



Family Rejection and Cigarette Smoking Among Sexual and Gender Minority Adolescents in the USA

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Abstract

Background Sexual and gender minority (SGM) adolescents are more likely than their heterosexual and cisgender peers to smoke cigarettes. Family rejection has been associated with adverse health outcomes; however, few studies have examined whether SGM-specific family rejection is associated with cigarette smoking among SGM adolescents.

Method A non-probability sample of 11,005 SGM adolescents ($M = 15.58$, $SD = 1.27$) completed an online cross-sectional survey. Bivariate and multivariable analyses were conducted to examine associations between SGM-specific family rejection, sociodemographic variables, and smoking.

Results Approximately 7% of the sample currently smoked cigarettes. Pansexual, asexual, trans boys, and non-binary assigned female at birth adolescents had the highest SGM family rejection scores. In multivariable regression analyses, SGM-specific family rejection was independently associated with smoking after adjusting for covariates (AOR = 1.15, 95% CI 1.04, 1.28). Family support (AOR = 0.80, 95% CI 0.73, 0.88) and experiencing violence (AOR = 1.64, 95% CI 1.49, 1.82) were also associated with smoking in multivariable models. Adolescents who identified as bisexual versus gay/lesbian (AOR = 1.50, 95% CI 1.21, 1.85) and trans boys versus cisgender girls (AOR = 2.05, 95% CI 1.13, 3.71) had an increased odds of smoking. Those who disclosed their sexual orientation identity to most (AOR = 1.95, 95% CI 1.45, 2.63) and all (AOR = 1.60, 95% CI 1.21, 2.11) of their family/parents had increased odds of smoking.

Conclusion Our findings underscore the importance of attending to the role of SGM-specific family rejection and distinctions with SGM adolescents in tobacco prevention and smoking cessation efforts.

Keywords Sexual and gender minorities · Adolescents · Smoking · Family rejection

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Introduction

Evidence suggests that sexual and gender minority (SGM) populations are at elevated risk of tobacco use compared with their heterosexual and cisgender peers. Additional evidence indicates that initiation of tobacco use (e.g., cigarette smoking) emerges in adolescents and continues into adulthood [1–5]. A number of studies illustrate that sexual minority adolescents have higher smoking rates than their heterosexual counterparts [6–9]. Importantly, these early patterns of cigarette smoking also translate into sexual orientation-related disparities in smoking among adults [10–12].

Although existing evidence demonstrates significant differences in cigarette smoking between SGMs and their cisgender and heterosexual peers, accumulating evidence from population-based surveys suggests important variability among SGM subgroups. For example, lesbian and bisexual

women have consistently been found to use a variety of tobacco products at higher rates than heterosexual women; higher use among sexual minority men appears to depend on a number of intersecting characteristics such as age and race [13–17]. Although few nationally representative samples collect information about participants' gender identity, evidence from one probability sample suggests that transgender and gender-expansive individuals (i.e., individuals whose gender identity is different from their sex assigned on their original birth certificate) have almost a 2-fold odds in smoking compared with their cisgender (i.e., individuals whose gender identity is congruent with their sex assigned at birth) counterparts [15]. Results are mixed, though, with one non-probability study finding no differences in cigarette smoking by gender identity [16], whereas another study found that transgender boys had an increased odds of smoking compared with cisgender girls [18].

One potential explanation for higher cigarette smoking prevalence among SGM adolescents is exposure to minority stress [19]. Sexual minority stress and the more recent adaptation of gender minority stress [20] describe the chronic experiences of stress caused by discrimination and violence as a result of one's stigmatized sexual or gender identity. Minority stressors, such as sexual minority-specific violence, have been associated with substance use outcomes [21]. SGM adolescents also typically experience discrimination and victimization from peers, which have been associated with adverse health outcomes [22–24], including substance use outcomes [21].

