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A Preliminary Examination of the Association between Adolescent Gender Nonconformity and Suicidal Thoughts and Behaviors

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Abstract

Suicidal thoughts and behaviors are a significant health concern for adolescents. Extant research suggests that sexual and gender minority adolescents are a vulnerable population at elevated risk for suicidal thoughts and behaviors, yet to date few studies have examined the unique associations between adolescent gender nonconformity and suicide risk. This study examined data from the Youth Risk Behavior Surveillance Survey ($n = 7730$) to estimate the association between gender nonconformity and high school-aged adolescents' likelihood of endorsing four distinct suicide outcomes: suicidal ideation, suicide plans, any suicide attempts, and single vs. multiple suicide attempts. Multivariate logistic regression analyses were utilized to control for other known risk factors for suicidal thoughts and behaviors, including age, sex, sexual minority status, depression symptoms, and suicidal ideation. Results revealed that gender nonconformity was significantly associated with higher odds of reporting suicidal ideation, suicide plans, and multiple suicide attempts in the past year above and beyond other known risk factors. Gender nonconformity is an understudied vulnerability factor that should be taken into consideration by researchers and clinicians seeking to understand adolescents' risk for suicidal thoughts and behaviors.

Keywords Suicide · Suicidal thoughts and behaviors · Gender nonconformity · Adolescence

Suicidal thoughts and behaviors represent a significant health concern for adolescents across the United States. Suicide is the second leading cause of death among adolescents (Centers for Disease Control and Prevention 2015b). In 2014, the National Action Alliance for Suicide Prevention published a prioritized agenda highlighting the need for more research on vulnerable populations such as sexual and gender minority youth and the identification of novel risk factors for suicide (National Action Alliance for Suicide Prevention: Research Prioritization Task Force 2014). Indeed, a recent meta-analysis indicated that our ability to longitudinally predict risk for suicidal thoughts and behaviors has not improved over the past 50 years of empirical research (Franklin et al. 2017).

A growing body of research suggests that sexual and gender minority youth are a vulnerable population at elevated risk for suicidal thoughts and behaviors. The term sexual minority refers to minority sexual orientations; for example, youth who identify as lesbian, gay, bisexual, pansexual, queer, asexual, and other non-heterosexual identities. In contrast, gender minority refers to minority gender identities or expressions; for example, youth who are transgender, genderqueer, gender non-binary, gender nonconforming, and so on (APA 2015). Gender nonconforming can be used as an umbrella term to describe individuals whose gender, as expressed through the degree of masculinity and femininity in their appearance and mannerisms, diverges from societal stereotypes for their sex assigned at birth (APA 2015; Wylie et al. 2010).

Though sexual and gender minority youth are commonly grouped together (e.g., in the acronym LGBTQ), sexual orientation, gender identity, and gender expression represent distinct components of identity that should not be conflated (APA 2015). Unfortunately, extant data on suicide risk among sexual and gender minority youth have not consistently examined the unique associations between each aspect of identity and suicidal thoughts and behaviors. Data from the 2015 Youth Risk Behavior Surveillance Survey indicate that sexual minority youth are 2.45 times more likely to report suicidal thoughts, 2.59 times more likely to endorse having a suicide plan, and 3.37 times more likely to attempt suicide than heterosexual youth (Caputi et al. 2017). Similarly, transgender youth—individuals whose gender identity differs from their

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sex assigned at birth (Meier and Labuski 2013; APA 2015)—experience elevated risk for suicidal thoughts and behaviors compared to cisgender youth. For example, transgender children are approximately five times more likely to express suicidal ideation and over eight times more likely to harm themselves or attempt suicide compared to a non-clinical control group (Aitken et al. 2016). Though gender nonconforming youth are often grouped with transgender youth under the umbrella term of gender minority, few, if any, studies have explicitly assessed the prevalence of suicidal thoughts and behaviors among gender nonconforming adolescents who may or may not identify as transgender. This is a crucial distinction, as gender nonconformity likely encompasses a larger subset of the population than the estimated 0.7–1.3% of youth who identify as transgender (Connolly et al. 2016).

