

Mental Health Differences between Young Adults with and without Same-Sex Contact: A Simultaneous Examination of Underlying Mechanisms

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Abstract

Previous research has documented that sexual minorities are more likely than heterosexual people to experience mental health problems, but little is known about how these disparities emerge. Analysis of data from Miami–Dade County, Florida, shows that young adults reporting same-sex contact have higher levels of depressive symptoms and drug use than those without such contact, but that different processes explain the disparities in the two outcomes. A substantial portion of the gap in depressive symptoms is explained by sexual minorities' higher levels of stress exposure and their lower levels of family support and psychological resources. The gap in drug use is not explained by these processes, but is partially explained by self-exploratory attitudes and permissiveness of drug use in social networks. This study highlights the importance of using multiple outcome measures in research that examines mechanisms underlying mental health disparities across social groups.

Keywords

depression, drug use, gay/lesbian/bisexual people, sexuality, stress

Previous studies have reported that sexual minorities are more likely to experience mental health problems than heterosexual people. According to Meyer's (2003) meta-analysis, sexual minority adults are 2.3 times as likely to have mood disorders and 2.1 times as likely to have substance use disorders in the past year compared to heterosexual adults. Similarly, sexual minority youth report significantly higher levels of depressive symptoms and drug use than heterosexual youth (Hatzenbuehler, McLaughlin, and Nolen-Hoeksema 2008; Russell, Driscoll, and Truong 2002). However, the literature provides only limited information about the origins of these mental health disparities, reflecting several limitations of previous research. First, many studies were based on small samples of sexual minorities (e.g., Ryan et al. 2009; Rosario, Schrimshaw, and Hunter 2004) and were not designed to explain the mental health differences

between sexual minority and heterosexual people. Second, studies that did include heterosexual people as a comparison group provided little information on underlying mechanisms (Marshal et al. 2008). Third, the small number of studies that tested underlying processes considered only a few processes at a time (e.g., Mays and Cochran 2001; Russell and Joyner 2001), which may have led to an overestimation of the effects of these mechanisms due to confounding with other mechanisms not included in the analysis. Fourth, most studies

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of underlying mechanisms relied on a single mental health outcome, most often depressive symptoms (e.g., Ueno 2005) or suicide attempts (e.g., Safren and Heimberg 1999). Consequently, mechanisms for disparities in other mental health outcomes such as substance use have rarely been tested (Marshall et al. 2008).

The purpose of this study is to investigate the extent to which previously proposed mechanisms explain the mental health differences between sexual minority and heterosexual people. The analysis uses data from the Transitions Study based on a sample of Miami-Dade County residents transitioning into adulthood. Sexual contact is used as an indicator of sexual orientation. The data include information on a wide range of underlying processes (stress exposure, deficiency in psychosocial resources, self-exploratory attitudes, and network members' drug use and permissiveness). Simultaneous tests of these mechanisms allow more rigorous assessment of the relative importance of each mechanism than previous studies. Focusing on depressive symptoms and drug use, the study also examines the possibility that the disparities between people with and without same-sex contact arise through different sets of mechanisms for the two mental health outcomes.

MECHANISMS OF THE MENTAL HEALTH DISPARITIES

Scholars have proposed several mechanisms to explain the greater mental health problems among sexual minorities. Some mechanisms are based on the stress perspective (Pearlin 1989; Thoits 1995) and address how marginalization of sexual minorities in a heteronormative society increases their stress exposure and reduces their psychosocial resources (Meyer 2003). The stress perspective predicts that responses to these conditions contribute to the overall higher rates of mental health problems among sexual minorities, although it assumes their coping attempts and resiliency alleviate the psychological impact to some extent (Meyer 2003). This perspective conceptualizes depressive symptoms as an internalizing stress response, and drug use as an externalizing response (Rosenfield, Lennon, and White 2005; Simon 2002).

Diverging from this conceptualization of drug use in the stress perspective, some scholars emphasize its voluntary and learned aspects (Arnett 2005; Becker 1953). Because drug use is voluntary,

people with strong self-exploratory attitudes are likely to engage in the behavior (Arnett 1998). Because people learn the meaning and practical skills of drug use in their social networks, network members' drug use and permissiveness significantly predict the chance of drug use (Kandel 1996). These factors may account for the gap in drug use between sexual minority and heterosexual people unexplained by stress processes; self exploration is linked to unconventional sexual activities including same-sex behaviors especially in youth (Goode and Haber 1977; Hewitt 1998), and some sexual minorities live in drug-permissive social environments (Green 2003).

Stress Processes

Greater exposure to stressors. Sexual minorities' greater mental health problems may stem from their elevated levels of exposure to certain types of stressors. Sexual minorities are more likely than heterosexual people to experience *physical and sexual victimization* in their childhood and adolescence (Austin et al. 2008). For example, they are more likely to have their belongings damaged and to be threatened with a weapon at school (Garofalo et al. 1998). Using the National Longitudinal Study of Adolescent Health, Russell and Joyner (2001) showed that victimization partly explains sexual minority adolescents' higher rate of suicide attempts.

Discrimination is another type of stressor more commonly experienced by sexual minorities than by heterosexual people. Using the data from the National Survey of Midlife Development in the United States, Mays and Cochran (2001) demonstrated that sexual minorities are 1.8 times as likely as heterosexual people to report major discrimination events (e.g., fired from a job, hassled by the police) and 2.4 times as likely to report daily discrimination (e.g., called names, treated with less respect). In their study, major and daily discrimination partly explained sexual minorities' poorer mental states (higher rates of psychiatric disorders, perceptions of poorer mental health, and higher levels of psychological distress).

In addition to victimization and discrimination, which directly relate to sexual minorities' disadvantaged status, more general types of stressors may contribute to their greater rates of mental health problems. *Negative life events* refer to socially undesirable changes that require behavioral adjustments in routine activities (e.g., job loss,

injury) (Thoits 1995). People in marginalized statuses experience a greater number of negative life events because those events often arise from poorer living conditions structured by their low statuses (Pearlin 1989; Turner, Wheaton, and Lloyd 1995). Sexual minority youth are also more likely than heterosexual youth to experience friendship dissolution (Diamond and Lucas 2004) and suicide attempts by friends, especially for girls (Russell and Joyner 2001). Safren and Heimberg (1999) found that sexual minority youth's greater exposure to negative life events partly explains their higher rates of suicide attempts compared to heterosexual youth.

