Does LGB Identification Really Lead to Riskier Health Behaviors? New Evidence from Sibling Pairs and Panel Data[*]

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Extended Abstract

Motivation. Identification as a sexual minority has been found to be associated with risky health behaviors in general and increased substance use in particular. Specifically, men and women who self-identify as lesbian, gay or bisexual (LGB) face substantially higher rates of substance use, abuse and addiction as compared to their heterosexual counterparts. Some studies have found rates of alcohol dependence and marijuana or other drug use that are 2 to 3 times higher than rates for similar heterosexual men and women (McCabe et al., 2009). These high rates of substance use place sexual minorities at substantial health risk. Such patterns could be observed for a variety of reasons. It is possible that the correlation between substance use and sexual identity in fact reflects a causal relationship. On the other hand, the decision to identify as bisexual or homosexual may itself not be random. Disclosure may be related to other, difficult to measure, family background characteristics such as parenting style or personal characteristics such as personality or religiosity, that are themselves related to substance use.

In this paper, we re-examine the association between substance use and sexual orientation with new and careful attention to the role of difficult-to-measure factors that could be associated with both disclosure of sexual identity and with risky health behaviors. Using longitudinal data from the National Longitudinal Survey of Adolescent Health (AddHealth), we compare results across definitions of sexual identity and using a variety of models and methods to isolate a causal relationship and to test the robustness of these estimates.

In linking minority sexual self-identification to substance use, it is important to define and categorize minority identity. Behavioral LGB identity is measured by reports of same sex

sexual partners, while other studies have examined sexual attraction or identifying as heterosexual, homosexual or bisexual. We examine the link between substance use and sexual identity in models that include alternative definitions of sexual identity, use a wide variety of family-level and individual-level control variables and examine sibling pairs to control for family-specific fixed effects. Our results suggest that while there is evidence that LGBs are slightly more likely to use some substances, the effects are much smaller than previous research would suggest once individual and family characteristics are controlled.

Theoretical Links between Sexual Identity and Substance Use. Explanations that link LGB identification with substance often highlight the social stigma and discrimination faced by those who disclose minority sexual identity. Berlan et al. (2010) find that LGB youth are much more likely to report physical and sexual abuse, bullying and being threatened or injured at school. Each of these, in turn, could be related to more prevalent substance use in the form of alcohol, tobacco or other drugs (Tharp-Taylor, Haviland and D'Amico, 2009). Youth identifying as LGB often report more frequent emotional distress and depressive symptomology that could result in increased substance use and abuse (Almeida et al., 2009).

Social scientists point to a lack of connectedness and weak emotional ties between LGB youth and young adults and their families as a potential link to substance use. In-depth interviews suggest that rejection from family members in response to disclosure of LGB sexual orientation is associated with health problems including substantially higher levels of illegal drug use (Ryan et al., 2009).

Clinical psychologists explain the pattern of increased substance use among sexual minorities as a response to a homophobic and hostile environment (Baiocco, D'Alessio and Laghi, 2010). They refer to this theory as the 'minority stress model' that identifies external

events and conditions and the internalization of negative social and cultural attitudes as contributors to the high rates of substance use among LGB. Many other researchers refer broadly to the impact of mental stress and low self-esteem (McCabe et al., 2009).

Previous Literature. Dozens of empirical studies have consistently report higher rates of substance use by sexual minorities than by their heterosexual counterparts. Findings from national data suggest that sexual-orientation minorities are more likely to smoke (Corliss et al., 2013; McCabe et al., 2009) to drink (Cochran et al., 2004; Ziyadh et al., 2002; McCabe et al., 2009) and to use illegal drugs (Drabble L, LT Midanik, K Trockim 2005; McCabe et al., 2009). Many of these researchers find larger associations for lesbian and bisexual women as compared to men (Ziyadh, 2002; Corliss et al., 2012).

A handful of researchers have used data from the National Longitudinal Study of Adolescent Health to empirically examine this issue. Russell, Driscoll and Troung, (2002) suggest that 'sexual orientation is an important risk marker for growth in adolescent substance use." They find significantly higher levels of cigarette smoking, frequent and binge drinking and illegal drug use among youth who report that they are not primarily heterosexual. In keeping with other studies they find that the substance use effects are larger for females than males. Needham and Austin (2010) find similar results; lesbian and bisexual women are at elevated risk of drinking and smoking, but these risks are mediated by parental support.