Gender nonconformity is an important individual characteristic to examine to inform our understanding of adolescents' risk for health risk behaviors. Preliminary data suggests that gender nonconforming adolescents may be more likely to engage in health risk behaviors such as alcohol, tobacco, and illicit drug use than gender conforming adolescents, and, moreover, are more likely to think about, plan, and attempt suicide (Gill and Frazer 2016). Though these data are preliminary, and do not account for other factors that may contribute to suicide risk in particular, they clearly indicate that gender expression is a relevant characteristic to consider when conceptualizing adolescents' risk for health risk behaviors. Minority stress theory (Meyer 2003) informs our understanding of gender nonconforming adolescents' disproportionate risk for suicide and other health risk behaviors. Minority stress theory posits that gender minority youth may experience disproportionate rates of psychological distress and negative health outcomes as a result of chronic, identity-related stressors, such as victimization and expectations of rejection (Meyer 2003; Hendricks and Testa 2012). Importantly, adolescents may experience minority stress related to their gender expression regardless of their sexual orientation.

The primary aim of the current study was to examine preliminary data on gender nonconforming adolescents' risk for suicidal thoughts and behaviors. Experts in suicide research make a distinction between thoughts of suicide (i.e., suicidal ideation), suicide plans, and suicide attempts which have clinically-relevant implications for identifying youth at risk for death by suicide (Silverman et al. 2007). Additionally, research suggests discriminant predictors of each of these forms of suicidal thoughts and behaviors, reflecting the need for comprehensive studies of risk factors associated with each discrete outcome (e.g., Klonsky et al. 2016). Thus, consistent with prior approaches in self-injury science, this study examines the association between gender nonconformity and four separate outcomes: Suicide ideation, suicide plans, any suicide attempts, and single vs. multiple suicide attempts.

Suicidal ideation refers to thinking about engaging in behaviors with the intention of ending one's life, *suicide plans* refer to thinking about a specific method of ending one's life, and *suicide attempts* refers to engaging in self-injurious behaviors with the intention of ending one's life (Nock et al. 2008). Though suicidal thoughts and behaviors are often referred to collectively, the distinction between them is crucial to understanding adolescents' risk for dying by suicide. For example, only one third of adolescents who think about suicide will develop a specific suicide plan, yet 60% of adolescents with a suicide plan will go on to attempt suicide (Nock et al. 2013). Additionally, adolescents who report multiple suicide attempts appear to be a distinct clinical group from adolescents who report a single suicide attempt. A systematic review of the literature found that adolescents who reported multiple attempts endorsed more severe mood symptoms, non-suicidal self-injury, lower levels of social support, lower self-esteem, more emotion dysregulation, and more life stress (Mendez-Bustos et al. 2013). Moreover, the distinction between adolescents who make a single suicide attempt and those who make multiple suicide attempts carries significant clinical implications: multiple-attempters are more likely to make serious suicide attempts (e.g., wishing to die, attempting in a situation where it is unlikely that they will be stopped or helped) and they are over 4 times more likely to attempt suicide again in the future compared to single-attempters (Miranda et al. 2008).

In light of previous research suggesting discriminant risk factors, we examined whether gender nonconformity was associated with elevated risk for suicidal ideation, suicide plans, and suicide attempts after accounting for other known risk and vulnerability factors for suicidal thoughts and behaviors. Additionally, we examined whether gender nonconformity was associated with adolescents' risk for attempting suicide multiple times among those who reported any suicide attempts. This approach allowed us a nuanced perspective on the association between gender nonconformity and suicidal thoughts and behaviors. First, we controlled for depression symptoms in each model as depression is a well-established risk factor for suicidal ideation (e.g., Nock et al. 2013). To date, few studies have identified risk factors for suicidal thoughts and behaviors above and beyond depression symptoms (Prinstein et al. 2008), and thus it is critically important to control for depression symptoms when investigating other characteristics associated with suicide risk. Similarly, we controlled for suicidal ideation in analyses predicting suicide plans, any suicide attempts, and multiple suicide attempts to distinguish whether any association between gender nonconformity and these more severe forms of suicidal thoughts and behaviors exists merely as a function of its association with suicidal ideation. Additionally, we controlled for sexual minority status as sexual minority adolescents are at elevated risk for suicidal thoughts and behaviors (e.g., Caputi et al. 2017;

Marshal et al. 2011). Moreover, sexual minority individuals on average express a higher degree of gender nonconformity than heterosexual individuals (e.g., Rieger et al. 2008), and thus controlling for sexual minority status allowed us to investigate whether gender nonconformity is uniquely associated with heightened vulnerability for suicidal thoughts and behaviors.

