Educational Attainment by Life Course Sexual Attraction: Prevalence and Correlates in a Nationally Representative Sample of Young Adults

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Abstract

Researchers know relatively little about the educational attainment of sexual minorities, despite the fact that educational attainment is consistently associated with a range of social, economic, and health outcomes. We examined whether sexual attraction in adolescence and early adulthood was associated with educational attainment. We analyzed Waves I and IV restricted data from the National Longitudinal Study of Adolescent Health (n=14,111). Sexual orientation was assessed using self-reports of romantic attraction in Waves I (adolescence) and IV (adulthood). Women attracted to women in adulthood only had lower educational attainment compared to women attracted only to men in adolescence *and* adulthood. Men attracted to men in adolescence only had lower educational attainment compared to men attracted only to women in adolescence *and* adulthood. Adolescent experiences and academic performance attenuated educational disparities among men, but not among women. Our findings challenge previous research documenting higher educational attainment among sexual minorities in the US.

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Educational Attainment by Life Course Sexual Attraction: Prevalence and Correlates in a Nationally Representative Sample of Young Adults

In 2011, the Institute of Medicine released a comprehensive report detailing the state of lesbian, gay, bisexual, and transgender health, including gaps and opportunities for future research (Institute of Medicine 2011). Lack of information on the educational attainment of lesbian, gay, and bisexual (LGB) adults and a reliance on non-probability samples to describe demographic characteristics of the LGB population were of particular concern. Given strong evidence that educational attainment is consistently and positively associated with a range of social, economic, and health outcomes, including, for example, a sense of personal control (Mirowsky and Ross 2003; Schieman and Plickert 2008), occupational status (Kerckhoff, Raundenbush, and Glennie 2001), income (Elman and O'Rand 2004; Kerckhoff et al. 2001; Murnane, Willett, and Levy 1995), health (Elo 2009; Link 2008; Link and Phelan 1995; Lynch 2003; Ross and Wu 1995) and longevity (Elo 2009; Kitagawa and Hauser 1973; Miech et al. 2011; Rogers et al. 2010), it is surprising that so few studies have investigated disparities in educational attainment by sexual orientation. To our knowledge, our study is the first to examine the educational attainment of sexual minorities using a nationally representative sample of US young adults.

Indeed, little is known about the educational attainment of LGB individuals. One study explicitly examined educational attainment among the LGB population and found that sexual minorities had higher educational attainment than heterosexuals (Black et al. 2000). Using the 1990 Census, Black and colleagues (2000) found that among 25 to 34 year olds, approximately 43% of gay partnered men had at least a college degree compared to 24% of married

heterosexual men, whereas 47% of lesbian partnered women had at least a college degree compared to 22% of married heterosexual women. Other studies on wage discrimination based on sexual orientation have also reported higher levels of educational attainment among sexual minority persons in bivariate analyses using a variety of population-based data sources (e.g., the General Social Survey, the Current Population Survey, and the California Health Interview Survey) (Berg and Lien 2002; Black et al. 2003; Black, Sanders, and Taylor 2007; Carpenter 2005; Daneshvary, Waddoups, and Wimmer 2008; Elmslie and Tebaldi 2007). All of these studies, however, had limited external validity, as the samples were restricted to either cohabitating partners, full-time workers, or both. Thus, a large segment of the LGB population was excluded from prior estimates of educational attainment, potentially leading to biased conclusions about educational disparities by sexual orientation.

Moreover, educational attainment is not merely a marker of human capital, but reflects an evolving interaction between individuals and their social environments from childhood through adulthood (Walsemann, Geronimus, and Gee 2008). For example, childhood SES (Cabrera and La Nasa 2001; Ewert 2010; Goldrick-Rab 2006; Grodsky and Jackson 2009), childhood health (Eide and Showalter 2011; Eide, Showalter, and Goldhaber 2010; Haas and Fosse 2008; Jackson 2009), peer victimization (Haas and Fosse 2008; Nishina, Juvonen, and Witkow 2005) and academic performance (Ewert 2010; Jackson 2009; Messersmith and Schulenberg 2008) can have long-term effects on educational careers. For example, using data from the National Longitudinal Study of Youth (1997), Jackson (2009) found that adolescents who reported poorer health were less likely to graduate from high school by age 19 or attend a 4-year college compared to those who reported better health. Academic participation and performance were strong mediators of this relationship accounting for 50% of the difference in 4-year college

attendance. Others have found that poor psychological functioning decreases school functioning (Nishina et al. 2005) and increases the risk of dropping out of high school (Breslau et al. 2008; Fletcher 2010).

A key driver of adolescent health and educational attainment may be experiences of peer victimization during childhood and adolescence. Nishini and colleagues (2005) documented poorer psychological functioning and increased numbers of somatic complaints (e.g., headaches, stomachaces) among middle-schoolers who reported verbal or physical assaults or general harrassment. Psychological functioning and somatic complaints were in turn associated with lower school functioning. Haas and Fosse (2008) found that feeling safe in school increased the odds of timely high school graduation and college enrollment, whereas physical altercations decreased the odds. A recent meta-analysis of 33 cross-sectional studies investigating peer victimization and academic functioning demonstrated a significant, negative association; greater peer victimization was associated with poorer academic functioning (Nakamoto and Schwartz 2010).

