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Trends and Disparities in Disordered Eating among Heterosexual and Sexual Minority Adolescents

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Abstract

Objective—Disordered eating has decreased for all youth over time, but studies have not focused specifically on lesbian, gay, and bisexual(LGB) youth. Research has found that LGB youth report disordered eating behaviors more often compared to their heterosexual counterparts, but no studies have documented trends over time for LGB youth and considered whether these disparities are narrowing or widening across sexual orientation groups.

Method—We use pooled data from the 1999–2013 Massachusetts Youth Risk Behavior Surveys (N = 26,002) to investigate trends in purging, fasting, and using diet pills to lose or control weight for heterosexual and sexual minority youth. We used cross tabs, logistic regression, and interactions in regression models, stratified by sex.

Results—The prevalence of disordered eating has decreased on all three measures across nearly all groups of heterosexual and sexual minority youth. However, we found disparities in reported disordered eating behaviors for LGB youth persisted across all survey years, with LGB students reporting significantly higher prevalence of disordered eating than heterosexuals. The disparities in fasting to control weight widened between the first and last survey waves between lesbian and heterosexual females.

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Discussion—The significant reductions over time in prevalence of disordered eating among some youth are encouraging, but the disparities remain. Indeed, the increasing prevalence of fasting, diet pill use, and purging to control weight among lesbians may warrant targeted prevention and intervention programs.

Keywords

LGB; weight control; diet pills; sexual minority; purging; fasting; MYRBS

Sexual minority (i.e., lesbian, gay, bisexual) youth report disproportionately higher prevalence of disordered eating compared to heterosexual peers: up to 1 in 4 sexual minority youth report purging, fasting, and/or taking diet pills to lose weight,¹ and these patterns of disordered eating have been linked to physiological and psychological problems for all youth.^{2–4} Contemporary research has documented disparities in reports of body mass index (BMI) for sexual minority young people compared to heterosexuals,^{5,6} and disordered eating is related to higher BMIs in males and females over time.⁷ At the same time, studies have found that fewer adolescents have engaged in unhealthy weight control behaviors overall, though at different magnitudes across gender and ethnicities.^{8,9} These previous findings were based on studies of largely heterosexual samples that did not adjust for or examine sexual orientation. Given that various studies find that the prevalence of disordered eating is higher for sexual minorities compared to heterosexual youth,^{10–13} monitoring the trends for LGB youth health is warranted in light of sweeping social changes. Despite advances in social attitudes, some studies show that discrimination and violence against sexual minorities have persisted.¹

Studies that report the prevalence and outcomes of disordered eating behavior have largely utilized cross-sectional data; most have used large databases that are statewide or nationally representative,^{14–16} and others have used smaller non-probability samples.^{17,18} Though most of these studies have found disparities in disordered eating for sexual minority youth,¹ the reported patterns in each study are gender specific.¹⁹ For example, in one study, there was evidence that gay and bisexual men report more eating disordered behaviors than their heterosexual counterparts, but no differences were found in respect to lesbian and bisexual women.¹⁷ Evidence from the Growing Up Today Study (GUTS) suggests that gay, lesbian, bisexual, and ‘mostly heterosexual’ youth were more likely binge eat than their heterosexual peers.⁸ Specifically, data compiled from the 1998–2005 GUTS survey (n=13,795) revealed that gay, bisexual, and mostly heterosexual male youth reported higher frequencies of vomiting or using laxatives to control their weight throughout adolescence than heterosexual males. Using the GUTS data from 1999 (n=10,583), Austin and colleagues found that ‘mostly heterosexual’ females were more likely to use laxatives and binge compared to their completely heterosexual counterparts.²⁰ In addition, gay/bisexual males were more likely to binge compared to their heterosexual counterparts.

In addition to the GUTS data, scholars have used representative data from Massachusetts and found that both female and male adolescents with partners of both sexes reported more than double the frequency of disordered eating compared to their counterparts with opposite sex partners.²¹ Also using Massachusetts data from later years, scholars found that

unhealthy weight control behaviors were more prevalent among gay/bisexual males (Adjusted Odds Ratio (AOR) 4.38) and lesbian/bisexual females (AOR 2.27) when compared to heterosexual males and females.²²

These disparities in disordered eating have been found to continue past adolescence among sexual minorities. In one study, researchers used data from 2008–2009 wave of the American College Health Association’s National College Health Assessment and found that gay/lesbian-identified college students were more likely than heterosexual students to be clinically diagnosed with an eating disorder and to report dieting, using pills, or vomiting to lose or control weight.¹¹ In another study that investigated the weight control practices among young adult Australian women, scholars found that ‘mainly heterosexual’ and bisexual women were more likely to engage in unhealthy weight control practices, such as cutting meals, vomiting, and using laxatives.¹²

