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Sexual and gender minority (SGM) adolescents' disordered eating: Exploring general and SGM-specific factors

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Abstract

Objective: Sexual and gender minority (SGM) adolescents disproportionately report disordered eating, yet have primarily been considered under a larger SGM umbrella. The current study 1) compared disordered eating between sexual minority (SM) and gender minority (GM) adolescents; 2) examined how general psychological factors (self-esteem, depression, and stress) and SGM-specific factors (e.g., feelings about SGM identity, access to SGM resources) were associated with disordered eating; and 3) examined whether associations between these factors differed for SM versus GM adolescents.

Method: SGM adolescents in the U.S. ($N = 8814$; 35.0% GM; 43.7% cisgender girls; 66.9% White; $M_{age} = 15.6$) reported their disordered eating, depressive symptoms, stress, self-esteem, and SGM-related experiences on an anonymous, cross-sectional online survey.

Results: GM adolescents exhibited a higher prevalence of clinical threshold disordered eating than SM adolescents. Self-esteem was associated with lower odds of caloric restriction, purging, and binge eating. Depression was associated with higher odds of caloric restriction, diet pill use, purging, laxatives, and binge eating. Stress was associated with higher odds of purging. Associations were stronger for GM adolescents' caloric restriction. Positive feelings about SGM identity were associated with lower odds of caloric restriction, purging, and binge eating, whereas greater stress of "coming out" was associated with higher odds of caloric restriction, purging, and binge eating.

Discussion: These results suggest that SGM adolescents' disordered eating is associated with both general psychological factors and unique SGM experiences. Results highlight the importance of considering how the unique experiences of SGM youth may leave them vulnerable to disordered eating behaviors.

Public Significance Statement: Sexual and gender minority (SGM) youth are disproportionately affected by disordered eating. The current study found that higher depression and stress, and lower self-esteem, were associated with SGM adolescents' disordered eating. Furthermore, unique SGM experiences, such as stress about coming out, were also associated with eating pathology. Results highlight the importance of considering SGM adolescents' perceptions of their identity and social support.

KEYWORDS
adolescent, depression, feeding and eating disorders, gender identity, psychological, self concept, self disclosure, sexual and gender minorities, sexual orientation, stress

1 | INTRODUCTION

Disordered eating is relatively common among sexual and gender minority (SGM) adolescents (Parker & Harriger, 2020). "SGM" is an umbrella term referring to those who identify with a sexual diverse (e.g., lesbian, gay, and bisexual) and/or gender diverse (e.g., transgender, nonbinary, and genderqueer) identity, including those who identify as both sexual minority (SM) and gender minority (GM). Nationally representative data from the U.S. suggest that one-third of SM adolescents engage in disordered eating (Hadland et al., 2014), compared to national prevalence estimates ranging from 4.4% to 13% (Centers for Disease Control and Prevention, 2013). Caloric restriction, purging, and binge eating appear particularly common among SGM adolescents relative to their heterosexual, cisgender peers (Calzo et al., 2016, 2018; Guss et al., 2017; Miller & Luk, 2019; Roberts et al., 2021). It is critical to identify both general and SGM-specific factors that are related to SGM adolescents' disordered eating, as well as how these factors may differentially affect adolescents with a SM or GM identity.

Stress, depressive symptoms, and self-esteem have been proposed as general psychological factors contributing to disordered eating during adolescence, though they have primarily been studied among heterosexual, cisgender samples. Stress is implicated in the development of eating disorders during adolescence (Ball & Lee, 2000; Rojo et al., 2006), and depressive symptoms are associated with disordered eating cross-sectionally (Sharpe et al., 2018) and longitudinally (Ferreiro et al., 2012). Low self-esteem is considered a universal risk factor for eating disorders (Colmsee et al., 2021) as it increases the risk for body dissatisfaction (Espinoza et al., 2019). In a sample of Australian adolescents, stress, depressive symptoms, and self-esteem together accounted for approximately 47%–56% of the variance in body image (Murray et al., 2011). These general psychological factors are understudied among SGM youth.

Compared to their heterosexual and cisgender peers, SGM adolescents experience chronic stressors related to their minority identity status, contributing to disparities in negative mental health outcomes (Institute of Medicine, 2011; Parker & Harriger, 2020). Minority stress theory, a conceptual framework for understanding how these chronic stressors cause mental health problems for SM (Brooks, 1981; Meyer, 2003) and GM (Hendricks & Testa, 2012) populations, explains the association between chronic stressors and increased incidence of disordered eating among SGM adolescents (Miller & Luk, 2019; Parker & Harriger, 2020). For example, lesbian women report receiving negative comments about their bodies from men (Huxley et al., 2014); gay men report immense pressure to fit a muscular, thin aesthetic (VanKim et al., 2016); bisexual adults experience erasure and invalidation from both the SGM community and society at large (Brewster et al., 2014; Serpe et al., 2020); and transgender people experience non-affirmation of their gender identity (Testa et al., 2017). These experiences have been identified in the literature as risk factors for disordered eating among adults and adolescents (Calzo et al., 2017; Parker & Harriger, 2020). During adolescence, SGM youth generally experience poorer mental health than heterosexual, cisgender adolescents, as chronic discrimination increases their levels of stress and depressive symptoms (Connolly et al., 2016; Marshal et al., 2011) while lowering self-esteem (McDonald, 2018; Röder et al., 2018). Therefore, SGM youth may disproportionately experience stress, depressive symptoms, and low self-esteem—all associated with increased risk for disordered eating (Parker & Harriger, 2020).

