

https://dspace.org/

Sexual orientation discrimination and eating disorder symptoms in early adolescence a prospective cohort study

J Nagata; T Diep; C Helmer; S Domingue; E et al ...

https://hdl.handle.net/10539/44109
WOS

Downloaded from a DSpace repository. https://dspace.org/

Journal of Eating Disorders

RESEARCH

Open Access

Sexual orientation discrimination and eating disorder symptoms in early adolescence: a prospective cohort study

Jason M. Nagata[1*], Thang Diep[1], Christiane K. Helmer[1], Sydnie K. Domingue[1], Abubakr A. Al-Shoaibi[1], Julia H. Raney[1], Kyle T. Ganson[2], Alexander Testa[3], Jinbo He[4], Claire D. Brindis[1,5] and Fiona C. Baker[6,7]

Abstract

Background Sexual orientation discrimination increases the risks of negative health outcomes for sexual minorities. Previous studies have found increased rates of eating disorder symptoms in sexual minority individuals, which is attributable to minority stress and discrimination that they experience. Emerging research suggests relationships between sexual orientation discrimination and eating disorder symptoms. However, there is a lack of studies focusing on early adolescents. The objective of this study was to determine prospective associations between discrimination based on sexual orientation and eating disorder symptoms in a national sample of 10–13-year-old early adolescents in the U.S.

Methods We examined prospective data from Year 2 (2018–2020) and Year 3 (2019–2021) of the Adolescent Brain Cognitive Development (ABCD) Study (N = 8976). Multiple logistic regression analyses were used to estimate associations between self-reported experiences of sexual orientation discrimination in Year 2 and eating disorder symptoms in Year 3, adjusting for potential confounders, including eating disorder symptoms in Year 2. Sexual orientation discrimination was assessed based on the Perceived Discrimination Scale, which measures adolescents' perception of being treated unfairly based on various sociodemographic characteristics. Eating disorder symptoms were based on the parent-reported Kiddie Schedule for Affective Disorders and Schizophrenia (KSADS-5).

Results In this demographically diverse sample of early adolescents (N = 8976, age range 10–13 years at Year 2), 5.5% of adolescents reported sexual orientation discrimination in Year 2. The prevalence of parent-reported eating disorder symptoms in Year 3 varied from 1.0 to 8.3%. In the adjusted models, sexual orientation discrimination was prospectively associated with worry about weight gain (adjusted odds ratio [aOR] 2.33, 95% confidence interval [CI] 1.15–4.69) and self-worth tied to weight (aOR 1.60, 95% CI 1.01–2.53) one year later.

Conclusions Early adolescents who have experienced sexual orientation discrimination have higher odds of experiencing eating disorder symptoms, particularly worrying about weight gain and tying self-worth to weight. Clinicians may consider screening for sexual orientation discrimination and providing affirmative, trauma-informed care when evaluating and treating even younger sexual minority adolescents for eating disorder symptoms.

Keywords Eating disorder, Disordered eating, Adolescence, LGBTQ, LGBT, Gay, Lesbian, Bisexual, Sexual orientation, Discrimination

*Correspondence:
Jason M. Nagata
jason.nagata@ucsf.edu
Full list of author information is available at the end of the article

© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

Plain language summary

Sexual orientation discrimination increases the likelihood of adverse health effects for sexual minorities. Prior research has identified increased rates of eating disorder symptoms among sexual minority individuals, linked to minority stress and discrimination they endure. Although recent studies suggest associations between sexual orientation discrimination and eating disorder symptoms, there is a gap in research concerning early adolescents. In this large, demographically diverse, national study of 8,976 adolescents aged 10–13 years, we found that early adolescents who have experienced sexual orientation discrimination are more likely to worry about weight gain and tie their self-worth to weight one year later. These findings support the Minority Stress Theory, which describes how discrimination, stigmatization, and internalized negative beliefs may contribute to worse mental health outcomes and maladaptive health behaviors, including eating disorder symptoms. Clinicians can screen for sexual orientation discrimination and provide affirmative, equity-focused care when evaluating even younger sexual minority patients for eating disorder symptoms.

Introduction

The prevalence of eating disorders has increased in recent years, specifically in adolescents [1]. Adolescence is a critical developmental period for the risk of eating disorders [2], and eating disorder symptoms often materialize during this time [2, 3]. Eating disorder symptoms, such as distress from binge eating, self-induced weight loss, intense fear of gaining weight, and self-worth tied to weight, are risk factors for developing full-threshold eating disorders [4]. Given that eating disorders are associated with adverse psychological and physical health outcomes like depression and multi-organ dysfunction [5–7], early identification and intervention of eating disorders and eating disorder symptoms are crucial for minimizing health consequences and reducing morbidity in adolescents [8].