The relationship between peer victimization, adolescent health, and academic achievement is of particular concern with regard to the LGB population as LGB students are more likely than heterosexual students to miss school because they feel unsafe (Bontempo and D'Augelli 2002; Poteat et al. 2011), be physically threatened (O'Shaughnessy et al. 2004), experience psychological problems (Russell and Joyner 2001), feel marginalized at school, hold lower expectations of attending college, and have lower academic performance (O'Shaughnessy et al. 2004; Pearson, Muller, and Wilkinson 2007; Poteat et al. 2011). From a life course perspective (Elder, Kirkpatrick Johnson, and Crosnoe 2003), such experiences can have life-long consequences for the educational attainment of LGB individuals by decreasing the likelihood of

graduating from high school or college (Cabrera, Nora, and Castaneda 1993; Buchmann, DiPrete, and McDaniel 2008; Hearn 1992). As such, adolescents who identify as LGB or are suspected of being LGB may experience a series of events during high school that diminishes academic achievement, resulting in lower educational attainment as compared to heterosexual adolescents. This may also be the case for adolescents who are aware of their same-sex attractions but have not "come out" to their peers, particularly if they perceive that their peers will harass or bully them (Meyer 2003).

Not all LGB adults, however, were aware of their same-sex attractions as adolescents (Frankowski and The Committee on Adolescence 2004; Jager and Davis-Kean 2011; Saewyc 2011). As a result, these adults may not have experienced harassment or discrimination based on their sexual orientation during high school and would not differ from heterosexual adults in their educational attainment. Thus, it is important to consider how timing of same-sex attractions in adolescence and/or early adulthood impacts educational attainment, since the timing might have important effects on individuals' social and educational trajectories.

Our study advances current LGB research by exploring whether or not life course sexual attraction is associated with educational attainment among a nationally representative sample of US young adults. We chose to use life course sexual attraction as our measure of sexual orientation for two reasons. First, awareness of sexual attraction occurs, *on average*, around age 9 for boys and age 10 for girls, whereas the average age of sexual identification as LGB occurs around age 16 to 17 for girls and boys, respectively (D'Augelli 2006; Herdt and Boxer 1993). Our first assessment of sexual orientation occurs when respondents were 11 to 20 years old; thus, a measure of sexual attraction likely provides a more valid assessment of sexual orientation for our sample than sexual identity given that individuals may not identify as LGB until late

adolescence or early adulthood (Savin-Williams 2001). Second, in our study, sexual attraction was measured in adolescence *and* adulthood, whereas sexual identity was only measured in adulthood.

We hypothesize that individuals with same-sex attractions during adolescence will report lower educational attainment in adulthood compared to individuals with only opposite-sex attractions in adolescence *and* adulthood, but that individuals with same-sex attractions in adulthood only will report similar levels of educational attainment as individuals with only opposite-sex attractions in adolescence and adulthood. We also expect that educational disparities will be attenuated with adjustment for adolescent health and experiences, as well as high school academic performance.

METHODS

Sample

We analyzed Wave I (1994/5) and Wave IV (2007/8) restricted data from the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative sample of adolescents in grades 7-12 in 1994-1995 (Harris et al. 2009). The Add Health sample is representative of US schools with respect to region of country, urbanicity, school size, school type (private/public), and race/ethnicity. Our analysis utilized data from in-home interviews of respondents in Waves I and IV, as well as data from in-home interviews of parents in Wave I. We restricted our sample to those assigned probability weights in Wave IV (n=14,800). Approximately 688 respondents were excluded due to item-missingness on covariates. Most of these exclusions were due to item non-response on self-reported grades (n=420). After exclusions, our final analytic sample consisted of 14,111 respondents (7,516 females and 6,595 males).

Measures

Educational Attainment: Respondents reported their highest level of education along with the type of degrees they had received by Wave IV. We coded respondents as 1=high school diploma or less, 2=some college or Associate's degree, and 3=Bachelor's degree or higher. We considered other specifications of this variable (e.g., 8 categories, 4 categories), but our specification yielded substantively similar results and did not suffer from issues of data sparseness.

Life Course Sexual Attraction: In Wave I, respondents were asked, "Have you ever had a romantic attraction to a female? To a male?" In Wave IV, respondents were asked, "Are you romantically attracted to females? To males?" We categorized respondents as 1) attracted only to opposite-sex in youth *and* adulthood, 2) attracted to same-sex in youth, but not adulthood, 3) attracted to same-sex in adulthood, but not youth, 4) attracted to same-sex in youth *and* adulthood, and 5) not attracted to either same or opposite sex in youth *or* adulthood. We considered categorizing respondents who did not report a romantic attraction to either sex during adolescence separately from those who reported no romantic attraction to either sex in adulthood, but issues with data sparseness prevented us from doing so. Sensitivity analyses, however, suggested that these groups experienced similar levels of educational attainment. As a result, individuals who reported no attraction to either sex in youth and adulthood are included in the same category as individuals who reported no attraction to either sex in youth only as well as individuals who reported no attraction to either sex in adulthood only.