We had several hypotheses in this preliminary examination of the association between adolescent gender nonconformity and suicidal thoughts and behaviors. First, across suicide outcome variables, we expected that gender nonconformity would provide an incremental contribution above and beyond sexual minority status. Clearly, not all gender nonconforming adolescents identify as a sexual minority, and gender minority adolescents may face unique minority stress experiences that could contribute to their risk for suicide (Hendricks and Testa 2012). Second, though there is insufficient prior research to make specific hypotheses about the association between gender nonconformity and each type of suicidal thought and behavior, we broadly expected that gender nonconformity would be a relevant characteristic for understanding risk for more severe forms of suicidal thoughts and behaviors. This hypothesis was based on previous research demonstrating that some subsets of gender minority adolescents—namely, transgender adolescents—are at high risk for suicide attempts (e.g., Perez-Brumer et al. 2017). Additionally, we examined the associations between gender nonconformity and reporting multiple suicide attempts among those who reported *any* suicide attempts in light of previous research demonstrating discriminant risk factors for youth who attempt suicide repeatedly compared to those who make single attempts (Mendez-Bustos et al. 2013). Thus, this study will provide an initial examination of the association between gender nonconformity and severe forms of suicidal thoughts and behaviors.

Methods

Participants

Participants in this study were drawn from the Youth Risk Behavior Surveillance Survey (YRBSS) conducted by the Centers for Disease Control and Prevention (CDC). In 2013 and in 2015, the CDC offered an optional measure of gender nonconformity that districts and states could choose to administer in addition to the standard YRBSS battery; gender nonconformity was not included in the national YRBSS battery. In the 2013 and 2015 surveys, several districts administered this measure, including Broward County, FL (2013 and 2015), Chicago, IL (2013 only), and San Diego, CA (2013 and 2015). Participants from these districts were included in this study if they completed the measure of gender nonconformity, yielding a total analytic sample of 7730 adolescents across survey years (4139 from 2013 survey; 3591 from 2015 survey) and districts (see Table 1 for full demographic information). The study sample was comprised of adolescents in the 9th through 12th grades who ranged in age from 12- to 18-years-old. The sample was racially and ethnically diverse: 36.5% Hispanic or Latinx, 31.2% Black or African-American, 21.8% White or Caucasian, and 10.4% other races (e.g., Asian, American Indian/Alaska Native, Native Hawaiian, Pacific Islander, multiracial). The sample predominantly identified as heterosexual (87.2%; Table 1).

Procedure

The procedures of the YRBSS have been described by Brener and colleagues (Brener et al. 2013) and are briefly reviewed here. The YRBSS uses a two-stage cluster sampling design to obtain representative samples. In the first stage, schools within a given school district were randomly sampled based on probabilities determined by the size of the school's population. In the second stage, classes within schools were randomly selected for participation. The procedure for obtaining parental consent in the YRBSS is determined at the local level, though most participating districts utilize a passive parental consent process. Students who agreed to participate completed an anonymous YRBSS questionnaire packet during a single class period at school. The CDC reports that participating schools attempt to provide maximum privacy for students completing questionnaires by spreading out seating within classrooms. The CDC weights data collected within school districts to adjust for student response rate and to reflect the distribution of high school students based on grade, sex, and race/ethnicity.

Measures

For a detailed description of questionnaire development, reliability, and validity for the YRBSS, see Brener and colleagues (Brener et al. 2013).

Covariates The covariates included in this study were sex, age, sexual orientation, and depression symptoms. The YRBSS administered a binary sex variable (i.e., "What is your sex?"; male, female) and an interval age variable (i.e., "How old are you?"). To assess sexual orientation, the YRBSS asked participants to select which of the following identity labels best described them: "Heterosexual (straight)," "gay or lesbian," "bisexual," or "not sure." Participant responses to this item were dummy coded for analyses to examine subgroups of sexual minority youth. Finally, the YRBSS included a one-item brief assessment of depression symptoms by asking "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some of your usual activities?" Thus, this

Table 1 Sample demographic characteristics

Characteristic	Estimated percent of weighted sample	95% Confidence interval
Sex		
Female	50.4	[48.6, 52.2]
Male	49.6	[47.8, 51.4]
Age		
≤ 12 years old	0.2	[0.1, 0.4]
13 years old	0.2	[0.1, 0.3]
14 years old	10.9	[9.0, 13.2]
15 years old	24.1	[21.3, 27.1]
16 years old	25.2	[23.3, 27.1]
17 years old	24.0	[21.3, 27.0]
≥ 18 years old	15.3	[13.1, 17.9]
Grade		
9th	26.3	[21.9, 31.3]
10th	25.8	[22.0, 29.9]
11th	24.0	[20.7, 27.6]
12th	23.9	[20.0, 28.4]
Race/Ethnicity		
White	21.8	[19.3, 24.6]
Black or African American	31.2	[27.1, 35.7]
Hispanic/Latinx	36.5	[32.9, 40.3]
All other races/ethnicities	10.4	[9.3, 11.6]
Sexual orientation identity label		
Heterosexual	87.2	[86.2, 88.2]
Gay or Lesbian	2.7	[2.2, 3.3]
Bisexual	6.1	[5.4, 6.8]
Not sure	4.0	[3.4, 4.6]

Percentages estimated using weighted data and adjusted for complex sampling design

binary variable indicates the presence ("yes") or absence ("no") of significant depression symptoms in the past year.