Sexual minority adults and adolescents—those who identify as gay, lesbian, or bisexual, or who are attracted to or have sexual contact with individuals of the same gender [9]—are at higher risk of developing disordered eating behaviors, in comparison to their heterosexual peers [10]. For instance, nationally representative data of 9th to 12th-grade students found that sexual minority adolescent girls have 1.5 times the odds of using diet pills and 1.77 times the odds of purging, while sexual minority adolescent boys have more than twice the odds of fasting compared to their heterosexual sex-matched peers [11]. Another study of high school students in Massachusetts found that nearly one-third of sexual minority youth reported unhealthy weight control behaviors such as fasting for more than 24 h, using diet pills, or vomiting [12]. Additionally, sexual minority males are more than four times and sexual minority females are more than twice as likely to engage in such behaviors relative to their heterosexual peers [12]. Prior research established a strong groundwork for examining the prevalence of eating disorder symptoms in sexual minority adolescents, yet few studies investigated the experiences of early adolescents [11, 12]. One study that included early adolescents found that sexual orientation disparities in purging and binge eating were evident at the youngest ages and persisted through adolescence, but the data is now over a decade old, and the sample included participants ages 12–23 years old [13].

Moreover, a growing body of literature shows that societal pressures and stigmatization may be one underlying reason for the high prevalence of disordered eating in sexual minority adolescents [14, 15]. Sexual minority early adolescents are more likely to experience interpersonal discrimination because of their sexual orientation compared to their non-sexual minority peers [16, 17]. According to the Minority Stress Theory, sociopolitical factors and conditions perpetuate both internal (e.g., internalized homophobia, identity concealment) and external (e.g., discrimination, stigmatization, violence) stressors that disproportionately impact sexual minority individuals [18, 19]. These stressors create a hostile and unsafe environment that may worsen both physical and mental health outcomes [18, 19]. For instance, sexual orientation discrimination can serve as a minority stressor that contributes to mental health burdens, body dissatisfaction, and low self-esteem, which can predispose the development of eating disorder symptomatology across all age groups [17, 20, 21].

Our previous research showed that the prevalence of sexual orientation discrimination was highest among sexual minority adolescents (37.4%) [22]. However, approximately 3% of heterosexual adolescents still reported sexual orientation discrimination [22]. This may occur because heterosexual adolescents who deviate from the societal expectations of gender roles and sexual identity can be perceived differently by their peers and might be teased based on these perceptions. As a result, these individuals may internalize this teasing as sexual orientation discrimination. Consequently, heterosexual adolescents may still experience the negative effects associated

with sexual orientation discrimination, so it is important to explore how sexual orientation discrimination may impact eating disorder symptoms within this group. Despite the burden of sexual orientation discrimination in adolescents, few studies have linked sexual orientation discrimination specifically with eating disorder symptoms, particularly in a large prospective cohort of early adolescents.

In the present study, we aimed to examine the prospective association between sexual orientation discrimination and DSM-5 eating disorder symptoms from a large, nationally diverse sample of early adolescents in the U.S. We hypothesized that sexual orientation discrimination would be prospectively associated with eating disorder symptoms in early adolescents.

Methods

Study sample

We examined prospective data from the Adolescent Brain Cognitive Development (ABCD) Study, a longitudinal study of brain development and health in the U.S. In 2016–2018 (baseline; Year 0), 11,875 children mostly aged 9–10 years were recruited from 21 demographically diverse sites across the nation. These participants were recruited mainly through elementary schools and were selected via stratified, probability sampling of U.S. schools within the 21 catchment areas. Institutional review board approval was granted from the University of California, San Diego, and at each of the 21 study sites. Written assent was provided by participants, and written informed consent was provided by caregivers.

Data analyzed in the present study were from the ABCD 5.1 release from Year 2 (2018–2020) and Year 3 (2019–2021), with early adolescents aged 11–14 years at Year 3. Evaluation of youth-reported eating disorder symptoms was only performed at the Year 2 assessment, so we opted to use parent-reported eating disorder symptoms instead to conduct a prospective analysis. Out of the participants enrolled in the study, 2024 were missing parent-reported eating disorder symptoms data, 828 were missing sexual orientation discrimination data, and 134 were missing sociodemographic data (Additional File 1: Appendix A). We did not exclude majority groups in the analyses because they can also face discrimination. For instance, approximately 3% of heterosexuals reported discrimination based on sexual orientation [22]. Our inclusion criteria yielded a final analytical sample of 8976 participants.