Chronic strains are another broad category of stressors and refer to recurring or persistent problems (Pearlin and Schooler 1978). Like negative life events, chronic strains are more prevalent among socially marginalized groups (Mirowsky and Ross 1986; Turner et al. 1995). For sexual minorities, others' resistance to nonheterosexual orientation creates enduring problems and repeated conflicts in social relationships. For instance, Ueno (2005) showed that sexual minorities are more likely to report arguments with parents and problems getting along with their peers and teachers, and these factors partly explain sexual minority youth's higher levels of depressive symptoms.

Deficiency in psychosocial resources. In the stress framework, social support and psychological resources are conceptualized as resources necessary to cope with stressors (Thoits 1995), and sexual minorities' greater mental health problems may result from their lack of sufficient resources. Although sexual minorities generally maintain high-quality relationships with their friends (Ueno et al. 2009), some of them report a lack of social support from family members due to family members' rejection, as well as their own attempts to maintain emotional distance and avoid the pressure to disclose their sexual orientation (Lasser and Tharinger 2003). Safren and Heimberg (1999) found that sexual minorities' lower levels of social support partly explain their elevated rates of suicide attempts, compared to heterosexual youth.

There are several *psychological resources* important for maintaining mental health. Optimism refers to the tendency to expect positive outcomes (Scheier, Carver, and Bridges 1994). Self-esteem refers to the positive evaluation or approving attitude toward oneself (Rosenberg

1965). Mastery refers to the sense of being under one's own control as opposed to external forces (Pearlin and Schooler 1978). Mattering refers to "the feeling that others depend upon us, are interested in us, are concerned with our fate, or experience us as an ego-extension" (Rosenberg and McCullough 1981:165).

Sexual minorities may have lower levels of psychological resources than heterosexual people for three reasons. First, as noted above, they are more likely to experience violence and discrimination, which tend to drain psychological resources (Ryff, Keyes, and Hughes 2003). Second, in addition to actual discriminatory events, perceived heterosexism may lead to anticipation of discrimination, and constantly being on guard against discrimination erodes psychological resources (Allport 1954; Meyer 2003). Third, some sexual minorities struggle with internalized homophobia (Meyer 1995), which undermines their self-esteem (Szymanski and Kashubeck-West 2008). Despite these possibilities, previous studies have produced mixed findings about whether sexual minorities have lower levels of psychological resources than heterosexual people (see Savin-Williams 1990 for a review of self-esteem studies). To my knowledge, no study has evaluated the extent to which resource deficiency explains the mental health gaps between sexual minority and heterosexual people.

Attitudinal and Network Processes of Drug Use

Because the stress framework proposes general processes through which stress exposure manifests in various mental health outcomes (Mays and Cochran 2001; Thoits 1995), the framework tends to ignore etiological factors unique to each mental health outcome. Drug use, in particular, may be motivated by one's inclination to engage in untraditional or risky behaviors (Arentt 1998). Social networks also strongly affect the chance of drug use by shifting social norms and drug access (Kandel 1996; Sutherland and Cressey 1966). Below, I explain how these attitudinal and environmental factors may help explain sexual minorities' higher frequencies of drug use while paying special attention to young adulthood as a life stage context. Because these mechanisms are specific to drug use, they are not expected to explain sexual minorities' greater levels of depressive symptoms.

Self exploration. Arnett (2005) characterizes the period between ages 18 and 25 as a time for self exploration. As constraints from parents and school weaken, people seek to find out who they are and what they want for their careers and intimate relationships before they settle into adult life. He argues that self exploration is partly responsible for the high frequency of drug use in this life stage. Further, among young adults, those with strong self-exploratory and sensation-seeking attitudes are more likely to engage in drug use (Arentt 1998).

Like drug use, sexual activities in early life stages are often viewed as manifestations of self-exploratory attitudes (Jessor and Jessor 1977). The exploratory aspect may be particularly strong for untraditional sexual behaviors such as same-sex activities (Goode and Haber 1977; Hewitt 1998). Clearly, not all youth with strong self-exploratory attitudes engage in same-sex activities, and not all same-sex activities in youth are exploratory. Studies do find, however, that sexual minority youth tend to be more sexually active than other youth; they report earlier age of first sexual contact (Austin et al. 2008) and a greater number of sexual partners (Garofalo et al. 1998). These findings suggest that sexual minorities' higher frequencies of drug use may result from their self-exploratory attitudes.

Network norms. Behaviors and attitudes of parents and friends are other antecedents shared by sexual behaviors and drug use. Research shows that network members' drug use and their permissiveness significantly contribute to youth's drug use (Musick, Seltzer, and Schwartz 2008) by introducing positive views on drug use, teaching how to use drugs, and increasing access to drugs (Becker 1953; Sutherland and Cressey 1966). Like drug use, sexual behaviors are shaped by network members' attitudes; youth in sexually permissive social networks are more likely to become sexually active at early ages and engage in risky sexual acts (Billy and Udry 1985; Buhi and Goodson 2007). Given the positive correlation between attitudes toward sexual activities and drug use (Jessor and Jessor 1977), social networks tolerant of sexual activities may also be tolerant of drug use. These findings thus suggest that sexual minorities' frequent drug use may result from their social networks permissive of drug use and sexual activities.

Integration into the sexual minority community provides another link between network norms and drug use. Some sexual minorities become integrated into the sexual minority community as

they seek opportunities for sex, romance, and friendships. They may resort to drugs to reduce anxiety about meeting new people and enhance sexual performance (Green 2003). Accordingly, young people who are more integrated into the sexual minority community report more frequent drug use than those with no involvement in the community (Rosario et al. 2004). Among sexual minorities, drug use is often initiated in gay bars or clubs (Parsons, Kelly, and Weiser 2007). Consequently, those who frequent these places are more likely than other sexual minorities to use drugs (Kipke et al. 2007). These findings suggest that the positive association between same-sex sexuality and drug use may develop through integration into the sexual minority community, particularly into drug-permissive subcultures in bar and club settings.