Although minority stress theory has been used in numerous studies [21], it was developed for adult populations. Goldbach and Gibbs [25] and Katz-Wise, Rosario, and Tsappis [26] describe the importance of SGM-specific family rejection in the experiences of minority stress, and the impact family dynamics can have on SGM adolescents' health [26]. A lack of family support and rejection have been associated with a range of poor health outcomes for SGM adolescents including depression, heavy drinking, and recreational drug use [27–29]. Moreover, the number of rejecting reactions from others upon sexual orientation disclosure has been associated with substance use among sexual minority adolescents [30]. To our knowledge, no studies have examined associations between SGM-specific family rejection and cigarette smoking over and above general family support and SGM-specific violence. Further, to our knowledge, studies have yet to examine whether there are differences in SGM-specific family rejection and cigarette smoking among SGM adolescents on the basis of more contemporary sexual orientation identity labels (e.g., pansexual, asexual) and gender identities (e.g., non-binary). Understanding the unique impact of SGM-specific family rejection on cigarette smoking, and whether these experiences vary across SGM identities,

can inform interventions aimed at reducing tobacco use disparities in this at-risk population [31].

To help guide tobacco prevention and smoking cessation efforts, this study sought to identify whether SGM-specific family rejection was associated with cigarette smoking after adjusting for known confounders. Consistent with prior literature [21, 28], we hypothesized that experiences with SGM-specific family rejection would be associated with an increased odds of cigarette smoking among SGM adolescents. Based on prior literature, we hypothesized that trans boys compared with cisgender girls and bisexual compared with heterosexual adolescents would have greater odds of cigarette smoking [18]; however, we did not have any specific hypotheses regarding differences in SGM-specific family rejection across SGM subgroups.

Methods

Study Overview

Between April and December 2017, data ($N = 17,112$) were collected in partnership with the Human Rights Campaign (HRC) [32, 33]. Eligible participants needed to be 13–17 years of age; be able to read English; identify as lesbian, gay, bisexual, transgender, gender non-conforming, queer, and/or questioning; and live in the USA. Participants were offered compensation in the form of wristbands or raffle entry for an Amazon gift card.

Participants were recruited through HRCs wide-reaching network of community partners (e.g., Youth Link, Trevor Project, Planned Parenthood), as well as social media (Twitter, Facebook, Instagram, Reddit, and Snapchat), with the assistance from social influencers (e.g., Jazz Jennings, Tyler Oakley) who shared the survey link via their social media profiles. The study recruitment methods have also been described elsewhere. Participants provided assent through the Information page of the survey. Participants were informed that their participation was anonymous, was voluntary, and could be terminated at any time. All procedures were reviewed and approved by the Institutional Review Board who granted permission for parental consent to be waived, indicating parental consent would potentially place youth at more risk than waiving the consent.

Participants were excluded from analyses if they were missing data on at least 50% of the survey questions ($n = 6107$). The final analytic sample comprised of 11,005 SGM adolescents, who had complete data on all variables of interest. Participants who were missing data on at least 50% of the survey questions were slightly older in age and more likely to be non-Hispanic White and identify as a cisgender girl. There were no significant demographic differences in SGM-specific

family rejection and smoking status; therefore, we did not employ multiple imputation methods.

Measures

SGM-Specific Family Rejection Participants completed an adapted 4-item family rejection scale, which was originally developed for LGBTQ adolescents [28, 34]. The four questions asked whether the respondent's family had "taunted or mocked you because you are an LGBTQ person," "said negative comments about you being an LGBTQ person," "said bad things about LGBTQ people in general," and "made you feel like you are bad because you are an LGBTQ person." Response options included 0 = Never, 1 = Rarely, 2 = Sometimes, and 3 = Often. These responses were then mean centered using all available data with higher values indicating more family rejection. The scale demonstrated good internal consistency in the sample ($\alpha = 0.93$).