Various theories have been put forth to account for the sexual orientation disparities in disordered eating. One major explanation derives from Meyer’s theory of minority stress,²³ which proposes that many of the unhealthy behaviors and outcomes found among LGB individuals are influenced by the social stress they experience. Having to cope with stressors such as lack of social acceptance, harassment and rejection, and even instances of physical victimization can lead to depression, other psychological symptomatology, and in some individuals, to internalizing behaviors such as disordered eating. To the extent that the disordered eating behaviors found among LGB youth have been influenced by their experience of stress as a stigmatized minority, then we might expect that a more accepting social climate would result in better mental health and in lower rates of self-damaging behaviors such as disordered eating. The rapid improvements in social acceptance of sexual minority individuals – as witnessed by recent overturning of laws against same-sex sexual activity, the legalization of same-sex marriage, and the growing prominence of openly gay entertainers, sports stars, and other public figures – should at least in theory lead toward improvement in behavioral outcomes among sexual minorities and toward a reduction of the disparities observed in the past. To date, however, research in this area has looked only at single points in time, and not considered whether population-level changes have occurred among LGB youth compared to their heterosexual counterparts.

Current Study

In this study, we document trends in disordered eating behaviors over the span of 14 years using a population-based sample to identify whether there are trends in disordered eating for heterosexual, bisexual, gay, and lesbian youth separately for males and females in Massachusetts; whether there are disparities between heterosexual and sexual minority groups among male and female adolescents; and whether the gaps or disparities for disordered eating between the groups have narrowed, widened, or stayed the same over time. Based on previous reports that have found gender differences among disparities in disordered eating for sexual minority youth¹⁷ we stratified our analyses by sex to elucidate the unique trends for male and female heterosexual, gay, lesbian, and bisexual adolescents.

Method

Data

Data in this study were from the Massachusetts Youth Risk Behavior Survey (MYRBS). The MYRBS is a population-based survey of Massachusetts's public high school students administered every two years since 1993. All regular public high schools were included in the sampling frame: between 57 (2003) and 75 (2013) schools were sampled. Schools were selected systematically with probability proportional to enrollment in grades 9 through 12 using a random start. The survey was developed by the Centers for Disease Control and Prevention, and the sampling procedures have been described in detail elsewhere: 1999;²⁴2003 and 2005;²⁵ and 2009 and 2011.²⁶ Following standard CDC procedures for passive consent, schools notified all parents of youth in classrooms selected for YRBS participation, so that parents could request that their sons or daughters not participate in the survey. The survey is weighted such that a weight was associated with each questionnaire to reflect the likelihood of sampling each student and to reduce bias by compensating for minor differing patterns of non response.

Sample

We included students who provided valid responses to the sexual orientation question (See Measures section). For this paper, we included data from eight total survey years: 1999, 2001, 2003, 2005, 2007, 2009, 2011, and 2013. We combined these into four survey waves (i.e., 1999/2001, 2003/2005, 2007/2009, 2011/2013) and excluded 1995 and 1997 surveys due to low sample sizes of sexual minorities, resulting in a total of 26,002 participants. The overall response rates to the MYRBS varied from a low of 65% (2009) to a high of 77% (2001). The number of participants ranged from a low of 2,721 (2009) to 4,415 (1999). In 2013, 1.6% of our sample identified as gay or lesbian and 4.4% identified as bisexual. Sample sizes by sexual orientation, sex, and survey wave are presented in Table I.

Measures

Age—All participants were high school students in grades 9 through 12, ranging in age from 12 to 18. The mean age of the sample was 16.04 years. Subgroups did not differ significantly by age.

Sex—Participants were asked, “What is your sex?” Response options were “Female” or “Male”.

Ethnicity—Participants self-reported their ethnicity. Response options included American Indian or Alaska Native, Asian, Black or African American, Hispanic/Latino, Native Hawaiian or Other Pacific Islander, and White. Students that indicated more than one race were coded multiracial. American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander were grouped together to form the ‘Other’ race category.

Sexual orientation—Sexual orientation was measured using a single item: “Which of the following best describes you?” Response options were “heterosexual (straight)”, “bisexual”, “gay or lesbian”, and “not sure”. We excluded participants who indicated they were not sure

of their sexual orientation from our trend analyses due to the lack of clear interpretation for this group.²⁷

Use of diet pills to lose weight—For the use of diet pills as a method to lose or control weight, we used one item: “During the past 30 days, did you take any diet pills, powders, or liquids without a doctor’s advice to lose weight or to keep from gaining weight? (Do not include meal replacement products such as Slim Fast.)” Response options were 1 (*yes*) and 0 (*no*).

