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Gender Minority Social Stress in Adolescence: Disparities in Adolescent Bullying and Substance Use by Gender Identity

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Abstract

Bullying and substance use represent serious public health issues facing adolescents in the U.S. Few large-sample national studies have examined differences in these indicators by gender identity. The Teen Health and Technology Study (N=5,542) sampled adolescents 13–18 years-old online. Weighted multivariable logistic regression models investigated disparities in substance use and tested a gender minority social stress hypothesis, comparing gender minority youth (i.e., who are transgender/gender nonconforming and have a gender different from their sex assigned at birth) and cisgender (i.e., whose gender identity or expression matches one's sex assigned at birth). Overall, 11.5% of youth self-identified as gender minority. Gender minority youth had increased odds of past-12 month alcohol use, marijuana use, and non-marijuana illicit drug use. Gender minority youth disproportionately experienced bullying and harassment in the past 12 months, and this victimization was associated with increased odds of all substance use indicators. Bullying mediated the elevated odds of substance use for gender minority youth compared to cisgender adolescents. Findings support the use of gender minority stress perspectives in designing early interventions aimed at addressing the negative health sequelae of bullying and harassment.

Keywords

transgender; gender nonconforming; adolescent; substance use; bullying; health disparity

Understanding and thereby reducing health disparities is a core aim of Healthy People 2020 (U.S. Department of Health and Human Services [U.S. DHHS], 2010). Health disparities are defined as "particular types[s] of difference[s] in health … in which *disadvantaged social*

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groups—such as the poor, racial/ethnic minorities, women, or other *groups who have persistently experienced social disadvantage or discrimination*—systematically experience worse health or greater health risks than more advantaged social groups" (Braveman, 2006). Although national studies are generally lacking – and this is especially true for adolescents – regional studies suggest that people who are gender minority are significantly affected by health disparities (e.g., Bradford, Reisner, Honnold, & Xavier, 2013; Clements-Nolle, Marx, & Katz, 2006; Conron, Scott, Stowell, & Landers, 2012; Xavier, Bobbin, Singer, & Budd, 2005). The term *gender minority* refers to transgender and 'gender nonconforming' people whose gender identities or gender expressions fall outside of the social norms typically associated with their assigned sex at birth (Hendricks & Testa, 2012). Definitions of *transgender* and *gender nonconforming*, as well as the diverse gender identities and expressions that comprise these categories, vary by geographic region, individual and subgroup communities, and continue to dynamically evolve over time (Institute of Medicine [IOM], 2011). Here, we define transgender people as those who have a gender identity different from their assigned sex at birth (e.g., assigned a male sex at birth and identify as female) (Substance Abuse and Mental Health Services Administration [SAMHSA], 2001). People who identify in a way that may not fit into binary (i.e., exclusively male or female) gender categories, or who feel they embody both or neither gender (e.g., genderqueer, bigender, pangender) we refer to as gender nonconforming. *Gender minority* is conceptually distinct from the term *sexual minority*, which describes sexual or romantic attractions (Savin-Williams & Cohen, 2004) and refers to people who are not exclusively heterosexual (e.g., lesbian/gay, bisexual, mostly heterosexual, or queer; or who experience same-gender attraction or engage in same-sex behavior, regardless of how they identify). In contrast, gender minority people can be attracted to people of any gender, and have diverse sexual orientation identities (IOM, 2011). *Cisgender* refers to having a gender identity or expression matching one's sex assigned at birth (i.e., non-transgender).

Substance Use as an Indicator of Health Disparity in Gender Minority Youth

Substance use and abuse represents a serious public health issue in the United States, especially among adolescents (Johnston, O'Malley, Bachman, & Schulenberg, 2010; SAMHSA, 2011) because of the social, physical, mental, and public health costs, including: school absenteeism, teenage pregnancy, sexually transmitted infections including HIV, motor vehicle fatalities, crime, suicide, and substance dependence (U.S. DHHS, 2012). In addition, adolescent-onset substance use can represent a distinct developmental trajectory of risk for substance use disorder (e.g., Clark, Kirisci, & Tarter, 1998; Ellickson, Tucker, & Klein, 2003; Tucker, Ellickson, Orlando, Martino, & Klein, 2005).

Community-based convenience samples demonstrate that gender minority youth report high prevalence of substance use (e.g., Garofalo, Deleon, Osmer, Doll, & Harper, 2006; Russell, Ryan, Toomey, Diaz, & Sanchez, 2011). For example, in a community-recruited study of 51 male-to-female transgender youth, the prevalence of recent substance use was 65% for alcohol, 71% for marijuana, and 23% for non-marijuana illicit drug (Garofalo et al., 2006). In comparison, among general high school students sampled in the national 2011 Youth Risk Behavior Surveillance, prevalence of substance use was lower, with 39% reporting

alcohol and 23% marijuana use in the past 30 days, and 3% to 9% reporting lifetime use of non-marijuana illicit drugs (Center for Disease Control [CDC], 2012).

