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## Does it Get Better? Change in Depressive Symptoms from Late-Adolescence to Early-Adulthood, Disordered Eating Behaviors, and Sexual Identity

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### Abstract

Sexual minority youth are often described as at-risk for mental health comorbidities, including disordered eating behavior (DEB) and depression. This study assesses differences in late-adolescent DEB and depressive symptoms among gay/lesbian, bisexual, or mostly-heterosexual individuals, and how their symptoms change across early-adulthood. While sexual minority youth were more likely to report DEB and elevated depressive symptoms in late-adolescence relative to exclusively heterosexual peers, gay/lesbian individuals experienced improvement in early-adulthood depressive symptoms. Conversely, bisexual individuals maintained elevated depressive symptoms into early-adulthood, and additional depressive symptoms associated with DEB. DEB may be a unique risk-factor shaping the mental health of bisexual youth.

### Keywords

eating disorder; disordered eating behavior; sexual minority youth; bisexual; depression

### Introduction

Sexual minority youth, or those who identify as not exclusively heterosexual, including lesbian/gay/bisexual (LGB) sexual identity and/or preference, are often described as an “at-risk” group given their higher likelihood of experiencing depression, sexually-transmitted infections, stress, anxiety, alcoholism, substance-abuse, post-traumatic stress disorder (PTSD), and other physical and/or mental health conditions (Dilley, Simmons, Boysun, Pizacani, & Stark, 2010; Lehavot & Simoni, 2011). This elevated risk has largely been

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explained by sexual minorities' exposure to disproportionate discrimination and victimization, and thus *stress*, related to their stigmatized identity (Hatzenbuehler, 2009; D'Augelli, Pilkington, & Hershberger, 2002; Meyer, 2003). However, this oversimplified language assumes that all LGB individuals endure elevated risk, and we know that some sexual minority youth can resist these adverse health consequences (Schmitz, Sanchez, & Lopez, 2018). Sexual minority experiences differ across both their gender and sexual minority spectrums (Zinn, Hondagneu-Sotelo, Messner, & Dennison, 2015). Sexual minority youth who occupy additional minority statuses, including those who are also low-income, a racial/ethnic minority, and/or transgender or gender nonconforming, have the greatest risks for poor health outcomes throughout their life (Thoma & Huebner, 2013; Grollman, 2012; Kuper, Coleman, & Mustanski, 2014; Toomey, Ryan, Diaz, Card, & Russell, 2010).

The minority stress perspective indicates that the experiences of sexual minorities can shape numerous adverse mental health consequences for LGB people as they weather exposure to discrimination and prejudice across the life course (Frost, Lehavot, & Meyer, 2015; Meyer, 2003). Sexual minorities experience what life course scholars refer to as "cumulative disadvantage," where risks for poor mental health accumulate throughout people's lives (McLaughlin, Hatzenbuehler, Xuan, & Conron, 2012). However, measures of stigma, stress, and discrimination fail to fully account for observed cumulative disadvantages in certain mental health outcomes by sexual identification (McLaughlin et al., 2012).

Using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), this study 1) explores the relationship between sexual self-identity (heterosexual, mostly heterosexual, bisexual, gay/lesbian), disordered eating behaviors (DEB), and depressive symptoms, to assess whether sexual minorities with DEBs in late-adolescence are at greater risk of depressive symptoms relative to heterosexual peers across late-adolescence and into early-adulthood. This study also examines 2) whether DEBs influence depressive symptoms differently across sexual minority identities (e.g., gay/lesbian, mostly heterosexual, bisexual). This study contributes to our understanding of sexual minority mental health risk or resiliency across the life course by examining absolute and relative change in depressive symptoms across late-adolescence and early-adulthood, while also considering the role of an influential behavioral health comorbidity (i.e., DEB). Further explorations into the diverse mental health challenges faced by sexual minority youth are critical to better tailor diverse services and interventions aimed at enhancing their wellbeing.

## Background

### Sexual Minority Status and Mental Health

The prevalence of individuals who label themselves as lesbian, gay, bisexual, and transgender (LGBT) is on the rise, with approximately 4.1% of the United States (U.S.) adult population identifying as sexual (LGB) and/or gender (T) minorities (Gates, 2014). While high quality data on the size of LGBT populations in Europe is scant (Kohler & Menzies, 2017), a recent representative survey suggests that the proportion of LGBT populations ranges from 7.4% in Germany and 6.9% in Spain, to 1.5% in Hungary (Dalia Research, 2016).

Coinciding with increasing sexual minority populations, there has been growing scholarly and mainstream attention given to the experiences of LGB people, such as their general wellbeing and life outcomes. Despite the increasing social acceptance of LGB sexual identities within society (Flores, 2014; Lewis et al., 2017), there is a well-established linkage between sexual minority identification and deleterious mental health consequences in comparison to heterosexual individuals (Meyer, 2003). For example, both sexual minority women and men have significantly higher odds of perceived poor mental health when compared to heterosexual men and women (Dilley et al., 2010).

One explanation for the elevated mental health challenges among sexual minorities is the *minority stress hypothesis*. People inhabiting minority social statuses suffer from unique stressors based on their socially marginalized position within society, and for sexual minorities, this can include experiences of sexual identity-related prejudice and discrimination (Meyer, 2003). Although stress is an independent mental health concern that does not always have a unidirectional relationship with depression, depression is often considered an important mental health consequence of chronic stress (Hammen, 2005). Differences in depression may be partially explained by variation across both exposure and reaction to stress over time (Hammen, 2005). Experiences of sexual minority stress, such as identity-related prejudice and discrimination, are associated with elevated depression (Lehavot & Simoni, 2011). This study utilizes depressive symptoms as an indicator of mental health and sexual identity as a proxy for minority stress experiences.