Although these attitudinal and network processes of drug use have received little attention in the stress literature, they may be linked to stress processes in three ways. First, the search for subcultures permissive of unconventional behaviors may be a consequence of stress exposure or resource deficiency in the conventional society (Achilles 1969; Cohen 1955). Second, self-exploratory attitudes may develop as a response to victimization, other traumas, or lack of social support in early life stages (Browning and Laumann 1997; De Coster and Heimer 2001; Heimer and Matsueda 1994). Third, although self-exploratory attitudes and integration into subcultures may create excitement and reduce stress exposure in adolescence, stress exposure may increase in young adulthood as people start to experience negative consequences for status attainment (Hagan 1997). These links among stress, attitudinal, and network processes underscore the need for simultaneous tests, especially for the drug use disparity.

The Present Study

The purpose of this article is to examine the extent to which previously proposed mechanisms explain the mental health disparities between sexual minority and heterosexual people. The Transitions Study is well suited for this investigation because the extensive list of measures for potential mechanisms included in the data allows one to identify the relative importance of each mechanism. Consideration of drug use as an outcome variable is another strength of the present study. The current literature emphasizes the importance of stress processes for explaining the disparities between

sexual minority and heterosexual people in various mental health problems (Marshal et al. 2008; Meyer 2003; Ueno 2010). Direct tests of mediation by stress processes, however, have been limited to studies that focused on depressive symptoms (e.g., Ueno 2005) or suicide attempts (e.g., Russell and Joyner 2001) and studies that examined presence of any type of mental disorders (Mays and Cochran 2001). Therefore, the importance of stress processes for the drug use disparity has not been empirically demonstrated (Marshal et al. 2008). Further, the emphasis on stress processes has hindered attention to other possible mechanisms for the drug use disparity. The present study overcomes these gaps in the existing literature by testing the importance of stress processes for both depressive symptoms and drug use, and by testing both stress processes and attitudinal and network processes for drug use.

The study has two important implications for the broader mental health literature. First, previous studies have shown that people with disadvantaged social statuses are more likely to experience mental health problems and that elevated stress exposure and reduced psychosocial resources are important mechanisms for these disparities (Kessler and McLeod 1984; Ross 1995; Turner, Taylor, and van Gundy 2004; Turner and Avison 2003). Tests of these stress processes have been largely limited to studies of disparities by gender, race, and socioeconomic status, however. The present study extends the literature by testing these mechanisms for sexual orientation.

Second, researchers agree that multiple outcomes need to be used in studies that examine mental health disparities because group differences in types of stress responses can lead to inaccurate conclusions when a single outcome is employed (Aneshensel, Rutter, and Lachenbruch 1991; Simon 2002). With a few notable exceptions (e.g., Hagan and Foster 2003; Rosenfield et al. 2005; Van Gundy 2002), however, multiple outcomes have rarely been employed in studies of underlying processes. Consequently, previous studies have not fully explored the possibility that mental health disparities across social groups develop through different sets of processes for different outcomes. The present study investigates underlying mechanisms for depressive symptoms and drug use, which have been contrasted as internalizing and externalizing mental health problems in previous research (Rosenfield et al. 2005; Simon 2002).

METHODS

Data and Sample

Data came from the first wave of the Transitions Study, an epidemiological research project of young adults in Miami-Dade County, Florida (Turner et al. 2004). The project built on a prior study of adolescents in the Miami-Dade public school system (Vega and Gil 1998). A random sample of 1,683 men was selected from the original study participants, targeting the ethnic composition of 25 percent non-Hispanic white, 25 percent African American, 25 percent Cuban, and 25 percent other Hispanic. All women in the original study who belonged to one of these ethnic categories were also eligible for the Transitions Study ($n = 517$). To supplement the small number of women from the original study, an additional random sample was drawn from sixth and seventh graders in the 1990 county roster, the sampling frame used for the original study. Of 2,200 contacted, 1,803 people (70.1%) were successfully interviewed. The Transitions sample as a whole well represented the participants in the original study, but the supplementary sample of women showed a significant bias with regard to parental socioeconomic status (Turner et al. 2007). Sampling weights were used to correct for this bias, as well as the unequal sampling probabilities across ethnic categories. Of 1,803 participants in the Transitions Study, the operational sample for the present analysis excluded 276 people who reported no sexual partner and an additional 35 respondents who did not provide valid data for all key variables. The analysis was conducted using the remaining 1,492 respondents. About 93 percent of respondents were between ages 19 and 21.

Measures

Sexual orientation. Gender of sexual partners was the only information available for sexual orientation in the Transitions data. Respondents first reported with how many persons they had sex over their entire lives, even if only one time, including men and women. Immediately after the question, respondents were asked how many of those sexual partners were of the opposite-sex. Respondents were considered as having had *same-sex contact* if they reported fewer opposite-sex partners than their totals.¹ The two-step question might have helped reduce the risk of underreporting the

negatively viewed sexual behavior. As mentioned earlier, people who did not report any same-sex or opposite-sex partners were excluded from the analysis to reduce the risk of confounding the effect of having same-sex contact with the effect of having any sexual contact.

Mental health. The measure of *depressive symptoms* summed scores from the Center for Epidemiology Studies Depression Scale (CES-D) (Radloff 1977). Twenty items asked about symptoms in the 30 days before interview (e.g., "could not shake off the blues"). Four response categories ranged from 0 = "not at all" to 3 = "almost all the time." The scale had good inter-item reliability (Cronbach's $\alpha = .87$). I measured *drug use* by the summed score from a nine-item scale. Each item asked about frequency of using an illegal substance in the past 30 days (e.g., sedative, marijuana, methamphetamine). Five response categories ranged from 1 = "not at all" to 5 = "daily." The original score had a positively skewed distribution, so I used the natural log to minimize potential problems associated with heteroscedasticity. The two dependent variables correlated only weakly ($r = .05, p < .05$).²

Unlike previous studies based on dichotomous measures of mental disorders (Meyer 2003), the present study used continuous mental health outcomes of mild depressive symptoms and drug use frequency. These measures permitted a narrow temporal target for outcome measures (30 days for both variables), thereby increasing the confidence that mental health outcomes were measured after first same-sex contact. Additionally, using continuous outcome variables generally helps retain greater variations in the sample and improves the ability to detect group differences (Mirowsky and Ross 1989). This advantage was particularly important in this study, which compared a small number of people who had same-sex contact to a large majority who did not. Continuous measures also helped preserve variations in the outcome variables for mediators to explain. In fact, in preliminary analysis based on dichotomous measures of major depressive disorder and drug dependence disorder (based on the Michigan Composite International Diagnostic Interview), the proposed mechanisms explained smaller portions of the mental health gaps between people with and without same-sex contact, compared to the primary analysis based on continuously measured outcomes.

