5, 2007
Approved Subject Enrollment #: 321 previously enrolled subjects

Additional Determinations for Research Involving Minors: These determinations have not been made for this study since it has not been approved for enrollment of minors.

Performance Sites: UIC, Howard Brown Health Center (lead performance site), St Joseph's Hospital, Chicago Department of Health, Uptown Clinic

Sponsor: CDC

Research Protocol(s):
  a) Treatment Advocacy Program Study Protocol; Version 3; 4/8/03
  b) The Efficacy of HIV Treatment Advocacy for Sexual Safety (The Centers for Disease Control and Prevention Grant #: R18/CCR520972; Principal Investigator: David J. McKirnan, Howard Brown Health Center)

Recruitment Material(s):
  a) Participant Scheduling Letter - CLEAN, 4/03/05 (No V#)

Informed Consent(s):
  a) TAP Consent Addendum, 03/35/05 (No V#)
  b) TAP Consent Addendum, remote 6-12 month interviews, 11/21/05

Please note the Review History of this submission:

<table>
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<tr>
<th>Receipt Date</th>
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<th>Review Date</th>
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<tr>
<td>12/02/2005</td>
<td>Continuing Review</td>
<td>Convened</td>
<td>12/15/2005</td>
<td>Approved</td>
</tr>
</tbody>
</table>

Please remember to:

➔ Use your research protocol number (2002-0419) on any documents or correspondence with the IRB concerning your research protocol.

➔ Review and comply with all requirements on the enclosure, "UIC Investigator Responsibilities, Protection of Human Research Subjects"

Please note that the UIC IRB has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact OPRS at (312) 996-1711 or me at (312) 355-2908. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Charles W. Hoehne, B.S.
Assistant Director, IRB # 2
Enclosure(s):

1. **UIC Investigator Responsibilities, Protection of Human Research Subjects**

2. **Informed Consent Document(s):**
   a) TAP Consent Addendum, 03/35/05 (No V#)
   b) TAP Consent Addendum, remote 6-12 month interviews, 11/21/05

3. **Recruiting Material(s):**
   a) Participant Scheduling Letter - CLEAN, 4/03/05 (No V#)

4. **Optional Form 310 - Protection of Human Subjects, Assurance Identification/Certification/Declaration**

   cc: Gary E. Raney, Psychology, M/C 285
STUDY TWO

CREW 450

Institutional Review Board Office
Northwestern University
Biomedical IRB 750 North Lake Shore Drive Suite 700 Chicago, Illinois 60611 312-503-9338

5/2/2013

Social and Behavioral Sciences IRB
600 Foster Street
Chambers Hall, Second Floor
Evanston, Illinois 60208
847-467-1723

Dr. Brian Mustanski
Medical Social Sciences (MSS)
625 N Michigan Suite 2700
Chicago IL 60622
brian@northwestern.edu

IRB Project Number: CR2_STU00046626
Project Title: Syndemic Development and HIV Risk Among Vulnerable Young Men
Project Sites: Ann & Robert H. Lurie Children’s Hospital of Chicago (Lurie Children's) Northwestern University (NU) Community centers, businesses, organizations and/or foundations

Sponsor Information (Grant #, if applicable):
View National Institute on Drug Abuse
View National Institute on Drug Abuse
View National Institute of Mental Health
View National Institute on Drug Abuse

1R03 DA033906-01 R01DA025548 K08 MH094441-01A1 3R01DA025548-04S2
Submission Considered: Continuing Review Submission Number:
CR2_STU00046626 Submission Review Type: Expedited Review Date (for Expedited Review): 5/2/2013

Status: APPROVED
Approval Period: (5/2/2013 - 5/26/2014)

Dear Dr. Mustanski,
The IRB considered and approved your submission referenced above through 5/26/2014. As Principal Investigator (P.I.), you have ultimate responsibility for the conduct of this study, the ethical performance of the project, and the protection of the rights and welfare of human subjects. You are required to comply with all NU policies and procedures, as well as with all applicable Federal, State and local laws regarding the protection of human subjects in research including, but not limited to the following:

Not changing the approved protocol or consent form without prior IRB approval (except in an emergency, if necessary, to safeguard the well-being of human subjects).

Obtaining proper informed consent from human subjects or their legally responsible representative, using only the currently approved, stamped consent form.

Promptly reporting unanticipated problems involving risks to subjects or others, or promptly reportable non-compliance in accordance with IRB guidelines.

