WHAT ARE GAY AND LESBIAN POPULATIONS? DEFINITIONS, STABILITY OVER TIME, AND IMPLICATIONS OF DIFFERENT CONCEPTUALIZATIONS OF SEXUAL MINORITY STATUS

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Abstract

Recently, research on sexual minorities has flourished. Yet there is no agreement on the best way to identify and define gay and lesbian populations, particularly in large-scale surveys, and little attention has been paid to the implications of these different definitions. It is also unclear if individuals maintain identities over time. This paper focuses on how survey researchers have defined gay and lesbian populations based on sexual activity, relationships and co-residency, attraction and identification; whether using these definitions produces similar estimates of demographic compositions and health risk factors, and whether definitions change over time. Results show that different definitions result in different populations, a significant proportion of the population changes their sexuality over time, and different definitions impact estimates of common demographic and public health indicators. Using different theoretical perspectives, the paper concludes with recommendations of how gay and lesbian populations should be conceptualized in future research using large-scale surveys.

In the past decade, as issues such as same-sex marriage and civil rights protection have further penetrated mainstream discourse, research on sexual minorities has flourished, driven in part by US government initiatives to collect more data on gay and lesbian populations. And yet, given that scholarly interest in gay and lesbian populations is relatively new, scholars have not yet agreed on the best way to identify these individuals, particularly in large-scale surveys. Recognizing the "ambiguity of the very definition of homosexuality," scholars like Black and colleagues (2000) use definitions of gay and lesbian populations based on sexual behavior history and co-residency with same-sex partners. More recent research, however, has used definitions based on sexual orientation and attraction in attempting to identifying gay and lesbians (Albelda et al. 2009; Russell and Joyner 2001). And yet, little attention has been paid to the implications of these different definitions of sexual minority status for estimates of the size of, demographic characteristics, and public health risk factors experienced by this population. It is also unclear whether or not individuals maintain identities over time. This is problematic in that demographic and public health research on these populations is often used to inform make arguments about public policies or interventions aimed at better serving the needs of gay and lesbian populations in the United States (e.g. Gates et al. 2007).

To address these questions, this study explores how different strategies for operationalizing homosexuality impact estimates of the size and characteristics of gay and lesbian populations in the United States. Specifically, this paper focuses on how survey researchers have defined gay and lesbian populations based on sexual activity, relationships and co-residency, and sexual attraction and identification; whether using these definitions produces similar estimates of demographic compositions and public health risk factors, and whether these definitions are stable over time.

I begin by reviewing and critiquing common ways in which survey researchers in demography and public health have defined gay and lesbian populations. I then analyze these common definitions using The National Survey of Family Growth (NSFG), which allows for the comparison of individuals from different age cohorts, and the National Longitudinal Study of Adolescent Health (Add Health), which follow a group of young adults longitudinally. The analysis contains three sections. First, I describe and compare the educational and racial/ethnic compositions of groups across common definitions using means and confidence intervals and zero-inflated Poisson regression. Second, I investigate whether or not individuals change, over time, aspects of sexuality that have been used to define gay and lesbian populations using longitudinal data. Third, I explore the differences in two common demographic and public health outcome measures, drug use and sexual initiation, across different definitions of gay and lesbian populations. I find that different definitions of sexual minority status result in different gay and lesbian populations, a significant proportion of the population changes their sexuality over time, and different definitions also impact estimates of common demographic and public health indicators.

In light of these findings, the discussion of this paper will draw on different theoretical perspectives to recommend how gay and lesbian populations should be conceptualized and measured in future research using large scale surveys. I argue that future research should use multiple definitions of sexual minority status to capture most broadly populations of interest and consider the intersection of sexuality, gender, and race/ethnicity. Finally, research should discuss outcomes of gays and lesbians while bearing in mind the constructed nature of sexuality.

MEASUREMENT OF GAY AND LESBIAN POPULATIONS

While scholars have operationalized homosexuality in various ways, they say little about the empirical and theoretical implications of these analytic choices. Surveys that ask about various facets of sexuality and use probability samples at the state and national level have been available for only two decades. The following sections describe how research from a number of disciplines defines and operationalizes gay and lesbian populations based on survey questions from a growing number of datasets[1]. The questions fall into the following categories: sexual activity, relationships and co-residency, sexual attraction and identification.

Sexual Activity

In using sexual activity as a measure of homosexuality, early research using large-scale datasets did not consider fully the implications of this analytic choice. Using datasets like the General Social Survey (GSS) and National Health and Social Life Survey (NHSLS), scholars identified gay and lesbian individuals as those who had same-sex sexual history. The goal of this research was primarily to estimate the size of the gay and lesbian populations (Black et al 1998; Laumann 1994), and characteristics of such populations, like educational attainment and labor market outcomes (Black et al 1998; Black, Sanders, and Taylor 2007). Similarly, public health scholars used sexual activity measures to show diverse spectrum of outcomes, including substance abuse and other risky behaviors (Bauer, Jairam, and Baidoobonso 2010; Chandra, Billioux, and Sionean 2012; Hallfors et al. 2004; Strathdee and Sherman 2003), depression (De Santis et al. 2008; Mays and Cochran 2001; Stall et al. 2003), and suicide (Paul et al. 2002). Yet, they do not consider how a focus on sexual activity might influence the results of these analyses.

[1] This section discusses a number of major surveys, but does not cover every available dataset. For work on available surveys, please see Coker, Austin, and Schuster's (2010) review piece of datasets which ask questions about sexuality, or the helpful website, gaydata.org (Sell 2007).

This operationalization may be problematic, for example, in that it assumes a fixed relationship between homosexual identification and same-sex sexual activity. As an effort to disassociate sexual activity and identity, public health research commonly use the terms MSM (men who have sex with men) and WSW (women who have sex with women). However, Young and Meyer (2005) argue that the ubiquitous use of MSM and WSW in public health research "1) undermines the self-determined sexual identity of members of sexual-minority groups, in particular people of color; (2) deflects attention from social dimensions of sexuality that are critical in understanding sexual health; and (3) obscures elements of sexual behavior that are important for public health research and intervention." In utilizing sexual activity as the sole marker of homosexuality, however, scholars have largely neglected to problematize the assumptions inherent in this choice.

Relationships and Co-residency

Another body of research defines gay and lesbian populations solely on co-residency and relationship history, which excludes members who may identify as non-heterosexual, but do not report being in a "marriage-like relationship", according to recent census waves, in one household (U.S. Census Bureau 1990, 2000). Defining gay and lesbian populations based on relationship and co-residency, research has uncovered a large amount of demographic, social and economic information about gay and lesbian populations. Specifically, this body of research has estimated the size of gay and lesbian populations in various contexts (Black et al 2000; Carpenter and Gates 2008), marriage (Andersson et al. 2006; Black et al 2000; Carpenter and Gates 2008). couple formation (Jepsen and Jepsen 2002), area of residence child-rearing (Andersson et al.

2006; Black, Sanders, and Taylor 2007; Rosenfeld and Kim 2005; Rosenfeld 2007), divorce (Andersson et al. 2006), and labor market outcomes (Black, Sanders, and Taylor 2007).

While some studies identify sexual minority individuals on the basis of their residential and relationship status, these studies are limited in that they likely underreport the prevalence of homosexuality. Studies suggest, for example, that many individuals who identify as gay or lesbian are unlikely to report that they are cohabiting with a same-sex partner. Other research also shows that sexual minority individuals are less likely than heterosexual individuals to report being part of a romantic couple. Thus, by defining heterosexuality only in terms of residential and relationship status, these studies may include only a limited, and also non-representative, sample of gay and lesbian individuals.

Sexual Attraction and Identification

Other research relies on self report of sexual attraction and identification/orientation to define non-heterosexual populations, although these definitions often assume a static and universal concept of sexuality. In addition to sexual activity, surveys such as NHSLS, the National Longitudinal Study of Adolescent Health (Add Health), and The National Survey of Family Growth (NSFG), ask respondents about sexual attraction and identity/orientation. These surveys ask about sexual attraction, and typically ask if respondents are attracted only or mostly to men or women, or to both men and women. Response categories for questions regarding identity include heterosexual / normal / straight, homosexual, bisexual, or something else.