Independent variable: sexual orientation discrimination (year 2)

Sexual orientation discrimination in Year 2 was measured from the Perceived Discrimination Scale [23, 24], which measures adolescents' perception of being treated unfairly based on various sociodemographic characteristics. Participants were asked, "In the past 12 months, have you felt discriminated against because someone thought you were gay, lesbian, or bisexual?" Response options were "Yes," "No," "Don't know," and "Refuse to answer," and those who answered with the latter two responses were excluded from the analysis (3.0% and 0.4%, respectively).

Dependent variable: symptoms of eating disorders (year 3)

The ABCD study uses the Kiddie Schedule for Affective Disorders and Schizophrenia (KSADS-5), a validated computerized tool for diagnostically categorizing child and adolescent mental health issues according to DSM-5 criteria, to evaluate eating disorder symptoms [25]. The KSADS-5 measured the frequency, duration, and characteristics of these symptoms. We used parent-reported eating disorder symptoms at Year 3. Participants' parents were asked, "Does your child feel like his or her self-worth is tied to his or her weight?" and "In the past two weeks, how often has your child been preoccupied with gaining weight or worrying a lot about being fat?" Additionally, they were asked about their child's behaviors, including compensatory behaviors to lose weight, binge eating, and distress with binge eating. Compensatory behaviors included eating foods with minimal calories, exercising a lot, throwing up, and taking water pills, laxatives, or diet pills. Due to the low prevalence of these behaviors in the study sample, participants who reported any of these actions were classified as engaging in compensatory behaviors to lose weight.

Covariates

We adjusted for the following covariates: age, sex (female or male), sexual orientation (heterosexual, maybe gay/bisexual, gay/bisexual, don't understand the question, or refused to answer), race and ethnicity (Asian, Black, Latino/Hispanic, Native American, White, or other), household income (grouped into six categories reflecting the US median household income), and highest parental education (high school or less or college education or more). Prior studies demonstrated that these variables have been associated with sexual orientation discrimination and/or eating disorder symptoms [26–28]. Furthermore, race was controlled for because racial identity may intersect with sexual orientation, supporting the intersectionality framework in that the intersection of marginalized identities may contribute to health disparities [29]. Household income and parental education are both proxies of socioeconomic status and can affect resources and support, potentially influencing experiences of discrimination and the development of eating

disorder symptoms. Additionally, the ABCD study site was included as a covariate to account for potential geographic variation. All covariates were from Year 2 except for sexual orientation, which was from Year 3 because it was more reflective of the adolescents' true sexual orientation since more of them had come out by Year 3. At the Year 3 visit, participants were asked "Are you gay or bisexual?" with response options of "Yes," "Maybe," "No," "Do not understand," and "Refuse to answer" from the background section of the Kiddie Schedule of Affective Disorders and Schizophrenia [9]. Each respective symptom of an eating disorder as reported by the parent from Year 2 was included as a covariate.

Statistical analysis

Data analyses were performed using Stata 18 (StataCorp LLC). Descriptive statistics, including means, standard deviations, and percentages, were calculated. Multiple logistic regression analyses were used to estimate associations between sexual orientation discrimination in Year 2 as the independent variable and the presence of eating disorder symptoms in Year 3 (worry about weight gain, self-worth tied to weight, inappropriate compensatory behavior to prevent weight gain, binge eating, and distress with binge eating) as the dependent variable, adjusting for covariates including the respective eating disorder symptom in Year 2. Sex-stratified analyses were also conducted given potential sex differences in sexual orientation discrimination and eating disorder symptoms. Interaction between sexual orientation and sexual orientation discrimination on eating disorder symptoms was tested for. Propensity weights were applied to yield representative estimates based on the American Community Survey from the US Census [30].

Results

Table 1 reports the descriptive characteristics of the 8976 adolescents included in our analytical sample. The sample was approximately matched by sex (48.5% female), included sexual minority adolescents (8.5% identified as gay/bisexual), and was racially and ethnically diverse (51.5% racial/ethnic minority). The prevalence of sexual orientation discrimination in Year 2 was 5.5% (26.4% among gay/bisexual, 8.4% among maybe gay/bisexual, 3.1% among heterosexual). The prevalence of eating disorder symptoms in Year 3 varied from 1.0 to 8.3%.

Prospective associations between sexual orientation discrimination and eating disorder symptoms are presented in Table 2. After adjusting for covariates, including respondent sexual orientation, we found that sexual orientation discrimination was prospectively associated with worry about weight gain (adjusted odds ratio [aOR] 2.33, 95% confidence interval [CI] 1.15–4.69) and self-worth tied to weight (aOR 1.60, 95% CI 1.01–2.53) one year later. Sexual orientation discrimination was not significantly associated with inappropriate compensatory behaviors to prevent weight gain, binge eating, and distress with binge eating.