Fasting to lose weight—To measure fasting as a method to lose or control weight, we used one item: “During the past 30 days, did you go without eating for 24 hours or more (also called fasting) to lose weight or to keep from gaining weight?” Response options were 1 (*yes*) and 0 (*no*).

Purging to lose weight—To measure purging as a method to lose or control weight, we used the item: “During the past 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?” Response options were 1 (*yes*) and 0 (*no*).

Analyses

All data were weighted and adjusted for complex sampling design by using SPSS Complex Samples 22. Analyses were adjusted for age and ethnicity. Ethnicity was dummy coded into five groups: Black (Non-Hispanic), Hispanic/Latino, Asian(Non-Hispanic), Other(Multi-ethnic), and White(Non-Hispanic)(referent group). All analyses were conducted separately for males and females.

We first addressed whether the prevalence of disordered eating changed between years of analysis (e.g., from 1999/2001 to 2011/2013). We used cross tab analyses to describe the prevalence by survey wave for each sex/orientation group, then we tested changes in trends in disordered eating behaviors across survey waves within each sex/orientation group using logistic regressions by survey year (reference 1999/2001), controlled for age and ethnicity. An odds ratio (OR) above 1 indicates that students were more likely engage in disordered eating in a particular survey year compared to 1999/2001 (reference year) whereas an OR below 1 indicates lower odds of disordered eating compared to the reference year.

Next, we were interested in whether the prevalence of disordered eating differed between heterosexual youth and sexual minority youth in each survey year. To test this, we used logistic regressions with sexual orientation (reference heterosexual), age (control), and ethnicity (control) as predictor variables. ORs above 1 indicate that a sexual minority subgroup was more likely to report disordered eating compared to their heterosexual counterparts.

Finally, we tested whether the disparity between sexual minority and heterosexual groups changed across the years. We used logistic regressions adjusted for age and ethnicity, with year-by-orientation interaction terms. We tested the main effects of sexual orientation (reference heterosexual) and year (reference 1999/2001) and the product term of orientation*year, adjusted for age and ethnicity. The product term presented is a ratio of

ORs, which compares the OR of an eating behavior (e.g., binge eating) for a particular subgroup (e.g., bisexual females) in a given year (e.g., 2007/2009) to the odds of the same behavior and subgroup of students in another survey year. Because ORs derived in separate samples cannot be directly compared²⁸, we used this method to examine changes in disparities over time. To interpret this product term(OR), an estimate above 1 indicates that the change in disparities in a given year has widened (or increased) compared to 1999/2001 (the referent year in the interaction models). The inverse is true for a product term OR less than 1, in which case the change in disparity over time has narrowed (decreased) compared to 1999/2001. For more information on this method, see Homma, Saewyc, and Zumbo (2016).

Results

Overall prevalence and trends, by sexual orientation

Table I displays the sample sizes across each sexual orientation group in each wave.

As shown by significant odds ratios in Table II, there were declines in the prevalence of using diet pills to lose weight for both males and females. For males, a drop in use of diet pills was found for heterosexuals, who were nearly half as likely to use diet pills in 2011/2013 compared to 1999/2001. Bisexual males were about one quarter as likely to use diet pills to lose weight in 2011/2013 compared to 1999/2001. Despite a spike in prevalence of diet pill use in 2007/2009, diet pill use among gay males was not significantly different in the final wave than it had been initially. For females, heterosexuals' use of diet pills dropped over time, and they were less than half as likely to use diet pills in 2011/2013 compared to 1999/2001. In addition, bisexual females were half as likely to use diet pills in 2011/2013 than 1999/2001. Diet pill use among lesbians remained statistically unchanged.

Table III displays the trends in fasting to lose weight. Heterosexual youth, both male and female, declined significantly from 1999/2001 to 2011/2013 in their use of fasting to control their weight. Bisexual adolescents of both sexes remained unchanged, as did gay males. In contrast, for lesbians, the prevalence of fasting to lose weight actually increased. Lesbians in the final MYRBS wave were almost twice as likely to report fasting for weight control as they had been initially.

The trends in purging to lose weight are shown in Table IV: there were significant decreases from 1999/2001 to 2011/2013 for heterosexual, bisexual, and gay males, and for heterosexual females. Among bisexual females, the prevalence of students who reported purging in the final wave was virtually the same as they had been initially. Lesbians, however, were more than twice as likely to fast to lose weight in 2011/2013 compared to 1999/2001.