Limitations of Previous Studies. While nearly all studies described above find that identification as a sexual minority is associated with increased risk of risky health behaviors, a exogenous to these behaviors; that is, essentially randomly assigned among youths. However, there are a number of reasons to treat this assumption with at least some degree of skepticism. While sexual orientation appears to be influenced by genetic factors (Kallmann 1952; Bailey and

Bell 1993; Hamer et al. 1993; Kendler et al. 2000; Dawood et al. 2009) that may be random, *self-identification* of oneself as LGB—on a survey or in society—could be related to a myriad of family background and individual characteristics that are also associated with the choice to engage in risky behaviors (Carpenter 2005). For instance, comfort with identifying as bisexual or homosexual may be related to difficult to measure family background characteristics such as parenting style or personal characteristics such as personality or religiosity. Because many of these characteristics may also be related to risky health behaviors, previous estimates of the effect of sexual identity on risky health behaviors may be biased.

In addition to problems of internal validity, data limitations in previous studies have generally not permitted authors to explore the sensitivity of findings to differences in measurement of sexual orientation. A number of researchers in the sexual orientation literature have suggested that defining sexual orientation in terms of sexual attraction may produce different results than if one defines sexual orientation by romantic attraction or actual sexual behavior (Badgett 2009; Sabia 2013). Finally, no study of which we are aware has made use of longitudinal data on sexual identity, which examines individual-specific changes in health behaviors of those who previously identified as heterosexuals, but begin the process of "coming out" and identifying as LGB.

Contributions. The current study draws on a rich new data source, the National Longitudinal Study of Adolescent Health (Add Health) to examine the relationship between sexual orientation and young adults' risky health behaviors. These data allow us to make three important contributions to the existing empirical literature. First, while previous studies have controlled only for basic demographic and background information in estimating the effect of sexual orientation on health behaviors, our data provide much more detail on family background

characteristics, parent-child relationships, religiosity, and personality. This will allow us to explore the sensitivity of prior estimates to controls for previously omitted variables.

Second, because we have information on sibling pairs, we will be able to estimate family fixed effects models that control for difficult to measure family-level characteristics common to siblings that could be associated with self-identified LGB status and with risky health behaviors. For men, identification of family fixed effects models will come from 103 brothers in 50 families with discordant self-reported sexual identities. For women, identification will come from 155 sisters in 77 families with discordant sexual identities.

Third, because the Add Health is a panel dataset, our study will be the first to examine the effect of *changes* in self-reported sexual identity over time on *changes* in risky health behaviors. That is, we will be the first to estimate a difference-in-difference model of the effect of "coming out" (on a survey) on health behaviors.

Finally, the Add Health data has three measures of sexual orientation: sexual identity (conflated with sexual attraction), romantic attraction, and adult sexual behavior (gender of sexual partners). These data will allow us to explore the sensitivity of our estimates to measurement of sexual orientation.

Data and Measures. The Add Health is a nationally representative survey of individuals in the United States attending 7th through 12th grades in the 1994-95 academic year. The Wave I (baseline) in-home survey was administered between April and December of 1995 to a core sample of 12,105 students from 132 schools. The core sample was augmented through the collection of information on biological siblings residing in the household of a core sample member and oversamples of black students with college-educated parents and Chinese, Cuban, and Puerto Rican students. Summing the core, sibling, and minority oversamples yielded a total

sample size for the Wave I in-home survey of just over 20,000 respondents. Three follow-up surveys were administered after the initial survey—the first follow-up (the Wave II) in-home survey in 1996, the second follow-up (Wave III) in-home survey in 2001; and the third follow-up (Wave IV) in 2007, which contains information on 15,170 of the original Add Health respondents. Our main analysis focuses on sexual orientation and risky health behaviors at Wave IV, when respondents are ages 24 to 32.

Our main measure of sexual orientation is constructed using the following questionnaire item in the Add Health:

> Please choose the description that best fits how you think about yourself:
>
> 1. 100% heterosexual (straight)
> 2. Mostly heterosexual (straight) but somewhat attracted to people of your own sex
> 3. Bisexual, that is, attracted to men and women equally
> 4. Mostly homosexual (gay), but somewhat attracted to people of the opposite sex
> 5. 100% homosexual (gay)
> 6. Not sexually attracted to either males or females

Following Sabia (2013), respondents who chose category 1 were coded as heterosexual, those who chose categories 2, 3, or 4 were coded as bisexual, those who chose category 5 were coded as gay/lesbian, and those who chose category 6 were coded as revealing no sexual attraction.[1] We also experimented with splitting the bisexual category into its component parts or categorizing the "leaners" with heterosexuals or gay/lesbians and the results are largely unchanged.