Submit a continuing review application 45 days prior to the expiration of IRB approval. If IRB re-approval is not obtained by the end of the approval period indicated above, all research related activities must stop and no new subjects may be enrolled.
STUDY TWO

PROJECT Q2

Institutional Review Board Office
Northwestern University
Biomedical IRB 750 North Lake Shore Drive Suite 700 Chicago, Illinois 60611 312-503-9338

4/23/2013

Social and Behavioral Sciences IRB
600 Foster Street
Chambers Hall, Second Floor
Evanston, Illinois 60208
847-467-1723

Dr. Brian Mustanski
Medical Social Sciences (MSS)
625 N Michigan Suite 2700
Chicago IL 60622
brian@northwestern.edu

IRB Project Number: CR2_STU00047881 Project Title: Project Q2: Trajectories of sexual minority youth development

Project Sites: Northwestern University (NU)

Sponsor Information (Grant #, if applicable):
View National Institute of Mental Health
View William T. Grant Foundation Scholars Award

Submission Considered: Continuing Review
Submission Number: CR2_STU00047881
Submission Review Type: Expedited Review
Date: 4/23/2013

Status: APPROVED - CLOSED TO ACCRUAL: Subjects have completed study treatment/intervention/procedures, but continue in follow-up observation or long-term follow-up.


Dear Dr. Mustanski,
The IRB considered and approved your submission referenced above through 5/16/2014. As Principal Investigator (P.I.), you have ultimate responsibility for the conduct of this study, the ethical performance of the project, and the protection of the rights and welfare of human subjects. You are required to comply with all NU policies and procedures, as well as with all applicable Federal, State and local laws regarding the protection of human subjects in research including, but not limited to the following:

Not changing the approved protocol or consent form without prior IRB approval (except in an emergency, if necessary, to safeguard the well-being of human subjects).

Obtaining proper informed consent from human subjects or their legally responsible representative, using only the currently approved, stamped consent form.

Promptly reporting unanticipated problems involving risks to subjects or others, or promptly reportable non-compliance in accordance with IRB guidelines.

Submit a continuing review application 45 days prior to the expiration of IRB approval. If IRB re-approval is not obtained by the end of the approval period indicated above, all research related activities must stop and no new subjects may be enrolled.
STUDY THREE

PROJECT MIX

UNIVERSITY OF ILLINOIS
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

Approval Notice

Continuing Review

July 22, 2008

David McKirnan, PhD
Psychology
1007 W. Harrison Street
1058-B B.S.B., M/C 285
Chicago, IL 60612
Phone: (312) 413-2634 / Fax: (312) 413-4122

RE: Protocol # 2004-0481
“Project Mix: Behavioral Intervention to Reduce Sexual Risk Behavior of Substance-Using (Non-Injection) Men Who Have Sex with Men”

Dear Dr. McKirnan:

Your Continuing Review application was reviewed and approved by the Expedited review process on July 7, 2008. You may continue your research.

Please note the following information about your approved research protocol:

Please note that key research personnel, Anna Veluz, is not up to date with investigator training requirements and is not currently eligible to engage in research protocols submitted to the UIC Institutional Review Board (IRB). All investigators and key research personnel involved in human subjects research must complete a minimum of two hours of investigator training in human subjects protection every two years. For more information regarding UIC’s investigator training requirements, please visit the OPRS website at http://tigger.uic.edu/depts/ovcr/research/protocolreview/irb/education/continuing.shtml.

Protocol Approval Period: July 7, 2008 - July 6, 2009
Approved Subject Enrollment #: 2,000 (limited to data analysis for 569 enrolled subjects; follow-up completed)

Additional Determinations for Research Involving Minors: These determinations have not been made for this study since it has not been approved for enrollment of minors.
Performance Sites: UIC, Howard Brown Health Center  
Sponsor: Centers for Disease Control and Prevention  
PAF#: Not available  
Grant/Contract No: U65/CCU522209-1  
Grant/Contract Title: Reducing Risk of HIV Transmission in Substance Using Men Who Have Sex with Men  

Research Protocol:
   c) Reducing Risk of HIV Transmission in Substance Using Men Who Have Sex With Men (CDC Grant #: U65/CCU522209-01)
   d) "Project Mix - Trial Phase of Protocol", 04/18/2006

Recruitment Material:
   b) N/A – Research is limited to data analysis only

Informed Consent:
   c) N/A – Research is limited to data analysis only

Your research continues to meet the criteria for expedited review as defined in 45 CFR 46.110(b)(1) under the following specific category:

(9) Continuing review of research, not conducted under an investigational new drug application or investigational device exemption where categories two (2) through eight (8) do not apply but IRB has determined and documented at a convened meeting that the research involves no greater than minimal risk and no additional risks have been identified.

Please note the Review History of this submission:

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<td>Continuing Review</td>
<td>Expedited</td>
<td>07/07/2008</td>
<td>Approved</td>
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Please remember to:

➔ Use your research protocol number (2004-0481) on any documents or correspondence with the IRB concerning your research protocol.