Current Cigarette Smoking Participants were asked two questions about cigarette smoking. First, participants were asked "Have you ever tried cigarette smoking, even one or two puffs?" Second, participants were asked "During the past 30 days, how many days did you smoke cigarettes?" with response options (0 = 0 days, 1 = 1 or 2 days, 3 = 3 to 5 days, 3 = 6 to 9 days, 4 = 10 to 19 days, 5 = 20 to 29 days, 6 = All 30 days). Given the low prevalence of cigarette smoking in this sample, we created a dichotomous past 30-day cigarette smoking measure (any = 1, none = 0) [35], which was based on the current cigarette smoking item in the Youth Risk Behavior Health Survey [36].

General Family Support Participants completed a 3-item scale that assessed family support in general (i.e., your family cares about your feelings, your family has lots of fun together, your family pays attention to you) [37]. Response options included 0 = Strongly Disagree, 1 = Disagree, 2 = Neither, 3 = Agree, and 4 = Strongly Agree. These responses were mean centered to create a scale score such that higher scores indicated more family support. The internal consistency of this scale was adequate ($\alpha = 0.84$).

Disclosure of Sexual Orientation and Gender Identity to Family/Parents Participants completed two items to assess whether they were "out" (had disclosed their identity) to their family/parents about their gender identity or sexual orientation identity, separately. Participants were asked "How many family members/parents currently do you think know you are transgender or non-binary?" and "How many family members/parents currently do you think know of your sexual orientation?" Response options included 0 = None, 1 = A few, 2 = Some, 3 = Most, or 4 = All.

SGM-Specific Violence Participants completed a 3-item scale that assessed experiences with different forms of violence that they attributed to their sexuality and/or gender identity (i.e., verbal insults, threats of physical violence, and objects thrown at you) [33, 38]. Response options included 0 = Never, 1 = Once, 2 = Twice, and 3 = Three or more times. These responses were mean centered to create a scale score such that higher scores indicated more frequent experiences of violence. The internal consistency of this scale was adequate ($\alpha = 0.72$).

Sexual Orientation Identity To assess sexual identity, participants responded to the question "How do you describe your sexual identity?" by selecting one of the categorical options 1 = Gay or Lesbian; 2 = Bisexual; 3 = Straight, that is, not gay; and 4 = Something Else. Selecting option four then prompted the follow-up question "By something else, do you mean..." with responses 1 = Queer, 2 = Pansexual, 3 = Asexual, 4 = Questioning, and 5 = Other. The fifth category of this question prompted respondents to specify their sexual identity via write-in option. Responses from these two questions were recoded into a single categorical measure consisting of options 1 = Gay or Lesbian, 2 = Bisexual, 3 = Straight, 4 = Pansexual, 5 = Asexual, 6 = Questioning, or 7 = Other.

Gender Identity Participants first reported their sex assigned at birth (male/female) followed by their gender identity by responding the question "What is your current gender identity?" with the options to select all applicable responses from these response options: 1 = "Male," 2 = "Female," 3 = "Trans male/Trans boy," 4 = "Trans female/Trans girl," 5 = "Non-Binary," 6 = "Genderqueer/Gender Non-Conforming," or 7 = "Different Identity" (with option to provide an open-ended response). From these two variables, we created a categorical variable for gender identity with the following categories: 1 = Cisgender boy, 2 = Cisgender girl, 3 = Trans boy, 4 = Trans girl, 5 = Non-Binary Assigned Female at Birth (NBAF), 6 = Non-Binary Assigned Male at Birth (NBAM).

Sociodemographic Variables Participants reported their age in years and race/ethnicity from the following categories: White, non-Hispanic, non-Latino; Black or African-American; American Indian or Alaska Native; Asian or Pacific Islander; Latino, Hispanic, or Mexican-American; or Other (with write-in option). A recoded categorical measure was created from these responses, with the categories of 1 = non-Hispanic White, 2 = non-Hispanic Black, 3 = Native American, 4 = Asian American, 5 = Hispanic/Latinx, 6 = Biracial/Multiracial, and 7 = Other. Given the small number of youth of color, we created a dichotomous variable of 1 = non-Hispanic White versus 1 = other racial/ethnic groups. Participants were asked what state they lived

in (at the time of participating in the study); responses were recoded into regions of the USA: 1 = Northeast, 2 = Midwest, 3 = South, 4 = West.