Socio-demographics: We include a number of covariates that have been associated with educational attainment in prior research (Buchmann et al. 2008; Cabrera and LaNasa 2001; Goldrick-Rab 2006). We categorized self-reported *race/ethnicity* as non-Hispanic white, non-

Hispanic black, Hispanic, or other race/ethnicity. We categorized respondents as *immigrants* if they reported being born outside of the US to non-US citizens. *Age* in Wave IV ranged from 24 to 34 years old. *Family structure* in Wave I was categorized as nuclear (two biological parents), step-family (one biological and one step-parent), female-headed, extended/intergenerational family, and other. Finally, we constructed a composite measure of *family SES* because multivariate indices of SES are more reliable than single-item measures and doing so reduced issues with item-missingness. Family SES was calculated as the mean of standardized (z-score) measures of family poverty, parental education, and parental occupation. The composite score was calculated for all respondents who had information on at least one of the indicators used in the composite measure. If the respondent resided with one parent, information for the one parent was used. If the respondent resided with two parents, the average of both parents' information was calculated. Positive values represented higher levels of SES (Cronbach's α=0.66).

Adolescent health at Wave I: We include a number of indicators assessing the health and health behaviors of respondents at Wave I in order to assess the extent to which adolescent health and health behaviors mediate the relationship between sexual orientation and educational attainment. *Self-rated health* was assessed using the following question: "In general, how is your health? Would you say excellent, very good, good, fair, or poor?" Higher values reflect better health. We measured *depressive symptoms* using the 19-item Center for Epidemiological Studies Depression Scale (CES-D) available in Add Health. Respondents were asked how often in the past week they had experienced any of 19 symptoms. Per convention, positively worded items were reverse coded and the 19 items were summed (Cronbach's α=0.86). Values ranged from 0 to 56. We measured *somatic symptoms* using 12 indicators of physical symptoms (i.e., headache, feeling hot, stomachache, cold sweats, weakness, feeling sick, wake up tired, dizziness, chest

pains, aches or pains, trouble falling asleep, and trouble relaxing). Respondents were asked how often they experienced any of these symptoms in the past 12 months (0=never, 4=everyday). Scores on the summated scale ranged from 0 to 41 (Cronbach's α=0.77). We measured *victimization* if in the past 12 months respondents experienced any of the following: (1) someone pulled a knife or gun on them; (2) they were shot or stabbed; or (3) they were jumped.

Adolescent Academic Performance and Expectations: Because LGB adolescents may experience greater harassment and discrimination at school due to their sexual orientation, their academic performance may suffer. Thus, we include indicators of academic performance and expectations measured at Wave I to assess the extent to which adolescent academic performance and expectations mediate the relationship between sexual orientation and educational attainment. We measured *difficulties in school* using four items. Respondents were asked how often during the 1994-5 school year (0=never, 4=everyday) they had trouble getting along with teachers, paying attention in school, getting homework done, and getting along with students. Scores on the summated scale ranged from 0 to 16 (Cronbach's α=0.69). *Academic expectations* were assessed using the following question: "On a scale of 1 to 5, where 1 is low and 5 is high, how likely is it that you will go to college?" We coded respondents as having high expectations if they reported a 4 or 5 on the scale. We calculated respondents' *grade point average* (GPA) in the most recent grading period by averaging their grades (using a 4-point scale, where 1=D or lower, 2=C, 3=B, 4=A) in English, mathematics, history or social science, and science. Values ranged from 1 to 4.

Analytic Approach

Given that women often show greater fluidity in their sexuality and some women become aware of their romantic attractions significantly later in the life course compared to men

(Diamond 1998; Diamond 2000; Diamond 2012; Floyd and Bakeman 2006; Floyd and Stein 2002; Savin-Williams 2001; Savin-Williams and Diamond 2000), all analyses were gender stratified. We began with descriptive statistics to understand data distribution. Next, we examined bivariate associations between selected characteristics and life course sexual attraction. We used multinomial logistic regression to examine the association between life course sexual attraction and educational attainment. We report predicted probabilities rather than relative risks in our multinomial logistic regression models as predicted probabilities provide an easily understood measure which can be used to compare risk across population groups. We weighted all analyses to adjust for Add Health's sampling design and respondent attrition using the *svy* command in Stata v12. Predicted probabilities were calculated using the *margins* command in Stata v12.