Figures 1 and 2 visually illustrate these changes in purging to lose weight among different subgroups without the adjustments for age and ethnicity.

Sexual orientation-based differences, by survey year

Table V presents odds ratios (ORs) adjusted for age and ethnicity for the associations between disordered eating and sexual orientation in each survey wave. Within each wave/sex group, bisexual and gay/lesbian youth were compared to the reference group of heterosexuals.

Of the 48 comparisons, all but one show increased risk for sexual minority youth. Most are statistically significant. For example, in 1999/2001 bisexual males were more likely to use diet pills and to purge to lose or control weight compared to their heterosexual counterparts. In 2003/2005, bisexual females were more likely to fast, use diet pills, and purge to lose weight compared to their heterosexual counterparts.

The disparities among gay and lesbian students were also disturbingly high. In 2011/2013, gay males were more likely to fast, use diet pills, and purge to lose weight compared to their heterosexual counterparts. In 1999/2001, gay males were nearly 16 times more likely to purge to lose weight compared to heterosexual peers. Lesbian females in 2007/2009 reported higher prevalence of fasting, purging, and using diet pills to lose weight in comparison to heterosexual females.

Changes in Disparities over Time

We next examined whether the disparity in disordered eating between sexual minority and heterosexual youth widened or narrowed from 1999/2001 to 2003/2005, 2007/2009, and 2011/2013 (presented in Table VI). In most instances, increases or reductions in the disparities between sexual minority and heterosexual youth were not significant, though there are a few exceptions. For females, the statistically significant product of wave by sexual orientation (presented as odds ratios) for lesbians indicates that the gap in fasting to lose weight significantly widened (as the AOR is above 1) between 1999/2001 and 2011/2013 for lesbians compared to heterosexual females. There was also a widening gap for bisexual females compared to heterosexual females in using diet pills to lose weight from 1999/2001 to 2007/2009 and purging to lose weight from 1999/2001 to 2005/2007, though these increases in disparities were no longer statistically significant by 2011/2013. Specifically, this product is determined by statistically comparing the odds ratio (disparity) of bisexual females (referent group is heterosexual females) in 2011/2013 to the odds ratio of bisexual females in 1999/2001 (the referent year in the models).

Discussion

The purpose of this study was to examine the trends in disordered eating behaviors for adolescent heterosexual and sexual minority males and females and to determine whether the gaps have narrowed, widened, or stayed the same over time between sexual minorities. The findings from this study corroborate previous evidence that suggests sexual minority youth are at higher risk for disordered eating compared to their heterosexual counterparts¹ and suggest this disparity is not improving. Even so, the prevalence of disordered eating behaviors for most sexual orientation groups decreased between 1999/2001 and 2011/2013. According to our logistic regression analyses, the odds of using diet pills to control weight

decreased in that time for all youth except lesbians and gay males. The odds of fasting decreased for heterosexual males and females, and purging decreased for heterosexuals, bisexual males, and gay males. In contrast to these positive trends, the odds of fasting, using diet pills, and purging to control weight were mostly unchanged for bisexual females, and increased (at least twice the odds for each variable) among lesbians.

The picture of shifts in disparities is more complex, but clearly sex-related. Among males, there were no significant changes in disparity over time. Although we can be pleased at the marked improvements among males, we cannot say that there has been any definitive reduction in sexual orientation disparities. Among females, the pattern is more concerning for bisexual and lesbian females, as the sexual orientation disparities for use of diet pills, fasting, and purging have widened over time, though by the final MYRBS wave these results were significant only for lesbians' fasting behavior.

We found several extreme disparities when comparing sexual minority youth to their heterosexual counterparts. In all comparisons, the odds of engaging in purging, fasting, and using diet pills were higher among bisexuals and gay/lesbians compared to heterosexuals. This study documents some changes over time but does not provide information on possible explanatory factors. Future studies might explore how minority stress³⁰ and the stress associated with the public disclosure of a sexual minority status (“coming out”) during adolescence are related to disordered eating for sexual minorities.³¹ Exposure to stigma, discrimination, or rejection from significant others has deleterious effects on self-esteem, which in turn is a key factor in the development of eating disorders.^{23,32}

Disordered eating and the use of unhealthy weight control behaviors have long been associated with physiological and psychological problems such as lower metabolic rate, decreased long-term weight gain, and depression.²⁻⁵ Emerging longitudinal research finds that the prevalence of these behaviors continues from adolescence through young adulthood.⁷ Given the immediate and long term effects associated with disordered eating behaviors, it is important for researchers, policy makers, and clinicians to develop appropriate interventions that are aimed at sexual minority youth.