In addition, we also experimented with two other measures of sexual orientation: (i) romantic attraction, using information on whether respondents were "romantically attracted" to

[1] The presentation of results focuses on those respondents who reported a sexual identity. Results from those who expressed no sexual attraction to either sex are available upon request of the author.

males, females, both, or neither, and (ii) adult sexual behavior, using information on self-reported gender of sexual partners at age 18 or older.

We construct four dichotomous measures of risky health behaviors in the Add Health:

- whether the respondent has smoked cigarettes in the last 30 days;
- whether the respondent has typically consumed 5 (4 for women) or more drinks in a single sitting in the last month;
- whether the respondent has consumed marijuana in the last 30 days; and
- whether the respondent has consumed a hard drug (e.g. cocaine, methamphetamine, heroin, etc.) in the last 30 days.

Empirical Methods. We begin by estimating an linear probability model of the following form (probit and logit models produce comparable marginal effects as reported below):

$$Y_i = \beta_0 + \beta_1 SO_i + \beta_2' X + \varepsilon_i \quad (1)$$

where *i* indexes respondent I, SO is a set of dichotomous indicators for the respondent's sexual identity (the omitted category is those who report being "100% heterosexual"), and **X** is a vector of controls including the respondent's age, age-squared, race/ethnicity, urbanicity, Peabody picture Vocabulary Test (PPVT) score, educational attainment, current school enrollment status, and romantic partnership status. The estimates from equation (1) are designed to benchmark the prior literature. Next, we estimate:

$$Y_{is} = \beta_0 + \beta_1 SO_i + \beta_2' X_i + \beta_3' F_i + \kappa_s + \varepsilon_{is} \quad (2)$$

where **F** is an additional vector of family background controls, including parental income, parental educational attainment, parental marital status, number of biological siblings, and whether the respondent had an older sibling. In addition, to control for unobserved community level heterogeneity when the respondent was an adolescent, we add a vector of controls for school fixed effects from Wave I, κ_s, where s indexes the respondent's Wave I school.

We then augment equation (2) with a vector of observable personal controls **P**:

$$Y_{is} = \beta_0 + \beta_1 SO_i + \beta_2' X_i + \beta_3' F_i + \beta_4' P_i + \kappa_s + \varepsilon_{is} \quad (3)$$

where **P** includes controls for religious affiliation, religious attendance, weight, height, and personality ("the big five"), as well as controls for personal discount rates (future-orientedness) and decision-making style.

In comparing estimates of β_1 from equations (1)-(3), we will get a sense of how sensitive prior estimates in the literature are to controls for family and personal heterogeneity that could be related to both self-identification as a sexual minority and with risky health behaviors. Next, we restrict the sample to siblings and estimate a family fixed effects model to address family-level heterogeneity common to siblings:

$$Y_{ij} = \beta_0 + \beta_1 SO_i + \beta_2' X_i + \beta_4' P_i + \alpha_j + \varepsilon_{ij} \quad (4)$$

where *j* indexes the respondent's family and α_j is a vector of family fixed effects. This empirical approach will net out any bias in the estimate of β_1 caused by omitted family-level variables common to siblings.

Finally, we exploit the longitudinal nature of the Add Health and estimate the effect of transitioning from a heterosexual identifier at the Wave III survey (ages 18 to 26) to a bisexual or gay/lesbian identifier at Wave IV. We restrict the sample to heterosexual identifiers at Wave III and estimate a difference-in-difference or individual fixed effects model of the following form:

$$Y_{it} = \beta_0 + \beta_1 SO_{it} + \beta_2' X_{it} + \alpha_i + \varepsilon_{it} \quad (5)$$

where *t* indexes time, $\mathbf{X}_{it}$ is a vector of individual-specific time-varying controls (age, educational attainment, and current school attendance), and α_i is an individual fixed effect. This approach is designed to (i) control for fixed individual-level unobservables related to sexual identification and risky health behaviors, and (ii) explore the relationship between "coming out" and health behaviors.

Main Findings. The main findings of our paper are shown in the tables below. We disaggregate our sample by gender to allow the effect of sexual orientation on risky health behaviors to differ for men and women. Table 1 shows the means for our key measures. Risky behaviors are more common among men than women, as expected. Approximately 20 percent of our female sample and 7 percent of our male sample report a non "100% heterosexual" identity. Rates of GLB young adults are substantially lower (particularly for women) when the romantic attraction and adult sexual behavior measures are employed.