However, relatively little is understood about how SGM adolescents' *perception* of their identity may be associated with disordered eating. For example, viewing one's identity positively may be associated with lower levels of disordered eating. Research with SM women suggests that being open about one's identity is associated with improved body image (Mason et al., 2018). Additionally, adolescents in more supportive environments may have greater access to SGM resources and community, potentially improving their wellbeing (Parker & Harriger, 2020). For SGM adolescents, social support can decrease the risk for disordered eating through reductions in depressive symptoms (Colvin et al., 2019), decreased psychological distress (Birkett et al., 2015), and increased self-esteem (McDonald, 2018). Therefore, access to SGM resources and the ability to be "out" as SGM may be negatively associated with disordered eating. One factor not yet explored is whether adolescents' beliefs about the future as an SGM person are associated with disordered eating. Extant literature has found that future orientation (the tendency to plan and think about the future) moderates the association between emotional victimization and depressive symptoms in early adolescence (Hamilton et al., 2015). However, it remains unknown whether feeling hopeful about adult life as an SGM person could be a positive coping mechanism for the increased incidence of victimization that SGM youth experience (Institute of Medicine, 2011), and, therefore, associated with lower levels of disordered eating.

Notably, little is known about how general and SGM-specific factors may differentially affect adolescents with a SM versus GM identity. SGM adolescents have historically been studied under an "SGM" umbrella, though this tendency may obfuscate the unique reasons that GM adolescents engage in disordered eating. GM adolescents may engage in disordered eating to affirm their gender identity (Griffiths & Yager, 2019; Roberts et al., 2021), to delay or slow pubertal development, or to alleviate concerns about being misgendered (Romito et al., 2021)—concerns that cisgender SM individuals may not experience. When SM and GM groups are collapsed into a singular category, important differences in the mechanisms contributing to their disordered eating may be disguised.

To address these gaps in the literature, the current study had three aims. First, we examined differences in disordered eating behaviors between cisgender SM and GM adolescents. Second, we examined how general psychological factors (depressive symptoms, stress, and self-esteem) and SGM-specific factors (feelings about SGM identity, access to SGM resources, future beliefs about life as an SGM person, openness about SGM identity, and stress of "coming out") were associated with disordered eating. Third, we examined whether associations between these factors and disordered eating differed between cisgender SM adolescents and GM adolescents of any sexual orientation. To address these questions, we used a nationwide

dataset, the *LGBTQ National Teen Survey*. Consistent with other recent nationwide U.S. datasets that include GM teens (e.g., Salk et al., 2020), the vast majority of GM teens in the current study also identified with an SM identity; in keeping with prior work, we will refer to all GM teens as simply "GM" for parsimony (e.g., Roberts et al., 2021).

2 | METHOD

2.1 | Participants and procedure

We utilized a subset of data ($n = 8814$) from a larger sample of 17,112 adolescents who participated in the *LGBTQ National Teen Survey*, an online, anonymous, cross-sectional survey of U.S. SGM adolescents' experiences (see Watson et al., 2020). Data were collected from April to December 2017 in partnership with the Human Rights Campaign (HRC). English-speaking SGM adolescents (ages 13–17) residing in the U.S. were eligible to participate. Participants were recruited through HRC's community partners and social media. Respondents spanned all 50 U.S. states, and were primarily White (66.9%), followed by multiple racial/ethnic identities (13.4%), Hispanic/Latinx (9.7%), Asian American (4.0%), Black (3.9%), and another race not listed (1.6%). For compensation, participants were offered HRC wristbands and entered in a gift card raffle. Procedures were approved by the University of Connecticut Institutional Review Board.

2.2 | Measures

2.2.1 | Sexual orientation

Participants responded to the survey item "How do you describe your sexual identity?" with either: "gay or lesbian," "bisexual," "straight, that is, not gay," or "something else." If they selected "something else," they were given additional response options: "queer," "pansexual," "asexual," "questioning," and "other." Participants who selected "other" described their sexual identity in a text box. If their written response matched one of the earlier response options, they were then appropriately categorized. If participants wrote in a response that did not match a previous option, they were categorized as "something else."

2.2.2 | Gender identity

Participants first responded to "What sex were you assigned at birth?" (response options: male/female), followed by "What is your current gender identity?" (response options: "male," "female," "trans male/trans boy," "trans female/trans girl," "non-binary," "gender queer/gender nonconforming," or "different identity"). Participants who selected "different identity" described their identity in a text box. If their written response matched one of the previous options, they were then appropriately categorized. If participants wrote in a response that did not match an earlier response, they were categorized as "something else."

2.2.3 | Gender minority and sexual minority categorizations

Adolescents were categorized as GM if they selected a gender identity that did not match their sex assigned at birth, or if they selected one of the transgender, non-binary, or genderqueer/nonconforming options. Consistent with prior work (e.g., Fox et al., 2020; Roberts et al., 2021), all adolescents who reported a non-cisgender identity were categorized as GM, regardless of sexual orientation. Adolescents were categorized as cisgender SM if they selected a sexually diverse sexual orientation (something other than heterosexual) and reported a gender identity congruent with their sex assigned at birth. Throughout this manuscript, "SM" refers to cisgender SM adolescents specifically, and "GM" refers to adolescents who reported a GM identity, the vast majority of whom (95.36%) also reported a SM identity.

2.2.4 | Disordered eating

Participants were asked, "How often have you done each of the following things in order to lose weight or keep from gaining weight during the past year?" with options ranging from 1 ("Never") to 4 ("On a Regular Basis"), as in prior work with adolescents (Neumark-Sztainer et al., 2002). Scores were dichotomized, such that "on a regular basis" approximated clinical threshold. Extant research with adolescents has similarly dichotomized distinct disordered eating behaviors from these items (see Hazzard et al., 2021). Further, "on a regular basis" is the closest approximation to capture previously used clinical cutoffs with community samples (e.g., "regularly engaged in (at least once per week over the past 3 months)"; see Mitchison et al., 2014). Five behaviors were captured: caloric restriction (3 items; fasting, eating little, and/or skipping meals), taking diet pills (1 item), purging (1 item; self-induced vomiting), taking laxatives (1 item), and objective binge eating (2 items; eating an objectively large amount while experiencing loss of control eating).