### Disordered Eating Behaviors

*Eating disorders* (ED), defined here as the range of psychological disorders characterized by abnormal or disturbed eating habits identified by the Diagnostic Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013), often begin in adolescence, with an average age of diagnosis at 17-18 years (Fairburn & Harrison, 2003). Swanson et al. (2011) estimate that approximately 2.7 per 100,000 adolescents between the ages of 13-18 in the U.S. have an ED. This estimate is potentially conservative, when considering the higher rates reported in Canadian, Finnish, UK and Netherland-based studies (see Smink, Hoeken, & Hoek, 2012). Similarly, lifetime prevalence of ED varies by country, however, as approximately 5-12% of women and 1-3% of men from Europe and the U.S. report an ED (Hudson, Hiripi, Pope, & Kessler, 2007; Keski-Rahkonen & Mustelin, 2016). Since many EDs are not diagnosed, these estimates are likely under-represented measures of true incidence or prevalence.

*Disordered eating behaviors* are the behavioral symptoms of EDs, such as purging, binge eating, and non-purging compensatory behaviors (e.g. fasting or taking laxatives), and are much more common than diagnosed EDs (Stephen, Rose, Kenney, Rosselli-Navarra, & Striegel-Weissman, 2014). Longitudinal studies indicate that DEBs increase from early to late-adolescence, meaning an adolescent's risk for developing and engaging in DEB increases across adolescence (Neumark-Sztainer, Wall, Larson, Eisenberg, & Loth, 2011). The high prevalence of DEB among the adolescent population and their correlation with adverse physical health and psychosocial outcomes (such as depression and weight gain) illustrates that DEB have long lasting impacts on wellbeing (Neumark-Sztainer, Wall, Story,

& Standish, 2012; Stephen et al., 2014; Nagata, Garber, Tabler, Murray, & Bibbins-Domingo, 2018a). Although DEBs have been traditionally utilized as proxy measures of EDs, DEBs are arguably clinically relevant independent of whether they evolve into fully-fledged EDs based on diagnostic criteria.

The adverse physical and mental health outcomes of EDs and DEB are well documented (Hudson et al., 2007; Piran & Robinson, 2011). Negative physical health symptoms as a result of ED and DEB can affect every organ system in the body (Katzman, 2005), with potential consequences including heart arrhythmias and renal failure (Nicholls, Lynn, & Viner, 2011). Certain forms of DEB in adolescence, such as purging and bingeing, have been linked to increases in BMI in adulthood (Stephen et al., 2014; Nagata et al., 2018a). However, the greatest risk posed to adolescents and young adults with histories of ED or DEB is their heightened risk for suicide (Arcelus, Mitchell, Wales, & Nielsen, 2011; Preti, Rocchi, Sisti, Camboni, & Miotto, 2011).

Elevated risk of suicide among those with histories of ED is unsurprising given that mental health comorbidities are common among individuals with DEB (Santos, Richards, & Bleckley, 2007; Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011). Individuals with a history of ED often experience high levels of stress and depression, as well as a myriad of other mental and emotional health comorbid conditions, such as post-traumatic stress disorder (PTSD) and substance abuse (Norris et al., 2012; Swanson et al., 2011). In addition, the mental health implications of DEB extend beyond their original manifestation in adolescence or young adulthood; there is evidence that EDs and DEB are predictive of, and may perpetuate, poor mental health outcomes later in life for men and women (Berkman, Lohr, & Bulik, 2007; Norris et al., 2012).

Research indicates that experiencing DEB and depression in early-life places individuals on a distinctive path, where they are likely to accumulate risk for poor mental and physical health into adulthood (Nagata, Garber, Tabler, Murray, & Bibbins-Domingo, 2018b; Tabler & Geist, 2016). LGB youth are more likely than their heterosexual peers to engage in certain DEB (Tabler & Geist, 2016), with DEB co-occurring with elevated depressive symptoms (Swanson et al., 2011). For this reason, DEBs can be conceptualized as potential “turning points,” i.e., sets of behaviors that result in a significant change to the life or health trajectory of an individual (Wheaton & Gotlib, 1997) that may contribute to sexual minority health disparities in depression *across* adulthood.

### **Sexual Orientation and Disordered Eating Behavior**

While binary gender differences in DEBs have been clearly established, with women at increased risk of DEB in adolescence (Tabler & Utz, 2015), less attention has been paid to the role of sexual identities. Previous studies have shown that sexual minority status (i.e. identifying as lesbian, gay, or bisexual) is a clear risk factor for an ED among men (Feldman & Meyer, 2007), and is associated with increased DEB (Nagata et al., 2018b; Tabler & Geist, 2016). Researchers posit that, like heterosexual women, gay and bisexual men are dissatisfied with their bodies and are vulnerable to EDs because of a shared emphasis on physical attractiveness and thinness grounded in a desire to attract and please men (see Siconolfi, Halkitis, Allomong, & Burton, 2009). There is some evidence to support this

hypothesis; lesbian women and heterosexual men have been found to be less concerned with their own physical attractiveness, and would hypothetically be less dissatisfied with their bodies and less likely to engage in DEB (Siever, 1994; Strong, Williamson, Netemeyer, & Geer, 2000).

However, there is an emerging body of research on DEB among sexual minority women, and theoretical reasoning expects lesbian women to have a more positive body image and be less likely to engage in DEB (Striegel-Moore, Tucker, & Hsu, 1990; Morrison, Morrison and Sager, 2004). However, the empirical literature is mixed regarding whether or not sexual minority status is a risk factor for EDs; for example, the rate of bulimia nervosa and binge eating is similar, if not higher, among sexual minority women and men (including bisexual or lesbian) compared to heterosexual women (Austin et al., 2009), while other research has failed to detect any ED differences among these groups (Feldman & Meyer, 2007). Recent studies on DEB suggest that lesbian and bisexual women are at higher risk for both purging and diet pill use (Austin et al., 2009). These mixed results are shaped largely by measurement differences—studies that indicate lower rates of ED among sexual minorities tend to focus on traditional ED diagnosis, particularly anorexia nervosa, which may obscure the extent of sexual minority individuals' risk of DEB. Potentially elevated rates of binge eating and purging behavior suggest that sexual minorities are not exempt from idealized heterosexist body image norms in addition to experiencing minority stress (Watson, Grotewiel, Farrell, Marshik, & Schneider, 2015).