A number of papers use Add Health to look at the relationship between attraction or identity and same-sex relationship formations among adolescents, school violence, and school outcomes (Galliher, Rostosky, and Hughes 2004; Look 2001; Russell, Driscoll, and Truong 2002;

Russell and Joyner 2001; Russell, Seif, and Truong 2001). Studies using the NSFG have investigated similar relationships, as well as issues like adoption and poverty (Albelda et al. 2009; Gates et al. 2007; Irwin and Morgenstern 2005).

This focus on sexual attraction and identification is problematic, however, in that previous research suggests that these concepts may be more fluid among gay and (especially) lesbian populations than among heterosexual ones, or that these terms may not hold consistent meaning among all groups. Scholarship from psychology, pioneered by Baumeister (2000, 2004), argues that women's sexuality is more "plastic", or more likely to change across time, than men's sexuality. This claim is supported by a set of studies based on interviews with close to one hundred young women found considerable change in women's sexual behavior and identification over time (Diamond 1998; 2000; 2008), and another study using the first three waves Add Health, which found that the agreement between waves of sexual attraction varied between males and females (Savin-Williams and Ream 2007). Similar to studies that find differences in the composition of gay and lesbian populations with different operationalizes within definitions based on sexual activity or partnership and co-residency, one study found that the racial composition and behavior of women who have sex with women differ significantly by their self-reported sexual identification (heterosexual, homosexual, bisexual, "something else") and partnership history (Bauer and Jairam 2008). Other work also finds that the meaning of common sexual identity labels such as "gay", "lesbian", and "bisexual" are not widely understood or prescribed to by all groups, particular adolescents (Ghaziani 2011; Green 2002; Russell, Clarke, and Clary 2009; Savin-Williams 2006).

Although scholars have used a variety of different measures to identify and evaluate gay and lesbian populations, there has been no theoretical discussion of the implications of these different operationalizations. Nor has there been any empirical research exploring how these different definitions lead to divergent conclusions about the characteristics (e.g., race, geographic location, and socioeconomic status) and behaviors (e.g., rates of cohabitation, divorce, and childrearing) of sexual minority populations. The goal in this paper, then, is to compare these various conceptualizations of homosexuality, and to explore how they impact what we know about the behavioral and demographic characteristics of gay and lesbian populations. Specifically this work asks:

1. How do different definitions of the gay and lesbian population influence our estimates of the educational and racial/ethnic compositions of these groups?
2. Are these definitions of gay and lesbian populations, such as sexual attraction and identification, stable across time?
3. How do different definitions of the gay and lesbian population shape our understanding of the behavioral characteristic and public health outcomes, such as sexual initiation and drug use, of these groups?

DATA AND METHODS

National Survey of Family Growth

The National Survey of Family Growth (NSFG) is a family and health survey of United States women and men, ages 15-45, with infant children. It is conducted by the National Center for Health Statistics. For this analysis, two waves were used covering 2002 and 2006 – 2010, with a total sample size of approximately 50,000 respondents.

The survey was selected for this study because it includes questions that address all three common survey definitions of homosexuality and samples respondents from a wide range of ages. Specifically, it includes three highly relevant questions about sexuality: 1. if participants "ever had any sexual experience of any kind with another male/female" (coded 1 if yes, 0 if no); 2. "People are different in their sexual attraction to other people. Which best describes your feelings? Are you a. only attracted to males (or females in female survey), b. mostly attracted to males, c. equally attracted to males and females, d. mostly attracted to females, e. only attracted to females, and f. Not sure." (coded 1 for response categories b – e, coded 0 for a., and missing if f.); and 3. "Do you think of yourself as heterosexual, homosexual, bisexual, or something else." (coded 1 if homosexual, bisexual, or something else, 0 if heterosexual). Another question on the surveys asked respondents for their age at first sexual intercourse with the opposite sex, and was worded "that very first time that you had sexual intercourse with a male/female, how old were you?" While these questions were asked only of a subsample of the total study, this subsample includes approximately 13,300 respondents for questions of same sex experience, attraction and identity, and among which approximately 10,000 participants also provided information about for sexual initiation.

The National Longitudinal Study of Adolescent Health

The four waves of The National Longitudinal Study of Adolescent Health (Add Health) followed a cohort of adolescents in grades 7 – 12 in the 1994 – 95 school year through 2008, when the sample was aged 24 – 32 (Harris 2009; Harris et al. 2009). The primary sampling frame in Wave I was school-based, with a 70 percent response rate, for a total of 132 public and private schools participated. From the schools, students were split into sex by grade strata and

randomly selected to be administered in-home interviews. Over-samples were taken of Chinese, Cuban, Puerto Rican, twins, disabled, and Black youth with at least one parent having a college degree.

This survey was selected for this paper because it asks respondents a number of questions about sexuality and is longitudinal, which allows for an analysis of respondents changing aspects of their sexuality over time. Moreover, it also asks respondents for relationship histories, which can be used to identify individuals who have been in same-sex cohabiting (or non-cohabitating) relationships. To be included in this study, respondents had to have valid data for all four waves and a valid grand sample weight. The analytic sample for the results presented in this paper was 9,320. Descriptive statistics for both NSFG and Add Health can be found in Appendix table A.

Description of Variables

This paper explores four broad definitions of sexual minority status – relationship status, sexual attraction, sexual identification, and sexual activity – based on and draws from two nationally representative datasets.

Relationship Status. Three variables describing respondents' relationship statuses were coded from questions taken from Wave III of the National Longitudinal Study of Adolescent Health (Add Health). First, respondents who answered they were "currently involved in a sexual or romantic relationship" and indicated that their partner was of the same sex were selected. These respondents were coded a 1 for the variable *same-sex partner, all* if they were in a same-sex relationship and 0 if not. The *same-sex, cohabit* variable was coded 1 if the respondent reported currently living or had in the past live together with the partner, and coded 0 if they had

never lived together with their partner. The variable s*ame-sex partner, no cohabit* was coded inversely.

Sexual Attraction. A set of variables represent sexual attractions of respondents, and were coded from two questions on all four waves of Add Health asked respondents about same-sex attraction. In Wave I, respondents were asked if "they ever had a romantic attraction to a female/male". In subsequent waves, respondents were asked about romantic attraction since the month of the last interview. For tables 1a – 1c, the variable for *same-sex attraction* was coded 1 if respondents indicated they were ever attracted to someone of the same sex and 0 if not. *No same-sex attraction* was coded 1 if respondents indicated that did not have attraction to the same sex and 0 otherwise. In Table 2, the variable *same-sex attraction* comes from questions on the female and male questionnaires from cycles 6 and 7 of the National Survey of Family Growth (NSFG). This question prompted the respondents by stating that "people are different in their sexual attraction to other people. Which best describes your feelings? Are you…only attracted to males, mostly attracted to males, equally attracted to males and females, mostly attracted to females, only attracted to females, not sure." This variable was coded 0 if respondents indicated they were exclusively attracted to the other sex and 1 if any other response.[2]

Sexual Identification. On Waves III and IV of Add Health, respondents were asked "Please choose the description that best fits how you think about yourself. 100% heterosexual (straight); mostly heterosexual (straight), but somewhat attracted to people of your own sex; bisexual—that is, attracted to men and women equally; mostly homosexual (gay), but somewhat attracted to people of the opposite sex; 100% homosexual (gay); not sexually attracted to either males or females. Individuals who refused to answer were excluded from the sample. This

[2] This binary variable could be constructed in a number of ways, but was coded to be a conservative match to the Add Health question asking if respondents had "ever had a romantic attraction" to members of each sex.

variable was coded 1 if respondents reported that answered they were mostly heterosexual, bisexual, mostly homosexual, or 100% homosexual and coded 0 if otherwise. The variable *Gay/Lesbian* was coded 1 if respondents reported being "100% homosexual" and coded 0 if otherwise. The variable *Heterosexual* was coded 1 if respondents reported being 100% heterosexual and 0 if otherwise. These three variables from Add Health, *Non-heterosexual Identification* and *Gay/Lesbian*, are used in Tables 1a – 1c and Tables 4a – 4d. On the NSFG, respondents were asked on cycles 6 and 7 if "you think of yourself as heterosexual, homosexual, bisexual, or something else?" The variable *Non-Heterosexual Identification* was coded 1 if respondents answered they were homosexual, bisexual, or something else, and coded 0 if heterosexual. The variable *Gay/Lesbian* was coded 1 if respondents answered they were homosexual and 0 otherwise. The variable *Heterosexual* was coded 1 if respondents reported being 100% heterosexual and 0 if otherwise. The NSFG variables are found in tables 4a – 4c.