A Gender Minority Social Stress Perspective

Health disparities, particularly mental health disparities, are commonly conceptualized within a social stress model (Horwitz, 1999; Miranda, McGuire, Williams, & Wang, 2008; Schwartz & Meyer, 2010). This paradigm posits that one's disadvantage in the social hierarchy leads to more stressful conditions and fewer resources, thereby resulting in greater rates of mental disorder (Horwitz, 1999; Thoits, 1999; Wheaton, 1999). Research in lesbian, gay, and bisexual (LGB) health has drawn upon an iteration of this model, sexual minority stress theory (Meyer, 2003; Hatzenbuehler, 2009; Herek, Gillis, & Cogan, 2009; Rosario, Schrimshaw, Hunter, & Gwadz, 2002), to understand the elevated prevalence of substance use for sexual minorities compared to heterosexuals. This theory attributes mental health disparities to added stressors that come with membership in a stigmatized minority group. For example, high rates of bullying, harassment, violence and victimization from peers and family, and discrimination from the world at large (Austin et al., 2008; Balsam, Rothblum, & Beauchaine, 2005; Berlan, Corliss, Field, Goodman, & Austin, 2010; Friedman et al., 2011; Gordon & Meyer, 2007; Reisner, Falb, VanWagenen, Grasso, & Bradford, 2013) are conceptualized as "distal" objective stressors which disproportionately affect sexual minorities relative to heterosexuals. These stressors may lead LGB youth to use substances as a coping or avoidance strategy (Meyer, 2003), thereby leading to higher prevalence of substance use among sexual minority youth on a population-level, and to potentially greater burden of substance abuse in LGB communities relative to heterosexuals. "Proximal" stressors refer to subjective minority stressors such as anticipated stigma or internalized homophobia (Herek et al., 2009; Meyer, 2003). These are also theorized to affect LGB youth and lead to increased substance use behaviors. Other processes, such as within-group sexual minority identification, may also support substance use behaviors through socialization and health behavior norms existing within LGB communities (Meyer, 2003). This minority social stress framework could be applied to gender minorities as well, wherein objective social stressors would contribute to elevated risks of substance use among transgender and gender nonconforming adolescents compared to cisgender adolescents. However, the application of a gender minority stress framework to substance use among adolescents has not yet been empirically tested.

Bullying and Health

Applications of a gender minority stress framework to epidemiologic and social science research are in its nascence - especially with regard to transgender and gender nonconforming adolescents. The role of bullying as an external social stressor in the lives of adolescents and its effects on health indicators (e.g., substance use) for gender minority youth remains understudied. Bullying represents a pervasive public health issue among U.S. teens (Nansel et al., 2001). Among the general adolescent high school student population sampled in the 2011 Youth Risk Behavior Surveillance (YRBS), 20.1% reported past-12-month bullying on school property and 16.2% were electronically bullied through e-mail, chatrooms, instant messaging, websites, or texting (CDC, 2012). Bullying has been

associated with worse school functioning (e.g., Ybarra, Diener-West, & Leaf, 2007), as well as with poorer psychosocial adjustment and adverse health behaviors (e.g., Gini & Pozzoli, 2009; Schneider, O'Donnel, Stueve, & Coulter, 2012; Nansel et al., 2001).

Gender minority youth experience high rates of bullying, harassment, and other types of peer victimization (Greytak, Kosciw, & Diaz, 2009; Grossman & D'Augelli, 2006, 2007; Grossman, D'Augelli, & Frank, 2011; McGuire, Anderson, Toomey, & Russell, 2010; Russell et al., 2011; Toomey, Ryan, Diaz, Card, & Russell, 2010). For example, as part of GLSEN's National School Climate Survey, 705 middle and high school transgender students were sampled during the 2010–2011 academic school year. The study found that in the past year, 75% of these transgender students reported being regularly verbally harassed, 32% regularly physically harassed (e.g., pushed, shoved), and 17% regularly physically assaulted (e.g., punched, kicked, or injured with a weapon) because of their gender expression (Kosciw, Greytak, Bartkiewicz, Boesen, & Palmer, 2012). Bullying has been associated with worse school functioning for transgender youth, including increased school absenteeism, lower academic performance, and decreased future educational aspirations (Greytak et al., 2009; Grossman & D'Augelli, 2006; McGuire et al., 2010).

Methodological weaknesses

There are virtually no national, representative sample studies of gender minority health in the U.S., especially of transgender adolescents, given that national surveillance systems such as the YRBS do not routinely include survey items to identify transgender respondents or respondents that identify outside a binary gender (IOM, 2011). Instead, most transgender health studies utilize a sample of transgender people in a particular locale, typically an urban area; and/or lack a cisgender (non-transgender) and/or non-sexual minority identified comparison group. As such, our understanding of transgender youth excludes those who live in rural and suburban settings; and we lack an appreciation for how their experiences are similar and different to non-sexual and gender minority youth. Such comparisons are critical to document health disparities (i.e., differential rates of negative health indicators for disadvantaged compared to advantaged social groups) (Schwartz & Meyer, 2010).