Gender Nonconformity The single item that the YRBSS provided to assess gender nonconformity was adapted from a measure developed by Wylie and colleagues (Wylie et al. 2010) for use in large-scale surveys. Participants were asked "A person's appearance, style, dress, or the way they walk or talk may affect how people describe them. How do you think other people at school would describe you?" Response options for this item ranged along a 7-point scale of "very feminine" to "very masculine", with the mid-point as "equally masculine and feminine." Participants' response to this single item were coded in relation to their self-reported sex, as the YRBSS did not assess gender identity. Thus, high values indicate a gender expression that is not stereotypically associated with a given sex assigned at birth (e.g., very masculine females, very feminine males).

Suicidal Thoughts and Behaviors The YRBSS included three items to assess suicidal thoughts and behaviors. To assess *suicidal ideation*, participants were asked whether they had seriously considered attempting suicide over the past 12 months; responses indicated the presence ("yes") or absence ("no") of suicidal ideation in the past year. To assess *suicide plan*, participants (not assessed in San Diego, CA in 2015; n = 5392) were asked whether they had made a plan about how they would attempt suicide in the past 12 months; responses indicated the presence ("yes") or absence ("no") of a suicide plan in the past year. Finally, to assess *suicide attempts*, all participants were asked how many times they actually attempted suicide in the past 12 months. For the current study, responses for suicide attempts were coded into three categories: no attempts, single attempt, and multiple attempts (2+).

Data Analysis

The data included in this study were drawn from the YRBSS (Centers for Disease Control and Prevention 2013, 2015a). The YRBSS utilizes a complex sampling design to obtain samples that are representative of the population in which the survey is conducted (e.g., within a district). Thus, it is

necessary to account for this complex design and sample weights in statistical analyses with these data (Bell et al. 2012). Analyses in this study were conducted using the Complex Sampling Module in SPSS Version 24 following the CDC's recommendations for data analyses with the YRBSS (Centers for Disease Control and Prevention 2016). This approach accounted for the complex sample design of the YRBSS and included sample weights. Sample sizes reported are unweighted, and percentages were estimated using weighted data. Survey data from the 2013 and 2015 surveys were combined, as preliminary analyses indicated that survey year did not moderate the association between gender nonconformity and the outcomes of interest.

First, descriptive analyses were conducted to estimate the frequency of gender nonconformity and suicidal thoughts and behaviors. Descriptive information about the degree of gender nonconformity in the sample was examined on a continuous scale (as entered in logistic regressions) as well as in conceptual categories (gender conforming, androgynous, gender nonconforming; e.g., Gill and Frazer 2016). Next, we conducted four univariate logistic regressions to estimate the association between gender nonconformity and each suicide outcome variable (ideation, plans, any attempts, single vs. multiple attempts). Finally, we conducted four multivariate logistic regressions to estimate the association between gender nonconformity and each suicide outcome variable (ideation, plans, any attempts, single vs. multiple attempts) after accounting for relevant covariates. All four dependent variables were dichotomous and indicated the presence relative to the absence of the outcome of interest (i.e., suicide ideation vs. no suicide ideation, suicide plan vs. no suicide plan, suicide attempt(s) vs. no suicide attempts). The dependent variables for the model examining multiple suicide attempts varied slightly: Multiple suicide attempts indicated adolescents who reported two or more attempts compared to those who reported only one attempt (those who reported no suicide attempts were excluded; $n = 585$). These analyses controlled for other known risk and vulnerability factors for suicidal thoughts and behaviors among adolescents, including age, sex, sexual minority status, depression symptoms, and suicidal ideation (Marshal et al. 2011; Nock et al. 2013). To account for possible differences across subgroups of sexual minority adolescents, sexual minority status was entered into models as a series of three dummy codes (i.e., gay/lesbian, bisexual, not sure).

