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Trajectories of Depressive Symptoms and Suicidality among Heterosexual and Sexual Minority Youth

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Abstract

Sexual minority youth report higher rates of depression and suicidality than do heterosexual youth. Little is known, however, about whether these disparities continue as youth transition into young adulthood. The primary goals of this study were to describe and compare trajectories of adolescent depressive symptoms and suicidality among sexual minority and heterosexual youth, examine differences in depressive symptoms and suicidality trajectories across sexual orientation subgroups, and determine whether there are gender differences in these longitudinal disparities. Four waves of data from the National Longitudinal Study of Adolescent Health were analyzed using latent curve modeling (N = 12,379; 53% female). Results showed that the rates of depressive symptoms and suicidality in early adolescence were higher among sexual minority youth than among heterosexual youth, and that these disparities persisted over time as participants transitioned into young adulthood. Consistent with previous cross-sectional studies, the observed

MPM conceived of the study, participated in its design and coordination and drafted the manuscript; SSD participated in the design of the study, conducted all of the analyses, drafted the Method and Results sections, JWC participated in the design of the study, supervised the data analysis and interpretation, and assisted with drafting the Results section, CMB participated in its design and coordination and helped to draft the manuscript, MSF, FA, and TH participated in the design of the study and assisted with drafting components of the Introduction and Discussion. All authors read, edited, and approved the final manuscript.

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longitudinal disparities were largest for females and for bisexually-identified youth. Sexual minority youth may benefit from childhood and early adolescent prevention and intervention programs.

Keywords

sexual minority youth; lesbian; gay; and bisexual youth; sexual orientation; depressive symptoms; suicidality; trajectories; latent growth curve modeling

Introduction

Unipolar depression is the most prevalent mental health problem worldwide, the third leading contributor to global disease burden, and it is responsible for 10 million “disability-adjusted life years” lost annually in the United States and in other high-income countries (Collins et al., 2011). It is anticipated by 2020 that 1.5 million people worldwide will die by suicide, and up to 30 million people per year will attempt suicide (Bertolote & Fleischman, 2002). In a recent report compiled by an international consensus group of experts, mental health problems constituted 13% of the global burden of disease, surpassing cardiovascular disease and cancer (Collins et al., 2011). Given the immense public health burden associated with depressive symptoms and suicidality, research is needed to identify individuals at highest risk for these problems in order to design effective prevention and intervention programs.

Members of the lesbian, gay, and bisexual community report much higher rates of depression and suicidality than their heterosexual counterparts (Cochran, Sullivan, & Mays, 2003; King et al., 2008; Meyer, 2003), and several recent government consensus reports emphasize the urgent need for research that helps describe, understand, and reduce mental health disparities in this vulnerable population. For example, the Institute of Medicine (Institute of Medicine, 2011) recently conducted a comprehensive review and analysis of sexual minority health research with the goals of identifying research gaps and opportunities and outlining a research agenda to help guide the National Institutes of Health in establishing research priorities. At least three themes emerged from this report that inspired the goals of this study. First, the report emphasized the urgent need for more research that describes and explains mental health disparities among sexual minority individuals. Second, the report emphasized the importance of taking a life course perspective when attempting to understand the emergence and long-term patterns of mental health disparities. Third, the report suggested that the minority stress model is an appropriate explanatory framework for conceptualizing the potential underlying causes of these disparities.

The Minority Stress Model

The minority stress model (Meyer, 2003) asserts that sexual minority individuals suffer from a pervasive pattern of homophobic biases and prejudices harbored by the dominant heterosexual culture. Such biases and prejudices increase risk of multiple stress-related health conditions and behaviors, including mental health problems such as depression and suicidality. While dozens of cross-sectional studies have documented substance use and mental health disparities among sexual minority youth and adults, very few have examined whether the disparities reported in adolescence persist as they transition into young adulthood (for notable exceptions see Corliss, Rosario, Wypij, Fisher, & Austin, 2008; Corliss et al., 2013). Doing so is important because many individuals traverse major gay-related developmental milestones (e.g., gay identify formation, disclosing one’s orientation to others) during this transition that may impact long-term health (Friedman, Marshal, Stall, Cheong, & Wright, 2008). Furthermore, according to developmental psychopathology

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theory (Cicchetti & Cohen, 2006), understanding the emergence and persistence of mental health problems over time among high-risk youth requires viewing the problems through a developmental lens. Thus, describing and documenting the persistence of mental health disparities among sexual minorities as they transition into young adulthood and beyond is an important first step in understanding the nature and extent of the problem.

Cross-Sectional Evidence for Depressive Symptom and Suicidality Disparities among Sexual Minority Youth (SMY)

Several pioneering studies (e.g., Remefedi, French, Story, Resnick, & Blum, 1998; Russell & Joyner, 2001) and in-depth narrative reviews (e.g., Haas et al., 2011) have shown that depressive symptoms and suicidality rates are higher among sexual minority youth (SMY) compared with heterosexual youth. A recent quantitative analysis and review of this literature (Marshal et al., 2011) support these conclusions. Using data from more than 20 cross-sectional youth studies, in which the majority of participants were 18 years old or younger, SMY reported significantly higher rates of depressive symptoms and suicidality than did heterosexual youth. Compared with heterosexual youth, SMY were nearly three times as likely to report a history of suicidality, and this disparity increased as severity of suicidality increased. More specifically, compared with heterosexual youth, SMY were almost two times as likely to report suicidal ideation, more than three times as likely to report suicide attempts, and more than four times as likely to report a suicide attempt that required medical attention. Despite the large disparities found in published cross-sectional studies of SMY, to our knowledge no studies have examined these symptoms over time among gay-identified young adults in order to evaluate whether adolescent disparities persist into young adulthood—the primary goal of this study.

Differences in SMY Mental Health Disparities across Sexual Minority Subgroups

“Sexual minority” is a generally accepted term used to encompass individuals who do not identify as exclusively heterosexual. Gay and lesbian individuals are exclusively attracted to the same-sex, bisexual individuals are attracted to both sexes equally, and mostly heterosexual individuals endorse being “mostly attracted to the opposite sex, but somewhat attracted to the same-sex.” Although these groups are all considered part of the same, overarching “sexual minority” category, they have been shown to experience varying levels of risk for different outcomes (McCabe, Hughes, Bostwick, & Boyd, 2005). Recent research suggests that bisexual and mostly heterosexual youth (and adults) are at higher risk than heterosexual youth and, in some cases, at higher risk than gay and lesbian youth for substance use and mental health problems, including suicidality (Austin et al., 2004; Bostwick, Boyd, Hughes, & McCabe, 2010; Marshal et al., 2008; Marshal et al., 2011). Thus, the second goal of this study was to examine whether the trajectories of depressive symptoms and suicidality for the SMY subgroups (lesbian/gay, bisexual, and mostly heterosexual) were different from each other and from heterosexual youth.

Gender Differences in SMY Mental Health Disparities

The third goal of this study was to investigate the role of gender in the association between sexual orientation and longitudinal trajectories of depressive symptoms and suicidality. It is important to examine gender differences given consistent findings of higher rates of depressive symptoms and suicidality among adolescent girls (Cyranowski, Frank, Young, & Shear, 2000). Evidence suggests that sexual orientation-related disparities vary by gender. For example, results from a meta-analysis of cross-sectional studies showed that compared with heterosexual girls, sexual minority girls were almost 400% more likely to use alcohol and other drugs, whereas the disparity between sexual minority and heterosexual boys was significant but much smaller (Marshal et al., 2008). Recent evidence also suggests that longitudinal substance use disparities differ by gender (Corliss et al., 2008; Dermody et al.,

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2013). For example, using the Add Health data set Dermody and colleagues (2013) recently found hazardous drinking at baseline (in mid-adolescence) were larger for sexual minority girls than for sexual minority boys; however there were sharper escalations in hazardous drinking among sexual minority boys as they transitioned into young adulthood. Given these previous findings, we examined gender differences in trajectories of depressive symptom and suicidality disparities.