Additional File 2: Appendix B shows prospective sex-stratified analyses between sexual orientation

Table 1 Sociodemographic characteristics and prevalence of sexual orientation discrimination and eating disorder symptoms of Adolescent Brain Cognitive Development (ABCD) Study participants (N = 8976)

Sociodemographic characteristics (Year 2)	Mean (SD) / %
Age (years)	12.0 (0.7)
Sex	
Female	48.5%
Male	51.5%
Sexual orientation (Year 3)	
Heterosexual	83.5%
Gay/bisexual	8.5%
Maybe gay/bisexual	5.4%
Don't understand the question	1.3%
Refuse to answer	1.3%
Race and ethnicity	
Asian	5.3%
Black	14.6%
Latino/Hispanic	19.6%
Native American	3.2%
Other[a]	1.4%
White	55.9%
Household income	
$24,999 or less	13.3%
$25,000 to $49,999	16.7%
$50,000 to $74,999	16.6%
$75,000 to $99,999	14.5%
$100,000 to $199,999	28.7%
$200,000 and greater	10.3%
Parent's highest education	
High school education or less	11.4%
College education or more	88.6%
Sexual orientation discrimination	5.5%
Parent-reported eating disorder symptoms (Year 3)	
Worry about weight gain	1.0%
Self-worth tied to weight	4.2%
Inappropriate compensatory behaviors to prevent weight gain	8.3%
Binge eating	3.9%
Distress with binge eating	2.5%

ABCD sampling weights were applied to yield representative estimates based on the American community survey from the US census

[a] This subcategory was listed as "other" but with no specific racial and ethnic groups defined, although write-ins were allowed

Table 2 Prospective associations between sexual orientation discrimination and eating disorder symptoms in the Adolescent Brain Cognitive Development (ABCD) Study (N = 8976)

	Sexual orientation discrimination (year 2, independent variable)			
Eating disorder symptoms (Year 3, dependent variable)	**Unadjusted OR (95% CI)**	**p**	**Adjusted OR (95% CI)[a]**	**p**
Worry about weight gain	**3.05 (1.55, 6.01)**	**0.005**	**2.33 (1.15, 4.69)**	**0.018**
Self-worth tied to weight	**2.19 (1.48, 3.25)**	**0.001**	**1.60 (1.01, 2.53)**	**0.044**
Inappropriate compensatory behaviors to prevent weight gain	**1.62 (1.16, 2.27)**	**< 0.001**	1.25 (0.83, 1.89)	0.286
Binge eating	1.44 (0.90, 2.29)	0.125	1.00 (0.57, 1.78)	0.994
Distress with binge eating	1.67 (0.96, 2.91)	0.069	1.16 (0.58, 2.30)	0.681

Bold indicates $p < 0.05$. Models represent the abbreviated output from 10 logistic regression models with sexual orientation discrimination in year 2 as the independent variable and eating disorder symptoms in year 3 as the dependent variable. ABCD propensity weights were applied to yield representative estimates based on the American community survey from the US census

[a] Adjusted for eating disorder symptoms at year 2, age, sex, sexual orientation, race and ethnicity, household income, parent education, and study site

discrimination and eating disorder symptoms. In female adolescents, sexual orientation discrimination was prospectively associated with worry about weight gain (aOR 2.72, 95% CI 1.20–6.15) one year later, after adjusting for covariates. In male adolescents, sexual orientation discrimination was prospectively associated with distress with binge eating (aOR 2.50, 95% CI 1.12, 5.57) and self-worth tied to weight (aOR 2.05, 95% CI 1.06, 3.94) one year later, after adjusting for covariates. The interaction between sexual orientation and sexual orientation discrimination on the association with eating disorder symptoms was not significant.

Discussion

In a demographically diverse national sample in the U.S., our study found that sexual orientation discrimination in early adolescents was associated with over twice the odds of worrying about weight gain and higher odds of tying one's self-worth to one's weight. In adolescent boys, sexual orientation discrimination was associated with distress with binge eating and self-worth tied to weight. In adolescent girls, sexual orientation discrimination was associated with fear of weight gain.

The results of our study add to the literature by investigating the prospective associations between sexual orientation discrimination and DSM-5 eating disorder symptoms in early adolescents whose developmental period is vulnerable to developing unhealthy and disordered eating behaviors [2, 3]. Prior research found sexual orientation disparities in eating disorders and disordered eating behaviors, with higher prevalence of sexual minority adolescents engaging in weight control behaviors such as fasting, using diet pills, or vomiting [11, 12, 31]. In addition to the high prevalence of eating disorder symptoms in sexual minority adolescents, our findings suggest that there is a prospective association between the experience of discrimination because of sexual orientation and subsequent eating disorder symptoms in early adolescents.