Sexual activity. One question on cycles 6 and 7 of NSFG asked respondents if they had ever had sex with males or females. This variable was coded 1 if respondents reported ever having sex with someone of the same sex and 0 if they did not.

Change in Attraction. This variable used responses from the four waves of Add Health, and was coded 1 if respondents ever changed their report of attraction over the four waves.

Change in Identification. This variable used responses from the Waves III and IV of Add Health, and was coded 1 if respondents ever changed their report of sexual identification.

Ever Smoked Marijuana. A question on Wave III of Add Health asked respondents if they had ever smoked marijuana. This variable was coded 1 if respondents had tried marijuana and 0 otherwise.

Age of Sexual Initiation. A question on cycles 6 and 7 of the NSFG asked respondents "That very first time you had sexual intercourse with a [member of the other sex], how old were you?" This variable was coded to reflect the age of first sexual experience.

A number of other variables were also used in the analyses in this work. A variable for *age cohort* separated participants from the NSFG into three ten-year categories with the oldest age group, 35 – 45 year olds, as the reference category. The variable *female* was coded 1 if female, 0 if male from both surveys, and a dummy variable was created to represent *race/ethnicity* of the respondents (categories from the NSFG are Asian, Latino, Black, American Indian, and Native Hawaiian / Pacific Islander, with White as the reference category and Asian, Latino, and Black, with White as the reference category for Add Health).

Analytic Strategy

The analytic strategy for the results is separated by research question. Using the NSFG dataset, the first two tables use descriptive and logistic regression analysis to consider how different definitions of sexual minority status lead to different conclusions about demographic characteristics of gay and lesbian populations. Summative statistics and t-tests and proportion tests are used to compare the average years of education and percent white of six definitions of non-heterosexual populations, as well as two definitions of heterosexual populations. Zero-inflated Poisson regression models, which correct for non-normal distribution, are used to explore variations in same-sex experience, attraction, and identification across different racial/ethnic groups, age-cohorts, and gender. Models which introduce interaction terms are also used to explore potential variations between racial/ethnic groups and age cohorts. Predicted

probabilities are then presented to indicate the overall proportion of people who have same-sex sexual experience and those who identify as non-heterosexual.

The stability of measures of sexuality uses Add Health to investigate how different definitions of homosexuality are related to the likelihood of change in individual identity and attraction over time. Logistic regression is used to indicate whether or not individuals changed their report of sexual attraction between any given waves of Add Health, with measures of attraction available for all four waves of data and measures of identification available for the third and fourth waves.

Both NSFG and Add Health datasets are used to see if different definitions of gay and lesbian populations shape how we perceive the demographic and public health outcomes of these groups. First, summative statistics and means with 95 percent confidence intervals are used to show differences in the incidence of individuals smoking marijuana across six definitions of homosexuality. Predicted probabilities are then used to show differences in age of sexual initiation and probabilities of ever smoking marijuana.

RESULTS

The first research question investigates how the educational and demographic compositions the gay and lesbian populations vary depending on the definitions used to identify these populations. Overall, there are differences depending on definitions. Table 1a shows summative statistics on two compositional measures, average years of education and percent White, by six definitions of gay and lesbian populations (same-sex partner, cohabit; Same-sex, no cohabit; same-sex partner, all; same-sex attraction; non-heterosexual identification; gay/lesbian identification) and two definitions of heterosexual populations (no same-sex

attraction, heterosexual identification). The average years of education for all groups is over or close to 13 years and about 70 percent of the respondents in each group is White. However, there are considerable differences between groups, which are explored in depth in Figures 1a and 1b, which show means and 95 percent confidence intervals between the average education and percent white of each group, respectively. In Figure 1a, the average years of education differs by operationalization of gay and lesbian populations. For example, definitions of sexual minority status based on relationship and residence status may lead to the assumption that the gay and lesbian population is more educated than would definitions based on sexual attraction or identification. Moreover, different operationalizations of definitions also produce different populations: the average education of individuals who have cohabited with same-sex partners is lower than individuals how have not co-habited with same-sex partners. A similar pattern is found in Figure 1c, which shows that the racial/ethnic composition of groups is different. Specifically, populations who have been in cohabiting same-sex relationships are whiter than partners who have not cohabited. This evidence suggests that the composition of different definitions of gay and lesbian groups is not the same.

[Table 1a here]

[Figure 1a here]

[Figure 1b here]

In order to understand how different definitions of homosexuality impact our understanding of the characteristics of gay and lesbian populations, I explore both how these definitions impact what we perceive as the racial/ethnic composition of these groups, and also the extent to which homosexuality is evenly distributed across different racial/ethnic groups. Figure 1b showed evidence of different racial composition by definitions of sexuality, while

Table 2 uses zero-inflated Poisson regression models to focus on patterns among different racial/ethnic and age cohorts of report on three facets of sexuality: same-sex experience (Models 1a and 1b), same-sex attraction (Models 2a and 2b), and non-heterosexual identification (Models 3a and 3b). The first model in each specification compares younger cohorts, 15 – 24 year olds and 25 – 34 year olds with the oldest cohort, individuals ages 35 – 45, and also includes variables for the sex and race/ethnicity of respondents. Model 2a also controls for same-sex sexual experience, and Model 3a includes variable for both same-sex sex experience and attraction. The second model for each outcome introduces an interaction between race/ethnicity and age cohort.

[Table 2 here]

Overall, these models provide more evidence that racial/ethnic composition may vary by definition of homosexuality. For example, from Model 1a, Asians and Latinos have much lower odds than Whites of same-sex sexual experience (76 percent and 62 percent, respectively), but Asians have 78 percent higher odds of reporting same-sex attraction than Whites, net of same-sex activity (Model 1b).

Regardless of the definition used, the homosexual population is more female than male. This is consistent with prior research, which suggests that homosexuality is more common among females than among males (Diamond 2000). That said, the relative representation of these groups does vary by definition. Females, for example, have more than twice the odds of having same-sex sexual experience, but only and 73 percent higher odds of same-sex attraction (Models 1a and 2a, respectively). After controlling for same-sex experience and attraction, however, women actually are less likely than men to identify as non-heterosexual (with 39 percent lower odds) (Model 3a).

Interaction models also show how the consequences of these different definitions vary simultaneously across race/ethnicity and age cohorts. For ease of interpretation, Figures 2 and 3 show predicted probabilities of same-sex attraction and non-heterosexual identity by age cohort, gender, and race/ethnicity, respectively. Figure 2 shows that the younger cohorts of Whites, Blacks, and American Indian are more likely to have same-sex attractions. However, this pattern is reversed for Asians: for example, 19 percent of the oldest Asian male cohort report same-sex attraction, which is 10 point greater than the youngest cohort. Figure 3 shows that patterns across age cohorts also are different between Blacks and other groups. For Whites, Asians, Latinos, and American Indians, the youngest cohorts have much higher odds of reporting a non-heterosexual identity, net of same-sex sexual experience and attraction. This may be consistent with the notion that modern society is more accepting of non-heterosexual identities than previous generations, as suggested by both scholarly work and popular news outlets (Connelly 2012; Loftus 2001). For example, 5 percent of the youngest White women report a non-heterosexual identity, which is more than twice the percent of their oldest counterparts. However, older Blacks have higher odds than younger Blacks of reporting a non-heterosexual identity. Overall, Table 2 and Figures 2 and 3 are evidence that there are distinct racial/ethnic patterns in report of common notions of sexuality.