Results

Descriptive Analyses

First, we estimated the frequency of gender nonconformity and suicidal thoughts and behavior. In terms of gender expression, 79.9% (95% CI 78.1–81.5%) of adolescents fell within the gender conforming range (very, mostly, somewhat conforming), 11% (95% CI 10.1–11.9%) were androgynous (equally conforming and nonconforming), and 9.2% (95% CI 8.1–10.3%) fell within the gender nonconforming range (very, mostly, somewhat nonconforming; Table 2). Gender nonconformity varied across sex, and males (estimate = 2.61, $SE = .05$, 95% CI 2.51–2.71) were more gender nonconforming than females (estimate = 2.21, $SE = .03$, 95% CI 2.16–2.26; $p < .001$).

As expected in a population-based sample, suicidal thoughts and behaviors were relatively infrequent. Specifically, an estimated 15.2% (95% CI 14.3–16.2%) of adolescents reported suicidal ideation, 12.8% (95% CI 11.9–13.7%) reported having a suicide plan, 4.7% (95% CI 4.2–5.3%) reported making a single suicide attempt, and 4% (95% CI 3.5–4.6%) reported making multiple suicide attempts over the past year.

Logistic Regression Models of Suicidal Thoughts and Behaviors

Univariate Associations First, we examined the association between gender nonconformity and suicidal thoughts and behaviors in univariate logistic regression models. Gender nonconformity was significantly associated with higher odds of reporting suicidal ideation, plan, and suicide attempts. For each one-unit increase in gender nonconformity, adolescents' odds of reporting suicidal ideation in the past year increased by approximately 23% (OR = 1.23; 95%CI 1.17–1.28), their odds of reporting a suicide plan increased by 22% (OR = 1.22; 95%CI 1.17–1.27), and their odds of reporting suicide attempts increased by 27% (OR = 1.27; 95%CI 1.20–1.35). Finally, gender nonconformity was marginally associated with higher odds of reporting multiple suicide attempts among adolescents who reported any suicide attempts (OR = 1.14; 95%CI 0.98–1.33; $p = .08$).

Suicide Ideation Table 3 presents the results of the four multivariate logistic regression models examining the association between gender nonconformity and suicidal thoughts and behaviors. In the first model, suicide ideation was regressed on depression symptoms, sex, age, sexual minority status, and gender nonconformity. Consistent with prior research, depression symptoms, sex (i.e., female assigned at birth), and sexual minority status were all associated with higher odds of reporting past-year suicidal ideation. Adolescents who identified as gay or lesbian, bisexual, and who were "not sure" about their sexual orientation were all more likely to endorse suicidal ideation than were heterosexual adolescents. After controlling for these known risk and vulnerability factors, gender nonconformity was significantly associated with higher odds of reporting past-year suicidal ideation. Specifically, for each one-unit increase in gender

Table 2 Distribution of gender nonconformity & estimated prevalence of suicide outcomes across gender expression

Gender expression	%(SE) of weighted sample	Suicidal ideation		Suicide plan		Suicide attempts		
		No %(SE)	Yes %(SE)	No %(SE)	Yes %(SE)	None %(SE)	1%(SE)	2+ %(SE)
1	32.3 (0.9)	90.0(0.8)	10.0(0.8)	90.0(0.7)	9.1(0.7)	93.4(0.6)	3.7(0.5)	2.8(0.5)
2	33.2(0.7)	86.2(0.7)	13.8(0.7)	89.1(0.8)	10.9(0.8)	93.3(0.6)	4.3(0.5)	2.4(0.4)
3	14.3(0.5)	81.5(1.3)	18.5(1.3)	84.1(1.1)	15.9(1.1)	90.2(1.1)	5.1(0.8)	4.7(0.7)
4	11.0(0.4)	74.9(1.4)	25.1(1.4)	80.3(2.0)	19.7(2.0)	86.4(1.2)	6.6(1.0)	7.0(1.1)
5	3.4(0.3)	73.5(3.5)	26.5(3.5)	80.3(3.7)	19.7(3.7)	84.0(2.5)	4.0(1.4)	12.0(2.6)
6	2.2(0.2)	83.0(3.5)	17.0(3.5)	86.2(3.5)	13.8(3.5)	82.3(4.0)	8.5(2.8)	9.2(3.5)
7	3.6(0.3)	78.1(3.8)	21.9(3.8)	77.2(3.6)	22.8(3.6)	81.3(4.0)	9.5(3.2)	9.1(2.6)