Data Analysis

Descriptive statistics were computed to describe the study sample. We used independent sample *t* tests for continuous variables and Fisher's exact tests for categorical variables in order to assess bivariate differences in SGM-specific family rejection, potential confounders, and current cigarette smoking. Next, we used analyses of variance (ANOVA) to examine differences by sexual orientation and gender identity in reports of SGM-specific family rejection. When a significant difference emerged using ANOVA, post hoc comparisons were made using Tukey's multiple comparison posttests. Subsequently, we fit a multivariable logistic regression model to examine the association between SGM-specific family rejection and cigarette smoking after statistically adjusting for potential confounders with the exception of sex assigned at birth. All analyses were conducted using IBM SPSS Statistics 19.0.

Results

Descriptive Characteristics of the Sample

Descriptive statistics by smoking status are presented in Table 1. Overall, 6.9% of participants reported being a current smoker (i.e., smoking in the past 30 days). Participants ranged in age from 13 to 17 ($M=15.58$, $SD=1.27$). The majority of the sample identified as lesbian/gay (36.7%) or bisexual (33.8%). Nearly half of participants identified as a cisgender girl (44.2%) and a little less than one-quarter identified as non-binary assigned female at birth (22.7%). The majority of the sample reported that they were assigned a female sex on their original birth certificate (75.5%) and identified as non-Hispanic white (66%). Regarding disclosure to family/partners about gender identity, 13.5% ($n=1489$) reported "none," 6.0% ($n=661$) reported "a few," 1.9% ($n=204$) reported "some," 3.1% ($n=338$) reported "most," 6.9% ($n=760$) reported "all," and 68.6% ($n=7554$) reported that the question was "not applicable." For disclosure of sexual orientation identity, 27.3% ($n=3005$) reported "none," 23.2% ($n=2557$) reported "a few," 8.7% ($n=956$) reported "some," 11.3% ($n=1244$) reported "most," 20% ($n=2206$) reported "all," and 9.4% ($n=1037$) reported that the question was "not applicable."

Bivariate Differences by Smoking Status

Current smokers reported higher levels of family rejection compared with non-smokers ($F_{1,10131}=7.55$, $p<0.001$). There were statistically significant differences between cigarette smokers and non-smokers based on family support, SGM-specific violence, age, sexual orientation identity, gender identity, race/ethnicity, geographic region, and disclosure to family/parents based on gender identity and sexual orientation identity. Specifically, smokers reported lower scores on family support compared with non-smokers ($F_{1,10131}=16.21$, $p<0.001$). Smokers reported higher levels of SGM-specific violence than non-smokers ($F_{1,10131}=-10.09$, $p<0.001$). A greater proportion of adolescents who identified as straight ($\chi^2(7)=24.79$, $p<0.001$), a trans boy ($\chi^2(5)=101.9$, $p<0.001$), and non-Hispanic White ($\chi^2(6)=41.16$, $p<0.001$) reported smoking compared with the other sexual orientation, gender identity, and racial/ethnic groups. Additionally, a greater proportion of those who lived in the Midwest smoked compared with other geographic regions ($\chi^2(3)=12.75$, $p<0.01$). Finally, a higher proportion of those who disclosed their gender identity ($\chi^2(5)=60.55$, $p<0.001$) and sexual orientation identity ($\chi^2(5)=55.77$, $p<0.001$) to most or all of their family/parents were smokers compared with those who had not disclosed to their family/parents.

Bivariate Comparisons by SGM-Specific Family Rejection

Table 2 presents bivariate comparisons between sexual orientation and gender identity by SGM-specific family rejection. There were statistically significant differences by sexual orientation identity such that those who identified as Pansexual, Asexual, and Other reported higher scores of SGM-specific family rejection compared with those who identified Gay/Lesbian, Queer, or Questioning ($F_{7,9750}=12.65$, $p<0.001$). Trans boys and non-binary assigned female at birth participants reported higher scores of SGM-specific family rejection compared with cisgender boys and trans girls ($F_{5,9750}=26.68$, $p<0.001$).