Sensitivity Analyses

We ran a set of sensitivity analyses to determine if results were being driven by model specification. These analyses included baseline measures of suicidal ideation, engagement in risky health behaviors (i.e., smoking, binge drinking, illicit drug use), engagement in delinquent behaviors, feelings of school belonging, and parental support. Results from these analyses did not alter our inferences. Moreover, these covariates were unrelated to educational attainment in multivariate models. Given issues of parsimony and to retain sample size, we chose to exclude these variables from our final models.

RESULTS

Sample Characteristics

Table 1 presents sample characteristics by gender. Among females, 35% attained at least a Bachelor's degree by Wave IV, whereas 28.5% had attained a high school diploma or less.

Over 76% reported attraction only to men in youth and adulthood, 3.5% reported attraction to women in youth, but not adulthood, 8% reported attraction to women in adulthood, but not youth, and 1.4% reported attraction to women in youth and adulthood. Female respondents were primarily white (68%) and 47.6% lived in a nuclear family at baseline. Over 11% of females had been victimized in the year prior to baseline, 79.9% held expectations to attend college at baseline, and the average GPA in the last academic term was 2.9.

[Insert Table 1 about here]

Among males, approximately 28% attained at least a Bachelor's degree by Wave IV, whereas 38.9% attained a high school diploma or less. Over 76% reported attraction only to women in youth and adulthood, 6.1% reported attraction to men in youth, but not adulthood, 3.1% reported attraction to men in adulthood, but not youth, and 1% reported attraction to men in youth and adulthood. Male respondents were primarily white (68.3%) and 49.6% lived in a nuclear family at baseline. Over 27% of males had been victimized in the year prior to baseline, 71.9% had expectations to attend college at baseline, and the average GPA in the last academic term was 2.7.

Bivariate Analysis

Table 2 presents selected bivariate associations between sample characteristics and life course sexual attraction, separately for females and males. Among females, educational attainment varied by life course sexual attraction. Approximately 38% of women attracted only to men in youth and adulthood had a college degree, whereas 29.9% of women attracted to women in youth only and 21.5% of women attracted to women in adulthood only had attained a college degree. Significant differences in baseline self-rated health, depressive symptoms, and somatic symptoms were also noted. For example, women attracted only to men in youth and

adulthood scored 11.5 on the CES-D, whereas females who were attracted to women in youth and adulthood scored 16.7. We also found significant differences in victimization, difficulties in school, educational expectations, and GPA by life course sexual attraction.

[Insert Table 2 about here]

Among males, we found significant differences by life course sexual attraction across all covariates presented in Table 2 except for family SES and self-rated health. Almost 30% of men attracted only to women in youth and adulthood had attained a college degree by Wave IV, whereas 22.8% of men attracted to men in youth only and 37.3% of men attracted to men in adulthood only had attained a college degree by that time. Additionally, 36.5% of men who reported attraction to men in youth only had been victimized in the year prior to baseline compared to 28.3% of men who reported attraction only to women in youth and adulthood.

Multinomial Logistic Regression Analyses

We present weighted estimates of predicted probabilities for females in Table 3. Our model building approach allowed us to test our two hypotheses. In Model 1, we examined the effects of life course sexual attraction on educational attainment, with adjustment for socio-demographic covariates. We ran two additional models that adjusted for adolescent health and experiences in Wave I (Model 2) and academic performance and expectations in Wave I (Model 3) to test our hypotheses that educational disparities by life course attraction would be attenuated after adjustment for these covariates. Estimates represent average predicted probabilities, as all covariates were centered at their grand means.

[Insert Table 3 about here]

Among females, those who were attracted to women in adulthood only had lower educational attainment than women who were attracted only to men in youth and adulthood.

Specifically, the predicted probability of having a high school diploma or less or having a Bachelor's degree or higher was 0.37 and 0.21 among women attracted to women in adulthood only, but was 0.24 and 0.34 among women attracted only to men in youth and adulthood. Women who reported no attraction to either sex in youth or adulthood also had a higher predicted probability of having a high school diploma or less compared to women attracted only to men in youth and adulthood (0.34 versus 0.24, respectively). Adjustment for adolescent health and experiences at Wave I (Model 2) and academic performance and expectations at Wave I (Model 3) attenuated differences in the predicted probabilities of having a high school diploma or less and having a Bachelor's degree or higher between women attracted to women in adulthood only and women attracted only to men in youth and adulthood. Adjustment for these covariates did not eliminate these differences, however. Further, we found that women who were attracted to women in youth only, as well as women who were attracted to women in youth and adulthood, reported similar levels of educational attainment as women attracted only to men in youth and adulthood, regardless of the covariates included in the model. Interestingly, women attracted to women in youth only had lower predicted probabilities of having a high school diploma or less (PP=0.22) compared to women attracted to women in adulthood only (PP=0.37).