Our results show clear improvements over time in disordered eating among sexual minority males but not among females. Why might interventions, policies, and/or shifts in social environments be associated with improvements for males but not females? In particular, why is the prevalence of disordered eating among lesbian girls increasing, and sexual orientation disparities widening for them? To address this issue, scholars may need to examine the mechanisms through which disordered eating interventions work to reduce the prevalence of disordered eating – such as a focus on body image –specific for sex, to elucidate aspects that may differentially affect gay, lesbian, and bisexual males and females. Alternately, researchers may need to more closely examine the potential differential sexed effects of policies and programs that aim to reduce homophobia and support sexual minority adolescents. An important challenge will be disentangling the complexities related to the intersectionality of sexual orientation, sex, and age.

This study had several strengths: we used a population-based statewide survey and assessed the trends of disordered eating measures assessed identically over eight waves of data. In addition, we traced the changes in disparities and identified widening and narrowing gaps in disparities over time and sexual orientation: no studies have done this to date. We also stratified our analyses by sex and found important and dramatic differences between males and females.

Limitations and Conclusions

There were also some limitations to this study. First, data presented here came from one state; results from Massachusetts may or may not be generalizable to other states. Massachusetts has led the United States in policies and laws, such as same-sex marriage, that have protected the rights of sexual minorities. The generally more supportive social climate for sexual minority individuals in Massachusetts may have indirectly influenced the health risk behaviors of LGB youth. Also, despite the large sample sizes available with the MYRBS data, there were still small numbers of sexual minority youth in the unweighted sample data. Our items were all youth-reported and single measurements of disordered eating behaviors; future research might employ clinical screening for different perspectives of disordered eating. Last, though our measure of sexual orientation remained constant over all four waves, we acknowledge that societal stigma toward sexual minorities may have led to underreporting of sexual minority status disproportionately in the earlier survey years. We cannot account for this in our analyses, but we posit that it is societal stigma responsible for both the widening disparities in disordered eating and perhaps underreports of sexual minority students in our survey.

In summary, we sought to explore the trends in disordered eating over time to consider whether the disparities had narrowed or widened across sexual orientation groups since 1999/2001. While we found that the prevalence of disordered eating has decreased across nearly all subgroups since 1999/2001, sexual minority males and females still report higher prevalence of purging, using diet pills, and fasting to lose weight in the most recent survey wave compared to their heterosexual counterparts. In addition, disparities have actually widened for sexual minority females compared to heterosexual peers. These findings illuminate important health concerns for sexual minorities—especially females—and shed light on the need for further scholarship around reducing disparities in disordered eating for this population.

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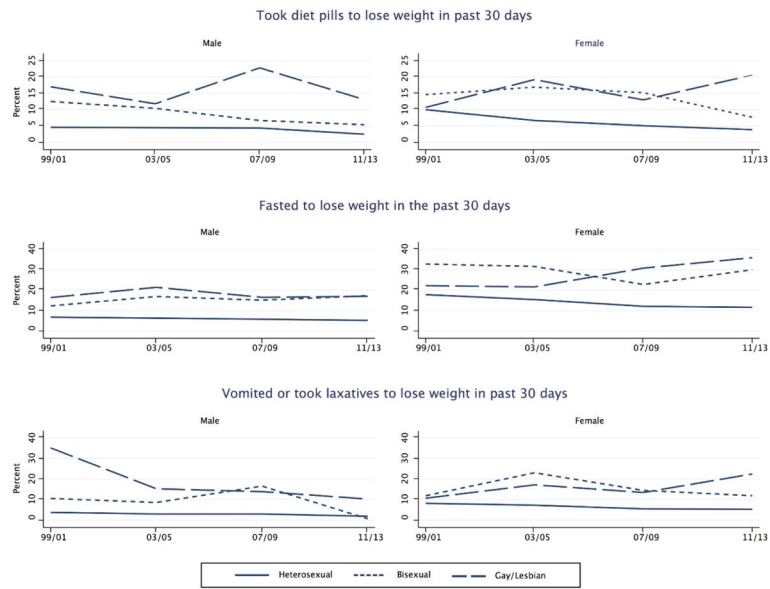


Figure 1. Prevalence in disordered eating behaviors among sexual minority and heterosexual youth by sex, 1999–2013.