[Figure 2 here]

[Figure 3 here]

Another measurement concern in trying to define sexual minority status is the stability of definitions across time. The second research question explores the stability of sexuality in a nationally representative sample of young adults over a fourteen-year period. Table 3 shows odds ratios from logistic regression models of change in sexual attraction (models 1a and 1b) and

identification (models 2a and 2b) of individuals followed over time. Models 1a and 2a include variables representing the sex and race/ethnicity of respondents. Models 1b and 2b introduce interactions between gender (whether or not the respondent is female) and race/ethnicity. Overall, females have much higher odds of changing sexual attraction (50 percent higher odds from Model 1a) and identification (3 times higher odds from Model 2a) than men, which suggests that there is a substantial amount of variability in definitions across time. Patterns vary less by racial/ethnic group, although once interaction terms are introduced, we see that changes in sexuality vary by the intersection of gender and race/ethnicity. Across time, the direction of change in attraction and identification is more toward non-heterosexuality (model not shown). Predicted probabilities, found in Figure 4, show the magnitude of change in sexual attraction and identification over time. While females have higher probabilities than men of changing their attraction or identification, the percentage of men is also high. Overall, 22 percent and 20 percent of women change their report of sexual attraction and identification over time, but the same is true for 15 percent and 8 percent of males as well.

[Table 3 here]

[Figure 4 here]

Previous tables and figures have shown that the characteristics of the gay and lesbian population vary depending on the definitions used to identify homosexual individuals in surveys. Moreover, a large portion of the population changes their reports of sexuality over time. Yet, to fully understand the consequences of these different definitions, we must also consider how they impact our understanding of differences in the behaviors and outcomes of gay/lesbian and heterosexual groups. The final two tables address the final research question: do common demographic and public health outcomes vary depending on measures of gay and lesbian

populations? Table 4a shows summative statistics for two outcome measures: ever smoked marijuana and the age of sexual initiation for males and females, by different definitions of gay and lesbian and heterosexual populations. Figures 5a, 5b, and 5c show means and 95 percent confidence intervals for the outcome measures. There are differences across definitions in the estimates of the proportion of homosexuals who have ever smoked marijuana (Figure 5a). Estimates of the average age of sexual orientation among heterosexual individuals also vary depending on how these groups are identified (Figure 5b and Figure 5c). Interestingly, from a regression analysis not shown, overall, females are older than men the first time they have sex with the opposite sex, and this pattern does not vary by sexual attraction or identification. However, women who have same-sex sexual experience report the lowest age of sexual initiation of any group.

[Table 4a here]

[Figure 5a here]

[Figure 5b here]

[Figure 5c here]

DISCUSSION

The main results of this paper show that the composition of gay and lesbian populations varies significantly, depending on whether these individuals are identified by their sexual behavior, attraction, identity, relationship history, or residential status (e.g., cohabiting with a same-sex partner). These different definitions of homosexuality also lead to different estimates of the extent to which racial/ethnic, gender, and age cohorts report sexual minority status. Another complication is the finding that many respondents report different sexual attraction and

identity over time, which points to the limits of cross sectional data. Finally, different ways of defining the gay and lesbian population yield markedly different estimates of the behavioral and health outcomes of homosexual individuals, which may have larger consequences if results are used to inform policy decisions.

So how can researchers characterize a population that is so difficult to define? Empirical studies from psychology, sociology, and anthropology have long argued that the many facets of sexuality are dynamic and vary across global contexts and by many other characteristics (Blackwood 1986; Blumstein and Schwartz 1976a, 1976b; Goode and Haber 1977; Herdt 1984). Other scholars argue that survey questions can essentialize categories of sexuality. Valocchi (2005) argues that survey items are insufficient indicators that cannot capture real or objective social processes and Gamson and Moon (2004) challenge researchers to be mindful of the ways social categories of sexuality may obfuscate the wide spectrum of situations in which people live. Seidman (1996) states that limited response categories make it difficult to "observe the incongruities between classification systems and individuals' actual behaviors and even harder to develop alternative classification schemes in the process of the research", and that "identities are always multiple or at best composites with literally an infinite number of ways in which 'identity-components' (e.g., sexual orientation, race, class, nationality, gender, age, able-ness) can intersect or combine". These arguments form the foundation of Queer theory, which traces its origins from scholarship in the humanities (Fuss 1991), but is now used in the social sciences. Queer theory challenges the "assumption that homosexual theory and politics has its object 'the homosexual' as a stable, unified, and identifiable human type…Identity constructions function as templates defining selves and behaviors and therefore exclud[e] a range of possible ways to frame the self, body, desires, actions, and social relations (Seidman 1996)." Moreover,

"identities are always on uncertain ground, entailing displacements of identification and knowing" (Stein & Plummer 1996), and "sexual identities, desires, and categories are fluid and dynamic (Gamson and Moon 2004)." Distinct from much research on sexual fluidity, work that relies on queer theory often challenges the meaning of social categories of sexuality, and argue that categories such as 'gay' and 'lesbian' may reflect a variety of meaning to individuals.

In order to address methodological concerns explored in this paper, future research should consider three recommendations. First, research should compare the outcome of interest among populations derived from multiple measures of gay and lesbian. Since more surveys today contain questions that capture multiple facets of sexuality - sexual experience, attraction, identification, relationship history, and cohabitation – researchers can strengthen and broaden arguments if patterns are consistent across these measures, while also avoiding the unintentional association of behaviors with identities (such as defining gay and lesbian populations only by sexual history or cohabitation). If there are different patterns depending on definition, researchers can theorize why there are differences between groups, or why certain groups are not captured by certain definitions.

Second, the intersection, not just the disaggregation, of sexuality, gender, and race/ethnicity should be incorporated into research designs by using interactions between gender and race/ethnicity. Prior qualitative research from a number of disciplines suggests that common measures of sexuality may vary uniquely by gender and/or race and ethnicity (Diamond 2008; Green 2007; Rust 2000; Seidman 1996). This variation was supported by results in this paper that show statistically significant interaction terms[3]. It is likely that broad and singular

[3] Small sample sizes are of concern when interactions are introduced; however, this is becoming less of an issue with datasets that can be stacked, therefore resulting in greater sample sizes.

definitions of gay and lesbian populations - even defining non-heterosexuality using questions that ask respondents about sexual identification - will exclude many populations.

Third, researchers should bear in mind the constructed nature of sexuality when interpreting their results. Results from this paper can be used as an illustration of this final point. For most groups, net of same-sex sexual experience and attraction, younger people express more often a non-heterosexual identity (though individuals are more likely to report homosexual attraction and identity when they are slightly older than when they are younger). One explanation may be that society is becoming more accepting of sexual minorities. However, once interactions are introduced between race/ethnicity and age cohorts, the patterns for blacks are reversed: the youngest black cohort has significantly lower predicted probabilities of identifying as non-heterosexual than older cohorts. A simple explanation may be that black communities are socially conservative and young black sexual minorities may face more discrimination than their peers from other racial/ethnic backgrounds. Indeed, some research explores how black men are "on the DL", or "down low", a term which is used often to describe individuals who are not "out of the closet", or publically disclose an often gay identity (Ford et al. 2007)[4]. This explanation may also potentially explain why older blacks, who have had more time to negotiate their sexuality, are more willing to embrace a non-heterosexual identity. However, this interpretation imposes a universal definition of sexual identity that is confounded with sexual behavior: individuals who have sex with members of the same sex are gay or lesbian, and that these young Black individuals do not embrace these identities due to social pressures. It may be the case, however, that different notions of sexuality exist among different groups.