The Current Study

The study goals described above were guided by an assessment and review of the SMY mental health disparities literature. First, there is incontrovertible cross-sectional evidence that, compared with their heterosexual counterparts, sexual minority adolescents are at significantly higher risk for depressive symptoms and suicidality. Second, there are few if any published studies that examine whether or not these disparities persist as SMY transition to young adulthood. Third, the cross-sectional literature suggests that SMY disparities are larger for "mostly heterosexual" and bisexual youth compared with exclusively gay/lesbian youth, and larger for sexual minority girls than for sexual minority boys. Given these conclusions, we established three goals for the current study. First, we describe and compare trajectories of depressive symptoms and suicidality among sexual minority and heterosexual youth from adolescence to young adulthood. Second, we examine differences in trajectories of depressive symptoms and suicidality across four sexual orientation subgroups (heterosexual, mostly heterosexual, bisexual, and gay/lesbian). Third, we examine gender differences in SMY depressive symptoms and suicidality trajectories. We hypothesize that, compared with exclusively heterosexual youth, SMY will report higher levels of depressive symptoms and suicidality as they transition into young adulthood, that disparities will be higher for individuals who identify as bisexual and mostly heterosexual, and that disparities will be more robust for sexual minority girls compared with sexual minority boys.

Method

Study Design

To address the study goals, we used data from the National Longitudinal Study of Adolescent Health (Add Health), a school-based, longitudinal study of health behaviors and attitudes (Chantala, 2003; Harris, 2009). The data were collected using systematic and stratified sampling methods to establish a nationally representative sample with respect to region of country, urbanicity, school size, school type, and ethnicity (Tourangeau & Shin, 1999). Between September 1994 and April 1995 at Wave I, students from 80 high schools and 52 middle schools completed an initial in-school questionnaire followed by four in-home interviews approximately 1, 6, and 12 years after Wave I. The current study used four waves of data, beginning with participants who were 14 to 18 years old at Wave I (N = 12,379). We restricted the age range of the sample by omitting participants in the outlying age groups at Wave I (ages 12, 13, 19; n = 1,996) in order to approximate key developmental stages at each Wave: ages 14 to 18 and 15 to 19 at Waves I and II (adolescence), ages 20 to 24 at Wave III (emerging adulthood), and ages 27 to 31 at Wave IV (young adulthood). Given the systematic and stratified sampling methods used for the Add Health data, the present study only examined participants with valid sampling weights in order to provide nationally representative estimates. Participants who had missing data on the sexual orientation item (n = 98, 0.8%) were excluded from the analyses because they refused to answer (n = 51), or were not sexually attracted to males or females (n = 47).

Demographic characteristics of the sample are summarized in Table 1. On average, participants were 16 years old at Wave I. Approximately half of the sample was female (53%), 16% were Hispanic, and 36% were of minority race. The sexual orientation groups

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differed significantly on age, gender, and race. Heterosexual participants were older than mostly heterosexual participants, women were more widely represented in the mostly heterosexual and bisexual groups than other groups, and the mostly heterosexual group was less racially diverse than the other groups.

Measures

Demographic characteristics—At Wave I, participants reported their age (in years), gender (1=male, 2=female), ethnicity (0=Hispanic, 1=non-Hispanic) and race (0=racial minorities, 1= White). Racial minorities included Black/African American, American Indian/Native American, Asian/Pacific Islander and "other."

Sexual orientation—Sexual orientation was operationalized based on responses to a single item at Wave IV that asked participants to "Please choose the description that best fits how you think about yourself." Response options were "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," and "100% homosexual (gay)." Participants were categorized as 1) heterosexual, 2) mostly heterosexual, 3) bisexual, and 4) mostly gay or completely gay. Mostly heterosexual individuals (n = 1,186) were considered as a separate sexual orientation group from heterosexual individuals because, as previously described, cross-sectional evidence has shown that individuals who identify as mostly heterosexual appear to be at risk for mood disturbances (Bostwick, Boyd, Hughes, & McCabe, 2010) than heterosexual individuals. The mostly gay and completely gay groups were combined similar to previous research (Marshal et al., 2009; Marshal et al., 2012) because there is a dearth of research to suggest that the groups differ on outcomes and because the mostly gay group was too small in our sample to produce reliable trajectory estimates (n = 99). We operationalized sexual orientation as a stratifying variable using a Wave IV sexual orientation identity because preliminary analyses showed that only 13% of those who endorsed a same-sex sexual identity at Wave IV (as young adults) endorsed same-sex attraction at Wave I (as young teenagers). Thus if we were to use same sex attraction measured at earlier waves as our SMY indicator and stratifying variable, a large number of the sexual minority young adults in the data set would have been inappropriately classified as heterosexual (also see Discussion section).

Depressive symptoms—Depressive symptoms were assessed using nine items from the Center for Epidemiologic Studies Depression (CES-D) scale at all four waves of data collection (Radloff, 1977). Participants were asked "How often was each of the following things true during the past week" (e.g., "You were bothered by things that usually don't bother you," "You could not shake off the blues, even with help from your family and friends," "You felt you were just as good as other people"). Responses options were on 4-point Likert scale ranging from 1 (*never or rarely*) to 4 (*most of the time*). The final depressive symptoms variable was the average of the participant's responses to the nine items. Participants with missing data on five or more of the depressive symptoms questions were coded as having missing data. For the current sample, the Cronbach's alpha for the nine items across the four waves were .79, .80, .80, and .81, respectively. Responses ranged from 0 to 3 with a mean of .66 (SD=.47), .65 (SD=.47), .51 (SD=.45), and .58 (SD=.46) across the four waves, respectively. The skew of these variables and others below are discussed in detail in the Data Analytic Strategy section and treated accordingly in the statistical models. The final aggregate variables were standardized with respect to the scores at each wave.

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Suicidally—Suicidally was assessed in each of the four waves using three questions. These questions were presented in the following order with succeeding questions asked only if the participant endorsed suicidality in the previous questions: “During the past 12 months, have you ever seriously thought about committing suicide?” (yes/no); “During the past 12 months, how many times have you actually attempted suicide?” (none, once, twice, 3 or 4 times, 5 or more times); and “Did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?” (yes/no). Responses to the questions were used to create a single variable of suicide risk based on each participant’s most severe endorsement of suicidally with the following categories: 1) no suicidally, 2) ideation in the past 12 months, 3) attempt in the past 12 months not requiring medical attention, and 4) attempt in the past 12 months requiring medical attention (range 0–3). In this sample, the means of the final categorical variables at each of the four waves were .18 (SD=.52), .15 (SD=.48), .09 (SD=.37), and .09 (SD=.35), respectively.

Data Analytic Strategy

Analyses were carried out in the structural equation modeling (SEM) framework using Mplus 6.0 (Muthén & Muthén, 1998–2010). The “complex” analysis type and the individual weight variables were used to account for the sampling methods used to collect the Add Health data (Stapleton, 2006) and appropriately weigh the observations. The skewness and missing values of the outcome variables were addressed by using a robust estimation method, MLR, implemented in Mplus.