Multivariable Analyses Examining Smoking Status

Results of the multivariable logistic regression model are presented in Table 3. Greater SGM-specific family rejection was associated with higher odds of being a cigarette smoker compared with a non-smoker (AOR = 1.15, 95% CI 1.04, 1.28, $p=0.006$). Greater family support was associated with a reduced odds of being a smoker (AOR = 0.80, 95% CI 0.73, 0.88, $p<0.001$). Greater SGM-specific violence (AOR = 1.64, 95% CI 1.49, 1.82, $p<0.001$) and older age were associated with higher odds of being a smoker compared with a

Table 1 Sample characteristics by cigarette smoking status ($N = 11,005$)

	Total	Smoker ($n = 758$)	Non-smoker ($n = 10,247$)	
	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	Test statistic
SGM-specific family rejection	1.07 (0.96)	1.34 (1.02)	1.05 (0.96)	$F_{1,10131} = 7.55^{***}$
General family support	2.43 (1.00)	2.07 (1.03)	2.46 (0.99)	$F_{1,10131} = 16.21^{***}$
SGM-specific violence	0.91 (0.84)	1.40 (0.95)	0.87 (0.82)	$F_{1,10131} = -10.09^{***}$
Age	15.58 (1.27)	15.95 (1.13)	15.55 (1.27)	$F_{1,10131} = 18.80^{***}$
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	Test statistic
Sexual identity				$\chi^2 (7) = 24.79^{***}$
Gay or lesbian	4037 (36.7)	258 (6.4) ^a	3779 (93.6)	
Bisexual	3716 (33.8)	265 (7.1) ^a	3451 (92.9)	
Straight	177 (1.6)	22 (12.4) ^b	155 (87.6)	
Queer	490 (4.5)	31 (6.3) ^a	459 (93.7)	
Pansexual	1534 (13.9)	130 (8.5) ^a	1404 (91.5)	
Asexual	541 (4.9)	21 (3.9) ^a	520 (96.1)	
Questioning	268 (2.4)	16 (6.0) ^a	252 (94.0)	
Other	242 (2.2)	15 (6.2) ^a	227 (93.8)	
Gender identity				$\chi^2 (5) = 101.9^{***}$
Cisgender boys	2303 (20.9)	178 (7.7) ^a	2125 (92.3)	
Cisgender girls	4862 (44.2)	257 (5.3) ^b	4605 (94.7)	
Trans boy	951 (8.6)	135 (14.2) ^a	816 (85.8)	
Trans girl	127 (1.2)	9 (7.1) ^a	118 (92.9)	
Non-binary AFAB	2498 (22.7)	163 (6.5) ^a	2335 (93.5)	
Non-binary AMAB	264 (2.4)	16 (6.1) ^a	248 (93.9)	
Sex assigned at birth				$\chi^2 (1) = 2.33$
Male	2694 (24.5)	203 (7.5)	2491 (92.1)	
Female	8311 (75.5)	555 (6.7)	7756 (93.3)	
Race/ethnicity				$\chi^2 (6) = 41.16^{***}$
White	7259 (66.0)	536 (7.4) ^a	6723 (92.6)	
Black	485 (4.4)	15 (3.1) ^b	470 (96.9)	
Native American	49 (0.4)	10 (20.4) ^b	39 (79.6)	
Asian or Pacific Islander	422 (3.8)	13 (3.1) ^b	409 (96.9)	
Hispanic/Latinx	1116 (10.2)	61 (5.5) ^b	1055 (94.5)	
Multiracial	1491 (13.5)	108 (7.3) ^b	1383 (92.7)	
Other	181 (1.6)	13 (7.2) ^b	168 (92.8)	
Geographical region				$\chi^2 (3) = 12.75^{**}$
Northeast	2007 (18.2)	113 (5.6) ^b	1187 (94.4)	
Midwest	2563 (23.3)	211 (8.2) ^a	2352 (91.8)	
South	4019 (36.5)	227 (6.9) ^b	3742 (93.1)	
West	2416 (22.0)	157 (6.5) ^b	2259 (93.5)	
Gender identity disclosure				$\chi^2 (5) = 60.55^{***}$
None	1489 (13.5)	79 (5.3) ^a	1410 (94.7)	
A few	661 (6.0)	60 (9.1) ^a	601 (90.9)	
Some	204 (1.9)	20 (9.8) ^a	184 (90.2)	
Most	338 (3.1)	44 (13.1) ^b	293 (86.9)	
All	760 (6.9)	85 (11.2) ^b	675 (88.8)	
Not applicable	7554 (68.6)	470 (6.2) ^a	7084 (93.8)	
Sexual identity disclosure				$\chi^2 (5) = 55.77^{***}$
None	3005 (27.3)	137 (4.6) ^a	2868 (95.4)	
A few	2557 (23.2)	154 (6.0) ^a	2403 (94.0)	
Some	956 (8.7)	74 (7.7) ^a	882 (92.3)	
Most	1244 (11.3)	119 (9.6) ^b	1125 (90.4)	
All	2206 (20.0)	188 (8.5) ^b	2018 (91.5)	
Not applicable	1037 (9.4)	86 (8.3) ^a	951 (91.7)	