[4] There are also misleading notions, both in popular culture and academia, that misleading associates individuals who are labeled as "DL" with higher incidence of risk sexual behavior (Bond et al. 2009)

As more systematic data becomes available on sexual minorities, research on gay and lesbian populations which relies on large scale data must continue the tradition set out by first article in *Demography.* There is a growing body of literature that analyzes and critiques common measures of other social categories, such as race and ethnicity, and cautions scholars against making essentialist arguments with these definitions (Hirschman, Alba, and Farley 2000; Kaplan and Bennett 2003; Zuberi 2001). In the same vein, researchers must be reflective of how they define non-heterosexual populations, if different definitions are comparable and share similar patterns on outcomes of interest, and discuss their findings within the bounds of the limitations of the ability of surveys to capture complex notions of sexuality.

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Table 1a. Summative Statistics of Average Years of Education and Percent White, by Different Definitions of Gay / Lesbian and Heterosexual Populations

	Average Years of Education			Percent White		
	Mean (years)	SD	N	Percent	SD	N
Gay and lesbian populations						
Cohabiting with same-sex partner	12.70	1.69	78	78.21	41.55	78
Same-sex, non-cohabiting relationship	13.56	1.84	157	67.39	47.03	158
Any same-sex partner	13.47	2.00	400	74.81	43.46	401
Any same-sex attraction	13.04	2.06	1322	74.53	43.59	1323
Identifies as non-heterosexual	13.23	2.01	1414	75.55	43.00	1415
Identifies as gay/lesbian	13.54	1.96	124	72.52	44.82	125
Heterosexual populations						
Only other-sex attraction	13.07	1.99	12,987	67.60	46.80	12,999
Identifies as heterosexual	13.08	1.99	12,698	67.93	46.68	12,706

Note: Percentages and standard deviations are weighted. Ns are unweighted.
Source: Wave III of the National Longitudinal Study of Adolescent Health.

Figure 1a. Means of Average Years of Education with 95% Confidence Intervals, by Different Definitions of Gay / Lesbian and Heterosexual Populations

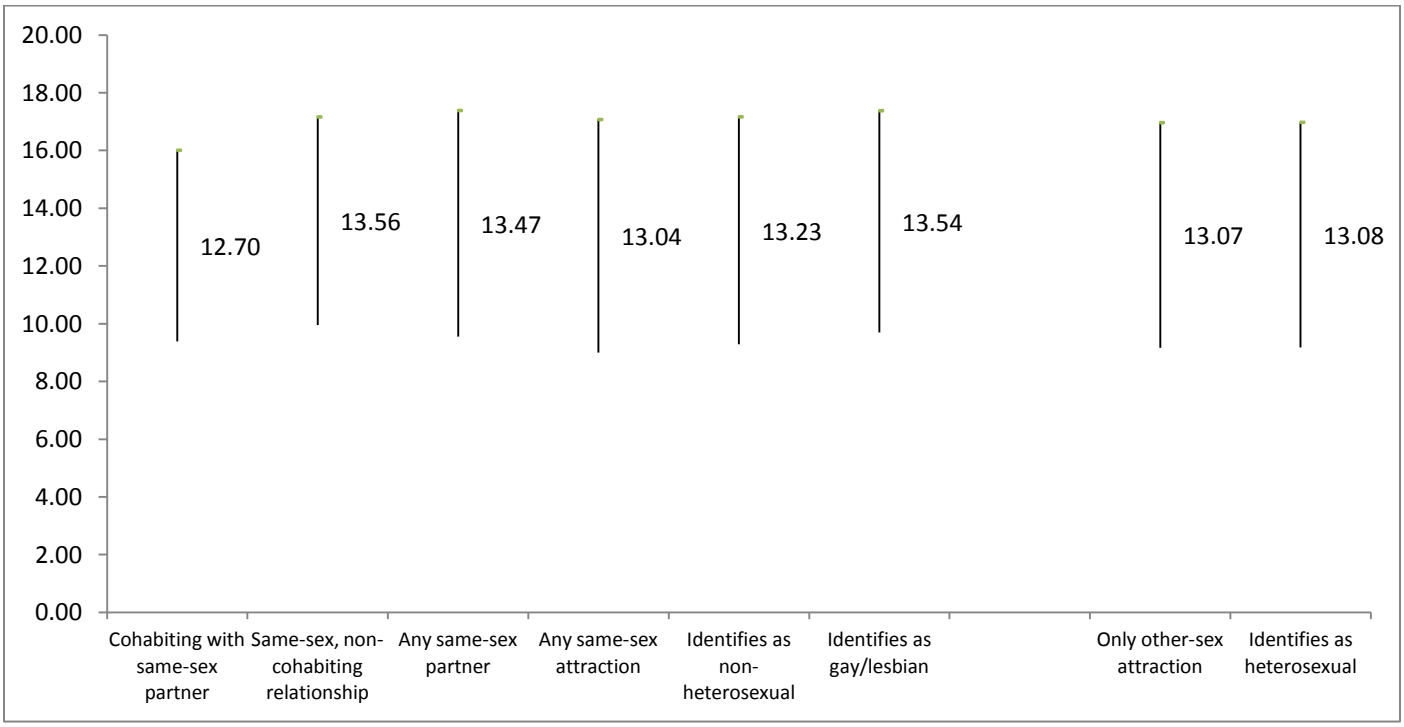


Figure 1b. Means of Percent White with 95% Confidence Intervals, by Different Definitions of Gay / Lesbian and Heterosexual Populations