Prior research has investigated substance use behaviors among samples of transgender youths only (Garofalo et al., 2006) or grouped sexual and gender minority adolescents together (e.g., LGBT youth) and compared them to their non-LGBT peers (Cochran, Stewart, Ginzler, & Cauca, 2002). However, to our knowledge, there are no large-scale studies that compare substance use behaviors of transgender and cisgender adolescents, irrespective of sexual orientation. Studies are needed that do not conflate gender identity and sexual orientation identity because these represent conceptually distinct dimensions of identity that may potentially influence health outcomes in divergent ways. Combining gender minority youth (transgender and gender nonconforming) and sexual minority (LGB) youth has historically hidden the unique difficulties that gender minority youth face (National Center for Transgender Equality, 2011). For example, gender minority youth may need specific supports in place to socially, medically, and/or legally transition their gender identity and express who they feel they are. In school, unlike sexual minority youth, gender minority youth may experience stress related to not being referred to by their preferred name

and/or pronoun. They may not have access to safe and appropriate restroom or gym locker room facilities at school (i.e., lack of access to private gender neutral, single stall facilities) and thus may be may be forced to use a bathroom or locker room that does not correspond to their gender identity or expression. These experiences of being denied their preferred name, pronoun, or facility may all lead to increased exposure to teasing and bullying (Kosciw, et al., 2012).

Study Aims and Hypotheses

Few studies have documented substance use-based health disparities for gender minority youth, or linked bullying to substance use-related health outcomes for gender minority youth. Based upon the gender minority stress model, we view bullying and harassment as distal stressors that may lead gender minority youth to use substances as a coping or avoidance strategy. This theorized relationship is presented in Figure 1. As shown, gender minority identity increases adolescents' exposure to bullying and harassment experiences (path "a"), which is an objective social stressor. This activates coping-related behaviors, in this case, substance use behaviors (path "b"). As such, substance use is hypothesized as a health disparity for gender minority youth caused by gender minority stress processes. If the model is supported, then bullying and harassment will explain increased health disparities represented by substance use among gender minority youth (shown as dashed line in path "c"). To examine these hypotheses, we: (1) investigate differences in substance use between gender minority and cisgender youth, thereby filling a gap in the literature by documenting prevalence of substances used by gender identity in a national sample; and (2) test a gender minority social stress pathway (e.g., bullying and harassment experiences) as one potential explanation for anticipated differences in prevalence estimates of substance use by gender identity.

METHODS

Sampling, Participants, and Procedures

Data for the Teen Health and Technology Study were collected online between August 2010 and January 2011 from 5,907 13 to 18 year-olds in the United States. The survey protocol was reviewed and approved by the Chesapeake Institutional Review Board (IRB), the University of New Hampshire IRB, and GLSEN (Gay, Lesbian and Straight Education Network) Research Ethics Review Committee. A waiver of parental consent was granted to protect youth who would be potentially placed in harm's way if their sexual orientation or gender identity was unintentionally disclosed to caregivers.

One of the reasons lesbian, gay, bisexual, transgender, and queer (LGBTQ) youth are understudied is because of sample size challenges due to low base rates (Remafedi, Resnick, Blum, & Harris, 1992), which makes it challenging to randomly identify a representative sample large enough to draw statistically valid conclusions. For example, a recent population-based study of adolescents 13 to 18 years-old (Harris Interactive & GLSEN, 2005) found that about 5% of adolescents identify as LGBTQ or questioning. The Teen Health and Technology Study was designed particularly to address this limitation.

Participants were recruited from two sources: (1) the Harris Poll Online (HPOL) opt-in panel (n=3,989); (2) through referrals from GLSEN (n=1,918).

HPOL is a multimillion-member panel of online respondents. Diverse methods are leveraged to identify and recruit potential panelists, including co-registration offers on partners' websites, targeted emails sent by online partners to their audiences, graphical and text banner placement on partners' websites, trade show presentations, targeted postal mail invitations, TV advertisements, member referrals, and telephone recruitment of targeted populations. HPOL data are comparable to data obtained from random telephone samples of adult populations once appropriate sample weights are applied (Berrens, Bohara, Jenkins-Smith, Silva, & Weimer, 2003, 2004; Schonlau et al., 2004; Taylor, Bremer, Overmeyer, Siegel, & Terhanian, 2001).

A random sample of adolescents, stratified to ensure equal groups of males and females, and older and younger youth, was identified from among four groups of HPOL members: (1) 13 to 18 year-olds; (2) adults with a 13 to 17 year-old in their household; (3) adults with a child under 18 in their household; and (4) a general population of adults. Respondents were invited through password protected email invitations that linked to a survey about their "online experiences". Members who were represented in more than one of the four groups could only be selected once. Invitations to adults noted that the survey was about "health and the Internet" and was intended for a 13 to 18 year-old in the household and asked the adult to forward the survey link to the teen. Invitations were purposefully vague to reduce self-selection bias.

An oversample of LGBTQ adolescents was recruited through GLSEN's referral efforts. Respondents were recruited through: (1) emails sent with the survey link to GLSEN's distribution list which is primarily made up on Gay Straight Alliance groups around the country, and (2) publicizing the survey through targeted advertising on Facebook.[1] In both cases, outreach communications noted that we were conducting a survey about health and the Internet and that we were particularly interested in hearing from sexual and gender minority youth.