Table 2 shows our results from equations (1)-(3) above for women (the omitted category is "100% Heterosexual" identifiers). The results suggest that bisexual and lesbian women generally engage in riskier health behaviors than their heterosexual counterparts. However, the magnitude of the estimated association falls substantially after the inclusion of personal controls (Panel III vs Panel I and II). For men, the pattern of results is even starker. The findings in Table 3 show that controlling for personal background characteristics (Panel III vs Panels I and II) renders the estimated effect of GLB status on smoking and binge drinking to be statistically indistinguishable from zero. The estimated associations also fall for drug use, though we still find evidence that bisexual men are more likely to use marijuana than their heterosexual counterparts, as are LGB men for hard drug use. Taken together, the findings in Tables 2 and 3 suggest that prior estimates of the risky behavior effects of LGB identification were biased upward.[2]

This interpretation of findings is supported by family fixed effects (equation 4) results in Table 4. We provide OLS estimates on the sibling sample for comparison. For women (Panel I), the results suggest that after controlling for family-level unobservables common to siblings and

[2] In Appendix Table 1, we disaggregate the bisexual "leaners" into their component categories. In no case can we reject the hypothesis that the coefficients are equal across each of the bisexual categories.

for observable personal characteristics (columns 3, 6, 9, and 12), there is little evidence that bisexual women are more likely to smoke, binge drink, or use hard drugs than their heterosexual counterparts. There is some evidence, however, that they are more likely to smoke marijuana (column 9). Only for cigarette consumption is there some evidence that lesbians may be more likely to smoke (column 3), though our estimate is imprecise.

For men (Panel II), family fixed effects estimates generally show that controlling for both family-level unobservables and observable personal characteristics substantially diminishes the estimated association between bisexual or gay identification and risky health behaviors. However, the signs on the fixed effects estimates are generally positive and are largest for marijuana consumption and smoking.

Tables 5 and 6 explore the robustness of the prior estimates to the alternate definitions of sexual orientation: romantic attraction (Panel I) and adult sexual behavior (Panel II). OLS-Full refers to OLS estimates on the full sample, OLS-Siblings refers to OLS estimates on the siblings sample, and FE-Siblings refers to family fixed effects estimates on siblings. The pattern of findings using these alternate sexual orientation measures is quite similar to our main measure.

Finally, in Table 7, we present estimates of equation (5) to explore the effect of transitions from a heterosexual to LGB identity on changes in risky health behaviors. The omitted category is comprised of those who consistently report a "100% heterosexual" identity between Waves III and IV. The results do provide some evidence that sexual identity transitions are associated with increases in risky health behaviors, particularly for bisexuals. For women, we find evidence that transitioning from a heterosexual to bisexual identity is associated with substantial increases in binge drinking, marijuana use and hard drug use. Moreover, the underlying behavioral dynamics (columns 2-3, 5-6, 8-9, 11-12) suggest that "coming out" is

associated with increased substance use initiation and decreased quitting behavior among previous users. Transitioning to a lesbian identity, however, appears to be *protective* of binge drinking and hard drug use. Coming out is associated with a reduction in the probability of binge drinking initiation and an increase in the probability of cessation.

For men, much of the action appears concentrated in drug use. There is evidence that transitioning from a heterosexual to gay identity is associated with an increase in the initiation of hard drug use and a decrease in hard drug cessation. A similar pattern emerges for marijuana use among those who transition to a bisexual identity. One explanation for this might be that as part of the coming out process, many gay men move to urban areas where drug use is more common.

Conclusions. This study is the first of which we are aware to use nationally representative data to (i) explore the role of family background and personal characteristics in contaminating prior estimates of the relationship between sexual orientation and risky health behaviors, and (ii) examine the effect of changes in self-identified sexual orientation ("coming out") on changes in risky sexual behaviors. We generally find that prior estimates of the association between sexual orientation and risky health behaviors were biased upward. However, even after controlling for family fixed effects, we do find some evidence that bisexual women are more likely to use marijuana than heterosexual women and that lesbians may be more likely to consume cigarettes.

When we examine transitions in sexual identity, we find that straight women who begin identifying as bisexual are much more likely to initiate substance use and less likely to quit. The same is true for gay men with regard to hard drugs. In contrast, heterosexual women who begin identifying as lesbians actually engage in healthier behaviors with regard to binge drinking and hard drug use. Our analysis suggests that the patterns of risky heath behaviors among self-identified LGBs are not as severe as initial studies suggest.