2.2.5 | General factors: Self-esteem, stress, and depression

Self-esteem was measured using the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), a 10-item measure validated with adolescents (Bagley & Mallick, 2001; current sample $\alpha = .91$). To assess stress, participants were asked to "please mark the appropriate number corresponding with your average level of stress," with response options ranging from 1 ("not very stressed") to 10 ("very stressed"). To measure depression, participants responded to a 10-item scale adapted from Kutcher's Adolescent Depression Scale (KADS;

Brooks, 2004; current sample α = .90) assessing how often participants felt various depressive symptoms with responses ranging from 0 ("hardly ever") to 3 ("all of the time"), such as "low mood, sadness, feeling blah or down, depressed, just can't be bothered." The only alteration was removal of one item assessing suicidality and self-harm.

2.2.6 | SGM-specific factors

Feelings about one's SGM identity

In consultation with the HRC, the research team created a novel measure of SGM-specific factors, using prior studies of SGM adolescent health as a guide (see Austin et al., 2020; Rosario et al., 2006). All items and scoring information are available in Supporting Information. Using 15 items, a newly created measure captured four SGM-specific factors: positive feelings about SGM identity (5 items; e.g., "I am proud to be part of the LGBTQ community"; current sample α = .81); access to SGM resources (3 items; e.g., "Do you have access to information about LGBTQ issues?"; current sample α = .67); future beliefs about life as an SGM person (3 items; e.g., "Are you able to see yourself in the future as a happy or successful LGBTQ adult?"; current sample α = .72); and openness about SGM identity (4 items; e.g., "As an LGBTQ person, are you able to be yourself at home?"; current sample α = .75). Responses ranged from 0 ("Definitely no") to 3 ("Definitely yes"). Scores for each subscale were averaged, with higher scores indicating more positive feelings, access to resources, positive future beliefs, and openness relating to one's SGM identity, respectively.

Stress of coming out

Participants were provided with 10 different scenarios with the instructions "For each event listed below we would like you to rate how stressful the situation was for you"; example event: "When your close friends first found out that you were LGBTQ." Responses ranged from 0 ("no stress") to 4 ("extremely stressful"). Each event also included an "N/A" option. N/A responses were not included in mean score calculations; participants who indicated N/A for all items were coded as missing for the "stress of coming out" variable. Final mean scores ranged from 0 to 4, with higher scores indicating more stress related to coming out. These scenarios have been used previously in research with SM adolescents (see Rosario et al., 1996).

2.3 | Analytic plan

Analyses were completed using R Version 4.1.1 (R Core Team, 2021). Chi Square tests compared clinical threshold disordered eating behavior across subgroups of adolescents: cisgender gay boys, cisgender lesbian girls, cisgender bisexual boys, cisgender bisexual girls, cisgender boys with another SM identity, cisgender girls with another SM identity, transmasculine adolescents, transfeminine adolescents, nonbinary/genderqueer adolescents assigned female at birth (AFAB), nonbinary/genderqueer adolescents assigned male at birth (AMAB). A Bonferroni correction was applied to address inflated Type I error (.05/45 comparisons = .0011).

To examine the associations between general and SGM-specific factors and clinical threshold disordered eating, separate logistic regression models for each of the five disordered eating behaviors were conducted. Each model controlled for race, age, sex assigned at birth, BMI percentile, and gender identity (1 = cisgender, 0 = GM). Model Set 1 included general psychological factors (self-esteem, depressive symptoms, stress) as independent variables. Model Set 2 included SGM-specific factors (positive feelings; access to resources; future beliefs; openness about identity). Model Set 3 added one additional SGM-specific variable to Model Set 2: the stress of coming out. This variable was added at step 3 because it only applies to adolescents who were out about their SGM identities to at least one person and thus excludes participants (n = 289) who were not yet out to anyone. A Bonferroni correction was applied to the significance threshold to address inflated Type I error (.05/5 outcomes per model = .01).

Finally, to assess the moderating role of cisgender versus GM identity on the associations between the factors and each disordered eating behavior, interaction terms between gender identity and each independent variable were added into separate models. These models were conducted with a gender identity dummy code (1 = cisgender SM adolescents; 0 = GM adolescents) entered as an interaction term, one at a time, with each general and SGM-specific factor. This resulted in 15 models testing the interaction between general factors and each of the five disordered eating behaviors (Model Set 4); 20 models testing the interaction between SGM-specific factors and each disordered eating behavior among all participants (Model Set 5); and 25 models testing the interaction between SGM-specific factors and each disordered eating behavior among participants who were "out" (Model Set 6). When models indicated a significant interaction, simple slope analyses were conducted to ascertain differences in the effect of the predictor on the outcome for SM adolescents versus GM adolescents. Within simple slope analyses, the significance threshold of coefficients for SM and GM adolescents was adjusted to .01 to adjust for inflated Type I error.

3 | RESULTS

The final sample of 8814 SGM adolescents reflects those who had complete data for all independent variables and at least one disordered eating behavior. Table 1 displays demographic information. There were at least 11 participants per state included for analyses, and participation across the four regions of the U.S. was roughly equal. Compared to those who were excluded from the final sample (n = 8298), included participants were more likely to be AFAB ($\chi^2[1] = 95.67$, $p < .001$), older ($t[16{,}643] = -3.64$, $p < .001$), have a lower BMI percentile ($t[14127] = 4.55$, $p < .001$), and identify as GM (vs. cisgender; $\chi^2[1] = 46.73$, $p < .001$), and more likely to be White and less likely to be Black ($\chi^2[6] = 291.84$, $p < .001$). Participants were