Stress exposure. To measure *victimization*, I modified Turner and Lloyd's (2003) inventory of traumatic events to focus on interpersonal coercion and violence (e.g., "shot with a gun or badly injured with another weapon"). I then computed the total score from the 11-item inventory. *Major discrimination* was the total score from a five-item inventory (e.g., "unfairly fired or denied a promotion") (Williams, Yu, and Jackson 1997). *Everyday discrimination* was the summed score from a nine-item scale ($\alpha = .85$). Each item measured minor but chronic and routine discrimination experience in daily life (e.g., "treated with less courtesy than other people") (Williams et al. 1997). Five response categories ranged from 1 = "never" to 5 = "almost always." *Negative life events* over a 12 month period were measured by the total score from a 33-item checklist (e.g., "serious accident or injury") (Avison and Turner 1988). Some of these items were also asked for partners (24 items) and friends/relatives (11 items) and added to each respondent's total score. To measure *chronic strains*, Wheaton's (1994) measure was modified to focus on life domains important for young adults (Turner and Avison 2003): employment (6 items), school (5 items), residence (6 items), children (3 items), relationships with partners (6 items) or parents (7 items), and general perceptions across domains (3 items). I computed the total score from the 36-item inventory.

Psychosocial resources. *Family support* was the summed score from an eight-item scale that focused on emotional support (e.g., "your family often lets you know that they think you are a worthwhile person," "your family always takes the time to talk over your problems") (Turner and Marino 1994). Response categories ranged from 1 = "strongly disagree" to 5 = "strongly agree" $\alpha = .91$. *Friend support* was the summed score of eight items similar to family support items ($\alpha = .91$). To measure *optimism*, I used the Life Orientation Test (e.g., "In uncertain times, you usually expect the best") (Scheier et al. 1994). Five response categories ranged from 1 = "strongly disagree" to 5 = "strongly agree." Six items were summed ($\alpha = .67$). I measured *mastery* with Pearlin and Schooler's (1978) scale (e.g., "What happens to you in the future mostly depends on you"). Five response categories ranged from 1 = "strongly disagree" to 5 = "strongly agree." I summed scores across seven items ($\alpha = .73$). I measured *self-esteem* by Rosenberg's (1965) scale (e.g., "You feel that you have a number of good qualities").

Five response categories ranged from 1 = "strongly disagree" to 5 = "strongly agree." Scores were summed across six items ($\alpha = .78$). *Mattering* was the summed score from a five-item scale (e.g., "How important do you feel you are to other people?") (Rosenberg and McCullough 1981). Four response categories ranged from 1 = "not at all" to 4 = "a lot" ($\alpha = .72$).

Self-exploratory attitudes. I measured *fun-seeking orientation* with the Fun-Seeking Subscale of Behavioral Activation System (BAS) (Gray 1975). The Behavioral Activation System measures the tendency that one's behaviors are motivated by rewards, instead of punishments. The Fun-seeking Subscale focuses on the impulsive pursuit of pleasure (e.g., "You often do things for no reason other than that they might be fun"), and it is positively associated with drug use disorder (Johnson, Turner, and Iwata 2003). The subscale summed four items, each of which ranged from 1 = "very false" to 4 = "very true" ($\alpha = .66$). *Relationship status* was a dichotomous variable (1 = currently in a marital or dating relationship; 0 = otherwise). *Number of sexual relationships* was the lifetime total including opposite-sex and same-sex relationships. *Early first sex* was a dichotomous variable (1 = had sex before age 15 for men or 16 for women; 0 = otherwise). The cut off age was chosen to identify about 25 percent of people who had first sex at early age within gender. I assumed that high levels of fun-seeking orientation, not being in a relationship, large numbers of sexual partners, and early experience of first sex show strong exploratory orientation.

Network norms. *Parents' permissiveness of drug use* and *friends' permissiveness of drug use* were the summed scores from five-item scales (e.g., "How do you think your parents/friends feel or would feel about you using marijuana once a month or less?"). Three response categories ranged from 1 = "strongly disapprove" to 3 = "not disapprove" ($\alpha = .70$ for both parents' permissiveness and friends' permissiveness). *Friends' drug use* was the summed score of a three-item scale (e.g., "How many of your friends regularly use illegal drugs?"). Six response categories ranged from 1 = none to 6 = all ($\alpha = .78$).

Control variables. I measured *age* in years. *Gender* was a dichotomous variable with men coded as 0 and women as 1. *Ethnicity* was a set of five dummy variables including non-Hispanic white (reference), African American, Cuban, other Hispanic, and other race. *Socioeconomic background*

was a composite score based on parents' reporting of their income level, occupational category, and educational attainment. Each dimension was standardized and summed. I used *high school graduation* as a measure of educational attainment (0 = has not graduated; 1 = graduated).

Analysis Plan

People with and without same-sex contact were first compared in key variables using *t* and chi-square tests. Multivariate analysis consisted of OLS models, which added blocks of predictors sequentially. To examine whether the predictors mediated the relationships between same-sex contact and mental health outcomes, changes in the coefficient for same-sex contact were observed across models. *R-squared* was used to evaluate the goodness of fit in each model, and changes in *R-squared* were tested across models (equivalent to *F* tests of nested models). I conducted all analyses in Stata 9.2 and weighted for unequal sampling probabilities.