➔ Review and comply with all requirements on the enclosure, "UIC Investigator Responsibilities, Protection of Human Research Subjects"

Please note that the UIC IRB has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact OPRS at (312) 996-1711 or me at (312) 996-2014. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,
Enclosures:

5. **UIC Investigator Responsibilities, Protection of Human Research Subjects**
6. **Protection of Human Subjects, Assurance Identification/Certification/Declaration (formerly Form 310)**

cc: Gary E. Raney, Psychology, M/C 285
Curriculum Vitae

Steve Nicholas Du Bois, Ph.D.
4101 N. Kenmore, Chicago, IL 60613  dubois@uic.edu  734.678.1608

PROFESSIONAL APPOINTMENTS
Dr. John J.B. Morgan Clinical Research Postdoctoral Fellow, Fall 2013 – present
The Family Institute, Northwestern University

EDUCATION
APA Accredited Clinical Psychology Predoctoral Internship, Completed June 2013
Hines Veterans Affairs Hospital, Hines, IL

Doctor of Philosophy, Clinical Psychology, June 2013 University of Illinois at Chicago (APA Accredited Program in Clinical Psychology)
Dissertation Title: What’s Love Got to do With It? Examining the Association of Partnership and Health among Multiple Groups of Gay and Bisexual Men

Preliminary Examination, Clinical Psychology January 2011 University of Illinois at Chicago
Empirical Study: Age, Internalized Homophobia, and Cognitive Escape among Men who Have Sex with Men

Master's Thesis, Clinical Psychology, April 2009 University of Illinois at Chicago
Title: A Cross-Sectional and Longitudinal Analysis of HIV-Treatment Adherence among Men who Have Sex with Men

Bachelor of Arts, Psychology, May 2005 Honors Program, University of Michigan, Ann Arbor

PEER-REVIEWED PUBLICATIONS


**BOOK CONTRIBUTIONS**


**MANUSCRIPTS UNDER REVIEW**

**Du Bois, S.N.** & McKirnan, D.J. Internalized homophobia, age, and cognitive escape among men who have sex with men. *Journal of Homosexuality.*

**MANUSCRIPTS IN PREPARATION**

**Du Bois, S.N.** & McKirnan, D.J. Does partnership buffer against the effects of HIV among seropositive gay and bisexual men?

**Du Bois, S.N.** & McKirnan, D.J. Testing the protection versus selection effects among behaviorally-risky gay and bisexual men.

**Du Bois, S.N.**, Mustanski, B., & Garofalo, R. Relationship satisfaction and social strain among young gay and bisexual men.

Raja, S., Allgood, K., Holland, C., & **Du Bois, S.N.** Trauma, violence, and risk behavior among HIV patients.

Winer, E.S., Robinson, J., & **Du Bois, S.N.** GAD turns 30: a review of mechanisms and treatment options.
CONFERENCE PRESENTATIONS


HONORS & AWARDS
Midwest Association of Graduate Schools Excellence in Teaching Award
Department of Psychology, University of Illinois at Chicago, 2013 Chosen by the Psychology Department’s Director of Graduate Studies as the sole nominee from the department for this University-wide and regional teaching award. Then selected from all University’s departmental nominees as the University’s “winner” to move on to compete with other University winners at the Midwestern level.

Harry S. Upshaw Award for Excellence in Teaching
Department of Psychology, University of Illinois at Chicago, 2012Du Bois 2 Awarded ($500, annually) to “the graduate student in the Department of Psychology at the University of Illinois at Chicago who best exemplifies Harry Upshaw’s dedication to teaching excellence.”

Department of Psychology Travel Grant
University of Illinois at Chicago, Spring 2008, 2009, 2010, Fall 2011, 2012 Department award ($100), given to student researchers presenting at research conferences

Graduate Student Council Award
University of Illinois at Chicago, Spring 2009, 2010, Fall 2011, Fall 2012 University award ($200), given to student researchers presenting at research conferences

LGBT Summer Institute (LGBTSI) Fellow
University of Michigan, Summer 2010 One of 47 LGBT researchers selected to attend a week-long colloquium to present my research, attend research presentations, and participate in research-related colloquia

Graduated Summa Cum Laude (with highest distinction)
University of Michigan, 2005

TEACHING EXPERIENCE__________________________________________*
*student N in parentheses after each listed semester

Instructor, Graduate Course, University of Illinois at Chicago
How to be a Teaching Assistant in the Department of Psychology
Fall 2010 (18), Fall 2011 (15)

Instructor, Undergraduate Courses, University of Illinois at Chicago
Psychological Testing
Summer 2010 (26), Spring 2011 (96), Summer 2011 (23), Summer 2012 (16)

Abnormal Psychology
Spring 2010 (48)

Teaching Assistant, Graduate Course, University of Illinois at Chicago
Clinical Interviewing

Teaching Assistant, Undergraduate Courses, University of Illinois at Chicago
Clinical Interviewing
Fieldwork in Psychology
Self-Intervention
Introduction to Psychology
Psychology of Sport

Instructor, Kaplan Test Preparation Services, Chicago, IL 2006 – 2009 (314)