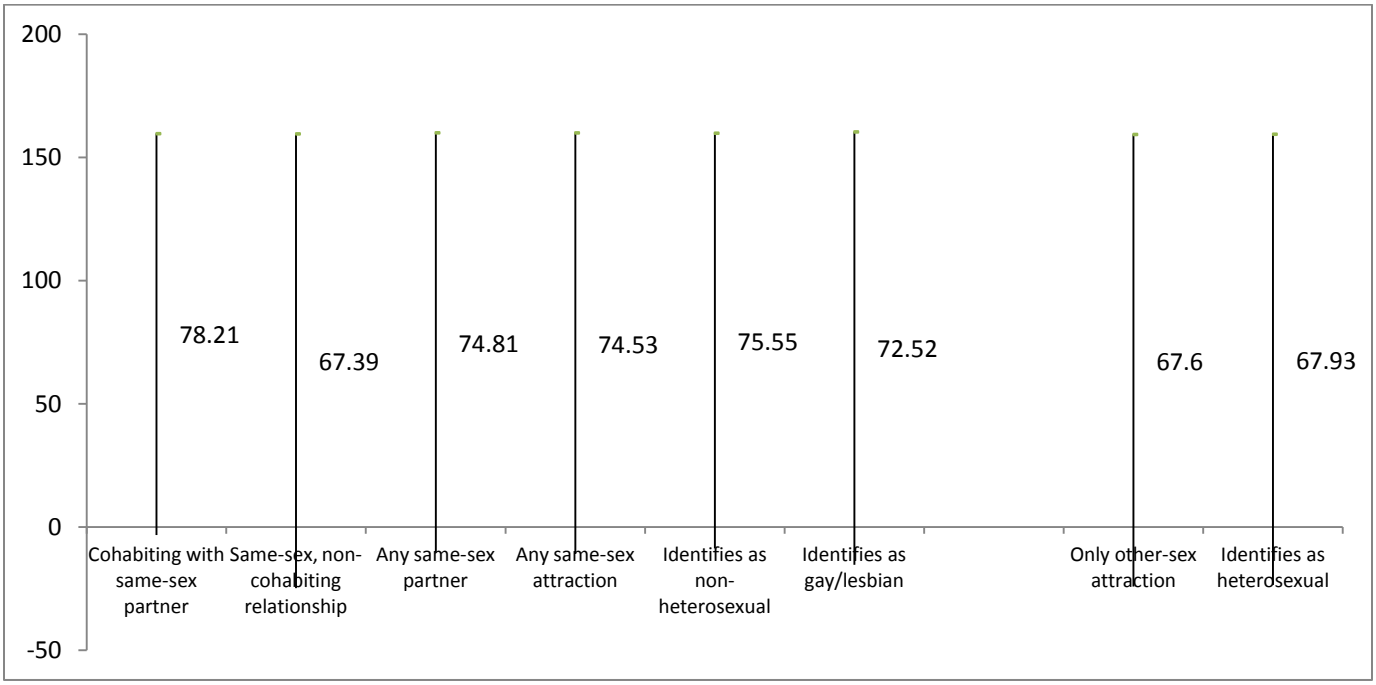
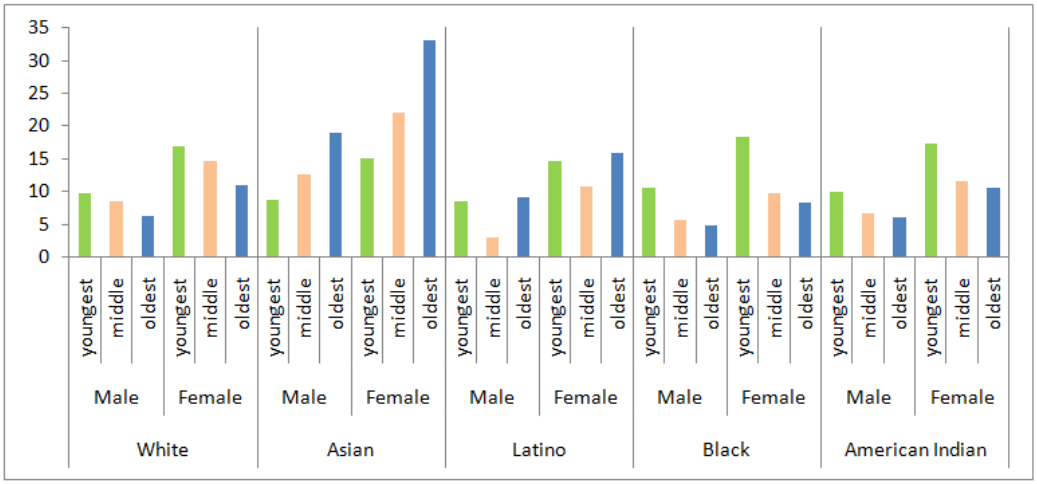


Table 2. Odds Ratios of Zero-Inflated Poisson Regression Models of Same-Sex Experience, Attraction, and Queer Identification, by Gender, Race/Ethnicity, and Age Cohort

	Same-sex sex experience		Same-sex attraction		Non-hetero. identification	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
Age cohort (base: *35 – 45 y.o.)*						
25 – 34 y.o.	1.16	1.19	1.18**	1.35***	1.28**	1.57**
	(0.123)	(0.128)	(0.095)	(0.131)	(0.149)	(0.354)
15 – 24 y.o.	1.04	1.06	1.47***	1.55***	1.68***	3.30***
	(0.118)	(0.119)	(0.129)	(0.155)	(0.174)	(0.736)
Same-sex sex experience			8.87***	8.82***	5.02***	12.04***
			(0.638)	(0.631)	(0.625)	(2.044)
Same-sex attraction					42.84***	69.99***
					(9.365)	(16.076)
Female	2.41***	2.44***	1.73***	1.74***	0.61***	0.39***
	(0.252)	(0.266)	(0.149)	(0.147)	(0.051)	(0.071)
Race/ethnicity (base: White)						
Asian	0.24***	0.38*	1.78***	3.03***	0.94	1.21
	(0.083)	(0.200)	(0.307)	(0.841)	(0.182)	(0.569)
Latino	0.38***	0.32***	0.95	1.45*	1.23	1.35
	(0.056)	(0.091)	(0.085)	(0.303)	(0.217)	(0.711)
Black	0.80**	0.54**	0.88**	0.76	1.09	4.65***
	(0.086)	(0.132)	(0.055)	(0.178)	(0.122)	(1.833)
American Indian	0.74	0.38	0.93	0.98	1.30*	0.70
	(0.188)	(0.256)	(0.187)	(0.532)	(0.193)	(0.684)
NH/PI	1.14	--	1.36	2.34	1.11	--
	(0.712)		(0.392)	(1.947)	(0.133)	
Ethnicity-Age Interactions						
Asian X 25 – 34 y.o.		0.23*		0.49*		0.88
		(0.170)		(0.179)		(0.642)
Asian X 15 – 24 y.o.		0.63		0.29***		0.55
		(0.486)		(0.116)		(0.482)
Latino X 25 – 34 y.o.		1.14		0.50***		1.52
		(0.399)		(0.127)		(1.023)
Latino X 15 – 24 y.o		1.45		0.60		0.85
		(0.465)		(0.200)		(0.428)
Black X 25 – 34 y.o.		1.46		0.87		0.53
		(0.430)		(0.242)		(0.309)
Black X 15 – 24 y.o		1.93**		1.43		0.10***
		(0.505)		(0.382)		(0.044)
AmInd. X 25 – 34 y.o.		2.08		0.81		1.11
		(1.087)		(0.354)		(1.332)
AmInd . X 15 – 24 y.o		2.91		1.04		3.93
		(2.339)		(0.568)		(4.328)
NH/PI X 25 – 34 y.o.		--		0.24		--
				(0.235)		
NH/PI X 15 – 24 y.o		--		0.57		--
				(0.482)		
Observations	13,373	13,373	13,343	13,343	13,244	13,244

Note: *** p<0.01, ** p<0.05, * p<0.1
Note: Model 1a is negative binomial regression model, models 3b is a logistic regression model.
Note: For reasons of convergence, models 1b and 3b omit the NH/PI ethnic category.

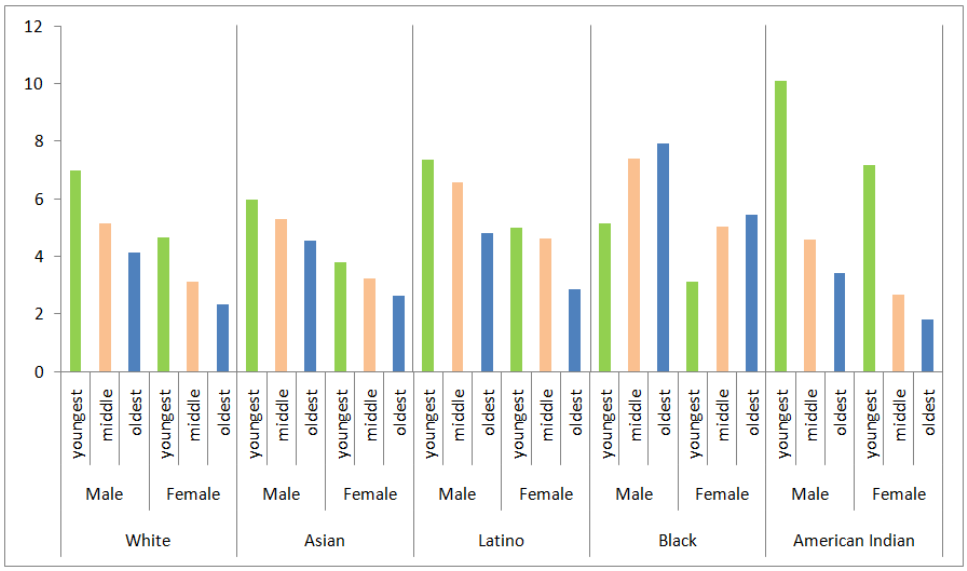
Figure 2. Predicted Probabilities of Same Sex Attraction by Age Cohort, Gender, and Race/Ethnicity



Note: Predicted probabilities were estimated from Table 2, model 2b.