Fisher's exact tests with different superscript letters differ significantly at $p < 0.05$. AFAB, assigned female at birth; AMAB, assigned male at birth. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

non-smoker (AOR = 1.37, 95% CI 1.27, 1.47, $p < 0.001$). Bisexual respondents (AOR = 1.50, 95% CI 1.21, 1.85, $p < 0.001$) had a greater odds of being smokers compared with gay/lesbian respondents. Trans boys (AOR = 2.05, 95% CI 1.13, 3.71, $p = 0.018$) had an increased odds of being a smoker compared with cisgender girls. Those who identified as non-Hispanic White (AOR = 1.36, 95% CI 1.13, 1.65 $p = 0.001$)

had a greater odds of smoking compared with adolescents of color. Those who had disclosed their sexual orientation identity to most (AOR = 1.60, 95% CI 1.45, 2.63, $p < 0.001$) or all (AOR = 1.61, 95% CI 1.21, 2.11, $p = 0.001$) of their parents/family had a greater odds of smoking compared with those who had not disclosed to their parents/family.

Table 2 Sociodemographic comparisons by SGM-specific family rejection ($N = 11,005$)

	SGM-Specific Family Rejection	
	<i>M</i> (SD)	Test statistic
Sexual identity		$F_{7,9750} = 12.65^{***}$
Gay or lesbian	0.98 (0.96) ^a	
Bisexual	1.09 (0.96) ^a	
Straight	1.09 (1.00) ^a	
Queer	1.04 (0.90) ^a	
Pansexual	1.20 (0.96) ^b	
Asexual	1.23 (0.99) ^b	
Questioning	1.04 (0.93) ^a	
Other	1.31 (0.99) ^b	
Gender identity		$F_{5,9750} = 26.68^{***}$
Cisgender boys	0.93 (0.96) ^a	
Cisgender girls	1.04 (0.95) ^a	
Trans boy	1.29 (0.98) ^b	
Trans girl	0.99 (1.01) ^a	
Non-binary AFAB	1.19 (0.96) ^b	
Non-binary AMAB	1.03 (0.95) ^a	

Post hoc Tukey's means with different superscript letters differ significantly at $p < 0.05$. *** $p < 0.001$

Discussion

This study adds to the growing body of literature focused on health inequities among SGM adolescents. Using a sample of SGM adolescents, we examined whether experiences of SGM-specific family rejection were associated with cigarette smoking. After adjusting for general family support, SGM-specific violence, sexual orientation identity, gender identity, and other sociodemographic factors, experiences of SGM-specific family rejection were independently associated with current cigarette smoking. Overall, these results highlight the importance of family contexts in smoking behaviors among SGM youth and must be addressed in interventions aimed at preventing tobacco use among SGM adolescents.