Sexual minority youth may be more likely to engage in DEB as a coping mechanism for minority stress, or perceived lack of control in their daily lives, relative to heterosexual-identifying peers. Research suggests that behavioral health conditions, such as DEB, can serve as coping mechanisms in response to chronic stress (see Polivy & Herman, 2002; Wills, 1986). Subgroup differences detected among sexual minorities, notably those identifying as mostly heterosexual and bisexual, reported higher levels of purging/bulimia, while lesbian women were only found to have higher rates of binge ED or binge behavior (Austin et al., 2009). Differences in DEB manifestation by sexual identity may reflect young people's differential exposure to stress, and/or access to resources or coping mechanisms, with many studies finding bisexual youth to report more mental health challenges (Russell & Fish, 2016). Bisexual youth in particular may endure unique stress exposure due to binegative societal pressures enforcing conformity to the binary model of sexual attraction, or monosexism (Ross, Dobinson, & Eady, 2010). Bisexual men and women experience increased levels of depression relative to heterosexual or lesbian/gay men and women (Fredriksen-Goldsen & Muraco, 2010). Therefore, it is important to consider within-group differences when exploring DEB and related mental health outcomes of sexual minority individuals to better design interventions encapsulating people's distinctive life experiences.

Applying both the minority stress and life course frameworks, we propose that engagement in DEB by sexual minority youth may function as a turning point, exacerbating sexual minorities' adverse mental health trajectories as they transition to adulthood, thereby resulting in an *accumulation* of mental health disadvantages. In addition to enduring heightened risk, some sexual minority youth may also establish resilience in struggling to overcome adverse life experiences (Saewyc, 2011), which can also shape their health

outcomes in distinctive ways. Given sexual minorities' potentially elevated risk for DEB and that DEBs emerge in adolescence, occur concurrently with, and are predictive of, depression in adulthood (Chesney, Goodwin, & Fazel, 2014), DEBs are valid examples of comorbid mental health experiences that may explain some of the unobserved variation in sexual minority mental health disparities.

## Method

### Data

The data used in this study come from Add Health, collected by the Carolina Population Center from 1994-2008 (Harris, 2011). Add Health follows the same cohort of randomly selected youth from adolescence to young adulthood, collecting data at four different time periods. They used a stratified sampling design (i.e. children were sampled within selected schools). Wave 1 was collected between 1994-95, when the cohort was aged 11 to 18; Wave 2 was repeated in 1996; Wave 3 was between 2001-02; and Wave 4 was collected in 2008, when the cohort was approximately aged 24 to 32.

The current study uses data from Waves 1, 3, and 4. Specifically, the early life contexts and demographic information were selected from Wave 1. Wave 3 provides information about DEB, sexual preference/identity, and mental health in late-adolescence. Finally, Wave 4 provides measures of socioeconomic status and physical and mental health in early-adulthood. Wave 2 was excluded because it did not add additional information relevant to our analyses. The restricted access version of the Add Health dataset (full sample) contains 20,745 individuals. Approximately 24% (n=5,044) of respondents were lost by attrition between Waves 1 and 4. An additional 4,974 individuals had missing values on key variables. This left a final analytic sample of 10,727 respondents (female=5,837; male=4,890), 52% of the original Add Health sample. Table 1 presents the descriptive profile of our sample. Supplementary analyses (not shown) indicate that the analytic sample is somewhat different from the full sample. Most notably, adolescents who were Hispanic or male were significantly more prone to attrition and exclusion from the final analytic sample.

**Dependent Variable:** *Depressive Symptoms* were measured by a nine-item version of the Center for Disease Epidemiology-Depression Scale (CES-D) (Radloff, 1977). The CES-D-10 is a composite score of ten items indicating the presence of depressive symptoms. The Add Health survey measures late adolescent depressive symptoms at Wave 3 using a modified nine-item version of the CES-D (excluding the "felt happy" item). Possible values range from 0 to 27, with higher scores indicating higher levels of depressive symptoms experienced in the past seven days ( $\alpha=0.81$ ). Early-adulthood depressive symptoms were measured at Wave 4 using a nearly identical combined nine-item scale (range: 0 to 27;  $\alpha=0.84$ ). Only three questions varied slightly between the Wave 3 and Wave 4 scales; Wave 3 uses the phrase "you 'were'" instead of "you 'felt'" on three questions, while Wave 4 uses the phrase "you 'felt'" on all questions.

**Primary Independent Variables:** *Disordered eating behaviors (DEB)*. To identify individuals with DEB, we first identified individuals participating in unhealthy compensatory behaviors directed at maintaining or losing weight. Respondents were asked,



“During the past seven days what did you do to keep from gaining weight?” Individuals who reported behaviors, “made yourself vomit, fasted or skipped meals, took laxatives, took diet pills, or diuretics,” were coded as having DEB. We also identified individuals with binge eating symptoms. We included those who identified having “eaten so much in a short period of time that [they] would have been embarrassed if others had seen them do it, in the past seven days” as having a DEB. The comparative group includes those who do not identify engaging in any of the measured DEB. Survey questions related to DEB were only asked in Wave 3.

*Gender* was specified at Wave 1 and is based on participants’ self categorization as male or female. Add Health does not provide information on non-binary gender identities, transgender, or agender identities. Although the question asked people to identify their sex, we use the term gender.

*Sexual Identity* was measured at Wave 3. Respondents were asked to “choose the description that best fits how you think about yourself.” Response options include “100% heterosexual (straight)”, our reference group (we refer to this group as “exclusively heterosexual”), “mostly heterosexual (straight),” “bisexual”, “mostly homosexual (gay),” and “100% homosexual (gay).” We collapsed the latter two categories and refer to this group as “gay/lesbian” throughout the remainder of the paper. We refer to those who identify as anything other than 100% heterosexual (straight) as sexual minority individuals.