Note: With the exception of race/ethnicity, age cohort, and gender specifications, other variables are set to mean or proportion.

Figure 3. Predicted Probabilities of Non-Heterosexual Identity by Age Cohort, Gender, and Race/Ethnicity



Note: Predicted probabilities were estimated from Table 2, model 3b.

Note: With the exception of race/ethnicity, age cohort, and gender specifications, other variables are set to mean or proportion.

Table 3. Odds Ratios from Logistic Regression Models Showing Change in Sexual Attraction and Identification Over Time

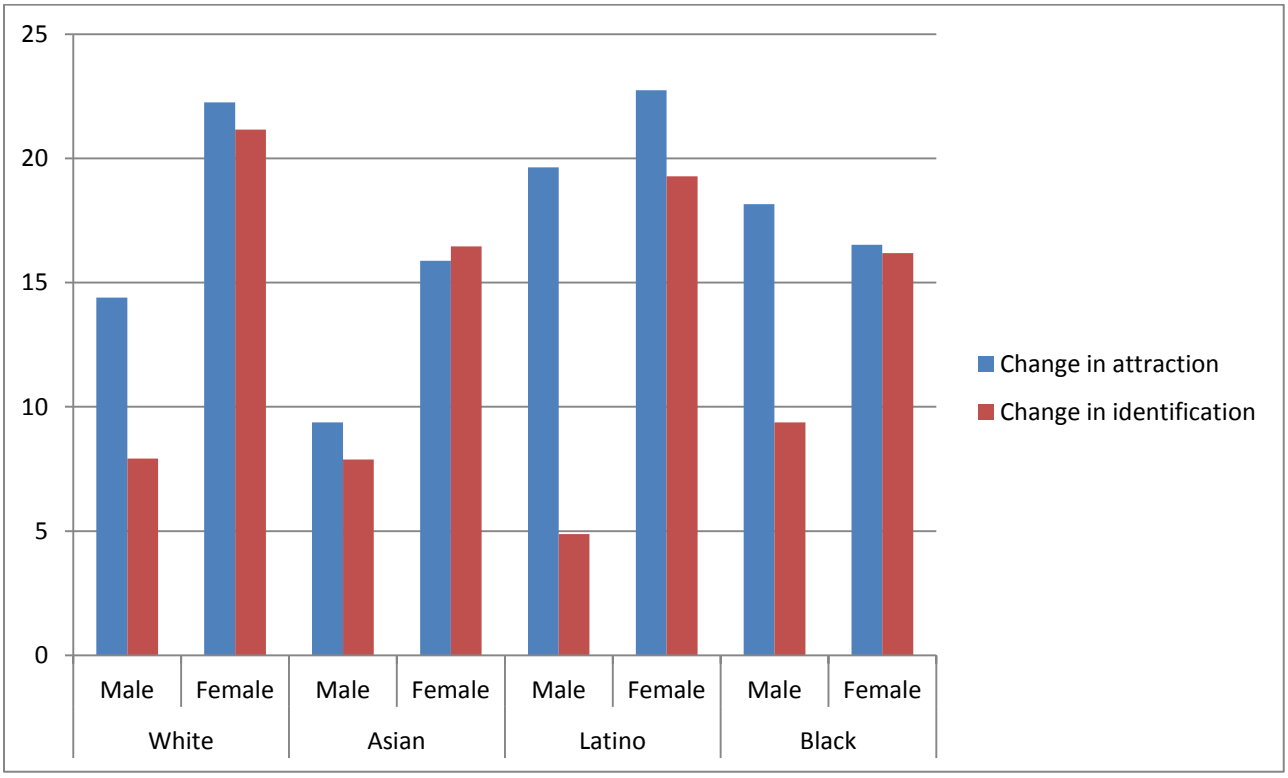
	Change in Attraction		Change in Identification	
	(1a)	(1b)	(2a)	(2b)
Female	1.49***	1.70***	3.03***	3.12***
	(0.117)	(0.176)	(0.272)	(0.352)
Race/Ethnicity (base: White)				
Asian	0.64*	0.62	0.82	0.99
	(0.153)	(0.230)	(0.172)	(0.318)
Latino	1.20	1.45**	0.80	0.60*
	(0.149)	(0.268)	(0.116)	(0.158)
Black	0.93	1.32*	0.85	1.20
	(0.098)	(0.213)	(0.114)	(0.270)
Interaction				
Female X Asian		1.07		0.74
		(0.446)		(0.315)
Female X Latino		0.71		1.49
		(0.179)		(0.385)
Female X Black		0.52***		0.60**
		(0.103)		(0.138)
Observations	9,416	9,416	9,416	9,416

*** p<0.01, ** p<0.05, * p<0.1

Note: Model 5 is an ordered logistic regression which shows direction in sexual identification, from wave III to wave IV. The variable was coded such that positive change reflects a less heterosexual identity.

Note: American Indians and Native Hawaiian / Pacific Islander were excluded from the analysis due to small sample size.

Figure 4. Predicted Probabilities of Change in Sexual Attraction and Identification, by Gender and Race/ethnicity



Note: Predicted probabilities were estimated from Table 3, model 2b.

Note: With the exception of race/ethnicity, age cohort, and gender specifications, other variables are set to mean or proportion.

Table 4a. Summative Statistics of Individuals who have Ever Smoked Marijuana and Age of Sexual Initiation, by Different Definitions of Gay and Lesbian and Heterosexual Populations

	Ever Smoked Marijuana			Age of Sexual Initiation					
				Male			Female		
	Percent	SD	N	Age	SD	N	Age	SD	N
Gay and lesbian populations									
Any same-sex sexual activity	--			16.43	2.72	231	15.68	2.73	968
Any same-sex attraction	66.02	47.38	1309	16.36	2.59	263	16.44	3.38	1132
Identifies as non-heterosexual	65.17	47.66	1393	16.51	2.56	121	15.93	3.19	404
Identifies as gay/lesbian	53.37	50.09	123	16.67	1.94	59	16.84	3.19	66
Cohabiting with same-sex partner	49.69	50.34	75	--			--		
Same-sex, non-cohabiting relationship	70.08	45.94	157	--			--		
Any same-sex partner	66.59	47.23	395	--			--		
Heterosexual populations									
Identifies as heterosexual	44.98	49.75	12,524	16.27	2.67	4034	17.48	3.38	5802

Note: Mean years, percentages, and standard deviations are weighted. Ns are unweighted.
Note: Age of sexual initiation is for age of first sex with other sex member.
Source: The National Longitudinal Study of Adolescent Health for statistics on Ever Smoke Marijuana. The National Survey for Family Growth, Cycles 6 and 7, for statistics on Age of Sexual Initiation.

Figure 5a. Means of Individuals who have Ever Smoked Marijuana with 95% Confidence Intervals, by Different Definitions of Gay / Lesbian and Heterosexual Populations