TABLE 1 Sample characteristics

	Cisgender sexual minority $n = 5711$ n (%)	Gender minority of any sexual orientation $n = 3103$ n (%)	t-test
Age *M (SD)*	15.7 (1.23)	15.5 (1.29)	−5.78***
Racial/Ethnic Identity			
White	3748 (65.63)	2149 (69.26)	3.49***
Black	256 (4.48)	91 (2.93)	−3.80***
Hispanic, Latinx/a/o	629 (11.01)	229 (7.38)	−5.80***
Asian American	261 (4.57)	91 (2.93)	−3.99***
Native American	17 (.30)	17 (.55)	1.66
Biracial or Multiracial	706 (12.36)	477 (15.37)	3.86***
Other	94 (1.65)	49 (1.58)	−.24
Sexual Orientation			
Straight/heterosexual	–	144 (4.64)	
Gay/lesbian	2564 (44.90)	709 (22.85)	−22.03***
Bisexual	2227 (38.99)	725 (23.36)	−15.68***
Pansexual	442 (7.74)	770 (24.81)	20.03***
Queer	124 (2.17)	276 (8.89)	12.31***
Asexual	189 (3.31)	260 (8.38)	9.20***
Questioning	93 (1.63)	100 (3.22)	4.45***
Other	72 (1.26)	119 (3.83)	6.86***
Gender Identity			
Cisgender girls	3852 (67.45)	–	
Cisgender boys	1859 (32.55)	–	
Transfeminine	–	101 (3.25)	
Transmasculine	–	767 (24.72)	
Nonbinary AFAB	–	2034 (65.55)	
Nonbinary AMAB	–	201 (6.45)	
Psychosocial risk & resilience factors *M (SD)*			
Self-esteem	1.58 (.64)	1.20 (.60)	−27.68***
Depressive symptoms	1.19 (.72)	1.60 (.73)	25.42***
General stress	6.31 (1.96)	6.79 (1.86)	11.53***
SGM—positive affect	2.28 (.62)	2.19 (.63)	−6.57***
SGM—access	1.64 (.80)	1.81 (.80)	9.46***
SGM—future beliefs	2.29 (.67)	2.07 (.76)	−13.74***
SGM—openness	1.80 (.76)	1.75 (.71)	−3.16***
SGM—stress of coming out	2.19 (1.09)	2.37 (.99)	7.91***

Note: SGM-specific items are on a 4-point Likert scale from 0 to 3. *SGM—positive affect* is pride and positive feelings about SGM identity. *SGM—access* is resource access and involvement in events related to SGM issues. *SGM—future beliefs* is positive beliefs about one's role as an SGM adult. *SGM—openness* is feeling able to be oneself as an SGM person in various contexts.
Abbreviations: AFAB, assigned female at birth; AMAB, assigned male at birth.
***$p < .001$.

excluded largely for early termination, with respondents only providing demographic information before exiting the survey.

A substantial portion of adolescents (16.55%) in the current study met clinical threshold for at least one disordered eating behavior. The percentage of adolescents meeting clinical threshold for each behavior, as well as differences across groups, is presented in Table 2. Clinical threshold binge eating was most common (9.73%), followed by caloric restriction (6.16%), purging (3.15%), diet pill use (1.44%), and laxative use (.82%). Transmasculine adolescents were estimated to have the highest prevalence of clinical threshold diet pill use (3.00%), purging (7.04%), and binge eating (15.12%). Nonbinary AFAB adolescents were estimated to have the highest prevalence of clinical threshold caloric

TABLE 2 Descriptive statistics

	Full sample	Cisgender sexual minority						Gender minority of any sexual orientation				
n (%)	*n* = 8814	Gay boys *n* = 1333	Lesbian girls *n* = 1231	Bisexual boys *n* = 438	Bisexual girls *n* = 1789	Other SM boys *n* = 88	Other SM girls *n* = 832	Transmasculine *n* = 767	Transfeminine *n* = 101	Non-binary AFAB *n* = 2034	Non-binary AMAB *n* = 201	χ^2
Any clinical threshold	1459 (16.55)	156[gi] (11.70)	158[gi] (12.84)	42[fgij] (9.59)	272[gi] (15.20)	9[a] (10.23)	135[cgi] (16.23)	199[abcdef] (25.95)	15 (14.85)	436[abcdf] (21.44)	37[b] (18.41)	170.25 ($p < .001$)
Caloric restriction	543 (6.16)	48[gi] (3.60)	57[gi] (4.63)	9[ghi] (2.05)	92[gi] (5.14)	1 (1.14)	48[c] (5.77)	73[abcd] (9.52)	9[b] (8.91)	194[abcdf] (9.54)	12 (5.97)	115.72 ($p < .001$)
Diet pills	127 (1.44)	11[a] (.83)	12 (.97)	6 (1.37)	23 (1.29)	0 (.00)	9 (1.08)	23[a] (3.00)	3 (2.97)	34 (1.67)	6 (2.99)	26.87 ($p < .001$)
Purge (vomit)	278 (3.15)	24[gi] (1.80)	38[a] (3.09)	8[g] (1.83)	33[gi] (1.84)	1 (1.14)	22[a] (2.64)	54[abcdf] (7.04)	3 (2.97)	90[ad] (4.42)	5 (2.49)	71.72 ($p < .001$)
Laxatives	72 (.82)	3 (.23)	10 (.81)	3 (.68)	16 (.89)	0 (.00)	5 (.60)	11 (1.43)	2 (1.98)	19 (.93)	3 (1.49)	14.04 ($p = .12$)
Binge eat	858 (9.73)	95[gi] (7.13)	96[gi] (7.80)	31[g] (7.08)	171[g] (9.56)	8 (9.09)	77[a] (9.25)	116[abcdf] (15.12)	7 (6.93)	234[ab] (11.50)	23 (11.44)	53.35 ($p < .001$)

Abbreviations: AFAB, assigned female at birth; AMAB, assigned male at birth; SM, sexual minority.

[a]Differs significantly (adjusted $p < .05$) from Gay Boys.

[b]Differs significantly (adjusted $p < .05$) from Lesbian Girls.

[c]Differs significantly (adjusted $p < .05$) from Bisexual Boys.

[d]Differs significantly (adjusted $p < .05$) from Bisexual Girls.

[e]Differs significantly (adjusted $p < .05$) from Other SM Boys.

[f]Differs significantly (adjusted $p < .05$) from Other SM Girls.

[g]Differs significantly (adjusted $p < .05$) from Transmasculine Adolescents.

[h]Differs significantly (adjusted $p < .05$) from Transfeminine Adolescents.

[i]Differs significantly (adjusted $p < .05$) from Nonbinary AFAB Adolescents.