Latent growth curve modeling techniques (see Bollen & Curran, 2006) were used to estimate trajectories of depressive symptoms and suicidality across the four waves of the Add Health data. First, the overall trajectory shape was determined by comparing linear and nonlinear trajectories. For the linear trajectory, the intercept factor loadings were fixed to 1 and the slope factors loadings for the four waves were fixed to 0, 1, 6, and 13, respectively, to reflect the number of years from Wave I to subsequent waves. For the non-linear trajectory, the loadings on the slope factor were fixed to 0, 1, and 6 for the first three waves and the loading for Wave IV was freely estimated to allow for estimation of the level at the final wave that may not follow a straight linear growth. A factor loading lower than 13 suggests that the level at Wave IV departed from the linear trajectory. In both specifications, the intercept factor modeled the level of depressive symptoms or suicidality at Wave I and the slope factor modeled the change rates in those variables per year. Assessment wave was used for the metric of time, as opposed to participants” age, because of the limited data available for intermediate ages due to the 5 or more year delay between Waves II, III, and IV. The trajectories of depressive symptoms and suicidality were estimated in separate models.

Each trajectory was modeled in a multiple group analysis framework using sexual orientation or sexual orientation and gender as a grouping variable to permit direct comparisons of the trajectories for each outcome between groups. First, trajectories were compared between sexual orientation groups, i.e., (1) heterosexual (2) mostly heterosexual (3) bisexual, and (4) mostly/completely gay/lesbian youth, with gender included as a covariate. Second, in order to test whether SMY group differences in trajectories of depression and suicidality were moderated by gender, we compared (1) male heterosexual (2) female heterosexual (3) male sexual minority, and (4) female sexual minority individuals. The advantage of multiple group analysis is that the means of the intercept (i.e., initial levels of depression and suicidality at Wave I) and the slope (i.e., change rates of depression and suicidality per year) can be compared statistically between the sexual orientation groups. We used the Satorra-Bentler chi-square difference test (Satorra & Bentler, 2001) for testing group differences in trajectories, as well as comparing model fit

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between a linear and a non-linear model. Covariates included age at Wave I, gender (omitted for gender-based group analysis), ethnicity, and race. These demographic covariates were chosen because they are widely accepted as covariates of depressive symptoms and suicidality and they also were significantly associated with sexual orientation. As a result, it was important to control for the potential confounding effects of the covariates when estimating group differences in each model. All suicidality analyses were repeated treating the suicidality variable as an ordinal categorical variable. Because the results were similar whether suicidality was examined as a continuous or categorical variable, we reported the results from the continuous model herein.

Results

Growth Trajectories of Depressive Symptoms

Comparisons across gay/lesbian, mostly heterosexual, bisexual, and heterosexual individuals—The non-linear model, in which the factor loading of Wave IV depressive symptoms on the slope was freely estimated, demonstrated significantly better model fit than the linear model based on the significant Satorra-Bentler chi-square difference test $\chi^2_{diff} = 83.76$, df = 4, $p < .001$). The non-linear model had good model fit overall, $\chi^2 = 28.963$ p=.067, CFI=.997, RMSEA=.013 (90% CI: .001 – .02). The estimated factor loading for Wave IV showed a significant departure from a linear trajectory (6.091 compared to 13). The value was similar to the factor loading at Wave III (i.e., 6), which suggests that the average level of depressive symptoms did not change between these two points. The estimated loading at Wave IV did not differ across four sexual orientation groups, resulting in similar non-linear patterns in depressive symptoms. The estimated group trajectories from the final model are depicted in Figure 1. The means and statistically supported group differences in these means are provided in Table 2.

As illustrated in Table 2, all sexual minority groups had significantly higher mean depressive symptom levels at Wave I than the heterosexual group ($\mu_\alpha = -.085$, SE = .017, $p < .001$; Throughout the Results section alpha [α] subscripts correspond to estimates of the intercept factor and beta subscripts [β] correspond to the slope factor.). The mean depressive symptom level of the bisexual group ($\mu_\alpha = .462$, SE = .105, $p < .001$) was significantly greater than the mostly heterosexual group ($\mu_\alpha = .221$, SE = .043, $p < .001$), which was significantly higher than the gay/lesbian group ($\mu_\alpha = .116$, SE = .079, $p < .05$). The variance of the intercept factor was significant in all four sexual orientation groups, suggesting significant individual differences in depressive symptom level at Wave I within each group. On average, depressive symptoms did not significantly change across time (i.e., the slope means were not significantly different from zero) for any of the sexual orientation groups; however, the disparities across groups were maintained due to the differences at Wave I. The significant variance of the slope factor suggests that there was individual variation of growth rates around the average zero slope, such that a subset of individuals may show increases or decreases in depressive symptoms over time.

Gender effects: Comparisons between sexual minority males and females and heterosexual males and females—A non-linear trajectory shape was supported over a linear trajectory shape ($\chi^2_{diff} = 121.52$, df = 4, $p < .001$), which was consistent with the depressive symptom trajectories models of the sexual orientation subgroups. The Wave IV slope factor loading did not differ between groups (6.078) and model fit was good, $\chi^2 = 28.931$ $p = .067$, CFI = .996, RMSEA=.013 (90% CI: .001 – .02). The trajectories are depicted in Figure 2. Means and results of group differences testing are summarized in Table 3.

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Sexual minority females demonstrated a significantly higher level of depressive symptoms at Wave I (μ_α = .336, SE = .046, p < .001) than the other groups. The initial level of depressive symptoms did not differ significantly between heterosexual females (μ_α = .072, SE = .024, p < .001) and sexual minority males (μ_α = .013, SE = .069, p < .01); however, the two groups demonstrated more depressive symptoms than heterosexual males (μ_α = −.216, SE = .020, p < .001). The variance of the intercept factor for each group was significant, suggesting significant intragroup variability. The positive mean of the slope factor for heterosexual males was significant (μ_β = .014, SE = .003, p < .001) and marginal for sexual minority males (μ_β = .021, SE = .012, p < .10) suggesting that depressive symptoms increased across time among males, regardless of sexual orientation. In contrast, depressive symptoms among heterosexual females appeared to decrease slightly, but not significantly, over time (μ_β = −.008, SE = .004, p < .10). For sexual minority females, depressive symptoms did not change over time (μ_β = .008, SE = .008, p > .10); however, their symptom levels remained the highest due to the higher level at Wave I. The variances of the slope factors in all groups were significant, suggesting significant individual differences in the growth rates of depressive symptoms with some increasing slopes and others decreasing.

Covariates of the depressive symptom trajectories—The model comparing across gay/lesbian, mostly heterosexual, bisexual, and heterosexual individuals with covariates as predictors of the slope and intercept factors, demonstrated good fit, χ^2 = 60.439 p = .17, CFI = .998, RMSEA = .009 (90% CI: .001 – .01). The covariates included including age at Wave I, gender, ethnicity, and race. Overall, older participants reported more depressive symptoms at Wave I and showed decreasing growth rates of depressive symptoms over time than did younger participants. In most sexual orientation groups, females had higher initial levels of depressive symptoms and decreasing growth rates of depressive symptoms relative to males. Within the heterosexual and bisexual groups, Hispanic ethnicity was associated with higher initial depressive symptoms compared to non-Hispanic participants (b = .108, SE = .042, p < .01; b = 1.01, SE = .314, p < .01, respectively), and Hispanic bisexual participants demonstrated greater growth of depressive symptoms than their non-Hispanic counterparts (b = −.103, SE = .046, p < .05). Furthermore, racial minority status was associated with high initial levels of depressive symptoms among heterosexual individuals (b = −.182, SE = .031, p < .001). A similar pattern of findings was supported with the models examining gender effects.