[Insert Table 4 about here]

We present weighted estimates of predicted probabilities for males in Table 4. Among males, those who were attracted to men in youth only had a higher predicted probability (PP=0.48) of having a high school diploma or less than men who were attracted only to women in youth and adulthood (PP=0.36). Similar results were found for men who reported no attraction to either sex in youth or adulthood. Additionally, men who reported no attraction to either sex in youth or adulthood also had a lower predicted probability of having a Bachelor's degree or

higher (PP=0.17) than men who were attracted only to women in youth and adulthood (PP=0.25). Adjustment for adolescent health and experiences at Wave I (Model 2) attenuated the differences between men who were attracted to men in youth only and men who were attracted only to women in youth and adulthood. These findings held after further adjustment for academic performance and expectations at Wave I (Model 3). Further, we found that men who were attracted to men in adulthood only, as well as men who were attracted to men in youth and adulthood, reported similar levels of educational attainment as men attracted only to women in youth and adulthood, regardless of the covariates included in the model.

DISCUSSION

Educational attainment is a key determinant of social, economic, and health conditions across the life course. As such, lack of valid and reliable estimates of LGB educational attainment has significant implications for social scientists' ability to understand the characteristics and experiences of the LGB population. Our study is one of the first to describe the educational attainment of LGB young adults using a nationally representative sample. We had 3 hypotheses: 1) individuals with same-sex attractions during adolescence would report lower educational attainment in adulthood compared to individuals with only opposite-sex attractions in adolescence *and* adulthood; 2) individuals with same-sex attractions in adulthood only would report similar levels of educational attainment as individuals with only opposite-sex attractions in adolescence *and* adulthood; and 3) educational disparities would be attenuated with adjustment for adolescent health and experiences, as well as high school academic performance. We found support for all three hypotheses among men, but not women.

Indeed, among women, our findings ran counter to our hypotheses. Women who were attracted to the same-sex in youth had similar levels of educational attainment as women who

were attracted only to men in youth and adulthood. However, women attracted to the same-sex in adulthood only had lower educational attainment compared to women attracted only to the opposite-sex in adolescence *and* adulthood; that is, they were more likely to have a high school diploma or less and were less likely to have a Bachelor's degree or higher than women attracted only to men in youth and adulthood. Adjustment for adolescent experiences and academic performance did not substantially attenuate these educational disparities. It is possible that the lower educational attainment of women with same-sex attraction in adulthood only were in part driven by women who were aware of their same-sex attraction in youth, but were not ready to report this attraction at the time of the Wave I interview. Concealment of one's sexual orientation represents a stressor that can negatively impact psychological well-being and academic achievement (Meyer 2003). We were unable to identify these women in the sample, making it impossible to quantify the extent to which this group could be driving the results.

These findings may also be related to gender differences in the timing at which developmental milestones related to individuals' sexuality are reached, including the age when one becomes aware of same-sex attractions, engages in same-sex behaviors, and self-identifies as lesbian or bisexual. For example, women, unlike men, often experience same-sex attractions and identities in response to a single intimate relationship with another woman during late adolescence or early adulthood (Diamond 2012; Floyd and Stein 2002). Completing these developmental milestones during the transition to adulthood, a time when individuals must choose whether or not to attend post-secondary school, may be associated with less social support (Needham and Austin 2010), fewer role models (Floyd and Bakeman 2006), and higher rates of psychosocial stress (Rankin 2003), all of which may hamper individuals from achieving their educational goals. Indeed, young adults often rely on their parents for financial resources

(Valentine, Skelton, and Butler 2003); this may be particularly true for young adults attending college. Disclosing one's sexual orientation to parents while in college may lead to the withdrawal of financial (Valentine et al. 2003) or emotional support from parents (Needham and Austin 2010), resulting in a disruption of the student's educational pursuits. Delayed entry into college and disrupted educational careers reduce the likelihood that one will complete a college degree (Buchmann et al. 2008; Ewert 2010; Goldrick-Rab 2006). Future research should consider how the timing and self-disclosure of same-sex attraction impacts the educational attainment of lesbian and bisexual women.

As expected, among men, we found that same-sex attraction in youth only was associated with lower educational attainment, whereas same-sex attraction in adulthood only was not. Because boys, in general, become aware of same-sex attractions, engage in same-sex behaviors, and come out to friends and family at earlier ages than girls, adolescent boys who are attracted to the same-sex may be at greater risk of experiencing poor educational outcomes due to the challenges they often face within their schools and families (O'Shaughnessy et al. 2004; Pearson et al. 2007; Poteat et al. 2011). Our results lend support for such a conclusion; after adjustment for adolescent health, victimization, difficulties in school, and academic performance, men attracted to the same-sex in youth only experienced similar levels of educational attainment as men attracted only to the opposite-sex in youth *and* adulthood. Interestingly, men with same-sex attractions in youth *and* adulthood experienced similar levels of educational attainment as men who maintained opposite-sex attractions, regardless of the covariates included in the model. Perhaps they were more likely to seek and obtain acceptance for their same-sex attractions during adolescence as compared to men attracted to the same-sex in youth only. Further research on resilience and identity development is required to confirm or challenge this supposition.