The response rate for the HPOL sample was 7.2% and is within range of other surveys (Lenhart, Purcell, Smith, & Zickuhr, 2010; Mitchell & Jones, 2011). The response rate for the GLSEN sample cannot be calculated as the denominator is indeterminable (e.g., it is impossible to know how many youth received but ignored the email). Of the 8,748 HPOL-recruited youth who started the survey, 45.6% (n=3,989) completed the survey. Of the 3,736 GLSEN-recruited youth who started the survey, 51.3% completed the survey (n=1,918).

Procedure

The survey questionnaire was self-administered online. Qualified respondents were defined as: (1) U.S. residents; (2) ages 13 to 18; (3) in 5th grade or above; and (4) who gave informed assent. Internet access and literacy were also necessary for participation. The

[1]While is it possible that a LGBTQ completed the survey through both recruitment methods, the lack of financial incentive reduces this likelihood. Moreover, only 0.6% of respondents had the same cookie as another respondent, suggesting very few surveys were completed on the same computer.

survey was written to be readable at the 4th grade level. The median survey length was 23 minutes for HPOL respondents and 34 minutes for GLSEN respondents. The survey length was longer for participants who identified as sexual or gender minority because they completed additional LGBTQ-specific questions.

Measures

Independent Variables: Gender Minority Identity—Participants were asked about their sex ("What is your biological sex?") and given the response options: "male", "female", and "do not want to answer." Current gender identity ("What is your gender? Your gender is how you feel inside and can be the same or different than the answer you gave above. Please select all that apply.") was captured with the response options: "male", "female", "transgender", "other", and "do not want to answer". Those selecting "other" were given the opportunity to write in how they described their gender. Youth who selected a different response for sex and gender, but did not also select "transgender" for the gender item were given a follow-up question: "Are you of transgender experience?" with responses: "yes", "no", "do not know", and "do not want to answer". Being gender minority was operationalized as indicating any of the following: (1) one's gender identity was transgender; (2) that one was of transgender experience; (3) that one's gender identity was both male and female; (4) that one's gender did not conform to traditional binary categorizations of gender, as indicated in their write-in response (e.g., "genderqueer"); or (5) that one selected "other" for their gender (exclusively or in addition to male or female) but did not provide a write-in response that allowed us to re-categorize them as non-transgender or transgender. Youth with responses (1), (2), (3), (4), and (5) were categorized as gender minority. For the purposes of this paper, both transgender and gender nonconforming youth are considered gender minority youth. All other youth were categorized as cisgender (non-gender minority) youth.

We chose not to statistically compare gender minority and cisgender boys and girls separately, or to empirically parse out differences between transgender and gender nonconforming youth in order to maximize statistical power. We also did not want to assign gender nonconforming youth to a particular gender vector (i.e., female-to-male or male-to-female) based on natal sex, given some of these youth endorsed a gender identity not on the binary of sex-gender identification (e.g., genderqueer) or identified with both genders. Nevertheless, we recognize that there may be gender differences even among gender-minority youth (e.g., transgender girls may have some different experiences than transgender boys) and further research should explore these differences and examine whether gender minority stress theory functions similarly for gender minority youth, regardless of their gender identity.

Outcomes: Past 12-Month Ever and Regular Substance Use—Youth were asked about eight different types of substances, which were then placed into four categories: alcohol use, cigarette smoking, marijuana use, and non-marijuana illicit drug use (e.g., inhalants, prescription drugs, etc.). The collapsing of non-marijuana illicit drug use was implemented to ensure adequate statistical power for analyses, and to be consistent with national reporting (SAMHSA, 2012). Youth were asked if they had ever used each

substance (yes/no). For those who indicated any use, a follow-up question was asked about their frequency of substance use in the past 12 months. Responses were captured on a Likert scale (from 1=every day or almost every day to 5=never in the past 12 months). For each category of substance use, two variables were dichotomously coded: ever use in the past 12 months (ever versus all other), and regular use in the past 12 months (monthly or more frequently versus all other).

Mediator: Past 12-Month Bullying Experiences

Bullying was assessed across five different modes: Respondents were asked how often they had been bullied or harassed in the past 12 months: in person, by phone (call on a cell phone or landline), by text message, online, or some other way. Response options for each question were captured on a Likert-scale ranging from 1=never in the past 12 months to 5=every day or almost every day. A binary indicator for each bullying modality was coded (yes/no). The mediator was operationalized as any bullying in the past 12 months compared to none.

Covariates

Covariates were: age in years (continuous), race/ethnicity (dichotomized as white vs racial/ethnic minority), perceived family socioeconomic status (SES) (i.e., youth perceived their family had “lower” income than the average family vs. their family had “similar” or “higher” income than the average family), and urbanicity (i.e., urban, suburban, or rural).