**Additional Covariates**—In an attempt to better isolate the association between DEBs, sexual identity, and depression, we account for etiological factors, demographic characteristics, and outcomes commonly associated with DEB and depression. This study includes covariates that describe young people’s early life contexts, the demographic characteristics of the individual, as well as the health and socioeconomic characteristics of the individual in early-adulthood.

Two variables provide information on the individual’s early life context. These variables were measured at Wave 1, when participants were approximately 11-18 years of age. Respondents were asked to choose from six potential categories to specify the highest educational level of their mother (*Mother’s Education*). Potential responses include 1 “less than high school” up to 5 “post baccalaureate degree”. Respondents could also specify if they were unsure of their mother’s highest level of education (coded as 0). The measure *Social Support Scale* captured the supportiveness of the child’s social network using eight Likert-scale items that measured perceived social support from persons or groups in the child’s social network. For example, respondents were asked, “How much do you feel that adults care about you?” Potential responses include 1 “not at all,” 2 “very little,” 3 “somewhat,” 4 “quite a bit,” and 5 “very much.” Other questions assessed the perceived support from teachers, parents, friends, and family members. Based on the sum of all 8 items, scores ranged from 8-40, with higher scores representing more supportive social environments. The scale was found to have sufficient internal consistency ( $\alpha=0.782$ ).

*Race/Ethnicity* is a self-identified measure of an individual’s race or ethnicity, measured at Wave 1. Potential categories include “Hispanic,” “Non-Hispanic White,” “Non-Hispanic-

Black,” “Non-Hispanic Asian,” and “Non-Hispanic Other.” We selected these categories due to sample size limitations; more detailed racial and ethnic groups were too small for meaningful comparisons by DEB. *Age*, measured in years, was calculated by subtracting birth date from the survey date (of Wave 3 & Wave 4).

*General Health* was measured by self-report of global health in Waves 3 and 4. Respondents were asked, “How is your general health?” Responses fall on a 5-point Likert-scale, ranging from 0 “poor” to 5 “excellent.” *Body Mass Index* was calculated by first using the height and weight data measured by the interviewer at Waves 3 and Wave 4. Self-Reported height and weight was used if the respondent had missing measured data.

In addition, we control for the level of education of respondents at Wave 3 (late adolescent analyses) and Wave 4 (early-adulthood analyses). *Educational Attainment* is measured in years of completed education. Using the International Standard Classification of Education (ISCED) (UIS, 2011), categorical responses to the question, “What is the highest level of education that you have achieved to date?” (i.e., completed high school) were transformed into years of completed school.

Finally, we controlled for the marital status of the respondent in early adolescence (Wave 3) or early-adulthood (Wave 4). *Married* is a dichotomous variable comparing those who have never been married to those who have been married at least once.

### Analytic Plan

In a first step, we present the unadjusted associations and group differences by sexual identity, comparing exclusively heterosexual (reference), mostly heterosexual, bisexual, gay/lesbian, and our dependent and selected independent variables (Table 2).

In a second step, we estimate a series of Ordinary Least Squares (OLS) regression models examining the association between sexual-identification (comparing heterosexual, mostly heterosexual, bisexual, gay/lesbian) and DEBs (as well as their interactions), and depressive symptoms in late-adolescence (Wave 3) (model 1), early-adulthood (Wave 4) (model 2), as well as the change in depressive symptoms from Waves 3 to 4 (model 3) (see Table 3). We repeat these models and include an interaction term between sexual identity and DEB to examine whether DEB has unique associations with depressive symptoms based on specific sexual identity (models 4-6).

In a third step, we examine depressive symptoms in early-adulthood (Wave 4) while adjusting for depressive symptoms in late-adolescence (Wave 3) (model 1) using a series of nested OLS regression models. We examine the interaction between late-adolescent depressive symptoms and sexual preference identification (model 2), and the interaction between late-adolescent depressive symptoms and DEB (model 3), to assess whether late-adolescent sexual minorities or those with identified DEB behavior with elevated depressive symptoms in late-adolescence are at exponential risk for depressive symptoms in early-adulthood.



All regression analyses were estimated using robust standard errors to account for potential heterogeneity bias that may result from such issues as clustering or lack of independence between observations due to sampling techniques.

## Results

A majority of the sample identified as exclusively heterosexual (90%) or mostly heterosexual (7%) (Table 1), followed by bisexual (1.7%) and gay/lesbian (1.4%). In unadjusted analyses, mostly heterosexual and bisexual identifying minorities were more likely to report DEB relative to their exclusively heterosexual peers ( $p<0.001$ ), while gay/lesbian individuals report similar DEB compared to their exclusively heterosexual peers (Table 2). All sexual minority subgroups also experienced lower social support in early adolescence (Wave 1) relative to their exclusively heterosexual peers ( $p<0.001$ ).

In addition, sexual minority sub-groups report higher mean depressive symptoms in late-adolescence (Wave 3) relative to heterosexuals ( $p<0.001$ ). While mostly heterosexual and bisexual individuals report higher mean depressive symptoms in early-adulthood (Wave 4) as well ( $p<0.001$ ), differences in depressive symptoms between exclusively heterosexual and gay/lesbian individuals were no longer detected. Gay and lesbian individuals experienced significantly different changes in depressive symptoms between Waves 3 and 4 relative to exclusively heterosexual peers ( $p<0.01$ ); those who identify as gay/lesbian experienced an average negative change of  $-0.30$  depressive symptoms, and exclusively heterosexual individuals experienced an average positive change of  $+0.70$  depressive symptoms (Table 2).

Results from OLS regression analyses suggest that while all sexual minority individuals report greater depressive symptoms in late-adolescence relative to exclusively heterosexual peers (Table 3, model 1;  $p<0.001$ ), individuals who identified as gay/lesbian in late-adolescence did not exhibit different levels of depressive symptoms in early-adulthood relative to those identifying as exclusively heterosexual (model 2). Although there were no significant interactions between DEB and sexual identity in late-adolescent cross-sectional analyses (model 4), results suggest that those who identify as bisexual *and* exhibit DEB in late-adolescence experience additional depressive symptoms in early-adulthood (model 5). In addition, while DEBs are predictive of depressive symptoms in both late-adolescence and early-adulthood, results from model 3 suggest that the effect of DEB on depressive symptoms is actually reduced between waves 3 and 4 ( $p<0.001$ ). Results from model 6 suggest that those who identify as bisexual *and* exhibit DEB in late-adolescence are likely to experience an additional mean positive change of  $+1.602$  depressive symptoms, adjusting for other covariates ( $p<0.05$ ).