RESULTS

Bivariate Analysis

Bivariate analysis showed significant differences between people with and without same-sex contact in mental health outcomes and potential mediators (see Table 1). As expected, people with same-sex contact tended to report higher levels of both depressive symptoms and drug use. Although the two groups did not differ in gender, ethnicity, or socioeconomic background, people with same-sex contact were less likely to have graduated from high school, consistent with a recent national study documenting academic problems among sexual minority youth (Pearson, Muller, and Wilkinson 2007). Stressor and resource variables showed expected patterns: People with same-sex contact generally reported higher levels of stress exposure and lower levels of social support and psychological resources. Further, those who reported same-sex contact showed stronger self-exploratory attitudes, and their network members used drugs more frequently and were more permissive of drug use. There were some exceptions to these patterns, however. The two groups did not differ in relationship status, major discrimination, friend support, and optimism. Because these variables had no ability to explain the relationship

Table 1. Descriptive Statistics by Same-sex Contact

	Min-Max	Without Same-Sex Contact (N = 1,428)		With Same-Sex Contact (N = 64)	
		Mean	SD	Mean	SD
Depressive Symptoms	0–60	13.05	(8.31)	19.11***	(10.09)
Drug Use Frequency	9–45	9.80	(1.72)	11.15***	(2.36)
Logged Drug Use Frequency	2.20–3.81	.99	(.06)	1.04***	(.09)
Age	18–23 ^a	20.01	(.93)	20.22	(.86)
Gender (1 = Women)	0–1	.46		.48	
Ethnicity					
Non-Hispanic White	0–1	.27		.32	
African American	0–1	.24		.20	
Cuban	0–1	.25		.20	
Other Hispanic	0–1	.23		.26	
Other Race	0–1	.01		.02	
Socioeconomic Background	–2.30–2.17	.09	(.96)	–.01	(.91)
Graduated from High School	0–1	.81		.66**	
Victimization	0–11	1.64	(1.68)	2.48**	(2.23)
Major Discrimination Events	0–5	1.12	(1.14)	1.31	(1.25)
Daily Discrimination	9–45	17.80	(5.46)	19.92***	(5.12)
Negative Life Events	0–68	3.60	(2.80)	5.34***	(3.17)
Chronic Strains	0–36	8.04	(4.61)	10.09***	(4.76)
Family Support	8–40	35.02	(5.17)	31.87***	(6.50)
Friend Support	8–40	27.57	(4.55)	26.75	(5.05)
Optimism	6–30	22.07	(4.08)	21.02	(4.57)
Mastery	7–35	27.77	(4.69)	26.09**	(4.55)
Self-esteem	6–30	27.78	(2.77)	26.64**	(3.33)
Mattering	5–20	17.25	(2.18)	16.58*	(2.25)
Fun-seeking Orientation	4–16	12.65	(2.27)	13.53***	(2.07)
Relationship Status	0–1	.64		.64	
Number of Sexual Relationships	1–175	6.18	(8.15)	16.79**	(28.21)
Early First Sex	0–1	.24		.37*	
Parents' Permissiveness of Drug Use	5–15	5.87	(1.45)	6.37*	(1.98)
Friends' Permissiveness of Drug Use	5–15	8.28	(2.48)	9.23**	(2.40)
Friends' Drug Use	3–18	8.18	(4.09)	10.46***	(4.96)

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

Notes: For categorical variables, proportions are presented, instead of means.

Asterisks indicate significant differences between people with and without same-sex contact based on *t*-tests for continuous variables and chi-square tests for categorical variables.

^a92percent of respondents were between the ages of 19 and 21.

between same-sex contact and mental health, I did not include them in the multivariate analysis below.

Multivariate Analysis

Depressive symptoms. Table 2 presents the results from OLS models predicting depressive symptoms. Model 1 shows that levels of depressive symptoms were 5.56 points higher for people with same-sex contact after controlling for socio-demographic backgrounds. Models 2 through 5

showed that all variables measuring stress exposure, social support, and psychological resources were significantly associated with depressive symptoms in the expected directions. In these models, the group difference between people with and without same-sex contact was reduced to 3.89 by victimization and daily discrimination (model 2), to 3.30 by negative life events and chronic strains (model 3), to 4.11 by family support (model 4), and to 3.80 by mastery, self esteem, and mattering (model 5). When these predictors were

Table 2. OLS Regression Models Predicting Depressive Symptoms

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Same-Sex Contact	5.56*** (1.28)	3.89** (1.21)	3.30** (1.19)	4.11*** (1.24)	3.80*** (1.03)	2.02* (.98)	5.04*** (1.29)	5.09*** (1.29)	2.12* (1.00)
Age	-.43 (.24)	-.14 (.22)	-.10 (.21)	-.44 (.23)	-.42* (.21)	-.16 (.19)	-.51* (.24)	-.43 (.24)	-.20 (.19)
Women	3.69*** (.44)	4.85*** (.41)	3.00*** (.38)	3.61*** (.41)	3.41*** (.37)	3.35*** (.35)	3.96*** (.45)	4.06*** (.46)	3.25*** (.37)
Ethnicity (reference = Non-Hispanic White)									
African American	.35 (.63)	-.06 (.58)	-.59 (.58)	.71 (.58)	.28 (.53)	-.26 (.49)	.32 (.65)	1.01 (.64)	-.16 (.53)
Cuban American	-1.32* (.63)	.15 (.58)	-1.57** (.55)	-1.12 (.59)	-.56 (.52)	-.32 (.48)	-1.29* (.63)	-.80 (.64)	-.37 (.48)
Other Hispanic	.05 (.64)	.77 (.59)	-.72 (.58)	.02 (.61)	-.07 (.54)	-.22 (.50)	.11 (.64)	.51 (.65)	-.22 (.51)
Other Ethnicity	4.15 (2.89)	2.38 (2.44)	-.04 (2.50)	3.87 (2.83)	3.66 (2.60)	.78 (2.21)	4.27 (2.86)	4.70 (2.84)	.77 (2.17)
Socioeconomic Background	-.46 (.26)	-.20 (.24)	-.11 (.24)	-.20 (.25)	-.16 (.22)	.11 (.20)	-.49 (.26)	-.54* (.26)	.10 (.20)
High School Graduate	-2.68*** (.59)	-1.48** (.55)	-1.98*** (.51)	-1.74** (.57)	-1.09* (.51)	-.53 (.46)	-2.63*** (.60)	-2.22*** (.59)	-.75 (.47)
Victimization		.94*** (.14)				.34** (.12)			.39** (.12)
Daily Discrimination		.49*** (.04)				.16*** (.04)			.16*** (.04)
Negative Life Events			.57*** (.08)			.36*** (.07)			.37*** (.07)
Chronic Strains			.66*** (.05)			.39*** (.04)			.39*** (.04)
Family Support				-.52*** (.05)		-.11** (.04)			-.11** (.04)
Mastery					-.45*** (.05)	-.32*** (.04)			-.31*** (.04)
Self-esteem					-.67*** (.08)	-.59*** (.08)			-.60*** (.08)
Mattering					-.80*** (.10)	-.45*** (.09)			-.45*** (.09)
Fun-seeking Orientation							.06 (.09)		.11 (.07)
Number of Sex Partners							.06 (.03)		-.01 (.02)
Early First Sex							-.90 (.51)		-.98* (.40)
Parents' Permissiveness								.37* (.16)	.14 (.13)
Friends' Permissiveness								.05 (.12)	-.11 (.09)
Friends' Drug Use								.14* (.06)	-.02 (.05)
Constant	22.30*** (5.02)	4.48 (4.76)	8.54 (4.43)	40.02*** (4.99)	65.85*** (4.71)	44.02*** (4.71)	22.95*** (5.14)	17.70*** (5.16)	44.45*** (4.78)
R ²	.10***	.25***	.30***	.20***	.36***	.48***	.11***	.11***	.48***