Weighting and Data Management—Propensity weighting is a well-established statistical technique that minimizes the issue of non-randomness based on known covariates and establishes equivalency for those who are in the sample versus not due to self-selection bias (Rosenbaum & Ruben, 1984; Schonlau et al., 2004; Terhanian & Bremer, 2000). Weighting procedures were used to align the two samples (HPOL and GLSEN) so that they could be combined into one dataset, and subsequently so that the data would behave as if they were nationally representative. First, the HPOL sample was weighted to known demographics of 13 to 18 year-olds based on the 2009 Current Population Survey (CPS). These demographic characteristics included: natal/assigned sex at birth, age, race/ethnicity, parents’ highest level of education, school location, and U.S. region. Next, a demographic profile was created for LGBTQ-identified teens (those who identified as lesbian, gay, bisexual, transgender and/or queer) in the HPOL sample. The profile was applied to the GLSEN-recruited LGBTQ teens and included the above demographic characteristics. This weighting did not bring GLSEN and HPOL LGBTQ teens into alignment; as such, a propensity score was created to adjust for behavioral and attitudinal differences between the two groups. This propensity model was based upon survey items that differed between the two groups: being born-again or evangelical Christian; participation in after-school programs or activities run or organized by school; attending Gay/Straight Alliance (GSA) meetings; parental monitoring of youth’s online activities; past-year history of being bullied or harassed because of being or perceived as being gay, lesbian or bisexual; attending programs or groups for LGBTQ people outside of school; using the Internet to connect with other LGBTQ people; being “out” to their parents (their parents know respondent is LGBTQ); and amount of time spent online using a computer at home. Similar to the

demographic weight, the propensity score weighted GLSEN data to HPOL data. Following standard procedures, extreme weights were trimmed to avoid undue influence on estimates.[2]

Imputation and Sample Size—Respondents who gave valid answers (i.e., not "do not know" answers) for less than 80% of the survey, or those who do not meet valid data requirements (i.e., survey length was less than 5 minutes; self-reported age at the beginning and end of the survey differed by more than one year) were dropped. Then, non-responsive (i.e., "decline to answer") data were imputed using the "impute" command in Stata. In most cases, fewer than 5% of data were imputed. The final data analytic sample included 5,542 youth (93.8% of the original sample).

Data Analysis—The current data analyses were implemented in SAS v 9.3.1. Statistical significance was determined at the alpha 0.05 level. Bivariate weighted analyses first compared gender minority adolescents, cisgender girls, and cisgender boys (referent) on past 12-month substance use outcomes (ever and regular) to document substance use differences by gender identity. Cisgender boys were selected as the referent group for all comparisons to be consistent with national epidemiologic substance use surveillance systems (Center for Behavioral Health Statistics and Quality, 2011). A series of weighted logistic regression models were fit regressing each substance use outcome on gender minority status. Crude (unadjusted) and covariate-adjusted (adjusted for age, race/ethnicity, perceived family SES, urbanicity) models were estimated.

Next, mediational analyses were conducted (Kraemer, Kiernan, Essex, & Kupfer, 2008). Covariate-adjusted models were used to compare gender minority and cisgender girls to cisgender boys on past 12-month bullying/harassment (mediator), our indicator of social stress (path "a" in Figure 1), and to assess the relation between past-12 month bullying/harassment and substance use (path "b" in Figure 1). Lastly, past 12-month substance use outcomes that showed disparities for gender minority youth were regressed on gender identity and any bullying/harassment experiences (yes/no) (mediator), adjusting for covariates. A SAS macro (Hertzmark, Pazaris, & Spiegelman, 2012) was used to quantify meditational effects (percent of effect accounted for; synonymous with a statistical test of indirect effects) and compare the estimates between models with and without bullying (Lin, Fleming, & De Gruttola, 1997).

RESULTS

Past 12-Month Substance Use

As shown in Table 1, the prevalence of ever and regular (i.e., monthly or more frequent) substance use were significantly different by gender identity. Table 2 presents multivariable

[2]Because the GLSEN LGBTQ sample was more than 8 times the size of the HPOL LGBTQ sample, the final weights even after trimming were larger than desired. To examine the possibility that finding are due to extreme weights rather than actual relationships between variables, additional analyses were conducted. An independent random subsample of 597 (only 3 times the size of the HPOL LGBTQ sample) restricted to exclude respondents with the lowest weights (i.e., those overrepresented in the data) was selected from the GLSEN LGBTQ sample and weighted to represent 50% of the combined LGBTQ sample to create a nationally-representative sample of LGBTQ with less extreme weights but a smaller total sample size of LGBQ than the combined sample including all GLSEN LGBTQ. All analyses were then conducted with both combined samples and results compared. Results did not vary enough to warrant different conclusions based on the different samples. Therefore, results using the full combined sample are reported.

weighted logistic regression models documenting disparities in specific substances by gender identity. Compared to cisgender boys, and adjusting for age, race/ethnicity, family SES, and urbanicity, gender minority youth were at increased odds of ever using alcohol, cigarettes, marijuana, and non-marijuana illicit drug use in the past 12 months (ORs range from 1.42 to 1.80; $p < 0.01$), and of regular marijuana and illicit drug use (ORs range from 1.66 to 1.75; $p < 0.01$). Cisgender girls were not significantly different from cisgender boys in their odds of substance use.