When adjusting for depressive symptoms in late-adolescence, results indicate that identifying as bisexual no longer has an independent association with depressive symptoms in early-adulthood (Table 4, model 1). However, results indicate a potential threshold effect; model 2 indicates that for every unit increase in late-adolescent depression after a score of 1.437, those who identify as bisexual experience an average change of 0.294 depressive symptoms ( $p<0.001$ ) that is in addition to the baseline increase of 0.322 in early-adulthood

depressive symptoms already found to be associated with late-adolescent depression ( $p < 0.001$ ) (model 2).

DEB in late-adolescence is also predictive of depressive symptoms in early-adulthood, even when adjusting for levels of depression in late-adolescence (Table 4, model 1). Interactive models suggest that those with DEB are likely to experience *additional* depressive symptoms in early-adulthood associated with late-adolescent depressive symptoms (interaction coefficient = 0.094;  $p < 0.001$ ) (model 3). This is in addition to the increases of depressive symptoms that are already independently associated to DEB and depressive symptoms in late-adolescence.

## Discussion

This study contributes to our understanding of sexual minority mental health risk or resiliency across late-adolescence and early-adulthood by examining changes in depressive symptoms across late-adolescence and early-adulthood while considering the role of DEB. This study also examines whether DEBs influence depressive symptoms of sexual minorities differently relative to heterosexual identifying peers based on identification, (e.g., mostly heterosexual, gay/lesbian, or bisexual).

First, results from this study suggest that not all sexual minority young people are at heightened risk of depressive symptoms across the life course relative to heterosexual-identifying peers. We found that individuals who identify as gay/lesbian or mostly heterosexual exhibit characteristics indicating mental health resiliency, and, like activist group It Gets Better Project [IGBP] proposes, “it” potentially does “get better” (IGBP, 2018), at least for specific groups of sexual minority youth. Gay/lesbian and mostly heterosexual identifying individuals exhibited modest improvements (relative change) in depressive symptoms from late-adolescence to early-adulthood, despite initial elevated average depressive symptoms relative to heterosexual peers. Previous research also finds support for the “it gets better” hypothesis, showing how psychological distress may decrease over time for sexual minority youth as they establish resilience, particularly those with access to social support resources (Birkett, Newcomb, & Mustanski, 2015).

“It gets better,” however, does not appear to apply to bisexual identifying peers in this study, who were found to maintain elevated levels of depression into early-adulthood. These findings mirror growing literature that bisexual individuals experience unique stressors and are at elevated risk of depression and other mental health concerns relative to gay/lesbian and heterosexual-identifying peers (Fredriksen-Goldsen & Muraco, 2010; Marshal et al., 2011; Volpp 2010). While the minority stress perspective gives us an explanation for the negative mental health outcomes of sexual minorities, it is important for clinicians not to assume sexual minorities experience equal risk, or have the same exposure or response to potential stressors, when addressing their unique mental health needs.

In particular, bisexual-identifying young adults may endure unique dynamics surrounding social rejection based on their non-binary sexual identity that does not fit dominant conventions of an “either/or” view of sexuality (Scherrer, Kazyak, & Schmitz, 2015), which

include negative reactions to bisexuality known as “binegativity” (Eliason, 2000). Similarly, “it gets better” discourse can potentially overburden bisexual youth with expectations of their future happiness and wellbeing in the absence of concerted efforts to alter social structures and systems that privilege heterosexuality (Grzanka & Mann, 2014).

Indeed, results suggest that bisexual identifying individuals may experience significantly greater mental health risks relative to heterosexual or lesbian/gay peers, in part due to DEB. A second major finding of this study was that older adolescents identifying as bisexual were most likely to engage in DEB, and experience an *accumulation* of depressive symptoms associated with DEB relative to peers with or without DEB. While this study found that DEB is associated with increased depressive symptoms across late-adolescence and early-adulthood regardless of sexual-identity, DEB may have particularly negative influences on the mental health of bisexual individuals and represent a unique stressor for their mental health. Bisexual youth report lower sense of belonging and adult-related social support relative to lesbian/gay peers (Human Rights Campaign, 2014), which may explain their risk of DEB, and why DEB may exacerbate their mental health co-morbidities. Social support is a well known mediator of ED and DEB, and is a significant factor in the ED recovery process (Wonderlich-Tierney & Vander Wal, 2010). Based on these findings, clinicians and service providers should be attuned to the types of support, and distinctive mental health challenges, that bisexual people face in utilizing community mental health resources (Filice & Meyer, 2018).

These findings support growing literature challenging prior perspectives that only heterosexual women and gay men are at elevated risk of ED or DEB (see Watson et al., 2015) and suggests that bisexual individuals may be experiencing heightened depression and other mental health issues associated with DEB relative to heterosexual or gay/lesbian peers. Clinicians should be aware of the role of DEB as a potential coping mechanism sexual minorities may be utilizing to manage stress stemming from societal pressures. Future studies should also examine other behavioral health conditions in tandem with ED or DEB, such as substance use, to see if a comprehensive behavioral health program should be developed to support the unique mental health needs of sexual minority youth.

Finally, results indicate that while depressive symptoms in late-adolescence may be predictive of depressive symptoms in early-adulthood for everyone, of the sexual identities examined, only those who identify as bisexual were at risk for cumulative disadvantages as a result of late-adolescent depression. These findings strengthen our primary finding that, while certain sexual minorities may experience mental health resiliency during the transition to adulthood, those who identify as bisexual may experience unique mental health risks. Screening for depression and DEB in sexual minority, particularly bisexual, youth through the transition to adulthood may be important given their increased risk. Understanding why baseline depressive symptoms are a risk factor for bisexual-identifying youth, and not other sexual minorities, is critical if we are to effectively intervene.