Growth Trajectories of Suicidality

Comparisons between gay/lesbian, mostly heterosexual, bisexual, and heterosexual individuals—A non-linear trajectory model with the factor loading of Wave IV freely estimated was supported over a linear model (χ^2_{diff} = 98.83, df = 4, p < .001) and demonstrated good fit, χ^2 = 30.319 p = .035, CFI = .977, RMSEA=.015 (90% CI: .004 – .02). The trajectories are depicted in Figure 2. The parameter estimates and results of group difference tests are summarized in Table 2. The loading of Wave IV on the slope factor was the same for the heterosexual, bisexual, and gay/lesbian groups (5.431), which suggests that the level of suicidality was similar between Waves III and IV. The loading of Wave IV was higher for the mostly heterosexual group (8.025). The loading of the mostly heterosexual group less than 13 indicates suicidality continued to decrease from Wave III to Wave IV, but the decrease was not linear.

Each sexual minority group had significantly higher initial levels of suicidality than the heterosexual group (μ_α = .164, SE = .006, p < .001). Among the sexual minority groups, the highest initial suicidality level was reported by bisexual participants (μ_α = .548, SE = .085, p < .001), while the initial levels of the mostly heterosexual (μ_α = .339, SE = .031, p < .001)

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and gay/lesbian (μ_α = .279, SE = .040, p < .01) groups did not differ from each other. Suicidality decreased over time in all four groups; however, the bisexual group decreased at the fastest rate (μ_β = −.057, SE = .018, p < .01). The significant declines among heterosexual (μ_β = −.015, SE = .001, p < .001) and mostly heterosexual (μ_β = −.024, SE = .005, p < .001) individuals and the marginal decline in the gay/lesbian group (μ_β = −.014, SE = .008, p < .10) were not significantly different from each other. There was significant variability in the intercept and slope factors within each sexual orientation group, as exhibited by significant slope and intercept factor variances, except for the bisexual group that showed a marginally significant variance for the slope and intercept factors.

Gender effects: Comparisons between sexual minority males and females and heterosexual males and females—A non-linear trajectory model was supported over the linear trajectory (χ^2_{diff} = 57.07, df = 4, p < .001), which was consistent with the suicidality trajectories models of the sexual orientation subgroups. The Wave IV factor loading did not differ significantly between the groups (5.723). The final model demonstrated good model fit, χ^2 = 26.389 p = .120, CFI = .982, RMSEA = .011 (90% CI: .001 – .021), and is depicted in Figure 2. The parameter estimates and group differences of the parameter estimates are summarized in Table 3.

Initial levels of suicidality were highest among sexual minority females (μ_α = .401, SE = .031, p < .001), followed by sexual minority males (μ_α = .257, SE = .036, p < .001), heterosexual females (μ_α = .206, SE = .010, p < .001), and heterosexual males (μ_α = .128, SE = .006, p < .001). Suicidality demonstrated a significant, non-linear decrease for all four groups. The decline among sexual minority females was steeper than the other three groups (μ_β = −.040, SE = .005, p < .001). The change in suicidality over time did not differ between sexual minority males (μ_β = −.012, SE = .007, p < .10) and heterosexual females (μ_β = −.021, SE = .002, p < .001); however, the two groups demonstrated a steeper decline than heterosexual males (μ_β = −.009, SE = .002, p < .001). Significant variances of the slope and intercept terms were detected.

Covariates of the suicidality trajectories—The model comparing across gay/lesbian, mostly heterosexual, bisexual, and heterosexual individuals with covariates as predictors of the slope and intercept factors demonstrated good fit, χ^2 = 64.544, p = .045, CFI = .990, RMSEA = .011 (90% CI: .001 – .018). Ethnicity did not predict the intercept or slope terms above and beyond the other covariates, and thus, was removed from the model. In general, female gender corresponded with higher initial levels of suicidality and a greater decrease in suicidality across time compared to males in each group. Racial minority individuals in the heterosexual and bisexual groups exhibited higher initial levels of suicidally than their White counterparts (b = .028, SE = .013, p< .05; b = .359, SE = .143, p< .05). Furthermore, racial minority bisexual participants showed smaller decreases in suicidality over time than White bisexual participants (b = −.094, SE = .030, p< .01). Older heterosexual participants demonstrated a slower rate of decrease in suicidality than younger heterosexual participants. The effects of the covariates were similar when examining the gender effects models.

Discussion

Two decades of cross-sectional research provide robust evidence for large disparities in depressive symptoms and suicidality among SMY (Marshal et al., 2011). Few, if any, studies have examined long-term disparities among youth using longitudinal trajectory modeling. Doing so is important because describing longitudinal disparities in mental health outcomes provides researchers and clinicians with the evidence that early and developmentally appropriate intervention and prevention programs are needed and may prevent long-term mental health problems. Cross-sectional evidence also shows that

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bisexual and mostly heterosexual youth report higher rates of depressive symptoms and suicidality than do heterosexual and gay/lesbian identified youth; however, little is known about whether or not this pattern persists as teenagers transition into young adulthood. Finally, sexual minority girls report larger substance use disparities than do sexual minority boys (Marshal et al., 2008), and longitudinal patterns of change over time in hazardous drinking disparities are different for boys and girls as they transition into young adulthood (e.g., Dermody et al., 2013). However, little is known about gender differences in depressive symptom and suicidality disparities over time. The primary goals of this study, therefore, were to describe and compare trajectories of adolescent depressive symptoms and suicidality among sexual minority and heterosexual youth, examine differences in average trajectories of depressive symptoms and suicidality among four sexual orientation subgroups (heterosexual, mostly heterosexual, bisexual, and gay/lesbian), and examine the role of gender in trajectories of SMY depressive symptoms and suicidality.

Results related to the first study goal showed that, compared with heterosexual youth, SMY reported higher levels of depressive symptoms and suicidality at Wave I of the study (mid-adolescence for most youth, approximately 16 years old). The disparities at Wave I largely were maintained during the transition into young adulthood at Wave IV (approximately 28 years old). In general, group mean levels of depressive symptoms were relatively stable over the course of the study, contributing to the persistently higher levels of depressive symptoms among SMY. However, there was significant individual variability in the patterns of depressive symptoms over time, suggesting that some individuals exhibited either increasing or decreasing symptoms as they transitioned into young adulthood. In contrast, there was also an interesting trend in the current results showing that rates of suicidality among bisexual, mostly heterosexual and gay/lesbian youth all decreased and converged during the transition from adolescence (Wave II) to young adulthood (Wave III). Nevertheless, all three SMY groups exhibited higher rates of suicidality compared with heterosexual youth during this transition.

This study is the first to describe the average trajectories of depressive symptoms and suicidality from adolescence to young adulthood among self-identified sexual minority young adults (gay/lesbian, bisexual, and mostly heterosexual). This is important because longitudinal research with sexual minority youth has been extremely difficult because the need for parental consent for youth under age 18 years old conflicts with the youths' desire to keep their sexual orientation private. Thus, very few studies exist that have the necessary requirements for conducting the analyses in this study: a large enough sample that includes an adequately-sized sexual minority youth subgroup, a comparison group of heterosexual youth, depressive symptoms and suicidality variables measured at multiple time points, and multiple time points assessed prior to age 18. Our results point to the critical need for more longitudinal studies with SMY to understand more fully when, how, and why depressive symptoms and suicidality disparities emerge, and why they persist as SMY transition into young adulthood.