Prior studies using national data report higher educational attainment among LGB individuals (Berg and Lien 2002; Black et al. 2000; Black et al. 2003; Black et al. 2007; Carpenter 2005; Daneshvary et al. 2008; Elmslie and Tebaldi 2007). Although bivariate results suggest that this might be the case in our sample for men and women who report same-sex attraction in youth *and* adulthood, as well as for men who report same-sex attraction only in adulthood, these findings did not hold in multivariate analyses. It is likely that the restriction of identifying LGB individuals in these prior studies as those in a cohabitating relationship affected the estimates.

Additional research that considers other dimensions of sexual orientation, such as sexual identity, at various points in the life course is needed to gain a better understanding of the socio-demographic characteristics of the LGB population. Moreover, research is needed on the experiences of individuals reporting no sexual attractions, as they also reported lower educational attainment than individuals with opposite-sex attractions only. Lastly, future research should include transgender populations and should explore how issues of gender identity, gender atypicality, and timing of gender transitioning during adolescence and/or adulthood are associated with educational attainment.

Limitations

Our sample represents individuals who were attending grades 7-12 in 1994-1995; thus, inferences should only be made to this population. To our knowledge, however, this is the first study to use a nationally representative sample to describe the educational attainment of LGB young adults and to understand the correlates associated with educational disparities between LGB and heterosexual young adults. Given the age of our sample at baseline and the consistency in which measures of sexual orientation were collected, we relied on romantic attraction as our

measure of sexual orientation, which represents only one dimensions of sexual orientation. Attraction, however, is considered the defining feature of sexual orientation (Diamond 2005; Levine 2003; Leiblum and Rosen 1988), and is likely the most appropriate measure to use when studying adolescents. However, some level of misclassification may have occurred in our study, particularly among respondents who were younger at Wave I and who had not yet become aware of their same-sex attractions until later in adolescence. Finally, the number of individuals who reported romantic attractions to the same-sex ranged in size from 70 to 575 when gender stratified, which likely reduced our ability to detect significant differences. As such, we were unable to distinguish individuals who reported attraction to both sexes from those who reported same-sex attraction only.

Conclusions

Our findings challenge results from prior studies documenting higher educational attainment among sexual minorities in the US. Rather, we found that educational attainment differs by life course sexual attraction; women attracted to the same-sex in adulthood only, men attracted to the same-sex in youth only, and both men and women reporting no sexual attractions in youth or adulthood had lower educational attainment compared to respondents attracted to only the opposite-sex in youth and adulthood. Additional information about the socio-demographics of the LGB population using representative samples is imperative as it increases our understanding of how these social determinants are distributed across population groups and may ultimately lead to the development of effective policies targeted at addressing these key forms of social stratification.

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Table 1: Sample Characteristics of Respondents by Gender, Weighted Data, Add Health, Waves I and IV

	Females N=7,516 % or Mean (SE)	Males N=6,595 % or Mean (SE)
Educational Attainment (Wave IV)		
High School Diploma or Less	28.5	38.9
Some College or Associate's Degree	36.5	33.3
Bachelor's Degree or Higher	35.0	27.9
Life Course Sexual Attraction		
Opposite Sex Youth & Adult	76.6	76.4
Same Sex Youth	3.5	6.1
Same Sex Adult	8.0	3.1
Same Sex Youth & Adult	1.4	1.0
Not Sexually Attracted Youth or Adult	10.4	13.4
Socio-Demographics		
Race/Ethnicity		
Non-Hispanic White	68.0	68.3
Non-Hispanic Black	16.0	14.9
Hispanic	11.5	11.6
Other Race/Ethnicity	4.5	5.3
Foreign-Born	4.2	4.3
Age in 2008 (years)	28.7 (0.12)	28.9 (0.12)
Family Structure (Wave I)		
Nuclear	47.6	49.6
Step-Family	9.0	9.6
Female Headed	14.8	13.7
Extended/Intergenerational	23.6	20.5
Other	5.0	6.6
Family SES (Wave I)	-0.1 (0.04)	-0.0 (0.03)
Adolescent Health (Wave I)		
Self-Rated Health	3.8 (0.02)	4.0 (0.02)
CES-D	11.8 (0.19)	10.0 (0.14)
Somatic Symptoms	10.0 (0.10)	8.9 (0.11)
Victimized in past year	11.3	27.6
Academic Performance & Expectations (Wave I)		
Difficulties in School	3.9 (0.06)	4.6 (0.06)
Likely to attend college	79.9	71.9
GPA in most recent term	2.9 (0.02)	2.7 (0.02)

Notes: Self-rated health coded so that higher values equal better health

Table 2: Selected Bivariate Associations by Life Course Sexual Attraction and Gender, Weighted Data, Add Health, Waves I and IV [a]