Past 12-Month Bullying and Harassment

Gender minority youth reported significantly higher prevalence of past 12-month bullying and harassment in the past year than cisgender youth (Table 3). Compared to cisgender boys in covariate-adjusted models, gender minority youth had approximately four-fold higher odds of experiencing any bullying or harassment in the past year for each communication modality (i.e., in person, phone call, text message, online, and some other way; Table 3). Compared to cisgender boys, cisgender girls were equally likely to report bullying or harassment across modalities. When examined by communication mode, cisgender girls had greater odds of being bullied or harassed online or by text message, but had decreased odds of being bullied or harassed in person. Any bullying in the past 12 months also was associated with ever use (ORs range from 1.81 to 2.58; $p < 0.0001$) and regular use (ORs range from 1.75 to 2.32; $p < 0.0001$) of all substances in the past year for youth (Table 4).

Mediational Models

Findings from mediational analyses are presented in Table 5. Past 12-month bullying either significantly attenuated or rendered the association between gender minority identity and substance use non-significant. It was thus a mediator for substance use outcomes. For example, the disparity in alcohol use for gender minority youth was fully explained when past 12-month bullying was included in the model (43.21% of the effect was accounted for; $p < 0.0001$). For any past 12-month substance use, bullying accounted for 27.7% to 46.8% of the effect for gender minority youth. For regular substance use in the past 12 months, bullying accounted for 26.8% to 32.9% of the effect for gender minority youth. Bullying remained strongly associated with substance use in each model ($p < 0.0001$).

DISCUSSION

Substance use is significantly more common for gender minority youth relative to cisgender youth in this large, national study of 13–18 year-olds surveyed online. Gender minority youth also disproportionately experience bullying and harassment relative to their cisgender peers, both online and offline. As posited based upon a gender minority social stress perspective (Hendricks & Testa, 2012), past 12-month bullying partially accounts for differences in substance use by gender identity. This is consistent with a hypothesis whereby youth who identify as transgender and gender nonconforming use substances to cope with external bullying experiences, conceptualized as a distal “objective” stressor. Thus, a social stress perspective seems informative in understanding substance use disparities for gender minority youth. Future research is needed to examine proximal “subjective” processes (Meyer, 2003), which may also contribute to health disparities for gender minorities. For

example, gender minority youth may use substances to cope with anticipated bullying (i.e., anticipated stigma; Herek et al., 2009) and/or with internalized transphobia they feel inside as a result of bullying victimization experiences. Anticipated stigma and internalized transphobia are two important constructs in minority stress theory (Meyer, 2003) that were not integrated into the current study and should be measured and tested in future research endeavors. Findings provide justification for further investigation into what other negative health behaviors and health outcomes may be informed by the gender minority stress framework.

A social stress model is only one way to interpret the findings. Instead of, or in addition to substance use being a coping strategy used to manage distal and proximal social stressors, gender role socialization may also partly explain elevated prevalence of substance use behaviors for gender minority youth. Gender minority youth may use substances to demonstrate gender nonconformity or conformity to gender roles within the context of negotiating their gender identity. Transgender and gender nonconforming adolescents may have peer or social networks that support and/or reinforce risky health behaviors. Gender nonconforming youth may affiliate or with or have peers who are part of other subcultural non-mainstream groups where higher levels of substance use and substance use permissiveness are part of in-group norms (e.g., Phillips et al., 2011; Sanchez, Finlayson, Murrill, Guilin, & Dean, 2010). Indeed, the desire for affiliation with a peer group may be particularly important for gender nonconforming youth, as research has shown that the most frequent reason youth cite for being bullied is that they “didn’t fit in” (Hoover, Oliver, & Hazler, 1992; Hoover, Oliver, & Thomson, 1993).

Limitations

Findings should be interpreted within these limitations of the data. Bullying was the single stress pathway tested in the current study. Previous research has shown a high prevalence of co-occurring stressors among some gender minorities (e.g., Operario & Nemoto, 2010). Stressors may relate specifically to being a gender minority (e.g., family acceptance, gender identity expression, passing, coming out) and/or may be non-specific stressors that all adolescents negotiate (e.g., autonomy). Increased exposure to multiple stressors and multiple sources of stressors – including physical abuse, sexual violence and other types of victimization by peers, family, and the world at large (Brennan et al., 2012; Greytak et al., 2009; Grossman & D’Augelli, 2006, 2007; Lombardi, Wilchins, Priesing, & Malouf, 2001; Nuttbrock et al., 2010) and/or contextual-related factors like economic and social marginalization (Brennan et al., 2012; Wilson et al., 2009) – may also propel youth to use substances (e.g., avoidant coping; Lazarus & Folkman, 1984). For example, passing (e.g., being perceived as the gender one identifies as) was not assessed in the current study, neither were specific measures of social, medical, or legal dimensions of gender affirmation. It may be that gender minority youth who do not pass experience more stressors, including bullying due to being visibly read as transgender/gender nonconforming (e.g., effect modification by passing). It also may be that there are other factors that account for both increased bullying and increased substance use in gender minority youth – e.g., disabilities, childhood trauma. The current findings might be further pronounced if additional stressors such as these noted above were taken into account. Future research should examine the role

of possible other third confounding variables in accounting for the relationship between a gender minority identity, bullying, and substance use.