The higher risks of eating disorder symptoms in early adolescents who have experienced sexual orientation discrimination may be due to elevated sexual minority stress levels. Although the exact mechanisms by which sexual orientation discrimination may influence the development of eating disorder symptoms remain unclear, the Minority Stress Theory describes how discrimination, stigmatization, and internalized negative beliefs may contribute to worse mental health outcomes and maladaptive health behaviors [16–19]. For instance, research on lesbian adults found that sexual minority stress was associated with social anxiety [20], which has been linked to more body shame and binge eating [32, 33]. A systematic review on the role of minority stress in disordered eating also found that shame, body shame, or negative affect are important mediators between minority stress and disordered eating in adults [34]. Sexual orientation discrimination may also undermine sexual minority individuals' ability to recognize and regulate their emotions by serving as a form of traumatic invalidation [35]. Emotional dysregulation can then predispose sexual minority individuals to adopt maladaptive behaviors as a means of coping with their emotions and fulfilling their needs [35], which may explain the binge eating distress seen among adolescent boys in our study who previously experienced sexual orientation discrimination. Moreover, stressors that target sexual orientation may uniquely impact youth mental health with one study showing that mental health burden was more common in early adolescents who reported experiencing discrimination based on their sexual orientation even when accounting for other interpersonal stressors not related to sexual orientation [17].

We found notable sex differences in some of the associations. Adolescents boys may face more victimization and discrimination due to their sexual orientation [36]. The association between sexual orientation discrimination and distress with binge eating in boys may be attributed to the higher prevalence of binge-eating behaviors in early adolescent boys compared to girls [26]. Girls have more fear of weight gain than boys, which reflects the feminine body ideal of thinness [37].

Findings from the present study hold significant implications for clinical practices, the education sector, public health, and public policy. For example, clinicians may consider screening for eating disorder behaviors in even their youngest adolescent patients who have experienced discrimination based on their sexual orientation. They should also integrate trauma-informed principles and a strength-based approach when evaluating and treating them for eating disorder symptoms [38]. However, given that clinicians play a relatively brief role in the lives of their patients, public policymakers should consider the larger role that schools play in adolescent development and their ability to ascertain that many sexual minority youth may experience stigma and discrimination at school [39]. In response, schools can bolster protective factors such as LGBTQ-inclusive curricula, supportive educators, and anti-bullying policies that have been shown to foster school connectedness and perceptions of personal safety [40], as well as potentially playing a role in referring adolescents experiencing sexual orientation discrimination. These strategies may decrease the minority stress level experienced by sexual minority adolescents [16], which in turn may decrease the risk of developing eating disorder symptomatology [20].

This study has several limitations. First, the Perceived Discrimination Scale focused on sexual orientation discrimination by other students, not peers more broadly, which may have missed perpetrators they interacted with outside of school. Additionally, this study used parent-reported eating disorder symptoms since evaluation of youth-reported eating disorder symptoms was not performed at Year 3. Although parents are important reporters of eating disorders in adolescents since children often have limited insight into their eating behaviors [41, 42], there tends to be low concordance between parent and youth reports of disordered eating behaviors [41–43]. Specifically, a study demonstrated parents may provide lower estimates of behavioral symptoms of eating disorders [44]. Moreover, measures in our study relied on self-reported responses to survey questions and may be subjected to reporting bias. Due to differences in sociodemographic characteristics between participants included and excluded in the analysis, it limits our ability to generalize the results of our study. We also cannot infer causality given the observational nature of the study. Due to limited cell size and insufficient power, we were not able to analyze associations stratified by sexual orientation categories. Future research could examine these associations with larger samples of sexual minorities.

Despite these limitations, our study has several strengths. To our knowledge, this is the first study to examine the prospective association between sexual orientation discrimination and eating disorder symptoms in early adolescents. Other similar studies have only examined pooled cross-sectional data [11, 12]. Our results support the Minority Stress Theory [16, 18] in that sexual orientation discrimination could be one factor that contributes to disparities in disordered eating behaviors [14, 27].

Conclusion

Adolescents who have experienced sexual orientation discrimination have higher odds of experiencing eating disorder symptoms one year later, particularly worrying about weight gain and tying self-worth to weight. This prospective study underscores the importance of addressing sexual orientation discrimination and building supportive environments for sexual minority youth in the prevention and intervention of eating disorders in early adolescence. Future research can investigate the mechanisms by which sexual orientation discrimination may affect the development of eating disorders even in younger adolescents and treatment options that incorporate coping strategies to effectively manage sexual orientation discrimination.