[j]Differs significantly (adjusted $p < .05$) from Nonbinary AMAB Adolescents.

TABLE 3 Associations between general psychological factors and clinical threshold disordered eating (models 1a–1e)

Model set 1					
n **= 8814**					
			95% CI OR		
Outcome	***b***	**OR**	**CI LL**	**CI UL**	***p***
a. Caloric restriction					
Self-esteem	**−.83**	**.44**	**.35**	**.54**	**<.001**
Depressive symptoms	**1.15**	**3.16**	**2.63**	**3.80**	**<.001**
General stress	.06	1.06	1.00	1.13	.046
b. Diet pills					
Self-esteem	.08	1.08	.74	1.58	.677
Depressive symptoms	**1.25**	**3.51**	**2.48**	**4.95**	**<.001**
General stress	.10	1.10	.98	1.23	.094
c. Purge (vomit)					
Self-esteem	**−.40**	**.67**	**.50**	**.88**	**.005**
Depressive symptoms	**1.40**	**4.06**	**3.17**	**5.21**	**<.001**
General stress	.04	1.04	.96	1.13	.313
d. Laxatives					
Self-esteem	−.37	.69	.41	1.16	.162
Depressive symptoms	**1.11**	**3.03**	**1.91**	**4.81**	**<.001**
General stress	.04	1.04	.89	1.20	.638
e. Binge eat					
Self-esteem	**−.28**	**.75**	**.64**	**.88**	**<.001**
Depressive symptoms	**.65**	**1.92**	**1.67**	**2.21**	**<.001**
General stress	.06	1.06	1.01	1.11	.014

Note: Sensitivity analyses revealed an identical pattern of results when excluding gender minority participants who identified as heterosexual.
Bold text denotes significance at $p < .05$.
Abbreviations: CI, confidence interval; LL, lower limit; OR, odds ratio; UL, upper limit.

restriction (9.54%). Transfeminine adolescents were estimated to have the highest prevalence of clinical threshold laxative use (1.98%). Transgender and nonbinary/genderqueer adolescents generally reported higher rates of disordered eating than SM adolescents.

Associations between general factors, SGM-specific factors, and disordered eating for the entire SGM sample (without examining SM vs. GM differences) are presented in Tables 3 and 4. Self-esteem was associated with lower odds of clinical threshold caloric restriction (OR = .44, 95% CI = .35–.54), purging (OR = .67, 95% CI = .50–.88), and binge eating (OR = .75, 95% CI = .64–.88). Depressive symptoms were associated with higher odds of clinical threshold caloric restriction (OR = 3.16, 95% CI = 2.63–3.80), diet pill use (OR = 3.51, 95% CI = 2.48–4.95), purging (OR = 4.06, 95% CI = 3.17–5.21), laxative use (OR = 3.03, 95% CI = 1.91–4.81), and binge eating (OR = 1.92, 95% CI = 1.67–2.21). Positive feelings about being SGM were associated with lower odds of clinical threshold caloric restriction (OR = .70, 95% CI = .60–.82), purging (OR = .69, 95% CI = .56–.85), and binge eating (OR = .77, 95% CI = .67–.87). Openness with one's SGM identity was associated with lower odds of clinical threshold caloric restriction (OR = .82, 95% CI = .71–.94). Of SGM adolescents who were "out," higher stress of coming out was associated with higher odds of clinical threshold caloric restriction (OR = 1.23, 95% CI = 1.11–1.35), purging (OR = 1.38, 95% CI = 1.21–1.58), and binge eating (OR = 1.13, 95% CI = 1.05–1.22).

In the moderation models, which tested whether general and SGM-specific factors differently affected SM versus GM adolescents' odds of meeting clinical threshold disordered eating, few significant interaction terms emerged. A summary of results is presented in Tables 5 and 6. Full results are available in Supporting Information. Self-esteem was significantly associated with lower odds of clinical threshold caloric restriction for both SM (OR = .53, $p < .001$) and GM adolescents, with a particularly strong association for GM adolescents (OR = .33, $p < .001$). Depression was significantly associated with higher odds of clinical threshold caloric restriction for both SM (OR = 2.66, $p < .001$) and GM adolescents, though this association was also particularly strong for GM adolescents (OR = 3.90, $p < .001$). Lastly, stress was significantly associated with higher odds of clinical threshold caloric restriction among GM adolescents (OR = 1.15, $p < .001$) but not SM adolescents (OR = .99, $p = .81$). SGM-specific factors did not differently affect SM versus GM adolescents' odds of engaging in disordered eating.

4 | DISCUSSION

The current study advances prior work by comparing how general and SGM-specific factors uniquely relate to disordered eating among SGM adolescents using a national sample. For SM and GM adolescents, depressive symptoms and the stress of coming out were generally associated with higher odds of clinical threshold disordered eating, whereas self-esteem, positive feelings about SGM identity, and openness about SGM identity were generally associated with lower odds of clinical threshold disordered eating. These results suggest that both unique SGM-specific cognitions and general psychological factors may be implicated in SGM adolescents' disordered eating. Given the disparities in disordered eating between SGM and cisgender, heterosexual youth, results from this study highlight the importance of considering how the unique experiences of SGM youth may leave them vulnerable to disordered eating behaviors.