One explanation could be the role of sexual identity development and how this can shift over time. This study does not examine changes in sexual identity across late-adolescence to early-adulthood; however, prior research indicates that changes toward *more* diverse sexual

preference is associated with increased depression across young adulthood (Everett, 2015). Furthermore, findings here indicate the enduring impact of monosexist cultural beliefs, or the idea that people should only be sexually attracted to people of one gender (Rodríguez-Rust, 2002), and the harms this societal ideology can have on bisexual youths' mental health.

There are several limitations of this study; we were unable to examine types of DEB separately, or measure the severity or duration of reported DEB. Additionally, we could not examine individuals clinically diagnosed with ED. These limitations are due to DEB subsample sizes and the design of the Add Health survey, which only measured certain DEB and a self-report of ED at a single time point. We expect that those with lifetime ED diagnoses or prolonged untreated DEB behaviors would be more likely to experience mental health complications and comorbidities commonly associated with severe, and ongoing DEB. Also due to survey limitations, we were unable to control for any genetic and epigenetic factors that are known to be associated with EDs (Yilmaz, Hardaway, & Bulik, 2015)

Finally, our small sample sizes of sexual minorities and men with DEB limited our ability to explore intersectionalities, such as racial/ethnic, and gender differences in outcomes. For example, in this study, only 100 non-Hispanic Asians were identified as having DEBs. Race and ethnicity shapes DEB manifestation and symptomology (e.g., Marques et al., 2011), and mental and physical wellbeing of sexual minorities varies at the intersection of other marginalized identities, including gender, socioeconomic status, and race/ethnicity. Future research should explore the similarities and differences in depression manifestation and its implications for racial and ethnic and/or low-income sexual minority youth who experience multiple sources of minority stress (Meyer, 2003; Grollman, 2012; Toomey, Huynh, Jones, Lee, & Revels-Macalinao, 2017).

This study has several strengths that underscore its significant contribution to understandings of sexual minority health disparities. This study utilized a longitudinal, community-based sample of adolescents, allowing for a comparison of those with ED diagnoses or related behaviors to those without such behaviors. This provides a case-control type of design and allows for better modeling of potential consequences of late-adolescent depression and DEB. Furthermore, the addition of extensive control variables afforded by a comprehensive survey like Add Health allowed for us to control for life course processes that would not have been possible with clinical studies of more limited scope or covariates.

## Conclusion

Findings from this study support research indicating that DEBs are important for the health of adolescents, and have potentially long lasting effects on wellbeing. While results of this study provide evidence indicating mental health resiliency among young people identifying as gay/lesbian or mostly heterosexual, certain sexual minorities, particular bisexual individuals, may be more likely to engage in DEB in adolescence compared to their heterosexual peers. DEB in adolescence may be a unique stressor for bisexual individuals and represent a turning point that sets individuals on a more challenging trajectory of health and wellbeing in early-adulthood.

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**Table 1:**

Descriptive Statistics of Analytic Sample

	Full Sample (N=10,727) % (N) or Mean (SD)
<b><u>Key Independent Variables</u></b>	
<i>Disordered Eating Behavior (Wave 3)</i>	
Yes, Behavior	16.73% (1,795)
<i>Sexual Identity (Wave 3)</i>	
Exclusively Heterosexual	89.93% (9,647)
Mostly Heterosexual	6.95% (745)
Bisexual	1.71% (183)
Gay/Lesbian	1.42% (152)
<b><u>Dependent Variables</u></b>	
<i>Depressive Symptoms (Wave 3) (range 0-27)</i>	4.56 (4.02)
<i>Depressive Symptoms (Wave 4) (range 0-27)</i>	5.22 (4.09)
<b><u>Covariates</u></b>	
<b><u>Wave 1 (Adolescence)</u></b>	
<i>Gender</i>	
Female	54.41% (5,837)
<i>Race/Ethnicity</i>	
Non-Hispanic White	61.18% (6,563)
Hispanic	8.71% (934)
Non-Hispanic Other	30.11% (3,230)
<i>Mother's Education (range 0-5)</i>	2.64 (1.30)
<i>Social Support Scale (range 10-40)</i>	32.01 (4.60)
<b><u>Wave 3 (Late-Adolescence)</u></b>	
<i>Age (range 18-27)</i>	21.84 (1.75)
<i>Education (in years) (range 6-22)</i>	13.29 (1.97)
<i>Marital Status</i>	
Married at Least Once	18.13% (1,945)
<i>Body Mass Index (range 13.5-64.4)</i>	26.73 (6.43)
<b><u>Wave 4 (Early-Adulthood)</u></b>	
<i>Age (Range 24-34)</i>	28.33 (1.77)
<i>Education (in years) (range 8-22)</i>	15.87 (2.29)
<i>Marital Status</i>	
Married at Least Once	48.97% (5,232)
<i>Body Mass Index (range 14.4-80.5)</i>	29.04 (7.51)