	Opp. Sex Youth & Adult % or Mean (SE)	Same Sex Youth % or Mean (SE)	Same Sex Adult % or Mean (SE)	Same Sex Youth & Adult % or Mean (SE)	No Sex Youth or Adult % or Mean (SE)
Females (n=7,516)					
Educational Attainment [b]					
High School Diploma or Less	25.8	26.1	41.1	21.1	40.2
Some College or Associate's	36.4	44.0	37.4	41.1	33.7
Bachelor's or Higher	37.8	29.9	21.5	37.8	26.2
Race/Ethnicity					
Non-Hispanic White	69.2	58.9	70.1	72.6	59.7
Non-Hispanic Black	15.9	17.7	12.8	12.4	19.1
Hispanic	10.7	13.9	12.3	9.7	15.9
Other Race/Ethnicity	4.1	9.5	4.7	5.2	5.3
Family SES [b]	-0.0 (0.04)	-0.2 (0.07)	-0.2 (0.05)	0.0 (0.12)	-0.3 (0.05)
Self-Rated Health [b]	3.8 (0.02)	3.6 (0.07)	3.7 (0.05)	3.2 (0.11)	3.9 (0.04)
CES-D [b]	11.5 (0.19)	13.5 (0.76)	13.0 (0.51)	16.7 (1.36)	11.4 (0.50)
Somatic Symptoms [b]	10.0 (0.10)	11.0 (0.60)	10.9 (0.32)	14.8 (0.68)	8.6 (0.30)
Victimized year prior to Wave I [b]	10.9	14.1	15.0	22.3	8.9
Difficulties in School [b]	3.8 (0.06)	4.4 (0.27)	4.7 (0.19)	5.9 (0.29)	3.3 (0.20)
Likely to attend college [b]	81.6	77.8	75.1	75.0	72.0
GPA [b]	2.9 (0.02)	2.9 (0.07)	2.8 (0.05)	2.8 (0.09)	2.9 (0.04)
Males (n=6,595)					
Educational Attainment [b]					
High School Diploma or Less	35.9	50.5	32.3	29.1	52.9
Some College or Associate's	34.5	26.7	30.4	38.3	29.3
Bachelor's or Higher	29.6	22.8	37.3	32.6	17.7
Race/Ethnicity [b]					
Non-Hispanic White	69.7	63.1	63.6	50.3	64.8
Non-Hispanic Black	13.8	19.3	12.7	28.3	18.8
Hispanic	11.1	14.2	18.6	13.0	11.2
Other Race/Ethnicity	5.4	3.3	5.1	8.5	5.2
Family SES [b]	-0.0 (0.04)	-0.1 (0.06)	-0.1 (0.09)	-0.0 (0.16)	-0.2 (0.04)
Self-Rated Health	4.0 (0.02)	3.9 (0.07)	3.9 (0.10)	3.9 (0.14)	3.9 (0.05)
CES-D [b]	9.7 (0.14)	12.2 (0.52)	11.8 (0.83)	12.1 (1.24)	9.9 (0.39)
Somatic Symptoms [b]	8.9 (0.11)	9.7 (0.39)	9.3 (0.52)	10.0 (0.63)	8.0 (0.29)
Victimized in past year [b]	28.3	36.5	19.6	15.6	21.9
Difficulties in School [b]	4.6 (0.06)	5.7 (0.25)	4.2 (0.28)	4.6 (0.43)	4.2 (0.20)
Likely to attend college [b]	73.6	65.5	73.3	82.8	64.1
GPA [b]	2.7 (0.02)	2.5 (0.05)	2.8 (0.08)	2.7 (0.12)	2.7 (0.06)

Notes: [a] F-test used to calculate significance for continuous variables; χ^2 used to calculate significance for categorical variables. [b] $p < 0.05$, two-tailed test

Table 3: Estimated Predicted Probabilities from Multinominal Logistic Regressions Predicting Educational Attainment in Early Adulthood, Weighted Data, Add Health, Waves I and IV, Females (n=7,516)