(continued)

Table 2. (continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Δ in R^2 from Model 1		.15***	.20***	.10***	.25***	.38***	.00	.01***	.38***
Δ in R^2 from Model 6									.00
Δ in R^2 from Model 7									.38***
Δ in R^2 from Model 8									.37***

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

Notes: Unstandardized coefficients are presented with standard errors in parentheses.

$N = 1,492$.

simultaneously entered in model 6, the group difference was reduced to 2.02, although it remained significant. Comparing models 2 and 6, the stressor and resource variables together accounted for 64 percent of the effect of same-sex contact on depressive symptoms unexplained by sociodemographic backgrounds ($[5.56 - 2.02] / 5.56 = .64$). Although there was no theoretical reason to expect that self-exploratory attitudes and network norms should be associated with depressive symptoms, these variables were entered in models 7 and 8 to facilitate the comparison with the models for drug use. As expected, variables measuring self-exploratory attitudes (fun-seeking orientation, number of sexual partners, and early sexual initiation) were not significantly related to depressive symptoms. Friends' drug use and family members' permissiveness, however, showed weak, positive associations with depressive symptoms, perhaps because people living in drug-saturated and drug-permissive networks experienced high stress exposure or had limited psychosocial resources. Consistent with this interpretation, the effects for these variables disappeared when stressor and resource variables were entered in model 9. The coefficients for stressor and resource variables, on the other hand, changed very little before and after the introduction of self-exploratory attitudes and network norms (compare models 6 and 9). In sum, stress exposure and resource deficiency explained a substantial portion of the gap between people with and without same-sex contact in depressive symptoms, but self-exploratory attitudes and network norms contributed little to the explanation of the gap.

Drug use. Drawing from the stress framework, I expected that stress exposure and resource deficiency would explain some portion of the gap in drug use between people with and without same-sex contact. Further, drawing from the literatures on drug use and sexuality, I hypothesized that

self-exploratory attitudes and network norms would explain an additional portion of the gap.

Table 3 presents the results from OLS models predicting drug use. As shown in model 1, controlling for sociodemographic backgrounds, logged drug use score was higher for people with same-sex contact than those without such contact, by .047 (about .73 of a standard deviation).³ As shown in models 2 through 5, three out of the four stressor variables (victimization, daily discrimination, and negative life events) were significantly associated with drug use, but only one of the four resource variables (family support) showed a significant relationship. When these variables were entered simultaneously in model 6, daily discrimination and family support lost significance. Comparing models 1 and 6, these variables explained only 17 percent of the gap in drug use between people with and without same-sex contact ($[(.048 - .040) / .048 = .17]$). Turning to the variables measuring self-exploratory attitudes, fun-seeking orientation and number of sexual partners were associated with drug use, as expected (model 7), and they reduced the group difference in drug use by 29 percent ($[(.048 - .034) / .048 = .29]$). Finally, all three variables measuring network norms (friends' drug use, friends' permissiveness, parents' permissiveness) were significantly associated with drug use (model 8). These variables explained 38 percent of the gap between people with and without same-sex contact ($[(.048 - .030) / .048 = .38]$). When all variables were entered in model 9, the effects of number of sexual partners and the three variables measuring network norms remained significant, but the variables measuring stress exposure and family support were no longer associated with drug use. In sum, self-exploratory attitudes and network norms partly explained the gap between people with and without same-sex contact in drug use. Although some variables measuring stress exposure and resource deficiency were associated with drug use,

Table 3. OLS Regression Models Predicting Logged Drug Use Frequency

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Same-Sex Contact	.048*** (.011)	.043*** (.011)	.041*** (.011)	.046*** (.011)	.047*** (.011)	.040*** (.011)	.034** (.011)	.030** (.009)	.025** (.009)
Age	-.001 (.002)	-.001 (.002)	.000 (.002)	-.002 (.002)	-.001 (.002)	.000 (.002)	-.002 (.002)	-.001 (.002)	-.001 (.002)
Women	-.019*** (.003)	-.017*** (.003)	-.021*** (.003)	-.020*** (.003)	-.019*** (.003)	-.018*** (.003)	-.015*** (.003)	-.003 (.003)	-.002 (.003)
Ethnicity (reference = Non-Hispanic White)									
African American	-.035*** (.005)	-.035*** (.005)	-.037*** (.005)	-.035*** (.005)	-.036*** (.005)	-.037*** (.005)	-.039*** (.005)	-.010* (.004)	-.013** (.004)
Cuban American	-.016** (.005)	-.012* (.005)	-.014** (.005)	-.016** (.005)	-.016** (.005)	-.012* (.005)	-.015** (.005)	.001 (.004)	.001 (.005)
Other Hispanic	-.023*** (.005)	-.020*** (.005)	-.022*** (.005)	-.023*** (.005)	-.023*** (.005)	-.020*** (.005)	-.022*** (.005)	-.007 (.005)	-.008 (.005)
Other Ethnicity	-.031** (.011)	-.034** (.012)	-.037** (.013)	-.032** (.012)	-.032** (.011)	-.037** (.012)	-.029** (.010)	-.014 (.016)	-.015 (.015)
Socioeconomic Background	.002 (.002)	.003 (.002)	.002 (.002)	.003 (.002)	.002 (.002)	.003 (.002)	.002 (.002)	-.001 (.002)	-.000 (.002)
High School Graduate	-.026*** (.005)	-.021*** (.005)	-.024*** (.005)	-.025*** (.005)	-.025*** (.005)	-.022*** (.005)	-.021*** (.005)	-.010* (.004)	-.008 (.004)
Victimization		.005*** (.001)				.004** (.001)			.001 (.001)
Daily Discrimination		.001* (.000)				.001 (.000)			-.000 (.000)
Negative Life Events			.004*** (.001)			.003*** (.001)			.001 (.001)
Chronic Strains			-.000 (.000)			-.000 (.000)			-.000 (.000)
Family Support				-.001* (.000)		.000 (.000)			.000 (.000)
Mastery					-.000 (.000)	.000 (.000)			-.000 (.000)
Self-esteem					.000 (.001)	.001 (.001)			.001 (.001)
Mattering					-.001 (.001)	-.000 (.001)			-.001 (.001)
Fun-seeking Orientation							.002*** (.001)		.001 (.001)
Number of Sex Partners							.001*** (.000)		.000* (.000)
Early First Sex							.006 (.004)		.003 (.004)
Parents' Permissiveness								.005*** (.001)	.005*** (.001)
Friends' Permissiveness								.003*** (.001)	.003*** (.001)
Friends' Drug Use								.006*** (.001)	.006*** (.001)
Constant	1.063*** (.037)	1.025*** (.039)	1.016*** (.037)	1.086*** (.039)	1.071*** (.040)	.978*** (.044)	1.028*** (.037)	.906*** (.032)	.885*** (.039)
R ²	.10***	.13***	.13***	.10***	.10***	.14***	.14***	.35***	.36***