**Note:** Data come from ADD Health Waves 1, 3, 4. DEB=Disordered eating behavior; SD=Standard Deviation.

**Table 2:**

Differences in Key Covariates by Sexual Identity

	<b>Exclusively Heterosexual (reference) (n=9,647)</b>	<b>Mostly Heterosexual (n=745)</b>	<b>Bisexual (n=183)</b>	<b>Gay/Lesbian (n=152)</b>
	<b>% (n) or Mean (SD)</b>	<b>% (n) or Mean (SD)</b>	<b>% (n) or Mean (SD)</b>	<b>% (n) or Mean (SD)</b>
<b>Wave 1 (Adolescence)</b>				
<i>Social Support Scale (Range 10-40)</i>	32.13 (4.58)	30.99 (4.60) ***	30.53 (4.85) ***	30.89 (4.78) ***
<b>Wave 3 (Late-Adolescence)</b>				
<i>Disordered Eating Behavior</i>	16.06% (1,549)	22.55% (168) ***	26.78% (49) ***	19.08% (29) <i>n.s.</i>
<i>Depressive Symptoms (range 0-27)</i>	4.38 (3.90)	6.13 (4.79) ***	6.54 (4.71) ***	5.68 (4.31) ***
<i>Body Mass Index (range 13.5-64.4)</i>	26.75 (6.38)	26.36 (6.69) <i>n.s.</i>	27.59 (8.05) <sup>+</sup>	26.33 (6.52) <i>n.s.</i>
<b>Wave 4 (Early-Adulthood)</b>				
<i>Depressive Symptoms (range 0-27)</i>	5.08 (4.00)	6.48 (4.62) ***	6.83 (5.11) ***	5.38 (3.90) <i>n.s.</i>
<i>Body Mass Index (range 14.4-80.5)</i>	29.06 (7.46)	28.65 (7.87) <i>n.s.</i>	29.57 (8.89) <i>n.s.</i>	29.04 (7.51) <i>n.s.</i>
<b>Change Variable (Wave 3 to 4)</b>				
<i>Change in Depressive Symptoms</i>	0.70 (4.34)	0.34 (5.12) <i>n.s.</i>	0.30 (4.31) <i>n.s.</i>	-0.30 (4.54) **

*Note:* Data come from ADD Health. DEB=Disordered eating behavior; SD=Standard Deviation. Group differences in key covariates were assessed using two-tailed two-sample t-tests (for mean differences in continuous measures) or two-category chi-squared tests (for proportion differences in categorical measures). We compared those who identify as “exclusively heterosexual” to sexual minority peers.

*n.s.*  $p > .10$

<sup>+</sup>  $p < .10$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

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**Table 3:**

Ordinary Least Square Regression Analyses: Disordered Eating Behavior, Sexual Preference, and Depressive Symptoms in Late-Adolescence to Early-Adulthood

	(1)	(2)	(3)	(4)	(5)	(6)
	Depressive Symptoms Wave 3	Depressive Symptoms Wave 4	Depressive Symptoms Change	Depressive Symptoms Wave 3	Depressive Symptoms Wave 4	Depressive Symptoms Change
<b><i>Primary Independent Variables</i></b>						
<i>Sexual Identity</i> <sup>a,b</sup>						
Mostly Heterosexual	1.233 <sup>***</sup> (0.172)	0.994 <sup>***</sup> (0.165)	-0.399 <sup>*</sup> (0.194)	1.100 <sup>***</sup> (0.186)	0.950 <sup>***</sup> (0.178)	-0.323 (0.214)
Bisexual	1.236 <sup>***</sup> (0.325)	0.920 <sup>**</sup> (0.351)	-0.445 (0.323)	0.990 <sup>**</sup> (0.339)	0.149 (0.358)	-0.874 <sup>*</sup> (0.347)
Gay/Lesbian	0.983 <sup>***</sup> (0.308)	0.036 (0.294)	-0.963 <sup>**</sup> (0.375)	1.077 <sup>***</sup> (0.337)	0.139 (0.329)	-0.934 <sup>*</sup> (0.402)
<i>Disordered Eating Behavior (DEB)</i> <sup>b</sup>	1.552 <sup>***</sup> (0.113)	1.034 <sup>***</sup> (0.112)	-0.598 <sup>***</sup> (0.125)	1.484 <sup>***</sup> (0.118)	0.954 <sup>***</sup> (0.118)	-0.605 <sup>***</sup> (0.132)
<i>Gender</i> <sup>c</sup>	0.497 <sup>***</sup> (0.074)	0.789 <sup>***</sup> (0.075)	0.135 (0.087)	0.503 <sup>***</sup> (0.074)	0.797 <sup>***</sup> (0.075)	0.137 (0.087)
<b><i>Interaction Terms</i></b>						
DEB x Mostly Heterosexual				0.603 (0.453)	0.210 (0.433)	-0.337 (0.485)
DEB x Bisexual				0.940 (0.847)	2.903 <sup>***</sup> (0.878)	1.602 <sup>*</sup> (0.793)
DEB x Gay/Lesbian				-0.478 (0.826)	-0.520 (0.720)	-0.153 (1.049)
<b><i>Covariates</i></b>						
<i>Social Support Scale</i> <sup>c</sup>	-0.106 <sup>***</sup> (0.009)	-0.110 <sup>***</sup> (0.009)	0.006 (0.010)	-0.105 <sup>***</sup> (0.009)	-0.109 <sup>***</sup> (0.009)	0.006 (0.010)
<i>Mother's Education</i> <sup>c</sup>	-0.069 <sup>*</sup> (0.030)	-0.115 <sup>***</sup> (0.031)	-0.058 <sup>+</sup> (0.035)	-0.069 <sup>*</sup> (0.030)	-0.114 <sup>***</sup> (0.031)	-0.057 (0.035)
<i>Race/Ethnicity</i> <sup>c,d</sup>						
Hispanic	0.784 <sup>***</sup> (0.146)	0.261 <sup>+</sup> (0.140)	-0.430 <sup>*</sup> (0.169)	0.782 <sup>***</sup> (0.146)	0.256 <sup>+</sup> (0.140)	-0.432 <sup>*</sup> (0.169)
Non-Hispanic Other	0.706 <sup>***</sup> (0.082)	0.411 <sup>***</sup> (0.085)	-0.139 (0.099)	0.706 <sup>***</sup> (0.082)	0.411 <sup>***</sup> (0.085)	-0.139 (0.099)
<i>Age</i> <sup>e</sup>	-0.017 (0.023)	-0.022 (0.022)	0.031 (0.025)	-0.017 (0.023)	-0.022 (0.022)	0.030 (0.025)
<i>Education</i> <sup>e</sup>	-0.214 <sup>***</sup>	-0.213 <sup>***</sup>	-0.020	-0.215 <sup>***</sup>	-0.214 <sup>***</sup>	-0.021