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Table 1. Means of Risky Health Behavior and Sexual Orientation Measures, by Gender

	Women	Men
Dependent Variables		
Smoking in Last 30 Days	0.323	0.409
	(0.467)	(0.492)
	[7718]	[7243]
Binge Drinking once per month or more in Last Year	0.139	0.262
	(0.346)	(0.442)
	[7740]	[7273]
Marijuana Consumption in Last 30 Days	0.127	0.204
	(0.334)	(0.403)
	[7758]	[7298]
Hard Drug Consumption in Last 30 Days	0.047	0.076
	(0.211)	(0.265)
	[7758]	[7310]
Sexual Orientation Variables		
Main Measure:		
Bisexual Identity	0.190	0.049
	(0.392)	(0.215)
	[7758]	[7310]
Gay/Lesbian Identity	0.010	0.018
	(0.099)	(0.133)
	[7758]	[7310]
Alternate Measures:		
Both Same- and Opposite-Sex Romantic Attractions	0.078	0.022
	(0.269)	(0.148)
	[7758]	[7323]
Exclusively Same-Sex Romantic Attractions	0.016	0.023
	(0.126)	(0.151)
	[7758]	[7323]
Both Same- and Opposite Sex Sexual Partners	0.113	0.034
	(0.318)	(0.182)
	[7543]	[7116]
Exclusively Same-Sex Sexual Partners	0.010	0.023
	(0.102)	(0.150)
	[7543]	[7116]

Notes: Unweighted means calculated using Wave IV of the National Longitudinal Study of Adolescent Health. Standard deviations are in parentheses and sample sizes are in brackets.

Table 2. Estimated Relationship Between Sexual Orientation and Wave IV Risky Health Behaviors for Women

	(1) Smoking	(2) Binge Drink	(3) Marijuana	(4) Hard Drug
		Panel I: Basic Controls		
Bisexual	0.141***	0.093***	0.149***	0.072***
	(0.014)	(0.011)	(0.011)	(0.009)
Lesbian	0.224***	0.065	0.187***	0.044
	(0.051)	(0.040)	(0.052)	(0.032)
	Panel II: Add Family Background Controls and School FE			
Bisexual	0.137***	0.087***	0.136***	0.069***
	(0.014)	(0.011)	(0.010)	(0.009)
Lesbian	0.206***	0.061	0.174***	0.041
	(0.051)	(0.042)	(0.053)	(0.033)
	Panel III: Family Background + Added Personal Controls			
Bisexual	0.081***	0.054***	0.097***	0.053***
	(0.015)	(0.010)	(0.011)	(0.008)
Lesbian	0.133**	0.037	0.133***	0.026
	(0.052)	(0.041)	(0.050)	(0.033)
N	7718	7740	7758	7758

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Unweighted estimates generated from data drawn from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. All models include controls for age, age-squared, race/ethnicity, urbanicity, PPVT score, educational attainment, current school attendance status, and romantic partnership status. Standard errors corrected for clustering on the school are in parentheses. Panel II adds controls for parental income, parental educational attainment, parental marital status, number of biological siblings, and whether the respondent had an older sibling. Panel III adds controls for religious affiliation, religious attendance, weight, height, personality, personal discount rates, and decision-making style.

Table 3. Estimated Relationship Between Sexual Orientation and Wave IV Risky Health Behaviors for Men

	(1) Smoking	(2) Binge Drink	(3) Marijuana	(4) Hard Drug
		Panel I: Basic Controls		
Bisexual	0.065***	0.001	0.104***	0.061***
	(0.024)	(0.026)	(0.023)	(0.017)
Gay	0.062*	-0.035	0.013	0.081**
	(0.034)	(0.040)	(0.032)	(0.034)
	Panel II: Add Family Background Controls and School FE			
Bisexual	0.068***	-0.002	0.090***	0.058***
	(0.025)	(0.028)	(0.024)	(0.018)
Gay	0.060	-0.033	0.013	0.076**
	(0.038)	(0.039)	(0.034)	(0.034)
	Panel III: Family Background + Added Personal Controls			
Bisexual	0.029	-0.017	0.061**	0.044**
	(0.024)	(0.028)	(0.023)	(0.018)
Gay	0.022	-0.054	-0.014	0.069*
	(0.039)	(0.036)	(0.034)	(0.035)
N	7243	7273	7298	7310

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Unweighted estimates generated from data drawn from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. All models include controls for age, age-squared, race/ethnicity, urbanicity, PPVT score, educational attainment, current school attendance status, and romantic partnership status. Standard errors corrected for clustering on the school are in parentheses. Panel II adds controls for parental income, parental educational attainment, parental marital status, number of biological siblings, and whether the respondent had an older sibling. Panel III adds controls for religious affiliation, religious attendance, weight, height, personality, personal discount rates, and decision-making style.