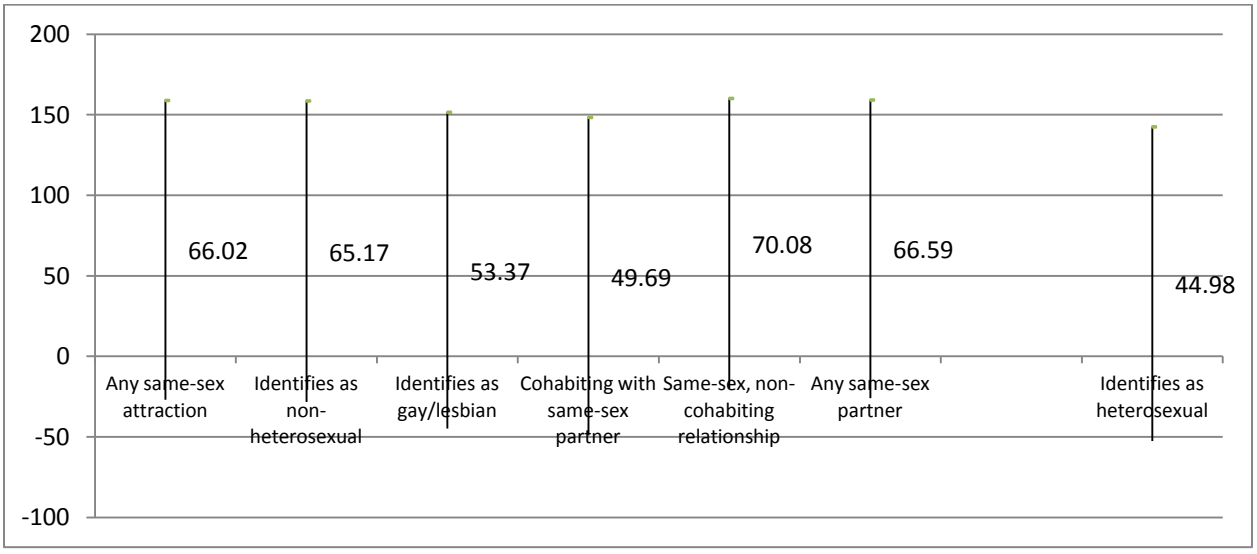


Figure 5b. Means of Ages of Sexual Initiation (Females) with 95% Confidence Intervals, by Different Definitions of Gay / Lesbian and Heterosexual Populations

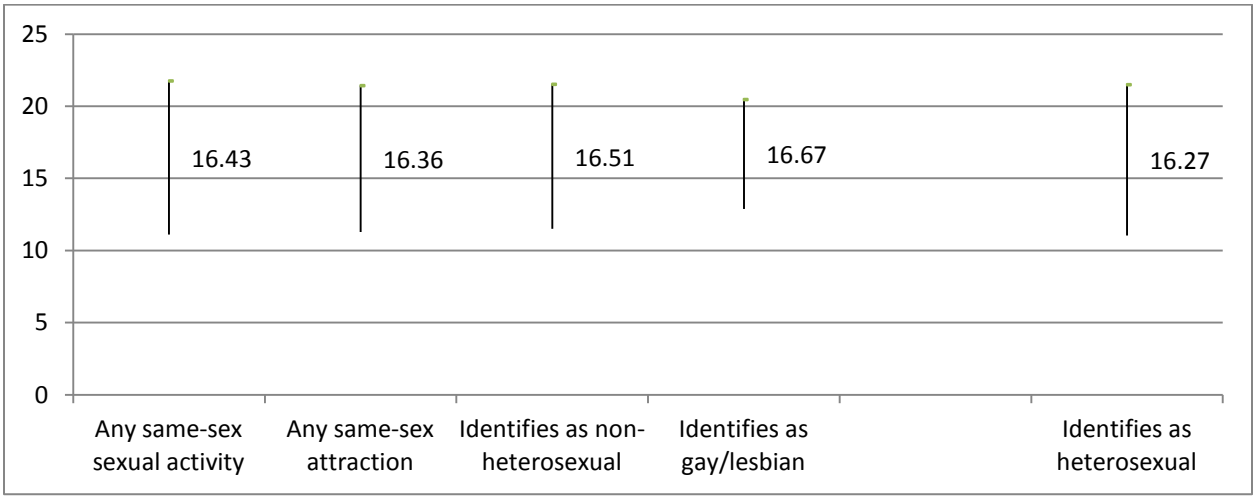
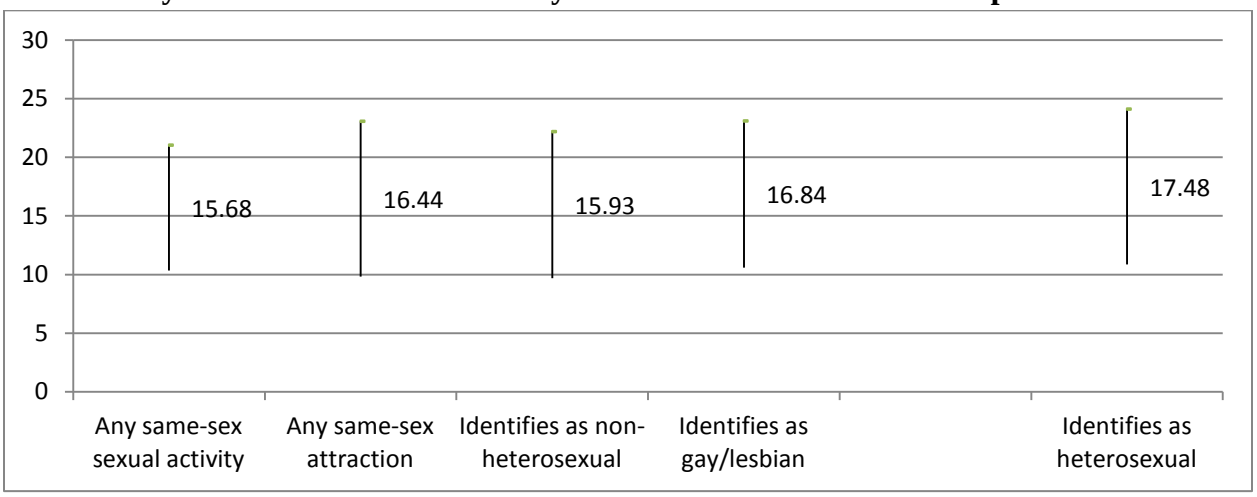


Figure 5c. Means of Ages of Sexual Initiation (Male) with 95% Confidence Intervals, by Different Definitions of Gay / Lesbian and Heterosexual Populations



Appendix Table A. Summary Statistics from National Survey of Family Growth, 2002, 2006 – 2010

	Same sex experience				Queer attraction				Queer ID			
	N	Total N	Mean	Standard Deviation	N	Total N	Mean	Standard Deviation	N	Total N	Mean	Standard Deviation
Overall												
White	1658	13736	0.121	0.326	2060	13717	0.15	0.357	951	13605	0.07	0.255
Asian	29	821	0.035	0.185	122	813	0.15	0.357	43	801	0.054	0.226
Latino	98	1403	0.07	0.255	156	1399	0.112	0.315	65	1375	0.047	0.212
Black	422	4185	0.101	0.301	463	4177	0.111	0.314	328	4138	0.079	0.27
Am.Ind	68	740	0.092	0.289	94	741	0.127	0.333	58	729	0.08	0.271
NH/PI	12	117	0.103	0.305	21	113	0.186	0.391	9	113	0.08	0.272
Male												
Overall	732	10997	0.067	0.249	971	10965	0.089	0.284	716	10855	0.066	0.248
White	255	3856	0.066	0.249	332	3854	0.086	0.281	179	3839	0.047	0.211
Asian	11	302	0.036	0.188	31	301	0.103	0.304	11	297	0.037	0.189
Latino	38	629	0.06	0.238	53	625	0.085	0.279	24	617	0.039	0.194
Black	39	1017	0.038	0.192	62	1018	0.061	0.239	30	1014	0.03	0.17
Am.Ind	12	241	0.05	0.218	17	242	0.07	0.256	8	238	0.034	0.181
NH/PI	2	31	0.065	0.25	3	30	0.1	0.305	2	31	0.065	0.25
Female												
Overall	1930	14933	0.129	0.335	2418	14897	0.162	0.369	1201	14732	0.082	0.274
White	1403	9880	0.142	0.349	1728	9863	0.175	0.38	772	9766	0.079	0.27
Asian	18	519	0.035	0.183	91	512	0.178	0.383	32	504	0.063	0.244
Latino	60	774	0.078	0.268	103	774	0.133	0.34	41	758	0.054	0.226
Black	383	3168	0.121	0.326	401	3159	0.127	0.333	298	3124	0.095	0.294
Am.Ind	56	499	0.112	0.316	77	499	0.154	0.362	50	491	0.102	0.303
NH/PI	10	86	0.116	0.322	18	83	0.217	0.415	7	82	0.085	0.281