Table I

Sample Sizes* and Percents** of the MYRBS Sample Disaggregated by Sexual Orientation, Survey Year, and Sex

	1999/2001	2003/2005	2007/2009	2011/2013
Male				
Heterosexual	4,054 (95.1%)	3,279 (95.4%)	2,712 (94.6%)	2,565 (94.4%)
Bisexual	60 (1.3%)	46 (1.3%)	52 (1.8%)	54 (2.0%)
Gay	37 (0.8%)	41 (1.2%)	64 (2.1%)	47 (1.7%)
Female				
Heterosexual	3,902 (93.9%)	3,306 (93.0%)	2,630 (90.7%)	2,397 (89.1%)
Bisexual	133 (3.3%)	153 (4.1%)	182 (6.3%)	177 (6.8%)
Lesbian	15 (0.4%)	25 (0.6%)	36 (1.2%)	35 (1.4%)

Note.

* Sample sizes are unweighted Ns;

** Percents are weighted. Within each Wave/sex group, percents do not add up to 100% because youth who answered “not sure” on the sexual identity question are not included here.

Table II

Prevalence and Odds Ratios of Changes in the Trends of Last 30-day Use of Diet Pills to Lose Weight Between 1999/2001 and 2011/2013 Disaggregated by Sexual Orientation and Sex.

		Used Diet Pills to Lose Weight last 30 days (%; [95% CI])						Trend 99/01 – 03/05		Trend 99/01 – 07/09		Trend 99/01 – 11/13	
		1999/2001	2003/2005	2007/2009	2011/2013	OR ^a (95% CI)	OR ^a (95% CI)	OR ^a (95% CI)	OR ^a (95% CI)	OR ^a (95% CI)	OR ^a (95% CI)	OR ^a (95% CI)	
Male													
Heterosexual		4.5 (3.9–4.8)	4.5 (3.8–5.3)	4.4 (3.6–5.4)	2.5 (1.9–3.4)	0.99 (0.78–1.26)	0.94 (0.70–1.26)	0.54 (0.38–0.75)					
Bisexual		12.5 (7.9–19.2)	10.4 (5.5–19.0)	6.6 (4.1–10.7)	5.4 (2.8–9.9)	0.85 (0.42–1.73)	0.39 (0.16–0.97)	0.26 (0.08–0.82)					
Gay		17.0 (12.6–22.6)	11.8 (11.12–12.4)	22.8 (18.9–27.2)	13.1 (12.2–13.9)	1.19 (0.86–1.65)	2.33 (1.57–3.45)	1.10 (0.76–1.59)					
Female													
Heterosexual		10.0 (9.0–11.3)	6.7 (5.7–7.8)	5.1 (4.3–5.9)	3.9 (3.1–4.9)	0.62 (0.51–0.77)	0.47 (0.38–0.57)	0.37 (0.28–0.49)					
Bisexual		14.6 (10.4–20.1)	16.9 (13.6–20.8)	15.2 (11.3–20.1)	7.7 (4.9–11.9)	1.24 (0.77–2.00)	0.99 (0.56–1.71)	0.49 (0.26–0.90)					
Lesbian		10.7 (10.6–10.9)	19.2 (11.4–30.4)	13.0 (12.2–13.8)	20.6 (10.3–37.0)	2.95 (1.40–6.23)	0.66 (0.42–1.04)	1.93 (0.96–3.89)					

Note. Data were weighted and adjusted for age and ethnicity (reference = White). OR in bold indicates p < .05. Each odds ratio parameter estimate compares changes in trends from the year indicated to the referent year (1999/2001) for each sexual orientation group separately.

^aOR: Adjusted Odds ratio.

CI: Confidence interval

Table III
Prevalence and Odds Ratios of Changes in the Trends of Last 30-day Use of Fasting to Lose Weight Between 1999/2001 and 2011/2013 Disaggregated by Sexual Orientation and Sex