Table 4. Family Fixed Effects Estimates of Relationship Between Sexual Orientation and Wave IV Risky Health Behaviors

	Smoking			Binge Drink			Marijuana			Hard Drug		
	(1) OLS	(2) FE	(3) FE	(4) OLS	(5) FE	(6) FE	(7) OLS	(8) FE	(9) FE	(10) OLS	(11) FE	(12) FE
						Panel I: Women						
Bisexual	0.213***	0.140	-0.032	0.130***	0.105	0.023	0.233***	0.146*	0.204*	0.068**	0.006	0.002
	(0.051)	(0.086)	(0.118)	(0.046)	(0.091)	(0.120)	(0.039)	(0.075)	(0.118)	(0.026)	(0.049)	(0.073)
Lesbian	0.384*	0.227	0.186	0.183	0.117	-0.021	0.354**	0.009	0.034	-0.034	-0.167	-0.098
	(0.209)	(0.448)	(0.568)	(0.157)	(0.141)	(0.228)	(0.161)	(0.245)	(0.495)	(0.024)	(0.181)	(0.165)
N	820	820	820	819	819	819	834	834	834	832	832	832
						Panel II: Men						
Bisexual	0.182***	0.118	0.078	0.095	0.105	0.023	0.185**	0.226	0.141	0.103*	0.133	0.065
	(0.069)	(0.125)	(0.199)	(0.067)	(0.091)	(0.120)	(0.075)	(0.157)	(0.217)	(0.054)	(0.082)	(0.101)
Gay	-0.001	0.215	0.202	-0.100	0.117	-0.021	0.039	0.141	0.112	0.041	0.038	0.118
	(0.115)	(0.181)	(0.237)	(0.097)	(0.141)	(0.228)	(0.099)	(0.162)	(0.229)	(0.075)	(0.141)	(0.177)
N	820	820	820	824	824	824	826	826	826	832	832	832
Basic Controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Added Personal Controls?	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes

***Significant at 1% level **Significant at 5% level *Significant at 10% level

All models include controls for age, age-squared, race/ethnicity, urbanicity, PPVT score, educational attainment, current school attendance status, and romantic partnership status, and whether the respondent had an older sibling. Added personal controls include religious affiliation, religious attendance, weight, height, personality, personal discount rates, and decision-making style.

Table 5. Robustness of Estimates to Alternate Definitions of Sexual Orientation for Females

	Smoking			Binge Drink			Marijuana			Hard Drug		
	(1) OLS-Full	(2) OLS-Sisters	(3) FE-Sisters	(4) OLS-Full	(5) OLS-Sisters	(6) FE-Sisters	(7) OLS-Full	(8) OLS-Sisters	(9) FE-Sisters	(10) OLS-Full	(11) OLS-Sisters	(12) FE-Sisters
						Panel I: Romantic Attraction						
Same- and Opp-Sex Rom Attract	0.089***	0.080	0.021	0.060***	0.202***	0.203	0.121**	0.234***	0.199*	0.059***	0.038	0.094
	(0.019)	(0.087)	(0.180)	(0.016)	(0.091)	(0.146)	(0.018)	(0.075)	(0.120)	(0.013)	(0.045)	(0.085)
Exclusively Same-Sex Rom Attract	0.062	0.096	0.134	0.075*	0.016	0.220	0.122**	0.232*	0.138	0.021	0.114	0.156
	(0.042)	(0.166)	(0.406)	(0.039)	(0.097)	(0.221)	(0.041)	(0.123)	(0.367)	(0.026)	(0.098)	(0.213)
N	7716	816	816	7740	826	826	7758	834	834	7758	828	828
						Panel II: Behavioral						
Same- and Opp-Sex Sex Partners	0.110***	0.090	-0.016	0.093***	0.072	-0.034	0.106***	0.109	0.142	0.047***	0.002	-0.036
	(0.021)	(0.069)	(0.131)	(0.017)	(0.058)	(0.137)	(0.016)	(0.066)	(0.119)	(0.010)	(0.036)	(0.069)
Exclusively Same-Sex Sex Partners	0.091*	0.162	-0.517	0.053	0.031	-0.631	0.137***	0.224	-0.036	0.066*	0.015	-0.295
	(0.054)	(0.271)	(0.565)	(0.050)	(0.128)	(0.439)	(0.045)	(0.167)	(0.510)	(0.035)	(0.041)	(0.251)
N	7508	784	784	7532	790	790	7544	794	794	7543	792	792
Basic Controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Added Personal Controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Unweighted estimates generated from data drawn from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. OLS-Full models include controls for age, age-squared, race/ethnicity, urbanicity, PPVT score, educational attainment, current school attendance status, romantic partnership status, parental income, parental educational attainment, parental marital status, number of biological siblings, whether the respondent had an older sibling, religious affiliation, religious attendance, weight, height, personality, personal discount rates, and decision-making style. OLS-Sisters and FE-Sisters models include controls for age, age-squared, race/ethnicity, urbanicity, PPVT score, educational attainment, current school attendance status, romantic partnership status, whether the respondent had an older sibling, religious affiliation & attendance, weight, height, personality, discount rates, and decision-making style.