Consistent with the study hypotheses and prior research [27–30], our results illustrated that experiences of SGM-specific family rejection are associated with greater tobacco smoking for this population. Despite calls to address the family context in SGM adolescent health [26, 45], empirical literature documenting associations between SGM-specific family rejection and health has been scant [28, 34]. In adult samples, minority stressors such as discrimination and internalized stigma have been associated with tobacco smoking [46, 47]. Our study provides novel results regarding SGM-specific family rejection as an important proximal minority stressor in understanding cigarette smoking among adolescents, above and beyond the effects of SGM-related violence and general family support. Consistent with prior research [30], we found that

adolescents who disclosed their gender identity and sexual orientation identity to their families/parents were at increased risk of smoking compared with those who had not disclosed their identity. These results have key implications for practice given the role of families of origin and choice in adolescent health [26]. It is plausible that SGM-specific family rejection may contribute to cigarette smoking as a means to cope with adversity. For example, research has shown that sexual minority adolescents are more likely to be rejected by their families than their heterosexual counterparts [39], which may result in

Table 3 Multivariable logistic regression examining smoking status ($N = 11,005$)

	AOR	95% CI	<i>p</i> value
SGM-specific family rejection	1.15	1.04, 1.28	0.006
General family support	0.80	0.73, 0.88	0.000
SGM-specific violence	1.64	1.49, 1.82	0.000
Age	1.37	1.27, 1.47	0.000
Sexual identity (ref gay/lesbian)			
Bisexual	1.50	1.21, 1.85	0.000
Straight	1.14	0.51, 2.52	0.750
Pansexual	1.25	0.95, 1.64	0.114
Queer	1.08	0.70, 1.66	0.741
Asexual	0.61	0.36, 1.05	0.077
Questioning	1.26	0.67, 2.38	0.479
Other	0.92	0.53, 1.59	0.767
Gender identity (ref cisgender girls)			
Cisgender boys	1.27	1.00, 1.61	0.053
Trans boy	2.05	1.13, 3.71	0.018
Trans girl	1.08	0.43, 2.73	0.868
Non-binary AFAB	1.27	0.72, 2.23	0.415
Non-binary AMAB	0.61	0.26, 1.44	0.258
White (ref person of color)	1.36	1.13, 1.65	0.001
Geographical region (ref West)			
Northwest	0.89	0.67, 1.18	0.421
Midwest	1.22	0.95, 1.55	0.115
South	1.04	0.83, 1.31	0.743
Gender identity disclosure (ref none)			
A few	1.32	1.90, 1.94	0.158
Some	1.21	0.69, 2.14	0.502
Most	1.46	0.94, 2.52	0.093
All	1.44	0.99, 2.07	0.052
Not applicable	1.67	0.93, 3.00	0.088
Sexual identity disclosure (ref none)			
A few	1.19	0.91, 1.55	0.209
Some	1.53	0.96, 2.12	0.110
Most	1.95	1.45, 2.63	0.000
All	1.60	1.21, 2.11	0.001
Not applicable	1.90	0.94, 3.48	0.090

ref, referent group

maladaptive behaviors as a coping response [40]. Similarly, programs that include families are particularly effective for preventing and treating adolescent substance use and abuse [48, 49]. Thus, future research is warranted to examine the family dynamics of SGM adolescents to guide tobacco prevention and smoking cessation efforts.