Percentages estimated using weighted data and adjusted for complex sampling design. Gender expression: 1 = very conforming, 2 = mostly conforming, 3 = somewhat conforming, 4 = equally conforming and nonconforming, 5 = somewhat nonconforming, 6 = mostly nonconforming, 7 = very nonconforming

nonconformity, adolescents' odds of reporting past-year suicidal ideation increased by approximately 17%.[1]

Suicide Plan The second model estimated the association between gender nonconformity and reporting a suicide plan, after controlling for known risk factors (Table 3). Again, as expected, depression symptoms and suicidal ideation were associated with higher odds of endorsing having a suicide plan in the past year. All other covariates—sex, age, sexual minority status—were nonsignificant after controlling for these psychological risk factors. Importantly, gender nonconformity emerged as a significant characteristic associated with higher odds of endorsing a suicide plan in the past year after controlling for depression symptoms, suicidal ideation, sexual minority status, age, and sex. For each one-unit increase in gender nonconformity, adolescents' odds of reporting a suicide plan in the past year increased by approximately 11%.[2]

Suicide Attempts The third model estimated the association between gender nonconformity and reporting suicide attempt(s) in the past year after controlling for the previously specified known risk factors (Table 3). Depression and suicidal ideation in the past year were associated with higher odds of endorsing a single suicide attempt. Additionally, identifying as bisexual was associated with over a twofold increase in odds of endorsing suicide attempts in the past year. Gender nonconformity was not statistically associated with odds of reporting suicide attempts in the past year after controlling for psychological risk factors, sex, age, and sexual minority status.

Multiple Suicide Attempts The fourth model estimated the association between gender nonconformity and reporting multiple suicide attempts in the past year among adolescents who reported any suicide attempts (Table 3). Suicidal ideation was significantly associated with higher odds of reporting multiple suicide attempts in the past year. Finally, consistent with our initial hypotheses, gender nonconformity was significantly associated with higher odds of reporting multiple suicide attempts in the past year, relative to a single suicide attempt, after controlling for psychological risk factors, sex, age, and sexual minority status. For each one-unit increase in gender nonconformity, adolescents' odds of reporting multiple suicide attempts in the past year increased by approximately 19%.

Discussion

Results from this study offer a preliminary assessment of the concurrent associations between adolescent gender nonconformity and suicidal thoughts and behaviors. Few, if any, studies to date have examined gender nonconforming adolescents' risk for suicidal thoughts and behaviors. Moreover, we are unaware of any prior studies that examine suicide risk in this population while controlling for sexual minority status and psychological risk factors for suicide. Thus, this study offers a critical first step highlighting an understudied individual characteristic that may be relevant for identifying youth at risk for suicidal thoughts and behaviors.

Findings from this analysis of YRBSS data suggest that gender nonconformity is an important characteristic for understanding adolescents' risk for reporting suicidal thoughts and behaviors that offers an incremental contribution beyond sexual minority status, depression symptoms, and suicidal ideation. Critically, gender nonconformity was associated with higher odds of adolescents reporting that they had engaged

[1] We re-ran this model excluding adolescents who endorsed having a suicide plan or attempting suicide in the past year, and the effect of gender nonconformity remained significant (*OR* = 1.13; 95% CI 1.04–1.24).

[2] We re-ran this model excluding adolescents who endorsed attempting suicide in the past year, and the effect of gender nonconformity remained significant (*OR* = 1.13; 95% CI 1.05–1.21).

Table 3 Multivariate logistic regression models estimating the association between gender nonconformity and suicidal ideation, plans, suicide attempts, and multiple attempts

	Dependent variables							
	Suicidal ideation		Suicide plan		Suicide attempts		Single vs. multiple suicide attempts[b]	
Independent variables	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI	*OR*	95% CI
Psychological risk factors								
Depression symptoms	9.71***	[8.22, 11.47]	2.23***	[1.74, 2.86]	1.42*	[1.06, 1.91]	1.43	[0.82, 2.48]
Suicidal ideation			20.45***	[15.80, 26.48]	23.53***	[18.70, 29.61]	3.84***	[1.86, 7.92]
Sex								
Male[a]	1		1		1		1	
Female	1.35 **	[1.10, 1.66]	0.96	[0.73, 1.26]	1.26	[0.98, 1.62]	0.81	[0.50, 1.30]
Age	0.94	[0.87, 1.02]	0.98	[0.91, 1.06]	1.03	[0.94, 1.15]	0.93	[0.39, 1.67]
Sexual orientation								
Heterosexual[a]	1		1		1		1	
Gay/Lesbian	1.80*	[1.08, 3.00]	0.89	[0.44, 1.81]	2.15	[0.87, 5.28]	0.40	[0.14, 1.18]
Bisexual	2.16***	[1.66, 2.82]	1.33	[0.92, 1.92]	2.22***	[1.61, 3.08]	0.97	[0.57, 1.65]
Not Sure	2.45***	[1.57, 3.83]	1.16	[0.73, 1.86]	1.28	[0.71, 2.33]	0.81	[0.39, 1.67]
Gender nonconformity	1.17***	[1.11, 1.24]	1.11**	[1.04, 1.19]	1.04	[0.94, 1.15]	1.19*	[1.03, 1.39]