Table 6. Robustness of Estimates to Alternate Definitions of Sexual Orientation for Males

	Smoking			Binge Drink			Marijuana			Hard Drug		
	(1) OLS-Full	(2) OLS-Brothers	(3) FE-Brothers	(4) OLS-Full	(5) OLS-Brothers	(6) FE-Brothers	(7) OLS-Full	(8) OLS-Brothers	(9) FE-Brothers	(10) OLS-Full	(11) OLS-Brothers	(12) FE-Brothers
						Panel I: Romantic Attraction						
Same- and Opp-Sex Rom Attract	0.057	0.057	-0.218	-0.065*	-0.219*	-0.443	-0.005	0.041	-0.117	0.014	-0.075	-0.060
	(0.039)	(0.152)	(0.260)	(0.037)	(0.127)	(0.324)	(0.033)	(0.143)	(0.318)	(0.024)	(0.070)	(0.092)
Exclusively Same-Sex Rom Attract	0.014	-0.000	0.113	-0.039	0.032	0.052	0.023	0.063	0.248	0.074**	0.128	0.206
	(0.034)	(0.119)	(0.217)	(0.035)	(0.121)	(0.258)	(0.029)	(0.099)	(0.177)	(0.034)	(0.103)	(0.169)
N	7250	820	820	7286	827	827	7312	824	824	7323	837	837
						Panel II: Behavioral						
Same- and Opp-Sex Sex Partners	0.037	0.044	-0.073	-0.026	0.097	0.071	0.013	0.034	-0.042	0.017	0.048	0.082
	(0.031)	(0.096)	(0.205)	(0.031)	(0.104)	(0.242)	(0.025)	(0.062)	(0.210)	(0.022)	(0.077)	(0.133)
Exclusively Same-Sex Sex Partners	0.007	0.096	0.131	-0.067	0.083	0.057	-0.014	0.011	0.027	0.057	0.095	0.179
	(0.037)	(0.112)	(0.228)	(0.041)	(0.121)	(0.285)	(0.032)	(0.105)	(0.246)	(0.035)	(0.108)	(0.170)
N	7064	784	784	7087	788	788	7106	788	788	7116	792	792
Basic Controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Added Personal Controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Unweighted estimates generated from data drawn from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. OLS-Full models include controls for age, age-squared, race/ethnicity, urbanicity, PPVT score, educational attainment, current school attendance status, romantic partnership status, parental income, parental educational attainment, parental marital status, number of biological siblings, whether the respondent had an older sibling, religious affiliation, religious attendance, weight, height, personality, personal discount rates, and decision-making style. OLS-Sisters and FE-Sisters models include controls for age, age-squared, race/ethnicity, urbanicity, PPVT score, educational attainment, current school attendance status, romantic partnership status, whether the respondent had an older sibling, religious affiliation & attendance, weight, height, personality, discount rates, and decision-making style.