The findings of the current study suggest that there is a developmental component to minority stress processes that can further inform the minority stress model (Meyer, 2003). This model asserts that mental health disparities among sexual minority adults are in large part driven by discrimination and victimization, components of a pervasive homophobic culture. The fact that mental health disparities between SMY and heterosexual youth emerge in early adolescence and continue over time suggests that gay-related stressors begin early in life, and perhaps that the persistence of discrimination experiences into young adulthood (e.g., same-sex marriage rights, workplace discrimination) may account for the persistence of depressive symptoms and suicidality disparities among SMY. Another plausible explanation may be that SMY depressive symptoms and suicidality in adolescence are not

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adequately treated. Major depressive disorder is a chronic illness. When adolescents experience a major depressive episode, their symptoms will often remit without treatment. However, if depressive symptoms go untreated in adolescence, they are more likely to reoccur later in life (Brent, Poling, & Goldstein, 2011). Given that there is an absence of empirically-supported mental health interventions tailored for SMY, and that members of the sexual minority community experience a higher number of healthcare access barriers (e.g., Heck, Sell, & Gorin, 2006), SMY may be particularly vulnerable to developing a chronic pattern of depressive symptoms and major depressive episodes that last into adulthood.

Previous research has shown that SMY who identify as bisexual (attracted to both sexes) or mostly heterosexual (mostly attracted to the opposite sex but somewhat attracted to the same-sex) have higher rates of some mental health problems. Findings related to our second study goal are consistent with these cross-sectional studies, showing that bisexual and mostly heterosexual youth have higher rates of depressive symptoms in adolescence which remain elevated over time compared with their peers. Although the reasons for disparities among bisexual and mostly heterosexual individuals have not been adequately studied, researchers hypothesize that they may be due to several factors, including individuals not feeling like they belong in either the heterosexual or gay groups, promoting an internal sense of isolation or marginalization (Hughes, Szalacha, & McNair, 2010). Additionally, the coming out process (deciding that one is lesbian/gay and disclosing one's sexual orientation to others) may be stressful in and of itself, and some youth who identify as bisexual or mostly heterosexual may be doing so as part of this transition (Friedman et al., 2008). Future studies that assess change in sexual orientation identity over time, and that assess gay-related developmental milestones as they unfold in adolescence and young adulthood, can help elucidate what may be contributing to such disparities.

Consistent with previous research and theory, findings related to our third study goal showed that, compared with heterosexual boys, heterosexual girls reported higher rates of depressive symptoms at baseline and this group difference was maintained across time. Interestingly, sexual minority girls reported even higher initial rates of depressive symptoms, and maintained these higher rates into young adulthood compared with all other groups, including heterosexual girls. While the identification of potential mechanisms underlying this disparity was beyond the scope of this study, the results are consistent with two theoretical premises. First, it is hypothesized that adolescent girls report higher rates of depressive symptoms than do adolescent boys, in part due to higher levels of affiliative needs that are threatened by interpersonal conflict (Cyranowski et al., 2000). Second, sexual minority girls experience higher rates of interpersonal conflict (e.g., bullying victimization) compared with heterosexual girls (Friedman et al., 2011; Meyer, 2003). It may be that the emergence of stronger affiliation needs in adolescence, coupled with the higher rates of peer victimization in adolescence due to one's sexual orientation, results in stronger emotional reactions among sexual minority girls than the other groups.

The current study also found that sexual minority girls reported higher rates of suicidality at the initial time point than did all other groups, suggesting that sexual minority girls, in particular, are at increased risk for early onset depression and comorbid suicidality. More research is necessary to identify the explanatory mechanisms of these disparities; however, several studies provide robust statistical support for the hypothesis that gay-related stress explains the disparities (Almeida, Johnson, Corliss, Molnar, & Azrael, 2009; Burton, Marshal, Chisolm, Sucato, & Friedman, 2013; Williams, Connolly, Pepler, & Craig, 2005). Identifying other important mediators of these and other outcomes, such as substance use and abuse, is critical to developing empirically informed prevention and intervention programs to help reduce these disparities. Finally, girls were on average about 16 years old

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at the first assessment at which time clear group differences already had emerged. Determining how early SMY group differences emerge could inform the etiology and understanding of the developmental timing of the emergence of differences in depressive symptoms among sexual minority girls.

In the current study, sexual orientation was modeled as a stratifying variable, and measured using a self-identification item taken from the final wave of the Add Health data, a strategy that is consistent with previous studies employing longitudinal modeling strategies and other data sets focused on SMY youth (e.g., Corliss et al., 2013). This strategy prevented us from examining the *prospective* association between sexual orientation and trajectories of depressive symptoms and suicidality, and from examining the association between *change* in self-identification over time and these outcome variables, which are both reasonable but distinctly different research questions than the questions posed in the current study. We adopted this strategy because self-reported same-sex attraction (reported in all 4 waves of Add Health, albeit with inconsistent wording across waves) in early adolescence is a less stable and reliable variable. Preliminary analyses showed that only 21% of those who reported same-sex attraction at Wave I reported it again one year later at Wave II, and only 13% of those who endorsed a same-sex sexual identity at Wave IV (as young adults) endorsed same-sex attraction at Wave I (as young teenagers). The fact that only 13% of sexual minority young adults endorsed same-sex attraction in early adolescence may be due to one or more factors, including fluidity in the participants' same-sex attractions, youth being unsure or questioning their feelings of same-sex attraction in early adolescence, and/or youth being hesitant to endorse same-sex attraction because they were fearful that their responses were not completely confidential. Given some evidence that most SMY do not disclose their minority sexual orientation until late adolescence or early adulthood (e.g., Friedman, et al., 2008), and that most SMY in Add Health did not endorse same-sex attraction at Wave I, the use of a Wave IV identity measure as our stratifying variable was a pragmatic approach to accomplish the study goals. Interestingly, even when using the sexual orientation measure reported at Wave IV as a stratifying variable we detected sexual minority group differences reported at Wave I, suggesting this strategy was not unreasonable.

There were several limitations of this study. First, the Add Health study was designed to assess a broad range of psychosocial health problems and outcomes rather than an in-depth assessment of psychiatric disorders. Thus, the results from this study cannot address SMY group differences in rates of major depressive disorder. Future studies that can examine the development of major depressive disorders and whether or not SMY are more likely to develop such disorders would illuminate the depth and extent of the disparity. The results of this study are, however, strengthened by psychometric analyses that have validated abbreviated versions of the CES-D with Add Health data (Galliher, Rostosky, & Hughes, 2004). Second, the data were too sparse to use age as the indicator of time in the growth models because of the 5-year or greater gap between the last three waves and the relatively small SMY subgroups. Using age as the time variable would lend itself to more appropriate interpretations of individual development over time and allow for more accurate descriptions of changes in depressive symptoms across developmental stages (Bollen & Curran, 2006; Mehta & West, 2000). Future research that assesses depressive symptoms and suicidality more intensively over time than the Add Health study could detect additional variability across time. However, we attempted to offset this limitation by restricting the age range of the sample at time to 14–18 years old at Wave I. By doing so, youth were clustered into three broad developmental stages across the four waves such that at Waves I and II the youth were "High-School-age," at Wave III the participants were approximately "college age" and at Wave IV they were young adults. In this regard, our approach provided a snapshot of depressive symptoms and suicidality as youth changed across these major

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developmental stages. The decrease across time between Wave II (adolescence) and Wave III (young adulthood) in the average suicidality trajectories is evidence of this, capturing what we would expect to happen developmentally.