Abbreviations

ABCD Adolescent Brain Cognitive Development Study
KSADS-5 Kiddie Schedule for Affective Disorders and Schizophrenia

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s40337-024-01157-y.

Additional file 1.

Additional file 2.

Acknowledgements

We thank Anthony Kung for editorial assistance.

Author contributions

JMN: Writing—review and editing, Writing—original draft, Formal analysis, Data curation, Conceptualization. TD: Writing—review and editing, Writing—original draft. CKH: Writing—review and editing, Writing—original draft, Formal analysis. SKD—review and editing, Writing—original draft. AAA: Writing—original draft, Formal analysis, Data curation, Conceptualization. JHR: Writing—review and editing. KTG: Writing—review and editing. AT: Writing—review and editing. JH: Writing—review and editing. CDB: Writing—review and editing. FCB: Writing—review and editing, Formal analysis, Data curation.

Funding
The research was supported by the National Institutes of Health (K08HL159350 and R01MH135492) and the Doris Duke Charitable Foundation (2022056). The funders had no role in the study analysis, decision to publish the study, or the preparation of the manuscript. The authors have no conflicts of interest to declare. The ABCD Study was supported by the National Institutes of Health and additional federal partners under award numbers U01DA041022, U01DA041025, U01DA041028, U01DA041048, U01DA041089, U01DA041093, U01DA041106, U01DA041117, U01DA041120, U01DA041134, U01DA041148, U01DA041156, U01DA041174, U24DA041123, and U24DA041147. A full list of supporters is available athttps://abcdstudy.org/federal-partners/. A listing of participating sites and a complete listing of the study investigators can be found athttps://abcdstudy.org/principal-investigators.html. ABCD consortium investigators designed and implemented the study and/or provided data but did not necessarily participate in analysis or writing of this report.

Availability of data and materials
Data used in the preparation of this article were obtained from the ABCD Study (https://abcdstudy.org), held in the NIMH Data Archive (NDA).

Declarations

Ethics approval and consent to participate
Centralized institutional review board (IRB) approval was obtained from the University of California, San Diego and each participating site received local IRB approval:

- Children's Hospital Los Angeles, Los Angeles, California
- Florida International University, Miami, Florida
- Laureate Institute for Brain Research, Tulsa, Oklahoma
- Medical University of South Carolina, Charleston, South Carolina
- Oregon Health and Science University, Portland, Oregon
- SRI International, Menlo Park, California
- University of California San Diego, San Diego, California
- University of California Los Angeles, Los Angeles, California
- University of Colorado Boulder, Boulder, Colorado
- University of Florida, Gainesville, Florida
- University of Maryland at Baltimore, Baltimore, Maryland
- University of Michigan, Ann Arbor, Michigan
- University of Minnesota, Minneapolis, Minnesota
- University of Pittsburgh, Pittsburgh, Pennsylvania
- University of Rochester, Rochester, New York
- University of Utah, Salt Lake City, Utah
- University of Vermont, Burlington, Vermont
- University of Wisconsin—Milwaukee, Milwaukee, Wisconsin
- Virginia Commonwealth University, Richmond, Virginia
- Washington University in St. Louis, St. Louis, Missouri
- Yale University, New Haven, Connecticut

Caregivers provided written informed consent, and each child provided written assent. All the methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication
Not Applicable.

Competing interest
The authors declare no competing interests.

Author details
[1]Department of Pediatrics, University of California, San Francisco, 550 16th Street, 4th Floor, Box 0503, San Francisco, CA 94143, USA. [2]Factor-Inwentash Faculty of Social Work, University of Toronto, 246 Bloor St W, Toronto, ON M5S 1V4, Canada. [3]Department of Management, Policy and Community Health, University of Texas Health Science Center at Houston, 7000 Fannin, Suite 1706, Houston, TX 77030, USA. [4]Division of Applied Psychology, School of Humanities and Social Science, The Chinese University of Hong Kong, 2001 Longxiang Boulevard, Longgang District, Shenzhen, Guangdong, China. [5]Philip R. Lee Institute for Health Policy Studies, University of California, San Francisco, 490 Illinois St, San Francisco, CA 94158, USA. [6]Center for Health Sciences, SRI International, 333 Ravenswood Ave, Menlo Park, CA 94025, USA. [7]School of Physiology, University of the Witwatersrand, 1 Jan Smuts Ave, Braamfontein, Johannesburg 2017, South Africa.