*$p < .05$, **$p < .01$, ***$p < .001$

[a] Reference group. OR stands for odds ratio, CI stands for confidence interval. Psychological risk factors are coded 0 = no and 1 = yes

[b] Model excluded participants who reported that they had not attempted suicide in the past year

in multiple suicide attempts in the past year, even after controlling for depression symptoms and suicidal ideation. This may suggest that gender minority adolescents are particularly at risk for severe forms of suicidal thoughts and behaviors, which may place them at higher risk for dying by suicide. Longitudinal research with adolescents suggests that with each successive suicide attempt, the length of time between suicide attempts decreases and the severity of adolescents' intent (i.e., their wish to die) increases (Goldston et al. 2015). Indeed, the relative risk for future suicide attempts increases by approximately 32% with each successive suicide attempt (Leon et al. 1990). Interestingly, this pattern has also been observed among sexual minority adolescents: Results from a meta-analysis indicate that the relative risk disparity for suicidal thoughts and behaviors between sexual minority and heterosexual youth increases at higher levels of severity of suicidal thoughts and behaviors (i.e., attempts; Marshal et al. 2011). It is unclear why gender nonconformity was not significantly associated with adolescents' broader odds of reporting any suicide attempts in the current study. Gender nonconformity was associated with adolescents' likelihood of endorsing suicide attempts in univariate analyses, and thus it is possible that broader psychological risk factors, such as depression symptoms or suicidal ideation, account for gender nonconforming adolescents' initial vulnerability.

Though the results from this study are clearly limited by the fact that the YRBSS is concurrent and based on self-report, they also provide several meaningful contributions to this emerging area of research. First, these preliminary findings indicate that the disproportionate risk for suicidal thoughts and behaviors among gender minority youth extends beyond transgender adolescents (e.g., Perez-Brumer et al. 2017) to also encompass adolescents with nonconforming gender expressions. This is a crucial insight into the nature and extent of gender minority adolescents as a vulnerable population. Similarly, previous research has indicated that transgender adolescents' elevated risk for suicidal thoughts and behaviors can be partially accounted for by victimization, depression symptoms, and substance use (Clements-Nolle et al. 2006; Goldblum et al. 2012; Perez-Brumer et al. 2017). Results from this study would suggest that these risk mechanisms should also be examined among gender nonconforming adolescents.

Second, results from this study support the notion that gender nonconformity represents an important and unique individual characteristic, and is not merely a proxy for sexual minority status. In multivariate logistic regression models predicting suicide ideation, suicide plans, and multiple suicide attempts, gender nonconformity was significantly associated with higher odds of suicide risk even after controlling for sexual minority status. Conversely, sexual minority status, and bisexual identities in particular, remained significantly associated with risk for suicidal thoughts and behaviors in several of these models. This clearly underscores the fact that sexual orientation and gender expression are distinct dimensions of identity that should both be assessed when identifying

vulnerable populations at risk for suicidal thoughts and behaviors. Indeed, some research suggests that it is gender nonconformity rather than sexual minority status that is concurrently associated with lower levels of subjective and psychological well-being (Rieger and Savin-Williams 2012). Why might gender nonconforming adolescents be a vulnerable population, distinct from sexual minority adolescents? From a theoretical perspective, gender nonconformity is an individual characteristic that, by definition, is a visible expression of identity. In contrast, sexual minority status may or may not be outwardly visible to those in an individual's environment. It is reasonable to hypothesize based on minority stress theory that individuals with visible minority identities may experience more identity-related victimization and harassment (Meyer 2003). Recent research with sexual and gender minority adolescents indicates that gender nonconformity is associated with more frequent interpersonal, identity-related microaggressions (Gartner and Sterzing 2018). Future research should examine how minority stress experiences related to gender nonconformity may contribute to adolescents' risk for suicidal thoughts and behaviors. Finally, it is important to reiterate that the observed associations between gender nonconformity and suicidal thoughts and behaviors are indicators that gender nonconforming adolescents may be a population that is *vulnerable* to suicidal thoughts and behaviors. The effects associated with gender nonconformity in this study were indeed much smaller than those of depression or suicidal ideation, which are likely more proximal *predictors* of suicidal thoughts and behaviors. Future research seeking to identify more robust predictors of suicide (e.g., Franklin et al. 2017) should explore the unique risk factors or mechanisms within vulnerable populations such as gender minority youth.