Third, although the Add Health sample was large, it was not possible to compare SMY subgroups on some rare events, such as suicide attempts. As with all minority groups, SMY are a heterogeneous group, especially in how they describe their sexual orientation and attraction. Future studies are needed to determine which sexual minority subgroups are at greatest risk for rarer events such as suicide attempts, and whether this risk persists into young-adulthood and beyond. Finally, due to the small SMY subgroup samples, we were unable to examine gender group differences within SMY subgroups, which would be an interesting next step given that females and SMY subgroups in which females are widely represented (e.g., bisexual and mostly heterosexual) were at particularly high risk.

Historically studies that examine trajectories of depressive symptoms among youth have fallen into three categories: Those that examine trajectories across childhood into adolescence (e.g., Dekker et al., 2007), those that examine trajectories during adolescence only (e.g., Garber, Keiley, & Martin, 2002), and those that examine trajectories across adolescence into young adulthood (e.g., Ge, Lorenz, Conger, Elder, & Simons, 1994; Meadows, Brown, & Elder, 2006). Furthermore, studies in this literature vary with respect to their substantive and methodological goals. For example, some studies focus on trajectories of depressive symptoms among all youth, with a focus on examining causal predictors (e.g., stressful life events) of change over time in symptoms (e.g., Garber et al., 2002; Ge et al., 1994), while others focus on certain demographic subsets of youth who are assumed to follow distinctive developmental trajectories compared to their peers (e.g., adolescent girls and young women; Ge, Conger, & Elder, 2001). Others focus on youth who are at increased risk for developing a major depressive disorder (e.g., Hankin et al., 1998). Each of these approaches generates a unique developmental snapshot of risk for adolescent depression, all of which are important to understanding the heterogeneity of risk and resilience and the etiology of the disorder. Our results contribute to this literature by identifying a unique demographic subgroup of youth (SMY) who are at particularly high risk for elevated depressive symptoms and suicidality across adolescence and young adulthood that may increase risk for long-term mental health problems.

In summary, results from this study represent an important step in the field of SMY mental health disparities research. Using a large epidemiological data set and individual growth curve modeling, we described differential rates of depressive symptoms and suicidality across time among SMY. Disparities among SMY were present in early adolescence and were maintained into young adulthood, suggesting that early prevention efforts targeted at reducing the factors (e.g., gay-related stressors and the dearth of mental health treatment resources for SMY) that contribute to this disparity are warranted. Furthermore, using the minority stress hypothesis as a foundation for interpretation of the findings, results are a strong indicator that SMY individuals may experience minority stressors throughout their young adult lives. There are currently no empirically-supported interventions to reduce depressive symptoms and suicidality among SMY. SMY and their families will benefit from future prevention and intervention efforts that provide empirical support for understanding the driving mechanisms of these disparities, as well as the identification of modifiable protective factors (e.g., parent and family support, see The Family Acceptance Project, Ryan, 2010) that can be incorporated into depression and suicidality prevention and intervention programs.

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References

Almeida J, Johnson RM, Corliss HL, Molnar BE, Azrael D. Emotional distress among LGBT youth: The influence of perceived discrimination based on sexual orientation. Journal of Youth and Adolescence. 2009; 38:1001–1014. [PubMed: 19636742]

Austin SB, Ziyadeh N, Fisher LB, Kahn JA, Colditz GA, Frazier AL. Sexual orientation and tobacco use in a cohort study of US adolescent girls and boys. Archives of Pediatric and Adolescent Medicine. 2004; 158:317–322.

Bertolote JM, Fleischmann A. A global perspective in the epidemiology of suicide. Suicidology. 2002; 7:6–8.

Bollen, KA.; Curran, PJ. Latent curve models: A structural equation approach. Hoboken, NJ: Wiley Series in Probability and Mathematical Statistics; 2006.

Bostwick WB, Boyd CJ, Hughes TL, McCabe SE. Dimensions of Sexual Orientation and the Prevalence of Mood and Anxiety Disorders in the United States. American Journal of Public Health. 2010; 100:468–475. [PubMed: 19696380]

Brent, DA.; Poling, KD.; Goldstein, TR. Treating depressed and suicidal adolescents: A clinician's guide. New York: Guilford; 2011.

Burton CM, Marshal MP, Chisolm DJ, Sucato GS, Friedman MS. Sexual minority-related victimization as a mediator of mental health disparities in sexual minority youth: A longitudinal analysis. Journal of Youth and Adolescence. 42:394–402. [PubMed: 23292751]

Chantala, K. Introduction to analyzing Add Health data. Prepared for the Add Health Users Workshop, National Institutes of Health. 2003. Retrieved June 10, 2011, from http://www.coc.unc.edu/projects/addhealth/files/analyze.pdf

Cicchetti D, Cohen DJ. Developmental Psychopathology, Theory and Method. Wiley Series on Personality Processes. 2006; 1

Cochran SD, Sullivan JG, Mays VM. Prevalence of mental disorders, psychological distress, and mental health services use among lesbian, gay, and bisexual adults in the United States. Journal of Consulting and Clinical Psychology. 2003; 71:53–61. [PubMed: 12602425]

Collins P, Patel V, Joestl S, March D, Insel T, Daar A. Grand challenges in global mental health. Nature. 2011; 475(7354):27–30. [PubMed: 21734685]

Corliss HL, Rosario M, Wypij D, Fisher LB, Austin SB. Sexual orientation disparities in longitudinal alcohol use patterns among adolescents: findings from the Growing Up Today Study. Archives of Pediatrics & Adolescent Medicine. 2008; 162:1071–1078. [PubMed: 18981356]

Corliss HL, Wadler BM, Jun HJ, Rosario M, Wypij D, Frazier AL, Austin SB. Sexual-Orientation Disparities in Cigarette Smoking in a Longitudinal Cohort Study of Adolescents. Nicotine & Tobacco Research. 2013; 15:213–222. [PubMed: 22581940]

Cyranowski JM, Frank E, Young E, Shear K. Adolescent onset of the gender difference in lifetime rates of major depression: A theoretical model. Archives of General Psychiatry. 2000; 57:21–27. [PubMed: 10632229]

Dekker MC, Ferdinand RF, Van Lang ND, Bongers IL, Van Der Ende J, Verhulst FC. Developmental trajectories of depressive symptoms from early childhood to late adolescence: gender differences and adult outcome. Journal of Child Psychology and Psychiatry. 2007; 48:657–666. [PubMed: 17593146]

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Dermody SS, Marshal MP, Cheong JW, Burton CM, Friedman MS, Aranda F, Hughes T. Longitudinal disparities of hazardous drinking between sexual minority and heterosexual individuals from adolescence to young adulthood. Journal of Youth and Adolescence. in press.

Friedman MS, Marshal MP, Guadamuz TE, Wei C, Wong CF, Saewyc EM, Stall R. A meta-analysis of disparities in childhood sexual abuse, parental physical abuse, and peer victimization among sexual minority and sexual nonminority individuals. American Journal of Public Health. 2011; 101:1481–1494. [PubMed: 21680921]

Friedman MS, Marshal MP, Stall R, Cheong J, Wright ER. Gay-related development, early abuse and adult health outcomes among gay males. AIDS and Behavior. 2008; 12:891–902. [PubMed: 17990094]

Galliher RV, Rostosky SS, Hughes HK. School belonging, self-esteem, and depressive symptoms in adolescents: an examination of sex, sexual attraction status, and urbanicity. Journal of Youth and Adolescence. 2004; 33:235–245.