Reverse causation represents the most significant threat to causal inference—that substance use could have preceded bullying experiences. The current analyses are limited in that both bullying and substance use were assessed in the past 12 months. Our mediational model made the assumption that bullying experiences occurred temporally prior to or at the least contemporaneously with substance use outcomes. It is possible that substance using youth may experience bullying due to being already on the outside of "popular" peer circles and occupying alternative spaces and identities. This competing explanation cannot be ruled out given the lack of temporal ordering in this cross-sectional survey.

Finally, methodologically, the online administration format of this study required youth be literate and have computer access. This may limit generalizability of findings, particularly among disenfranchised youth who are outside of a traditional educational setting. Still, our study represents a methodological step forward in terms of sampling a large national sample of youth and adding gender identity survey questions in order to assess bullying and substance use by gender minority status.

Implications

Findings from this study suggest that a gender minority stress framework may be useful in understanding substance use disparities between gender minority and cisgender youth. Further investigation into what other negative health behaviors and health outcomes may be informed by the gender minority stress framework is warranted, along with greater theoretical development of the model. For example, gender affirmation—the process by which individuals are affirmed or validated in their gender—has been theorized as a key construct relating to health risks in adult transgender women of color (Sevelius, 2013). How gender affirmation fits into a gender minority stress framework for transgender and gender nonconforming youth represents an area for future theorizing, empirical research, and potential intervention development.

Given the high prevalence of in-person bullying noted in the study, school-based curricula and prevention programs are needed, as are clear and implemented school policies on bullying (Cianciotto & Cahill, 2012; Russell, Kosciw, Horn, & Saewyc, 2010). For example, research has demonstrated that transgender youth in schools with LGBT-related resources, such as LGBT-inclusive curriculum, supportive educators, and LGBT student groups (e.g., Gay-Straight Alliances), are less likely to be bullied at school (Greytak, Kosciw, & Boesen, 2013). These efforts require a school administrative reporting system where bullying incidents can be tracked and monitored. School mechanisms that allow youth to report bullying experienced at school via text and online might ease administrative burden and provide an acceptable reporting mode for adolescents. In addition, it is critical that bullying prevention programs and other efforts to support LGBT youth explicitly address transphobia and gender-based victimization and discrimination. For example, anti-bullying and anti-discrimination policies should not only enumerate specific protections related to sexual orientation, but also those related to gender identity and expression.

Furthermore, consistent with clinical preventive screening guidelines (Solberg, Nordin, Bryant, Kristensen, & Maloney, 2009), pediatricians and adolescent medicine doctors should routinely screen adolescents for bullying and substance use behaviors – and this appears to be particularly crucial for youth who present with a transgender or gender nonconforming gender identity. Our findings bolster the recommendations of the American Academy of Pediatrics, which acknowledges the nexus between bullying and substance use by recommending physicians to ask about bullying when children and adolescents present with tobacco, alcohol, and other drug use (Lyznicki, McCaffree, & Robinowitz, 2004).

More broadly: Despite assumptions that it is uncommon, one in ten (11.1%) adolescents in our sample endorsed a gender minority identity. However, we oversampled for gender minority youth in this study, and there remains little prevalence data on the population of gender minority youth. This well supports the necessity of measuring gender identity in large-scale health survey research with youth and the feasibility of oversampling gender minority youth through community partnerships with LGBT organizations.

Conclusions

This study contributes to our understanding of bullying and substance use behaviors among youth sampled via the Internet. We offer evidence that bullying is associated with substance use behaviors. We also document elevated substance use prevalence in gender minority youth compared to cisgender boys, and show that these disparities are partly a function of increased rates of concurrent or previous bullying. To reduce the widening inequities in health across a variety of social determinants, including gender, the World Health Organization (WHO) recommends that researchers should: “measure and understand the problem and assess the impact of action” (WHO, 2008). Incorporating gender identity items that allow for identification of gender minority youth in national and federal adolescent surveys will allow public health data systems to document and understand a range of health disparities by gender identity and allow for the development of targeted public health efforts that are responsive to the lived realities of adolescent populations at the highest risk of poorer health, which includes transgender and gender nonconforming youth. The potential ‘cost’ in the few survey items that will need to be added are far outweighed by the public health benefits of the resulting knowledge.

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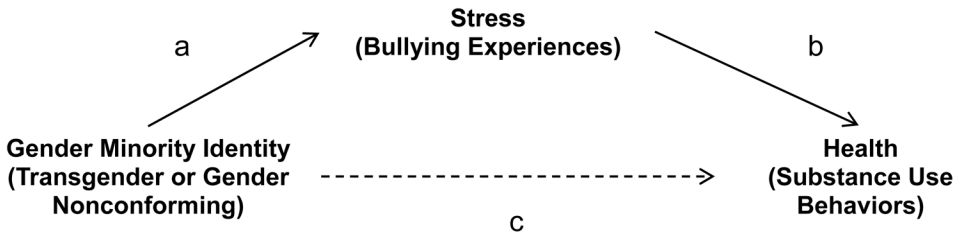

Figure 1.

A Gender Minority Social Stress Model: A Transgender and Gender Nonconforming Identity Increases Gender Minority Adolescents' Exposure to Social Stressors Such as Bullying Which In Turn Affects Coping-Related Health Behaviors, Including Substance Use.