4.1 | Disordered eating among SGM adolescents

Many adolescents in the current study met clinical threshold for a disordered eating behavior. GM adolescents exhibited greater prevalence of caloric restriction, purging, and binge eating than SM youth, generally. These findings echo recent evidence of elevated restriction and purging among transgender adolescents (Roberts et al., 2021) and adults (Diemer et al., 2015). Prior research suggests that GM youth may engage in these behaviors to prevent or delay pubertal development (Romito et al., 2021). Importantly, other research has documented higher rates of disordered eating among SM college students than GM college students (Simone et al., 2020). In the current study,

TABLE 4 Associations between SGM-specific factors and clinical threshold disordered eating (models 2a–2e; 3a–3e)

	Model set 2					Model set 3				
	n = 8814					*n* = 8525				
			95% CI OR					95% CI OR		
	b	OR	CI LL	CI UL	*p*	*b*	OR	CI LL	CI UL	*p*
a. Caloric restriction										
SGM—positive feelings	**−.36**	**.70**	**.60**	**.82**	**<.001**	**−.28**	**.76**	**.64**	**.89**	**.001**
SGM—access to resources	−.13	.88	.78	.99	.039	−.13	.88	.78	.99	.033
SGM—future beliefs	−.15	.86	.75	.98	.027	**−.18**	**.83**	**.73**	**.96**	**.009**
SGM—openness	**−.20**	**.82**	**.71**	**.94**	**.004**	−.13	.88	.76	1.01	.076
SGM—stress of coming out	–	–	–	–	–	**.20**	**1.23**	**1.11**	**1.35**	**<.001**
b. Diet pills										
SGM—positive feelings	−.28	.76	.56	1.03	.078	−.02	.81	.59	1.12	.201
SGM—access to resources	−.27	.76	.61	.96	.023	−.26	.77	.61	.97	.029
SGM—future beliefs	.18	1.19	.90	1.57	.211	.19	1.21	.91	1.60	.189
SGM—openness	−.22	.80	.61	1.05	.109	−.20	.82	.61	1.09	.165
SGM—stress of coming out	–	–	–	–	–	.20	1.22	1.01	1.47	.041
c. Purge (vomit)										
SGM—positive feelings	**−.37**	**.69**	**.56**	**.85**	**<.001**	**−.29**	**.75**	**.60**	**.93**	**.009**
SGM—access to resources	−.19	.83	.71	.97	.022	**−.23**	**.80**	**.68**	**.94**	**.006**
SGM—future beliefs	.09	1.09	.91	1.31	.349	.07	1.08	.89	1.30	.443
SGM—openness	−.24	.79	.66	.95	.014	−.12	.89	.73	1.08	.228
SGM—stress of coming out	–	–	–	–	–	**.32**	**1.38**	**1.21**	**1.58**	**<.001**
d. Laxatives										
SGM—positive feelings	−.26	.77	.51	1.16	.210	−.27	.76	.50	1.16	.202
SGM—access to resources	−.28	.76	.56	1.03	.073	−.28	.75	.56	1.02	.071
SGM—future beliefs	.36	1.44	.98	2.10	.062	.36	1.43	.98	2.10	.065
SGM—openness	−.34	.71	.50	1.02	.062	−.39	.68	.47	.99	.045
SGM—stress of coming out	–	–	–	–	–	.01	1.01	.79	1.28	.962
e. Binge eat										
SGM—positive feelings	**−.27**	**.77**	**.67**	**.87**	**<.001**	**−.23**	**.79**	**.69**	**.91**	**<.001**
SGM—access to resources	−.07	.93	.85	1.03	.160	−.07	.93	.84	1.02	.133
SGM—future beliefs	−.05	.95	.85	1.06	.385	−.05	.95	.85	1.06	.388
SGM—openness	−.14	.87	.78	.97	.014	−.12	.89	.79	1.00	.050
SGM—stress of coming out	–	–	–	–	–	**.12**	**1.13**	**1.05**	**1.22**	**.001**

Note: Model Set 2 included all participants. Model Set 3 included only adolescents who were "out" about their SGM identity to at least one person. Sensitivity analyses revealed an identical pattern of results when excluding gender minority participants who identified as heterosexual. Bold text denotes significance at $p < .05$. Abbreviations: CI, confidence interval; LL, lower limit; OR, odds ratio; UL, upper limit.

bisexual girls exhibited elevated prevalence of clinical threshold disordered eating, consistent with prior work demonstrating high prevalence of disordered eating among bisexual populations (Simone et al., 2020). Bisexual+ populations may be at elevated risk for disordered eating due to unique bisexual minority stress; research with adults supports that bisexual women experience sexual objectification in its traditional sense, in addition to fetishization of their bisexual identity, erasure, antibisexual discrimination, and internalized biphobia (Brewster et al., 2014; Serpe et al., 2020), ultimately contributing to eating disorder symptomatology (Brewster et al., 2014).

4.2 | General correlates of disordered eating

When examining which general factors were most relevant to SM and GM adolescents' disordered eating behaviors, several important findings emerged. For both SM and GM adolescents, findings extend prior work indicating that depression is associated with increased odds of disordered eating, whereas self-esteem is associated with decreased odds (Murray et al., 2011). Indeed, low self-esteem has been identified as a risk factor for disordered eating within reviews of SM adolescent and adult research (Parker & Harriger, 2020). More work is needed to

TABLE 5 Summary of interaction terms for associations between general psychological factors and clinical threshold disordered eating (models 4a–4o)

Model set 4						
$n = 8814$						
				95% CI OR		
Outcome		*b*	OR	CI LL	CI UL	*p*
Caloric restriction						
a	Self-esteem	**.44**	**1.56**	**1.07**	**2.27**	**.02**
b	Depressive symptoms	**−.38**	**.68**	**.51**	**.92**	**.01**
c	General stress	**−.15**	**.86**	**.78**	**.96**	**.01**
Diet pills						
d	Self-esteem	−.09	.91	.49	1.71	.77
e	Depressive symptoms	−.09	.91	.53	1.56	.75
f	General stress	−.10	.91	.74	1.11	.35
Purge (Vomit)						
g	Self-esteem	.08	1.08	.67	1.74	.74
h	Depressive symptoms	−.14	.87	.58	1.29	.49
i	General stress	−.12	.89	.77	1.02	.10
Laxatives						
j	Self-esteem	−.52	.59	.25	1.40	.23
k	Depressive symptoms	−.35	.71	.33	1.47	.36
l	General stress	.03	1.03	.79	1.34	.83
Binge eat						
m	Self-esteem	−.18	.83	.64	1.08	.16
n	Depressive symptoms	.14	1.15	.93	1.42	.20
o	General stress	−.01	.99	.91	1.07	.73

Note: Coefficients represent interaction terms for the differences in the association between the predictor and the outcome by cisgender sexual minority versus gender minority of any sexual orientation. All models control for race, age, assigned sex, and BMI percentile. Full results of individual models (e.g., Model 4a) are available in Supporting Information. Sensitivity analyses revealed an identical pattern of results when excluding gender minority participants who identified as heterosexual. Bold text denotes significance at $p < .05$.
Abbreviations: CI, confidence interval; LL, lower limit; OR, odds ratio; UL, upper limit.

identify associations between stress, self-esteem, and disordered eating among GM populations.