		Fasted to Lose Weight last 30 days (%; [95% CI])					Trend 99/01 – 11/13		
		1999/2001	2003/2005	2007/2009	2011/2013	OR ^a (95% CI)	Trend 99/01 – 07/09	OR ^a (95% CI)	Trend 99/01 – 11/13
Male									
Heterosexual		6.8 (6.1–7.6)	6.3 (5.4–7.3)	5.8 (4.8–7.1)	5.2 (4.2–6.5)	0.92 (0.76–1.12)	0.84 (0.67–1.06)	0.75 (0.58–0.96)	
Bisexual		12.3 (8.3–17.7)	16.9 (9.4–28.7)	15.1 (12.1–18.7)	17.3 (12.6–23.4)	1.49 (0.68–3.27)	1.11 (0.67–1.83)	1.46 (0.83–2.57)	
Gay		16.4 (10.0–25.7)	21.4 (13.6–32.1)	16.5 (11.6–23.0)	17.0 (11.2–25.0)	1.38 (0.90–1.26)	1.00 (0.67–1.50)	1.03 (0.60–1.76)	
Female									
Heterosexual		17.8 (16.6–19.1)	15.4 (13.9–17.1)	12.1 (10.7–13.6)	11.6 (10.0–13.3)	0.84 (0.72–0.97)	0.63 (0.54–0.75)	0.61 (0.51–0.73)	
Bisexual		32.8 (26.3–40.0)	31.6 (25.5–38.4)	22.8 (18.0–28.4)	30.0 (24.2–36.6)	0.95 (0.61–1.48)	0.59 (0.38–0.91)	0.84 (0.54–1.30)	
Lesbian		22.2 (21.2–23.3)	21.6 (15.6–28.9)	30.8 (28.7–32.9)	35.9 (25.3–48.2)	1.18 (0.81–1.72)	1.55 (1.14–2.10)	2.30 (1.16–4.55)	

Note. Data were weighted and adjusted for age ethnicity (reference = White). OR in bold indicates p < .05; Each odds ratio parameter estimate compares changes in trends from the year indicated to the referent year (1999/2001) for each sexual orientation group separately.

^aOR: Adjusted Odds ratio.

CI: Confidence interval

Table IV
Prevalence and Odds Ratios of Changes in the Trends of Last 30-day Purging to Lose Weight Between 1999/2001 and 2011/2013 Disaggregated by Sexual Orientation and Sex.

	Purged to Lose Weight last 30 days (%; [95% CI])						Trend 99/01 – 11/13	
	1999/2001	2003/2005	2007/2009	2011/2013	OR ^a (95% CI)	OR ^a (95% CI)	Trend 99/01 – 07/09	OR ^a (95% CI)
Male								
Heterosexual	3.8 (3.1–4.6)	3.0 (2.5–3.8)	3.0 (2.4–3.8)	1.9 (1.3–2.6)	0.80 (0.59–1.08)	0.79 (0.58–1.09)	0.49 (0.33–0.74)	
Bisexual	10.6 (6.8–16.1)	8.6 (2.2–28.5)	16.6 (12.2–22.1)	0.7 (0.6–0.7)	0.82 (0.18–3.79)	1.42 (0.75–2.68)	0.05 (0.03–0.08)	
Gay	35.2 (26.7–44.8)	15.3 (13.9–16.8)	13.9 (9.5–19.8)	10.3 (8.0–13.2)	0.33 (0.23–0.48)	0.29 (0.17–0.50)	0.22 (0.14–0.34)	
Female								
Heterosexual	8.2 (7.3–9.1)	7.3 (6.4–8.3)	5.5 (4.6–6.5)	5.3 (4.5–6.3)	0.89 (0.74–1.07)	0.66 (0.53–0.81)	0.63 (0.51–0.78)	
Bisexual	11.9 (7.5–18.4)	23.1 (18.0–29.0)	14.5 (10.9–19.0)	11.9 (7.6–18.0)	2.22 (1.21–4.09)	1.21 (0.65–2.25)	0.95 (0.47–1.93)	
Lesbian	10.7 (10.6–10.9)	17.2 (5.4–42.7)	13.5 (12.7–14.4)	22.5 (12.6–36.8)	2.08 (0.52–8.28)	1.27 (1.08–1.50)	2.57 (1.22–5.39)	

Note. Data were weighted and adjusted for age ethnicity (reference = White). OR in bold indicates p < .05; Each odds ratio parameter estimate compares changes in trends from the year indicated to the referent year (1999/2001) for each sexual orientation group separately.

^aOR: Adjusted Odds ratio.

CI: Confidence interval

Table V

Odds Ratios and 95% Confidence Intervals for Using Diet Pills, Fasting, and Purging Elucidating Disparities Disaggregated by Survey Year, Sex, and Sexual Orientation