	Model 1 PP (95% CI)	Model 2 PP (95% CI)	Model 3 PP (95% CI)
High School Diploma or Less			
<u>Life Course Sexual Attraction</u>			
Opposite Sex Youth & Adult	0.24 (0.22, 0.27)	0.24 (0.22, 0.26)	0.23 (0.20, 0.25)
Same Sex Youth	0.22 (0.16, 0.29)	0.21 (0.15, 0.27)	0.20 (0.13, 0.26)
Same Sex Adult	0.37 (0.31, 0.42)	0.34 (0.29, 0.39)	0.33 (0.28, 0.38)
Same Sex Youth & Adult	0.20 (0.11, 0.30)	0.15 (0.07, 0.24)	0.14 (0.06, 0.22)
No Sexual Attraction Youth or Adult	0.34 (0.29, 0.39)	0.35 (0.30, 0.40)	0.32 (0.27, 0.37)
Some College or Associate's Degree			
<u>Life Course Sexual Attraction</u>			
Opposite Sex Youth & Adult	0.42 (0.39, 0.44)	0.43 (0.40, 0.45)	0.48 (0.45, 0.50)
Same Sex Youth	0.50 (0.39, 0.60)	0.49 (0.40, 0.60)	0.56 (0.46, 0.66)
Same Sex Adult	0.43 (0.37, 0.48)	0.44 (0.38, 0.49)	0.48 (0.43, 0.53)
Same Sex Youth & Adult	0.48 (0.35, 0.61)	0.46 (0.31, 0.60)	0.49 (0.34, 0.63)
No Sexual Attraction Youth or Adult	0.39 (0.34, 0.44)	0.40 (0.35, 0.45)	0.46 (0.41, 0.51)
Bachelor's Degree or Higher			
<u>Life Course Sexual Attraction</u>			
Opposite Sex Youth & Adult	0.34 (0.31, 0.38)	0.33 (0.30, 0.37)	0.29 (0.26, 0.33)
Same Sex Youth	0.28 (0.19, 0.37)	0.30 (0.20, 0.39)	0.24 (0.15, 0.33)
Same Sex Adult	0.21 (0.16, 0.26)	0.22 (0.17, 0.28)	0.19 (0.14, 0.25)
Same Sex Youth & Adult	0.32 (0.18, 0.46)	0.39 (0.22, 0.56)	0.37 (0.20, 0.54)
No Sexual Attraction Youth or Adult	0.27 (0.23, 0.32)	0.25 (0.20, 0.29)	0.22 (0.17, 0.26)

Notes: Model 1 adjusts for race/ethnicity, gender, nativity, family structure (wave I), family SES (wave I), and age (wave IV). Model 2 further adjusts for depressive symptoms, somatic symptoms, victimization, and self-rated health (all in wave I). Model 3 further adjusts for difficulties in school, academic expectations, and GPA in most recent academic term (all in wave I). PP=predicted probability (95% confidence interval). All variables centered at grand mean.

Table 4: Estimated Predicted Probabilities from Multinominal Logistic Regressions Predicting Educational Attainment in Early Adulthood, Weighted Data, Add Health, Waves I and IV, Males (n=6,595)

	Model 1 PP (95% CI)	Model 2 PP (95% CI)	Model 3 PP (95% CI)
High School Diploma or Less			
Life Course Sexual Attraction			
Opposite Sex Youth & Adult	0.36 (0.33, 0.38)	0.36 (0.33, 0.39)	0.36 (0.33, 0.39)
Same Sex Youth	0.48 (0.39, 0.57)	0.45 (0.37, 0.54)	0.44 (0.34, 0.54)
Same Sex Adult	0.29 (0.18, 0.40)	0.30 (0.19, 0.41)	0.32 (0.19, 0.44)
Same Sex Youth & Adult	0.27 (0.12, 0.42)	0.27 (0.11, 0.44)	0.29 (0.11, 0.48)
No Sexual Attraction Youth or Adult	0.50 (0.44, 0.56)	0.50 (0.44, 0.56)	0.49 (0.43, 0.56)
Some College or Associate's Degree			
Life Course Sexual Attraction			
Opposite Sex Youth & Adult	0.39 (0.36, 0.41)	0.40 (0.38, 0.43)	0.44 (0.42, 0.47)
Same Sex Youth	0.30 (0.24, 0.37)	0.32 (0.25, 0.39)	0.35 (0.28, 0.43)
Same Sex Adult	0.34 (0.24, 0.44)	0.36 (0.25, 0.46)	0.39 (0.28, 0.50)
Same Sex Youth & Adult	0.43 (0.28, 0.58)	0.47 (0.32, 0.62)	0.50 (0.33, 0.66)
No Sexual Attraction Youth or Adult	0.33 (0.28, 0.39)	0.35 (0.30, 0.40)	0.38 (0.33, 0.44)
Bachelor's Degree or Higher			
Life Course Sexual Attraction			
Opposite Sex Youth & Adult	0.25 (0.23, 0.28)	0.24 (0.21, 0.27)	0.20 (0.17, 0.22)
Same Sex Youth	0.22 (0.15, 0.28)	0.23 (0.16, 0.29)	0.21 (0.14, 0.28)
Same Sex Adult	0.37 (0.24, 0.50)	0.35 (0.22, 0.48)	0.29 (0.17, 0.41)
Same Sex Youth & Adult	0.30 (0.18, 0.42)	0.26 (0.14, 0.37)	0.21 (0.10, 0.31)
No Sexual Attraction Youth or Adult	0.17 (0.13, 0.21)	0.15 (0.11, 0.19)	0.13 (0.09, 0.16)

Notes: Model 1 adjusts for race/ethnicity, gender, nativity, family structure (wave I), family SES (wave I), and age (wave IV). Model 2 further adjusts for depressive symptoms, somatic symptoms, victimization, and self-rated health (all in wave I). Model 3 further adjusts for difficulties in school, academic expectations, and GPA in most recent academic term (all in wave I). PP=predicted probability (95% confidence interval). All variables centered at grand mean.