Differences between SM and GM adolescents emerged when examining associations between general factors and disordered eating, with particularly strong associations among GM youth. These findings point to the importance of separately considering the experiences of SM and GM youth, rather than collapsing them into a singular category. These results suggest that, for eating disorder prevention to be most effective for GM youth, interventions could target mental health concerns as a potential mechanism contributing to disordered eating.

4.3 | SGM-Specific correlates of disordered eating

The current study also examined which SGM-specific factors were particularly relevant for SM or GM adolescents' disordered eating. Notably, differences in the associations between SGM-specific factors and disordered eating did not emerge for SM versus GM youth. More positive feelings about SGM identity were associated with lower odds of clinical threshold caloric restriction, purging, and binge eating among both SM and GM adolescents. Further, openness about one's SGM identity was associated with lower odds of clinical threshold caloric restriction for both SM and GM youth. These results are largely consistent with prior work. For example, youth who feel positively about their SGM identity may experience lower internalized homophobia and/or transphobia, known stressors associated with disordered eating (Calzo et al., 2017; Parker & Harriger, 2020; Uniacke et al., 2021). Additionally, the ability to be open about one's SGM identity could reflect an environment of greater social support, known to reduce the risk of disordered eating among SGM adolescents (Miller & Luk, 2019; Watson et al., 2017).

Surprisingly, access to SGM resources was not associated with disordered eating in the current study. However, reviews of the literature have found that SGM-specific community spaces can have either positive or negative effects on an individual's body image and risk for disordered eating (Parker & Harriger, 2020). For some SGM college students, the SGM community proliferates unique appearance ideals (e.g., for nonbinary people, a thin, white, masculine-presenting

TABLE 6 Summary of interaction terms for associations between SGM-specific factors and clinical threshold disordered eating (models 5a–5y; 6a–6y)

		Model set 5						Model set 6					
		n = 8814						*n* = 8525					
					95% CI OR						95% CI OR		
		b	*SE*	OR	CI LL	CI UL	*p*	*b*	*SE*	OR	CI LL	CI UL	*p*
Caloric restriction													
a	SGM—positive feelings	.23	.14	1.26	.96	1.64	.092	.23	.14	1.26	.96	1.66	.094
b	SGM—access to resources	−.15	.11	.86	.69	1.08	.189	−.12	.11	.89	.71	1.11	.293
c	SGM—future beliefs	.19	.12	1.20	.95	1.54	.131	.16	.13	1.17	.92	1.50	.206
d	SGM—openness	.04	.12	1.04	.82	1.33	.729	.05	.13	1.06	.82	1.35	.667
e	SGM—stress of coming out	–	–	–	–	–	–	−.15	.09	.86	.72	1.02	.091
Diet pills													
f	SGM—positive feelings	−.05	.27	.95	.56	1.60	.847	−.04	.27	.96	.56	1.64	.884
g	SGM—access to resources	−.10	.22	.90	.58	1.39	.650	−.06	.22	.94	.60	1.46	.783
h	SGM—future beliefs	−.28	.25	.75	.46	1.23	.256	−.26	.25	.77	.47	1.28	.309
i	SGM—openness	.29	.24	1.34	.84	2.17	.225	.29	.25	1.33	.82	2.18	.249
j	SGM—stress of coming out	–	–	–	–	–	–	−.31	.18	.73	.51	1.04	.084
Purge (vomit)													
k	SGM—positive feelings	.20	.18	1.22	.85	1.74	.282	.15	.19	1.16	.81	1.67	.427
l	SGM—access to resources	.04	.15	1.04	.77	1.41	.776	.02	.15	1.02	.75	1.37	.919
m	SGM—future beliefs	.15	.17	1.17	.84	1.64	.368	.12	.17	1.13	.81	1.60	.482
n	SGM—openness	−.18	.17	.83	.60	1.15	.269	−.17	.17	.84	.60	1.18	.315
o	SGM—stress of coming out	–	–	–	–	–	–	−.25	.13	.78	.61	1.00	.051
Laxatives													
p	SGM—positive feelings	−.51	.36	.60	.29	1.21	.159	−.55	.36	.58	.28	1.17	.131
q	SGM—access to resources	.26	.29	1.29	.73	2.29	.379	.25	.29	1.28	.72	2.28	.396
r	SGM—future beliefs	−.44	.34	.64	.32	1.26	.198	−.48	.35	.62	.31	1.22	.168
s	SGM—openness	−.08	.32	.93	.49	1.75	.810	−.14	.33	.87	.46	1.67	.681
t	SGM—stress of coming out	–	–	–	–	–	–	−.20	.23	.82	.52	1.28	.382
Binge eat													
u	SGM—positive feelings	.10	.11	1.10	.88	1.37	.398	.09	.11	1.09	.87	1.37	.448
v	SGM—access to resources	−.10	.09	.90	.76	1.08	.276	−.09	.09	.91	.76	1.10	.336
w	SGM—future beliefs	−.08	.10	.93	.76	1.13	.451	−.07	.10	.93	.76	1.14	.479
x	SGM—openness	−.09	.10	.92	.75	1.12	.395	−.09	.10	.91	.75	1.12	.390
y	SGM—stress of coming out	–	–	–	–	–	–	−.03	.07	.97	.84	1.12	.654

Note: Model Set 5 included all participants. Model Set 6 included only adolescents who were "out" about their SGM identity to at least one person. Coefficients represent interaction terms for the differences in the association between the predictor and the outcome by cisgender sexual minority versus gender minority of any sexual orientation. All models control for race, age, assigned sex, and BMI percentile. Sensitivity analyses revealed an identical pattern of results when excluding gender minority participants who identified as heterosexual. Full results of individual models (e.g., Model 5a) are available in Supporting Information.