There are several important limitations to this study. First, all studies using data from the YRBSS are limited by the fact that it is concurrent, self-report, and designed to be a brief assessment of health risk behaviors. The concurrent design precludes an analysis of how potential risk mechanisms, such as depression or victimization, impact risk for suicidal thoughts and behaviors among gender nonconforming adolescents. Due to the nature of the YRBSS, most constructs are assessed through a single, self-reported item; this approach is helpful for providing a broad assessment of health risk behaviors, yet is less useful for obtaining a more nuanced understanding of risk among vulnerable populations. For example, the single item assessing gender nonconformity offered a brief screening of adolescents' gender expression, yet could not provide a more specific or nuanced assessment. The continuous response options offered an opportunity to adolescents to describe their gender expression on a spectrum, but did not offer a fine-grain distinction between adolescents. Although this item was initially developed for use in large, population-based surveys (Wylie et al. 2010), future research is needed to validate its specificity in measuring the complex construct of gender nonconformity. Similarly, the single, self-report items assessing suicidal ideation, plans, and attempts are not ideal for the measurement of suicidal thoughts and behaviors. The items included in the YRBSS do not provide a careful assessment numerous factors related to suicide risk, such as adolescents' intent to die or the distinction between aborted, interrupted, or actual suicide attempts. Previous research has indicated that participants' suicide attempt history may be misclassified if it is assessed using a single item. In one study examining college-age students who endorsed a history of a suicide attempt, only 60% met criteria for a suicide attempt when assessed via clinical interview (Hom et al. 2016). The remaining participants were more accurately classified in a clinical interview as having suicidal ideation (17%), non-suicidal self-injury (13%), aborted attempts (7%), and interrupted attempts (3%). Thus, although it may only be feasible to include single-item assessments of suicidal thoughts and behaviors in large scale surveys such as the YRBSS, it is important to recognize the potential limitations of this approach. Future research that includes a more thorough assessment of suicidal thoughts and behaviors could further elucidate gender nonconforming adolescents' vulnerability to suicidal thoughts and behaviors.

Second, the YRBSS only assesses sex assigned at birth and does not assess gender identity—sex assigned at birth and gender identity do not necessarily align for all adolescents (APA 2015). This limited our ability to appropriately interpret adolescents' responses to the item about their gender expression, as we had to code gender nonconformity relative to participants' sex assigned at birth. Thus, it is possible that our analyses may have inaccurately represented gender expression for adolescents who were transgender or non-binary. For example, a transgender female may have been statistically coded as highly gender nonconforming (i.e., very feminine male assigned at birth), when her real-world gender expression was highly conforming. Unfortunately, with the data available from the YRBSS there is no way to determine how many transgender or gender non-binary may have been included in this sample. The current best practices for identifying transgender individuals in large-scale surveys involved a "two-step" approach in which participants are first asked to report their sex assigned at birth and secondly asked to report their current gender identity (GenIUSS Group 2014). Finally, this study was limited to a small subset of school districts that chose to administer the optional additional measure of gender expression. As such, the results are only representative of the included school districts. Sexual orientation was not included as part of the standard YRBSS questionnaire that is administered nation-wide until 2015. Clearly, gender expression is an equally important individual characteristic to assess to inform our understanding of adolescent health, and should be strongly considered for inclusion in the national YRBSS questionnaire in the future. Inclusion of this individual characteristic in

population-based surveys of adolescent health would also offer important opportunities for future research to examine the experiences of individuals with intersecting minority identities, such as gender nonconforming racial or ethnic minority youth or gender nonconforming sexual minority youth.

In conclusion, this study offers an important initial understanding of the association between adolescent gender nonconformity and suicidal thoughts and behaviors. The assessment of gender nonconformity offers incremental value above and beyond sexual minority status, and should be considered by investigators and practitioners working with youth at risk for suicidal thoughts and behaviors. Future research should examine the association between gender nonconformity and suicide risk using longitudinal methods to explicate the unique risk factors and mechanisms contributing to this risk disparity.

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Compliance with Ethical Standards

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

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from parents of all individual participants included in the YRBSS.

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