Table 7. Difference-in-Difference Estimates of the Relationship Between Change in Sexual Identification and Risky Health Behaviors between Waves III and IV, Conditional on Heterosexual Identification at Wave III

	Smoking			Binge Drink			Marijuana			Hard Drug		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All	Smoke at Wave IV| Non-Smoker at Wave III	Quit Smoke at Wave IV| Smoker at Wave III	All	Binge at Wave IV| Non-Binger at Wave III	Quit Binge at Wave IV| Binger at Wave III	All	Pot at Wave IV| Non-Smoker at Wave III	Quit Pot at Wave IV| Smoker at Wave III	All	Drugs at Wave IV| Non-Drugs at Wave III	Quit Drugs at Wave IV| Drugs at Wave III
						Panel I: Women						
Bisexual	0.027	0.086***	-0.046	0.041**	0.072***	-0.145***	0.030*	0.069***	-0.199***	0.028**	0.051***	-0.213**
	(0.018)	(0.023)	(0.029)	(0.019)	(0.017)	(0.038)	(0.016)	(0.013)	(0.040)	(0.013)	(0.013)	(0.083)
Lesbian	0.176	0.234	0.234	-0.116	-0.079***	0.265**	0.032	0.235	0.040	0.001	-0.033***	^
	(0.190)	(0.169)	(0.418)	(0.126)	(0.008)	(0.031)	(0.201)	(0.169)	(0.280)	(0.007)	(0.005)	
N	5571	4029	1542	5548	4331	1217	5584	4781	824	5587	5398	189
						Panel II: Men						
Bisexual	0.076	0.128**	-0.005	-0.012	-0.001	-0.035	0.065	0.077**	-0.153**	0.024	0.064**	0.013
	(0.051)	(0.055)	(0.059)	(0.045)	(0.042)	(0.067)	(0.044)	(0.036)	(0.069)	(0.037)	(0.029)	(0.120)
Gay	0.143	0.177	-0.125	0.061	-0.076	0.032	0.053	0.048	0.184	0.228**	0.189*	-0.822***
	(0.118)	(0.149)	(0.123)	(0.110)	(0.066)	(0.216)	(0.116)	(0.091)	(0.310)	(0.096)	(0.100)	(0.052)
N	5485	3505	1980	7087	3144	2324	5495	4044	1451	5520	5062	458

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Unweighted estimates generated from data drawn from Waves III and IV of the National Longitudinal Study of Adolescent Health. All models include controls for age, educational attainment, and current school attendance.

Appendix Table 1. Disaggregating Bisexual Identifiers in Identifying the Effect of Sexual Orientation on Risky Health Behaviors

	(1) Smoking	(2) Binge Drink	(3) Marijuana	(4) Hard Drug
		Panel I: Women		
Mostly Heterosexual (straight), but somewhat attracted to people of own sex	0.083***	0.049***	0.098***	0.057***
	(0.017)	(0.011)	(0.012)	(0.010)
Bisexual that is, attracted to men and women equally	0.076**	0.052*	0.072**	0.035*
	(0.032)	(0.029)	(0.032)	(0.021)
Mostly Homosexual (gay), but somewhat attracted to people of the opposite sex	0.071	0.156***	0.154***	0.025
	(0.052)	(0.053)	(0.053)	(0.034)
100% homosexual (gay)	0.133***	0.037	0.133***	0.025
	(0.052)	(0.040)	(0.050)	(0.033)
N	7718	7740	7758	7758
		Panel II: Men		
Mostly Heterosexual (straight), but somewhat attracted to people of own sex	0.008	-0.031	0.049*	0.038*
	(0.026)	(0.031)	(0.029)	(0.021)
Bisexual that is, attracted to men and women equally	0.072	0.042	0.111*	0.033
	(0.070)	(0.065)	(0.061)	(0.036)
Mostly Homosexual (gay), but somewhat attracted to people of the opposite sex	0.073	-0.014	0.064	0.078*
	(0.067)	(0.071)	(0.062)	(0.044)
100% homosexual (gay)	0.023	-0.056	-0.013	0.069**
	(0.039)	(0.036)	(0.034)	(0.035)
N	7243	7273	7298	7310

***Significant at 1% level **Significant at 5% level *Significant at 10% level

Notes: Unweighted estimates generated from data drawn from Waves I, III, and IV of the National Longitudinal Study of Adolescent Health. All models include controls for age, age-squared, race/ethnicity, urbanicity, PPVT score, educational attainment, current school attendance status, romantic partnership status, parental income, parental educational attainment, parental marital status, number of biological siblings, whether the respondent had an older sibling, religious affiliation, religious attendance, weight, height, personality, personal discount rates, and decision-making style. Standard errors corrected for clustering on the school are in parentheses.