Received: 22 July 2024 Accepted: 14 November 2024
Published online: 29 November 2024

References

1. McLean CP, Utpala R, Sharp G. The impacts of COVID-19 on eating disorders and disordered eating: a mixed studies systematic review and implications. Front Psychol. 2022;13: 926709.
2. Bohon C. Binge eating disorder in children and adolescents. Child Adolesc Psychiatr Clin N Am. 2019;28:549–55.
3. Curzio O, Bastiani L, Scalese M, Cutrupi V, Romano E, Denoth F, et al. Developing anorexia nervosa in adolescence: the role of self-image as a risk factor in a prevalence study. Adv Eating Disorders: Theory, Res Practice. 2014;3:63.
4. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (5th ed., text rev) [Internet]. DSM Library. 2022 [cited 2024 May 13]. Available from: https://dsm.psychiatryonline.org/doi/book/https://doi.org/10.1176/appi.books.9780890425787
5. Nagata JM, Garber AK, Tabler J, Murray SB, Vittinghoff E, Bibbins-Domingo K. Disordered eating behaviors and cardiometabolic risk among young adults with overweight or obesity. Int J Eat Disord. 2018;51:931–41.
6. Rosenbaum DL, White KS. The relation of anxiety, depression, and stress to binge eating behavior. J Health Psychol. 2015;20:887–98.
7. Peebles R, Sieke EH. Medical complications of eating disorders in youth. Child Adolesc Psychiatr Clin N Am. 2019;28:593–615.
8. Nagata JM, Golden NH. New US preventive services task force recommendations on screening for eating disorders. JAMA Intern Med. 2022;182:471–3.
9. Potter AS, Dube SL, Barrios LC, Bookheimer S, Espinoza A, Ewing SWF, et al. Measurement of gender and sexuality in the Adolescent Brain Cognitive Development (ABCD) study. Developmental Cognitive Neuroscience [Internet]. 2022 [cited 2024 Jun 27]; 53. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8759998/
10. Parker LL, Harriger JA. Eating disorders and disordered eating behaviors in the LGBT population: a review of the literature. J Eat Disord. 2020;8:51.
11. Calzo JP, Turner BC, Marro R, Phillips GL. Alcohol use and disordered eating in a US sample of heterosexual and sexual minority adolescents. J Am Acad Child Adolesc Psychiatry. 2019;58:200–10.
12. Hadland SE, Austin SB, Goodenow CS, Calzo JP. Weight misperception and unhealthy weight control behaviors among sexual minorities in the general adolescent population. J Adoles Health Offl Public Soc Adoles Med. 2014;54:296–303.
13. Austin SB, Ziyadeh NJ, Corliss HL, Rosario M, Wypij D, Haines J, et al. Sexual orientation disparities in purging and binge eating from early to late adolescence. J Adoles Health. 2009;45:238–45.
14. Nagata JM, Ganson KT, Bryn Austin S. Emerging trends in eating disorders among sexual and gender minorities. Curr Opinion Psych. 2020;33(6):562–7. https://doi.org/10.1097/YCO.0000000000000645.
15. Mason TB, Lewis RJ, Heron KE. Disordered eating and body image concerns among sexual minority women: a systematic review and testable model. Psychol Sex Orientat Gend Divers. 2018;5:397–422.
16. Hatzenbuehler ML. How does sexual minority stigma "get under the skin"? A psychological mediation framework. Psychol Bull. 2009;135:707–30.
17. Gordon JH, Tran KT, Visoki E, Argabright ST, DiDomenico GE, Saiegh E, et al. The role of individual discrimination and structural stigma in the mental health of sexual minority youth. J Am Acad Child Adolesc Psychiatry. 2024;63:231–44.
18. Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. Psychol Bull. 2003;129:674–97.
19. Brooks VR. Minority Stress and Lesbian Women. Lexington Books; 1981.
20. Mason TB, Lewis RJ. Minority stress, body shame, and binge eating among lesbian women: social anxiety as a linking mechanism. Psychol Women Q. 2016;40:428–40.