	1999/2001	2003/2005	2007/2009	2011/2013
Using Diet Pills				
Male				
Heterosexual	ref	ref	ref	ref
Bisexual	2.88 (1.43–5.81)	2.34 (1.00–5.49)	1.62 (0.60–4.38)	2.17 (0.59–8.01)
Gay	3.04 (0.83–11.11)	2.70 (0.92–7.95)	5.98 (3.37–10.64)	4.77 (1.65–13.81)
Female				
Heterosexual	ref	ref	ref	ref
Bisexual	1.46 (0.88–2.43)	2.91 (1.91–4.42)	3.35 (2.08–5.41)	1.97 (1.03–3.78)
Lesbian	1.13 (0.25–5.19)	3.45 (0.97–12.28)	2.04 (0.57–7.28)	5.62 (1.95–16.22)
Fasting				
Male				
Heterosexual	ref	ref	ref	ref
Bisexual	1.86 (0.97–3.56)	3.01 (1.28–7.08)	3.36 (1.36–8.32)	4.07 (1.68–9.86)
Gay	2.82 (0.98–8.10)	4.03 (1.50–10.82)	2.35 (1.10–5.01)	3.50 (1.20–10.22)
Female				
Heterosexual	ref	ref	ref	ref
Bisexual	2.19 (1.52–3.15)	2.61 (1.72–3.96)	2.11 (1.44–3.11)	3.19 (2.10–4.86)
Lesbian	1.30 (0.53–3.18)	1.11 (0.32–3.86)	2.75 (1.23–6.16)	4.11 (2.09–8.10)
Purging				
Male				
Heterosexual	ref	ref	ref	ref
Bisexual	3.03 (1.31–7.06)	2.92 (0.67–12.71)	6.88 (3.58–13.23)	0.38 (0.05–2.97)
Gay	15.88 (6.53–38.66)	5.78 (2.28–14.63)	5.43 (2.68–11.03)	5.00 (1.70–14.67)
Female				
Heterosexual	ref	ref	ref	ref
Bisexual	1.47 (0.77–2.79)	4.00 (2.66–6.03)	2.78 (1.73–4.45)	2.48 (1.43–4.32)
Lesbian	1.46 (0.33–6.39)	2.94 (0.68–12.71)	2.46 (0.95–6.38)	5.90 (2.58–13.45)

Note. Data were weighted and adjusted for age and ethnicity (reference = White). 95% confidence intervals are in parentheses. Odds ratio in bold indicates $p < .05$.

Table VI

Odds Ratios and 95% Confidence Intervals Reporting Changes in Disparity Gaps in Diet Pill Use, Fasting, and Purging, Disaggregated by Sexual Orientation and Survey Year

	Male OR ^a (95% CI)	Female OR ^a (95% CI)
Using Diet Pills		
Heterosexual by Year 99/01	ref	ref
Bisexual by Year 03/05	0.82 (0.28–2.42)	1.95 (1.03–3.72)
Bisexual by Year 07/09	0.57 (0.17–1.83)	2.20 (1.10–4.41)
Bisexual by Year 11/13	0.75 (0.17–3.25)	1.36 (0.61–3.02)
Gay/Lesbian by Year 03/05	0.86 (0.16–4.56)	3.23 (0.46–22.61)
Gay/Lesbian by Year 07/09	1.87 (0.47–7.52)	1.86 (0.27–12.84)
Gay/Lesbian by Year 11/13	1.48 (0.29–7.53)	5.40 (0.86–33.86)
Fasting		
Heterosexual by Year 99/01	ref	ref
Bisexual by Year 03/05	1.57 (0.53–4.62)	1.18 (0.69–2.03)
Bisexual by Year 07/09	1.63 (0.54–4.90)	0.95 (0.56–1.59)
Bisexual by Year 11/13	2.22 (0.75–6.55)	1.44 (0.84–2.49)
Gay/Lesbian by Year 03/05	1.33 (0.33–6.04)	0.89 (0.20–3.95)
Gay/Lesbian by Year 07/09	0.88 (0.23–3.28)	2.06 (0.63–6.81)
Gay/Lesbian by Year 11/13	1.27 (0.28–5.78)	3.24 (1.07–9.80)
Purging		
Heterosexual by Year 99/01	ref	ref
Bisexual by Year 03/05	0.97 (0.19–5.11)	2.66 (1.27–5.57)
Bisexual by Year 07/09	2.28 (0.78–6.63)	1.87 (0.86–4.04)
Bisexual by Year 11/13	0.13 (0.01–1.14)	1.64 (0.72–3.76)
Gay/Lesbian by Year 03/05	0.37 (0.11–1.31)	2.17 (0.27–17.25)
Gay/Lesbian by Year 07/09	0.36 (0.12–1.11)	1.78 (0.31–10.26)
Gay/Lesbian by Year 11/13	0.36 (0.09–1.40)	4.18 (0.77–22.68)

Note. Data were weighted. Odd ratio in bold indicates $p < .05$. ref: Reference group 1999/2001.

^aThe model included sexual orientation, survey year, ethnicity (reference = White), and grade along with orientation-by-year interaction; OR: Odds ratio.

CI: Confidence interval.