	(1)	(2)	(3)	(4)	(5)	(6)
	Depressive Symptoms Wave 3	Depressive Symptoms Wave 4	Depressive Symptoms Change	Depressive Symptoms Wave 3	Depressive Symptoms Wave 4	Depressive Symptoms Change
<i>General Health<sup>e</sup></i>	(0.021) -0.931 ***	(0.018) -1.016 ***	(0.021) -0.521 ***	(0.021) -0.931 ***	(0.018) -1.017 ***	(0.021) -0.522 ***
<i>Body Mass Index<sup>e</sup></i>	(0.048) -0.027 ***	(0.048) -0.035 ***	(0.056) -0.018 ***	(0.048) -0.027 ***	(0.048) -0.035 ***	(0.056) -0.018 **
<i>Married<sup>e</sup></i>	(0.006) -0.165	(0.006) -0.374 ***	(0.006) 0.044	(0.006) -0.166 <sup>+</sup>	(0.006) -0.376 ***	(0.006) 0.043
Constant	(0.101) 13.969 ***	(0.078) 16.080 ***	(0.090) 2.083 <sup>+</sup>	(0.101) 13.969 ***	(0.078) 16.110 ***	(0.090) 2.110 <sup>+</sup>
Observations	(0.633) 10,726	(0.781) 10,726	(0.881) 10,726	(0.632) 10,726	(0.781) 10,726	(0.881) 10,726
R-squared	0.143	0.145	0.015	0.144	0.147	0.016

**Note:** Data come from Add Health Waves 1, 3, and 4. Robust standard errors in parentheses. Models 1-3 represent baseline models: model 1 examines depressive symptoms measured at Wave 3, model 2 examines depressive symptoms measured at Wave 4, and model 3 examines individual change in depressive symptoms from Wave 3 to Wave 4. Models 4-6 repeat the baseline models, however with the addition of interaction terms between DEB (at Wave 3) and sexual identity.

<sup>a</sup>Reference is exclusively heterosexual

<sup>b</sup>Measured at Wave 3

<sup>c</sup>Measured at Wave 1

<sup>d</sup>Reference is non-Hispanic white

<sup>e</sup>Measured at Wave 3 for models 1 and 2, measured at Wave 4 for models 3 through 6.

<sup>+</sup>  $p < 0.10$

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$



**Table 4:**

Ordinary Least Square Regression Analyses: Influence of Late-Adolescent Depressive Symptoms on Depressive Symptoms in Early-Adulthood: Sexual Identity and Self-Identified Disordered Eating Behavior

Depressive Symptoms in Early-Adulthood	(1)	(2)	(3)
<b><i>Primary Independent Variables</i></b>			
<i>Sexual Identity</i> <sup>a,b</sup>			
Mostly Heterosexual	0.535*** (0.156)	0.480* (0.245)	0.530*** (0.156)
Bisexual	0.471 (0.305)	-1.437*** (0.493)	0.447 (0.302)
Gay/Lesbian	-0.293 (0.285)	0.091 (0.435)	-0.289 (0.287)
<i>Disordered Eating Behavior (DEB)</i> <sup>b</sup>	1.552*** (0.113)	0.488*** (0.104)	-0.044 (0.164)
<i>Depressive Symptoms in Late-Adolescence</i> <sup>b</sup>	0.329*** (0.011)	0.322*** (0.012)	0.307*** (0.012)
<i>Gender</i> <sup>c</sup>	0.574*** (0.071)	0.578*** (0.071)	0.574*** (0.071)
<b><i>Interaction Terms</i></b>			
Depressive Symptoms <sup>b</sup> x Mostly Heterosexual		0.011 (0.036)	
Depressive Symptoms <sup>b</sup> x Bisexual		0.294*** (0.074)	
Depressive Symptoms <sup>b</sup> x Gay/Lesbian		-0.066 (0.075)	
Depressive Symptoms <sup>b</sup> x DEB <sup>b</sup>			0.094*** (0.027)
<b><i>Covariates</i></b>			
<i>Social Support Scale</i> <sup>c</sup>	-0.072*** (0.009)	-0.072*** (0.009)	-0.072*** (0.009)
<i>Mother's Education</i> <sup>c</sup>	-0.096*** (0.029)	-0.096*** (0.029)	-0.098*** (0.029)
<i>Race/Ethnicity</i> <sup>c,d</sup>			
Hispanic	0.033 (0.133)	0.033 (0.133)	0.033 (0.133)
Non-Hispanic Other	0.230*** (0.081)	0.231*** (0.081)	0.242*** (0.081)
<i>Age</i> <sup>e</sup>	-0.005 (0.021)	-0.004 (0.021)	-0.004 (0.021)

Depressive Symptoms in Early-Adulthood	(1)	(2)	(3)
<i>Education<sup>e</sup></i>	-0.150 *** (0.017)	-0.150 *** (0.017)	-0.149 *** (0.017)
<i>General Health<sup>e</sup></i>	-0.853 *** (0.046)	-0.857 *** (0.046)	-0.857 *** (0.046)
<i>Body Mass Index<sup>e</sup></i>	-0.029 *** (0.005)	-0.030 *** (0.005)	-0.030 *** (0.005)
<i>Married<sup>f</sup></i>	-0.236 *** (0.074)	-0.244 *** (0.074)	-0.239 *** (0.074)
Constant	11.472 *** (0.750)	11.508 *** (0.750)	11.561 *** (0.750)
Observations	10,726	10,726	10,726
R-squared	0.237	0.239	0.239

Note: Data come from Add Health Waves 1, 3, and 4. Depressive symptoms (outcome) measured at Wave 4. Robust standard errors in parentheses. Model 1 represents a baseline model. Model 2 includes interaction terms between late adolescent depressive symptoms (measured at Wave 3) and sexual identity. Model 3 includes interaction terms between late adolescent depressive symptoms and DEB (both measured at Wave 3).

<sup>a</sup>Reference is exclusively heterosexual

<sup>b</sup>Measured at Wave 3

<sup>c</sup>Measured at Wave 1

<sup>d</sup>Reference is non-Hispanic white

<sup>e</sup>Measured at Wave 4

\*  $p < 0.05$

\*\*\*  $p < 0.001$

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