21. Nagata JM, Stuart E, Hur JO, Panchal S, Low P, Chaphekar AV, et al. Eating disorders in sexual and gender minority adolescents. Curr Psychiatry Rep. 2024;26:340–50.
22. Nagata JM, Helmer CK, Wong JH, Domingue SK, Shim JE, Al-shoaibi AAA. Prevalence and sociodemographic associations with weight discrimination in early adolescents. Prevent Med Rep. 2024;47:102892. https://doi.org/10.1016/j.pmedr.2024.102892.
23. Garnett BR, Masyn KE, Austin SB, Miller M, Williams DR, Viswanath K. The intersectionality of discrimination attributes and bullying among youth: an applied latent class analysis. J Youth Adolesc. 2014;43:1225–39.
24. Nagata JM, Wong JH, Helmer CK, Domingue SK, Shim JE, Al-Shoaibi A. Sexual orientation discrimination in early adolescents. JAMA Netw Open. 2024;7(10):e2437985.
25. Townsend L, Kobak K, Kearney C, Milham M, Andreotti C, Escalera J, et al. Development of three web-based computerized versions of the kiddie schedule for affective disorders and schizophrenia child psychiatric diagnostic interview: preliminary validity data. J Am Acad Child Adolesc Psychiatry. 2020;59:309–25.
26. Nagata JM, Smith-Russack Z, Paul A, Saldana GA, Shao IY, Al-Shoaibi AAA, et al. The social epidemiology of binge-eating disorder and behaviors in early adolescents. J Eat Disord. 2023;11:182.
27. Raney JH, Al-Shoaibi AA, Shao IY, Ganson KT, Testa A, Jackson DB, et al. Racial discrimination is associated with binge-eating disorder in early adolescents: a cross-sectional analysis. J Eat Disord. 2023;11:139.
28. Cao Z, Cini E, Pellegrini D, Fragkos KC. The association between sexual orientation and eating disorders-related eating behaviours in adolescents: a systematic review and meta-analysis. Eur Eat Disord Rev. 2023;31:46–64.
29. Collins P, Bilge S. Intersectionality. 1st edition. Cambridge, United Kingdom: Polity; 2016
30. Heeringa S, Berglund P. A guide for population-based analysis of the Adolescent Brain Cognitive Development (ABCD) study baseline data. bioRxiv. 2020;2020.02.10.942011.
31. Watson RJ, Adjei J, Saewyc E, Homma Y, Goodenow C. Trends and disparities in disordered eating among heterosexual and sexual minority adolescents. Int J Eat Disord. 2017;50:22–31.
32. Ostrovsky NW, Swencionis C, Wylie-Rosett J, Isasi CR. Social anxiety and disordered overeating: an association among overweight and obese individuals. Eat Behav. 2013;14:145–8.
33. Dakanalis A, Clerici M, Caslini M, Favagrossa L, Prunas A, Volpato C, et al. Internalization of sociocultural standards of beauty and disordered eating behaviours: the role of body surveillance, shame and social anxiety. J Psych. 2014;20:33–7.
34. Santoniccolo F, Rollè L. The role of minority stress in disordered eating: a systematic review of the literature. Eat Weight Disord. 2024;29:41.
35. Cardona ND, Madigan RJ, Sauer-Zavala S. How minority stress becomes traumatic invalidation: an emotion-focused conceptualization of minority stress in sexual and gender minority people. Clin Psychol Sci Pract. 2022;29:185–95.
36. Robinson JP, Espelage DL, Rivers I. Developmental trends in peer victimization and emotional distress in LGB and heterosexual youth. Pediatrics. 2013;131:423–30.
37. Choukas-Bradley S, Roberts SR, Maheux AJ, Nesi J. The perfect storm: a developmental-sociocultural framework for the role of social media in adolescent girls' body image concerns and mental health. Clin Child Fam Psychol Rev. 2022;25:681–701.
38. Ginsburg K, Brett Z, McClain R. Reaching teens: strength-based, trauma-sensitive, resilience-building communication strategies (2nd edition). American Academy of Pediatrics; 2020.
39. Kosciw JG, Clark CM, Truong NL, Zongrone AD. The 2019 National School Climate Survey: The Experiences of Lesbian, Gay, Bisexual, Transgender, and Queer Youth in Our Nation's Schools. A Report from GLSEN [Internet]. Gay, Lesbian and Straight Education Network (GLSEN). Gay, Lesbian and Straight Education Network (GLSEN); 2020. Available from: https://eric.ed.gov/?id=ED608534
40. Snapp SD, McGuire JK, Sinclair KO, Gabrion K, Russell ST. LGBTQ-inclusive curricula: why supportive curricula matter. Sex Edu. 2015;15:580–96.
41. Barch DM, Albaugh MD, Avenevoli S, Chang L, Clark DB, Glantz MD, et al. Demographic, physical and mental health assessments in the adolescent brain and cognitive development study: rationale and description. Dev Cogn Neurosci. 2018;32:55–66.
42. Braet C, Soetens B, Moens E, Mels S, Goossens L, Van Vlierberghe L. Are two informants better than one? Parent-child agreement on the eating styles of children who are overweight. Eur Eat Disord Rev. 2007;15:410–7.
43. Tanofsky-Kraff M, Yanovski SZ, Yanovski JA. Comparison of child interview and parent reports of children's eating disordered behaviors. Eat Behav. 2005;6:95–9.
44. Mariano P, Watson HJ, Leach DJ, McCormack J, Forbes DA. Parent-child concordance in reporting of child eating disorder pathology as assessed by the eating disorder examination. Int J Eat Disord. 2013;46:617–25.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.