Abbreviations: CI, confidence interval; LL, lower limit; OR, odds ratio; UL, upper limit.

appearance) (Gordon et al., 2019). Research with adults suggests that SM men show greater internalized weight bias than heterosexual men (Puhl et al., 2019), perhaps exacerbating the appearance pressures SM men face in the SGM community (Austen et al., 2020). However, other SGM adults perceive the SGM community to be accepting of greater body diversity (VanKim et al., 2016). Future work should attempt to disentangle which pieces of SGM resources and community may inadvertently encourage unattainable appearance ideals, and in turn, disordered eating.

For SGM adolescents who had "come out" to others, higher stress of coming out was significantly associated with higher odds of clinical threshold caloric restriction, purging, and binge eating. These

findings indicate that SGM adolescents may use disordered eating to cope with negative emotional experiences that accompany "coming out," a process that may be fraught with distress and stigmatization (Cox et al., 2010; Schimmel-Bristow et al., 2018). Beyond "coming out," future work should consider identity concealment, in which adolescents do not share their identity with others. Evidence suggests that among SM adults, concealment of one's sexual identity is associated with increased risk of eating disorders (Parker & Harriger, 2020). Both stress of coming out and identity concealment may indicate a lack of social support or stressful interpersonal relationships, increasing risk for disordered eating behaviors (Parker & Harriger, 2020). For clinicians working with SGM youth, special care must be taken to help youth navigate the coming out process and the distress that may accompany it.

4.4 | Limitations and future directions

While the current study extends prior work examining the general and SGM-specific factors that may be related to the disordered eating behaviors of SGM youth, there are a number of limitations. First, the cross-sectional design does not allow for the identification of temporal or causal relationships between the factors examined. Longitudinal designs would offer insight into how these factors are associated with disordered eating over time.

Second, some of the measures used have not been previously validated. The research team developed the survey assessing SGM-specific factors and stress of coming out for the larger study (see Watson et al., 2020), so future validation efforts are recommended to demonstrate its efficacy. Some SGM-specific factors had low reliability, so future measurement testing is recommended. Additionally, general stress was assessed with a single item. Future research on this topic should use a more extensive evaluation of adolescent stress. Further, the disordered eating items, although used in previous adolescent eating disorder studies (Neumark-Sztainer et al., 2002), did not allow the research team to capture the true frequency of the behaviors measured as language such as "on a regular basis" was used in lieu of number of times per week.

Third, while the current study benefitted from a large sample of SGM adolescents across the U.S., it is unknown if these results generalize to other cultural contexts. The U.S. is reported to have generally greater acceptance toward people with SGM identities than other countries, though is not among the most accepting (Flores, 2019). Future research on SGM adolescents' feelings about their identity in more- and less-accepting cultural climates will be especially important to further this research. The sample was also recruited from a community organization that provides resources to SGM youth; as such, the sample may be biased toward youth in more supportive environments and who are able to access SGM resources. Additionally, in 2017, at the time of data collection, general acceptance toward SGM people in the U.S. was on the rise, and a record number of U.S. cities advanced SGM-inclusive policies, yet there was also a barrage of anti-SGM legislation including preventing GM people from using bathrooms and serving in the military (Miller, 2017). This particular cultural context may have affected participants' responses.

Further, the majority of participants (66.9%) were White, which does not reflect the current distribution of racial/ethnic breakdown of individuals in the U.S. (51% White; 25% Latinx; 14% Black; U.S. Census Bureau, 2020). SGM youth with a racial/ethnic minority identity could be particularly vulnerable to disordered eating, as they must contend with both SGM-related and race-related minority stressors. Prior reviews of the literature have echoed the importance of conducting future research addressing intersections of race/ethnicity, gender identity, sexual identity, and other dimensions of identity that may be associated with disordered eating within SGM populations (Parker & Harriger, 2020).

Despite these limitations, our study possesses unique strengths that advance our understanding of SGM youth's mental health. Using a large sample of SGM youth with diverse identities from across the U.S., the results suggest that SGM adolescents' perceptions of their identity may be related to disordered eating, in addition to depressive symptoms and self-esteem. While the current work examined individual factors associated with SGM adolescents' disordered eating, future work ought to explore institutional and societal factors that could mitigate SGM youth's exposure to minority stressors, and, therefore, prevent disordered eating (Parker & Harriger, 2020). For example, schools are encouraged to implement SGM-specific programming, end discriminatory disciplinary practices, adopt inclusive policies, and incorporate SGM-related content into the curriculum (Biegel & Kuehl, 2010).

5 | CONCLUSION

The current study is among the first to examine how both general and SGM-specific factors contribute to SM and GM adolescents' disordered eating. For SM and GM adolescents in the study, depressive symptoms and distress over "coming out" were associated with higher odds of clinical threshold disordered eating, while self-esteem and positive feelings about one's SGM identity were associated with lower odds. By exploring why SGM adolescents are uniquely vulnerable to eating pathology, the current study sheds light on the factors that clinicians, researchers, and caregivers to SGM youth ought to consider when evaluating SGM adolescents' risk for disordered eating.

AUTHOR CONTRIBUTIONS

Savannah Rose Roberts: Conceptualization; formal analysis; writing – original draft; writing – review and editing. **Anne J. Maheux:** Conceptualization; formal analysis; writing – original draft; writing – review and editing. **Ryan J Watson:** Conceptualization; data curation; funding acquisition; investigation; methodology; project administration; resources; supervision; writing – review and editing. **Rebecca Puhl:** Conceptualization; project administration; supervision; writing – review and editing. **Sophia Choukas-Bradley:** Supervision; writing – original draft; writing – review and editing.

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CONFLICT OF INTEREST

The authors have no conflict to declare.

DATA AVAILABILITY STATEMENT

Data availability statement: The data that support the findings of this study are available from the authors upon reasonable request, following completion of a data sharing agreement.

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