Garber J, Keiley MK, Martin NC. Developmental trajectories of adolescents" depressive symptoms: Predictors of change. Journal of Consulting and Clinical Psychology. 2002; 70:79–95. [PubMed: 11860059]

Ge X, Conger RD, Elder GH. Pubertal transition, stressful life events, and the emergence of gender differences in adolescent depressive symptoms. Developmental Psychology. 2001; 37:404–416. [PubMed: 11370915]

Ge X, Lorenz FO, Conger RD, Elder GH, Simons RL. Trajectories of stressful life events and depressive symptoms during adolescence. Developmental Psychology. 1994; 30:467–483.

Haas A, Eliason M, Mays VM, Mathy RM, Cochran SD, D"Augelli AR, Clayton PJ. Suicide and suicide risk in lesbian, gay, bisexual, and transgender populations: Review and recommendations. Journal of Homosexuality. 2011; 58:10–51. [PubMed: 21213174]

Hankin BL, Abramson LY, Moffitt TE, Silva PA, McGee R, Angell KE. Development of depression from preadolescence to young adulthood: emerging gender differences in a 10-year longitudinal study. Journal of Abnormal Psychology. 1998; 107:128–140. [PubMed: 9505045]

Harris, KM. The National Longitudinal Study of Adolescent Health (Add Health), Waves I & II, 1994–1996; Wave III, 2001–2002; Wave IV, 2007–2009 [machine-readable data file and documentation]. Chapel Hill, NC: Carolina Population Center, University of North Carolina; 2009.

Heck JE, Sell RL, Gorin SS. Health Care Access Among Individuals Involved in Same-Sex Relationships. American Journal of Public Health. 2006; 96:1111–1118. [PubMed: 16670230]

Hughes T, Szalacha LA, McNair R. Substance abuse and mental health disparities: Comparisons across sexual identity groups in a national sample of young Australian women. Social Science & Medicine. 2010; 71:824–831. [PubMed: 20579794]

Institute of Medicine. The health of lesbian, gay, bisexual, and transgender people: Building a foundation for better understanding. Washington, DC: The National Academic Press; 2011.

King M, Semlyen J, Tai SS, Killaspy H, Osborn D, Popelyuk D, Nazareth I. A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people. BMC Psychiatry. 2008; 8:70–87. [PubMed: 18706118]

Marshal MP, Dietz LJ, Friedman MS, Stall R, Smith HA, McGinley J, Brent DA. Suicidality and depression disparities between sexual minority and heterosexual youth: A meta-analytic review. Journal of Adolescent Health. 2011; 49:115–123. [PubMed: 21783042]

Marshal MP, Friedman MS, Stall R, King KM, Miles J, Gold MA, Bukstein OG, Morse JQ. Sexual orientation and adolescent substance use: A meta-analysis and methodological review. Addiction. 2008; 103:546–556. [PubMed: 18339100]

Marshal MP, Friedman MS, Stall R, Thompson AL. Individual trajectories of substance use in lesbian, gay, and bisexual youth and heterosexual youth. Addiction. 2009; 104:974–981. [PubMed: 19344440]

Marshal MP, King KM, Stepp SD, Hipwell A, Smith HA, Chung T, Friedman MS, Markovic N. Trajectories of alcohol and cigarette use among sexual minority and heterosexual girls. Journal of Adolescent Health. 2012; 50:97–99. [PubMed: 22188841]

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McCabe SE, Hughes TL, Bostwick W, Boyd CJ. Assessment of difference in dimensions of sexual orientation: Implications for substance use research in a college-age population. Journal of Studies on Alcohol. 2005; 66:620–629. [PubMed: 16331847]

Meadows SO, Brown JS, Elder GH Jr. Depressive symptoms, stress, and support: Gendered trajectories from adolescence to young adulthood. Journal of Youth and Adolescence. 2006; 35:89–99.

Mehta PD, West SG. Putting the individual back into individual growth curves. Psychological Methods. 2000; 5:23–43. [PubMed: 10937321]

Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. Psychological Bulletin. 2003; 129:674–697. [PubMed: 12956539]

Muthén, LK.; Muthén, BO. Mplus 6.0 [Computer Software]. Los Angeles, CA: Muthén & Muthén; 1998–2010.

Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement. 1977; 1:385–401.

Remafedi G, French S, Story M, Resnick MD, Blum R. The relationship between suicide risk and sexual orientation: Results of a population-based study. American Journal of Public Health. 1998; 88:57–60. [PubMed: 9584034]

Russell ST, Joyner K. Adolescent sexual orientation and suicide risk: Evidence from a national study. American Journal of Public Health. 2001; 91:1276–1281. [PubMed: 11499118]

Ryan C. Engaging Families to Support Lesbian, Gay, Bisexual, and Transgender Youth: The Family Acceptance Project. Prevention Researcher. 2010; 17:11–13.

Satorra A, Bentler PM. A scaled difference chi-square test statistic for moment structure analysis. Psychometrika. 2001; 66:507–514.

Stapleton LM. An assessment of practical solutions for structural equation modeling with complex sample data. Structural Equation Modeling. 2006; 13:28–58.

Tourangeau, R.; Shin, HC. Grand sample weight. 1999. Retrieved June 10, 2011, from http://www.cpc.unc.edu/projects/addhealth/data/guides/weights.pdf

Williams T, Connolly J, Pepler D, Craig W. Peer victimization, social support, and psychosocial adjustment of sexual minority adolescents. Journal of Youth and Adolescence. 2005; 34:471–482.

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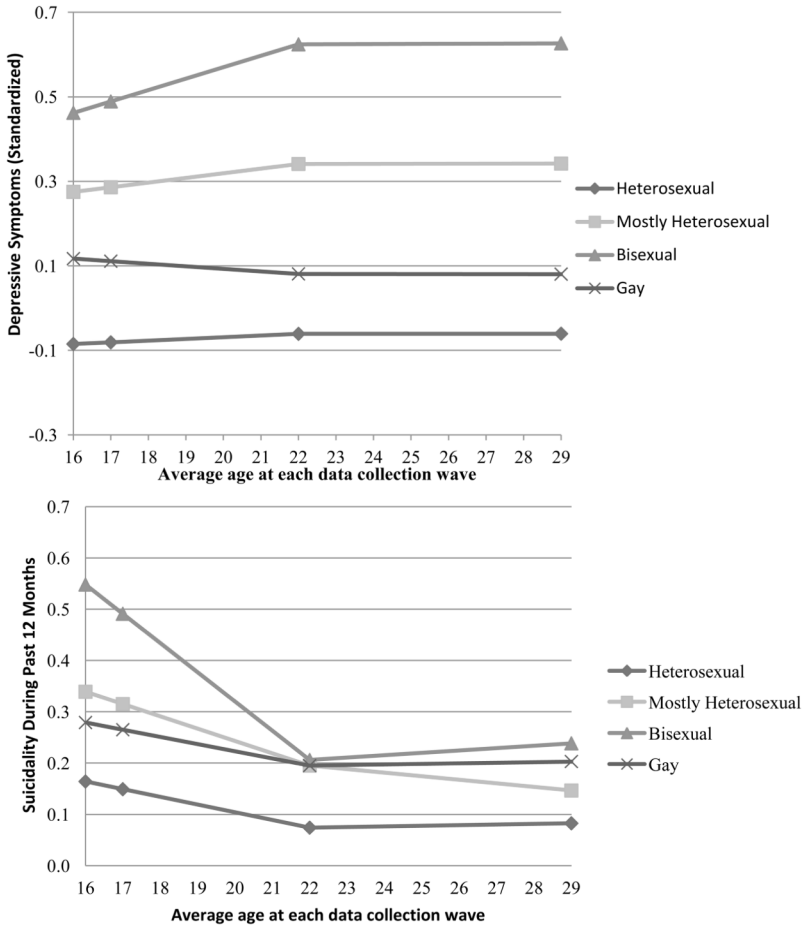

Figure 1.
Average trajectories of depressive symptoms and suicidality for each of four sexual orientation groups.