(continued)

Table 3. (continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Δ in R^2 from Model 1		.03***	.03***	.00*	.00	.04***	.04***	.25***	.26***
Δ in R^2 from Model 6									.22***
Δ in R^2 from Model 7									.22***
Δ in R^2 from Model 8									.01*

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

Notes: Unstandardized coefficients are presented with standard errors in parentheses.

$N = 1,492$.

they did not contribute to the explanation of the group difference net of self-exploratory attitudes and network norms.

Interaction analysis. Four sets of interaction effects were tested in supplemental analyses. First, an interaction effect between gender and same-sex contact was considered because the meaning of same-sex contact differs by gender (Herek 2002) and because women and men differ in types of stress responses (Aneshensel et al. 1991; Rosenfield et al. 2005; Simon 2002). The interaction effect was not significant for depressive symptoms or drug use, however. Second, the analysis also considered interactions between same-sex contact and underlying mechanisms. For example, I tested interactions between stressor variables and same-sex contact to investigate whether vulnerability to stressors differed between people with and without same-sex contact. None of the interactions was significant, however. Third, I tested interactions between stressor variables and psychosocial resource variables to investigate whether the “buffering effects” of psychosocial resources (Thoits 1995) helped explain the gap between same-sex contact and mental health outcomes. Although two interaction terms showed significant effects on depression (victimization \times self esteem; negative life events \times optimism), they did not contribute much to the explanation of the mental health disparities between people with and without same-sex contact. Fourth, I tested interactions between permissiveness and support for drug use to investigate whether network members’ permissiveness increased young adults’ drug use more strongly in supportive networks than in unsupportive networks. I tested interactions separately for family and friends. The interaction for family was not significant. Although friend support and friend permissiveness showed a significant interaction in the expected direction, it did not help explain the drug use difference between people with and without same-sex contact.

DISCUSSION

Using survey data of young adults in Miami–Dade County, the analysis showed that people who report same-sex contact have higher levels of depressive symptoms and drug use, consistent with previous studies (e.g., Hatzenbuehler et al. 2008; Safren and Heimberg 1999). The results do not necessarily suggest that people who engage in same-sex behaviors have immediate risks of mental disorders because the analysis was based on continuous measures of mild depressive symptoms and drug use frequency. Nonetheless, these mental health problems within normal functioning may indicate the foundation of disparities in depressive and substance use disorders. In this sense, this study provides important insights into the processes through which mental health disparities emerge between sexual minority and heterosexual people. The disparities in depressive symptoms and drug use linked to same-sex contact are as large or larger than those linked to other social divisions such as race, gender, and socioeconomic status (see Tables 2 and 3), suggesting that sexual orientation deserves continuing attention in mental health research.

Unlike previous studies, the present study tested a wide range of underlying mechanisms simultaneously. As shown in the analysis, each stress mechanism (victimization, discrimination, negative life events, chronic strains, social support, and psychological resources) accounts for a substantial portion of the gap between people with and without same-sex contact in depressive symptoms unexplained by sociodemographic backgrounds. Together, these mechanisms explain as much as 64 percent of the gap. Although the importance of these mechanisms has been demonstrated in previous studies (e.g., Safren and Heimberg 1999; Ueno 2005), the present study based on simultaneous examinations underscores that each mechanism makes independent contribution to the explanation

of the disparity in depressive symptoms, despite the moderate correlations among them.

These findings are also consistent with the broader mental health literature, which suggests that disadvantaged social statuses contribute to mental health problems by increasing stress exposure and reducing psychosocial resources (Mirowsky and Ross 1986; Turner et al. 1995). Previous efforts to test stress processes have mainly focused on mental health disparities linked to gender, race, and socioeconomic class (Kessler and McLeod 1984; Ross 1995; Turner and Avison 2003; Turner et al. 2004), but the present study shows that these processes also apply to the disparity linked to sexual orientation, at least for depressive symptoms.

The disparity in drug use seems to emerge through different processes. Self-exploratory attitudes and network norms explain fair portions of the gap between young adults with and without same-sex contact (28% and 38%, respectively). Although a few stressor and resource variables (victimization, daily discrimination, recent life events, and family support) are positively associated with drug use, they do not make contributions to the group difference in drug use independent of self-exploratory attitudes and network norms.