Importantly, our findings illustrated that SGM-specific family rejection may be an independent pathway through which SGM adolescents were at greater risk for cigarette smoking. Findings help to explain the variation in smoking behaviors among SGM subgroups such that those with sexual identities, specifically asexual, pansexual, and other, as well as those identified as trans boys and non-binary assigned female at birth, had the greatest reports of SGM-specific family violence. Study results highlight the need for targeted family-based prevention and cessation strategies that address and account for the emerging sexual orientation and gender identities among SGM adolescents. Although school policies that protect SGM adolescents from SGM violence and victimization are necessary, they may be insufficient in-and-of-themselves to address elevated rates of cigarette smoking among SGM adolescents. Multilevel and multicontextual interventions that target schools, peers, families, and community contexts, and their nexus, are warranted to adequately address disparities in tobacco smoking among SGM adolescents [26, 41].

Notably, tobacco industries have consistently targeted SGM populations and reinforced binary gender norms [18, 42, 43]. In our multivariable model, trans boys were at a higher risk of being cigarette smokers when compared with cisgender girls. Although somewhat contradictory to prior research, it is plausible that cigarettes may symbolize stereotypically male power and authority [44]. As such, trans boys may be at increased risk of cigarette smoking as a result of societal messages surrounding gender normativity. It is plausible that the young trans boys in this study may be at increased risk of smoking due to desires to be more masculine [18, 42, 43]. Future research is needed to understand the motives for cigarette smoking among young trans boys in order to inform such an intervention.

Limitations

The nature of the sampling strategy, specifically the use of non-probability and snowball sampling, likely limits the generalizability of the study findings. There were some small cell sizes as in the case of race and ethnicity, sexual orientation, and gender identity, which limited our ability to examine differences within these groups. Although our sample demographics are similar to other online studies [50], future research guided by community-based participatory research principles and engaging community stakeholders in research efforts has the potential to reach a more diverse and representative sample of SGM adolescents. The limitations of the sample also preclude our ability to make generalizations to racially

and ethnically diverse samples of SGM adolescents or examine differences between sexual orientation identities. Furthermore, we were unable to look at subgroup differences in the association between SGM-specific family rejection and smoking. This limits our examination into how identities may intersect in ways that impact smoking. The prevalence of cigarette smoking in the sample was low. However, adolescents may have been using other tobacco products, including electronic nicotine delivery systems (e.g., e-cigs) or other combustible products (e.g., little cigars or cigarillos). Unfortunately, the survey did not include questions to assess use of these other products. Moreover, although we used validated measures of cigarette smoking in national probability studies with youth, we were unable to characterize the severity of tobacco dependence. Thus, the use of more nuanced measures of tobacco use is an important area for future research to guide intervention efforts with SGM adolescents. Furthermore, we included all participants in our analyses regardless of whether they had disclosed their sexual or gender identity to their parents/family. It is plausible that participants may be responding based on their perceptions of their parents/family potential reactions. Notably, the results remained the same when we conducted sensitivity analyses among only participants who reported that they had disclosed their sexual or gender identity to their parent/family. Future research is warranted to refine the family rejection scale, such as using cognitive interviews to examine whether there are differences between those who disclosed and experience rejection compared with those who have not disclosed and anticipate rejection. Finally, data were from a one-time cross-sectional study, which also prevents us from determining causality and temporality between SGM-specific family rejection and cigarette smoking, which is an important area for future research.

Conclusions

Previous research in SGM health indicates that adolescents' experiences with SGM-specific family rejection are associated with maladaptive outcomes [21]. Study findings extend prior research by showing that SGM-specific family rejection over and above general family support may represent a unique pathway through which SGM adolescents become vulnerable to cigarette smoking. Given the magnitude of the association between SGM-specific family rejection and cigarette smoking, service providers and public health campaigns should consider the role of families when assessing SGM adolescent health and well-being. The provision of education to families of SGM adolescents may also assist in decreasing smoking risks. Future research is warranted with more racially diverse samples to examine the protective factors within families of origin and those of choice that may mitigate the

associations between SGM-specific family rejection and cigarette smoking among SGM adolescents.

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Compliance with Ethical Standards

All procedures were reviewed and approved by the Institutional Review Board who granted permission for parental consent to be waived, indicating parental consent would potentially place youth at more risk than waiving the consent.

Conflict of Interest The authors declare that they have no conflict of interest.

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