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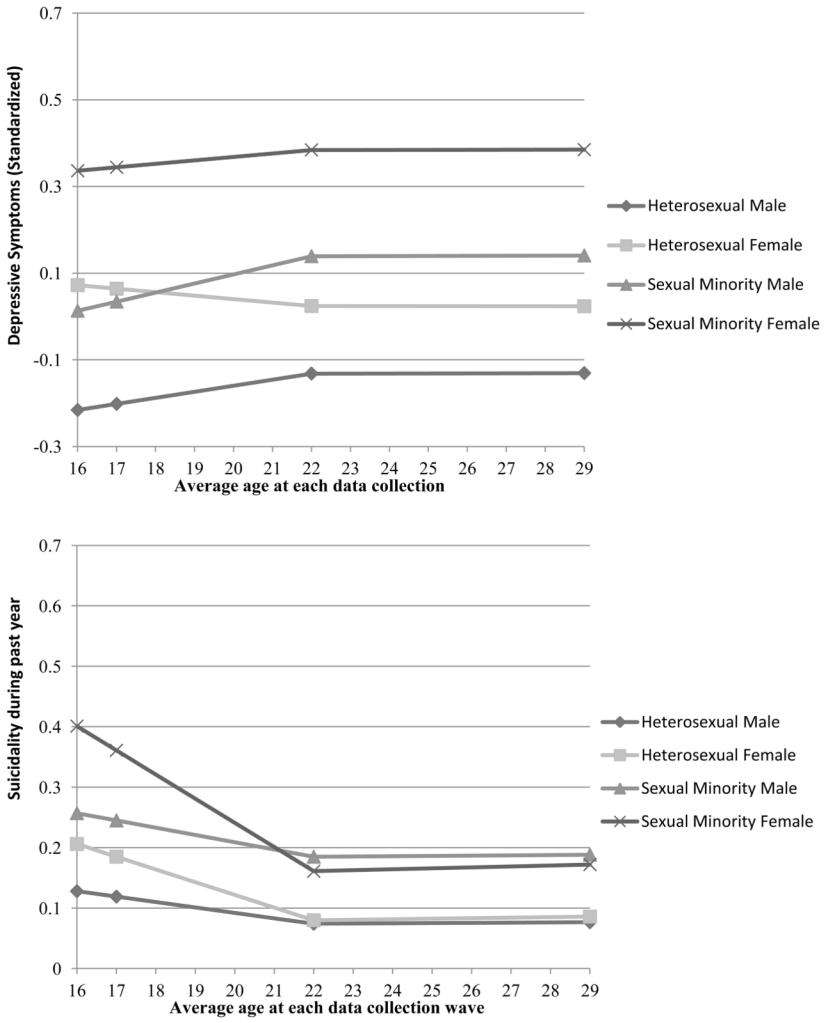

Figure 2.
Average trajectories of depressive symptoms and suicidality for each gender and sexual orientation group.

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Table 1

Descriptive statistics for demographic and sexual orientation variables.

Self-identified sexual orientation (Wave IV)	Heterosexual (n=10,148)	Mostly heterosexual (n =1186)	Bisexual (n =180)	Mostly gay or completely gay (n=265)	Total (n=12,379)
Wave I age (SD)	16.05(1.33)	15.82(1.32)	15.77(1.29)	15.97(1.30)	16.02(1.33)
Gender (% female)	49.3(*n*=5299)	84.1(*n*=998)	77.8 (*n*= 140)	41.9(*n*=111)	52.9(*n*=6548)
Race (% non-White)	37.0	30.0	36.7	40.8	36.4
Ethnicity (% Hispanic)	16.3	14.5	14.4	21.1	16.2

Note. Non-White race categories included “Black or African American”, “American Indian or Native American”, “Asian or Pacific Islander” and “Other.”

SD: Standard deviation.

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Table 2

Parameter estimates and standard errors for unconditional growth models of depression and suicidality among four young adult sexual orientation groups.

		Intercept factor		Slope factor	
Model	**Sexual Orientation**	**Mean**	**Variance**	**Mean**	**Variance**
Depression					
	Heterosexual	−.085(.017)^{***a}	.572(.019)***	.043(.003)^{a}	.009(.001)***
	Mostly Heterosexual	.221(.043)^{***b}	.593 (.072)***	.011(.008)^{a}	.010(.003)***
	Bisexual	.462(.105)^{***c}	.823(.238)***	.027(.022)^{a}	.014(.007)*
	Gay/lesbian	.116(.079)^{***d}	.936(.135)***	−.006(.015)^{a}	.016(.004)***
Suicidality					
	Heterosexual	.164(.006)^{***a}	.083(.008)***	−.015(.001)^{***a}	.002(.0002)***
	Mostly Heterosexual	.339(.031)^{***b}	.227(.032)***	−.024(.005)^{***a}	.003 (.001)**
	Bisexual	.548(.085)^{***c}	.246(.128)†	−.057(.018)^{**b}	.009(.005)†
	Gay/lesbian	.279(.040)^{**b}	.199(.054)***	−.014(.008)$^{\dagger a}$	.005(.002)*

Note.

$^{\dagger}p<.10$

$^{*}p<.05$

$^{**}p<.01$

$^{***}p<.001$

^{a,b,c,d}Estimates (e.g., intercept factor for depression) followed by different letters between groups (e.g., heterosexual vs mostly heterosexual) correspond with statistically significant group differences.

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Table 3

Parameter estimates and standard errors for unconditional growth models of depression and suicidality by gender and young adult sexual minority status.

		Intercept factor[1]		Slope factor	
Model	**Group**	**Mean**	**Variance**	**Mean**	**Variance**
Depression					
	Heterosexual Male	−.216(.020)^{***a}	.468(.023)***	.014(.003)^{***a}	.008(.001)***
	Heterosexual Female	.072(.024)^{***b}	.649(.031)***	−.008(.004)$^{\dagger a}$	.010(011)***
	Minority Male	.013(.069)^{**b}	.774(.110)***	.021(.012)$^{\dagger a}$	.015(.003)***
	Minority Female	.305(.045)^{***c}	.627(.086)***	.008(.008)^{b}	.010(.003)***
Suicidality					
	Heterosexual Male	.128(.006)^{***a}	.055(.008)***	−.009(.001)^{***a}	.001 (.0004)***
	Heterosexual Female	.206(.010)^{***b}	.113(.013)***	−.021(.002)^{***b}	.003(.0005)***
	Minority Male	.257(.036)^{***c}	.158(.046)***	−.012(.007)$^{\dagger b}$	.003(.001)*
	Minority Female	.401(.031)^{***d}	.248(.034)***	−..040(.005)^{***a}	.005(.001)***

Note.

$^{\dagger}p<.10$

$^{*}p<.05$

$^{**}p<.01$

$^{***}p<.001$

^{a,b,c,d}Estimates (e.g., intercept factor for depression) followed by different letters between groups (e.g., heterosexual vs mostly heterosexual) correspond with statistically significant group differences.