The findings for drug use therefore challenge the existing literature, which emphasizes the importance of stress mechanisms for explaining sexual minorities' greater mental health problems across various outcomes. The emphasis on stress processes is based on an assumption that sexual minorities' elevated stress exposure and resource deficiency manifest in a variety of mental health problems including drug use (Meyer 2003; Ueno 2010). Previous findings provided indirect support for the assumption: Sexual minorities are exposed to stressors to greater degrees than heterosexual people (e.g., Garofalo et al. 1998), and stress exposure is positively associated with drug use in the sexual minority population (e.g., Ryan et al. 2009). Direct tests of mediation, however, have been conducted only in one study that included drug dependence as one of several disorders in a dichotomous measure of "any disorder" (Mays and Cochran 2001). The present results thus cast doubt about the importance of stress mechanisms specifically for the drug use disparity.

Instead, the results highlight the importance of network members' drug use and permissiveness in explaining sexual minorities' frequent drug use. The findings concur with previous studies that described how club subcultures in the gay community promote favorable attitudes toward drug

use and increase access to drugs (Green 2003; Parsons, Kelly, and Weiser 2007). This interpretation should remain tentative for three reasons. First, levels of integration into the gay community and frequencies of visits to gay clubs were not directly measured in this study. Second, the argument implies that higher frequencies of drug use among people with same-sex contact should be marked for "party drugs" such as cocaine, ecstasy, and methamphetamine, but a follow-up analysis showed that the group's drug use was consistently higher across all types of substances (not shown). Third, although the argument is more commonly used for sexual minority men than for women, the analysis showed no gender difference in the degree to which same-sex contact was associated with friends' permissiveness, friends' drug use, or one's drug use (not shown).

Several other issues need to be kept in mind when interpreting the findings on drug use. First, the analysis was based on cross-sectional data and thus unable to specify the temporal order of the observed associations. Although network members' permissiveness and drug use were assumed to contribute to one's drug use in this study, engagement in drug use may in return promote affiliations with other drug users (Dishion and Owen 2002) or people who tolerate it. It is also possible that drug use encourages sexual exploration. Second, the measures of friends' drug use relied on respondents' reporting, which tends to overestimate the similarity between respondents' and friends' behaviors (Kandel 1996). Because of these two data limitations, the present analysis may have overestimated the effects of self-exploratory attitudes and network norms and underestimated the effects of stress exposure and resource deficiency, which disappear when controlling for self-exploratory attitudes and network norms. Second, the present measure of sexual orientation, which emphasized its behavioral aspect (same-sex contact), might have contributed to the detection of a significant association with the behavioral outcome variable (drug use) and increased the ability of behavioral variables (e.g., number of sexual partners, friends' drug use) to explain the relationship between same-sex contact and drug use. Third, the self-exploratory aspect of same-sex contact should not be overemphasized because same-sex contact is only moderately correlated with self-exploratory attitudes. Not all same-sex contact in youth is experimental. These contacts can involve intense infatuations and high degrees of intimacy, just as opposite-sex contacts do (Herdt

and Boxer 1993). Fourth, the importance of sexual attitudes and network norms found in this study may be specific to emerging adulthood and may not be generalized to later life stages. As Arnett (2005) points out, the strong link between self exploration and drug use in this life stage partly stems from unique conditions characterized by the declining influence of parents and school and the lack of strong obligations to adult institutions such as work and committed relationships. Fifth, the current results highlighting the importance of attitudes and social networks do not necessarily suggest that sexual minorities are responsible for their frequent drug use. Their self-exploratory attitudes and integration into subcultures partly result from their elevated stress exposure and lack of psychosocial resources in the heteronormative society (Achilles 1969; Green 2003).

CONCLUSIONS

To increase understanding about how mental health disparities emerge between sexual minority and heterosexual people, the study simultaneously tested several sets of previously proposed mechanisms. The contrasting results between depressive symptoms and drug use have important implications for the broader literature on mental health. Scholars have recommended the use of multiple outcomes in investigations of mental health disparities because group differences in stress responses can lead to inaccurate conclusions about the magnitude of disparities when a single outcome is employed (Aneshensel et al. 1991; Simon 2002). On the surface, this caution does not seem important for research on sexual orientation because there is no reason to expect differences in stress responses between sexual minority and heterosexual people and because sexual minorities report higher levels of both depressive symptoms and drug use than heterosexual people. The present study, however, identified another reason to use multiple outcomes—disparities may emerge through different sets of processes for different outcomes.

Although the use of multiple outcomes has become more common in studies that describe mental health disparities across social groups (e.g., Kessler and Zhao 1999), only a small number of studies have included multiple outcomes to investigate underlying mechanisms (Hagan and Foster 2003; Rosenfield et al. 2005; Van Gundy 2002). In

light of the present result that stress processes contribute little to the explanation of the drug use difference between sexual minority and heterosexual people, future research needs to reexamine the importance of these processes for disparities across other social divisions such as gender, race, and socioeconomic class. In this effort, it is important to simultaneously test stress processes and attitudinal and network processes because these two sets of processes may be intertwined. To incorporate attitudinal and network processes in research on mental health disparities, theoretical development is necessary to address how social statuses shape attitudinal and network antecedents of drug use. Further, future research should investigate the relationships *among* underlying processes by addressing how stress and attitudinal/network processes may influence each other and how they may be linked through shared antecedents. Previous longitudinal studies of delinquency and mental health (e.g., De Coster and Heimer 2001; Hagan 1997; Hagan and Foster. 2003; Heimer and Matsueda 1994) may serve as a starting point of this future research. Addressing these issues should help increase understanding about how various processes operate together to give rise to complex patterns of disparities across social groups in different mental health outcomes.

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NOTES

1. Among those who reported same-sex partners, 86% also reported opposite-sex partners. The high rate of opposite-sex contact among young sexual minorities has been reported in previous studies (e.g., Herdt and Boxer 1993). Among those who reported same-sex contact, presence of opposite-sex experience was not associated with depressive symptoms or drug use.
2. To address possible bias resulting from the correlation between the two outcome variables, seemingly unrelated regression was used as an alternative model, but it produced results very similar to those from OLS models (available from the author upon request).

3. I conducted supplemental analysis to examine implications of this gap in drug use for drug dependence and abuse. I computed predicted values for logged drug use scores from model 1 for people with and without same-sex contact, holding other characteristics constant (non-Hispanic white, men, average age and SES, and high school graduate). I then ran a logistic regression model to predict experience of drug dependence or abuse in past 6 months by logged drug use scores. According to this model, the gap in drug use between people with and without same-sex contact corresponded to a difference in predicted probabilities of drug dependence/abuse of .14 versus .45.

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Bio

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