Table 1

Past 12-Month Substance Use Behaviors, Bullying, and Demographic Characteristics Among Adolescents Sampled Online (n=5542) By Gender Identity.

	Cisgender		Gender Minority			
	Boys (n=2260)	**Girls (n=2840)**	**Transgender or Gender Nonconforming (n=442)**	**Weighted Bivariate Statistics[+]**		**Total Sample (n=5542)**
	39.1%	**49.4%**	**11.5%**			**100.0%**
	% (n)	**% (n)**	**% (n)**	**χ2 (df)**	**p-value**	**% (n)**
Outcomes:						
Substance Use, Past 12 Months						
Drink Alcohol						
Ever	38.1 (753)	36.0 (878)	49.2 (213)	28.02 (4)	**<0.0001**	38.3 (1844)
Regular Use	17.8 (339)	15.5 (359)	21.6 (93)	12.63 (4)	**0.013**	17.1 (791)
Smoke Cigarettes						
Ever	20.7 (414)	20.0 (464)	28.6 (123)	16.56 (4)	**0.002**	21.3 (1001)
Regular Use	13.0 (259)	12.3 (274)	17.4 (76)	8.67 (4)	0.070	13.1 (609)
Marijuana Use						
Ever	17.6 (350)	18.8 (433)	27.7 (120)	24.08 (4)	**<0.0001**	19.3 (903)
Regular Use	9.0 (181)	9.8 (218)	14.8 (65)	14.68 (4)	**0.005**	10.1 (464)
Any Non-Marijuana Illicit Drug Use						
Ever	11.9 (218)	11.8 (263)	20.5 (90)	26.91 (4)	**<0.0001**	12.8 (571)
Regular	5.8 (106)	5.6 (122)	10.3 (44)	14.65 (4)	**0.006**	6.2 (272)
Mediator:						
Bullying Experienced, Past 12 Months						
Any Bullying Experience	57.5 (1191)	57.9 (1354)	82.6 (365)	107.83 (4)	**<0.0001**	60.6 (3042)
In Person	52.0 (1084)	48.6 (1250)	75.5 (333)	111.67 (4)	**<0.0001**	53.0 (2667)
By Phone Call	14.1 (278)	15.5 (384)	22.0 (97)	17.93 (4)	**0.001**	15.7 (759)
Via Text Message	16.3 (323)	22.0 (548)	28.0 (125)	44.51 (4)	**<0.0001**	20.4 (996)
Online	28.1 (525)	32.0 (755)	54.3 (240)	112.26 (4)	**<0.0001**	33.0 (1520)
Some Other Way	19.2 (353)	17.4 (406)	33.4 (150)	63.74 (4)	**<0.0001**	20.0 (909)
Covariates:						
Current Age						

	Cisgender		Gender Minority			
	Boys (n=2260)	**Girls (n=2840)**	**Transgender or Gender Nonconforming (n=442)**	**Weighted Bivariate Statistics[+]**		**Total Sample (n=5542)**
	39.1%	**49.4%**	**11.5%**			**100.0%**
	% (n)	**% (n)**	**% (n)**	**χ2 (df)**	**p-value**	**% (n)**
Older (14 and older)	90.5 (1995)	90.0 (2512)	94.6 (415)	12.16 (4)	**0.016**	90.7 (4922)
Younger (13 or below)	9.5 (265)	10.0 (328)	5.4 (27)			9.3 (620)
Race/Ethnicity						
White (Non-Hispanic)	75.8 (1765)	70.8 (2010)	68.1 (301)	20.31 (4)	**0.0004**	72.4 (4076)
Racial/Ethnic Minority	24.2 (495)	29.2 (830)	31.9 (141)			27.6 (1466)
Family Socioeconomic Status (SES)						
Low Income	22.3 (504)	24.5 (686)	30.7 (135)	14.08 (4)	**0.007**	24.3 (1325)
High Income	77.7 (1756)	75.5 (2154)	69.3 (307)			75.7 (4217)
Geographic Context						
Urban	29.7 (648)	29.2 (815)	40.3 (176)	38.20 (8)	**<0.0001**	30.7 (1639)
Suburban	39.7 (904)	40.3 (1128)	32.7 (147)			39.2 (2179)
Small Town or Rural	30.6 (708)	30.5 (897)	27.0 (119)			30.1 (1724)

[+]Weighted bivariate analyses compare gender minority youth, cisgender girls, and cisgender boys.

Table 2

Weighted Multivariable Logistic Regression Models: Documenting Disparities in Adolescent Ever and Regular Past 12-Month Substance Use (Outcomes) By Gender Identity (n=5542).

	Drink Alcohol		Smoke Cigarettes		Marijuana Use		Non-Marijuana Illicit Drug Use	
	Ever	**Regular**	**Ever**	**Regular**	**Ever**	**Regular**	**Ever**	**Regular**
	OR (95% CI)	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Independent Variable:								
Cisgender Boy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cisgender Girl	0.91 (0.80, 1.04)	0.85 (0.71, 1.01)[a]	0.96 (0.82, 1.12)	0.95 (0.78, 1.15)	1.09 (0.93, 1.29)	1.12 (0.90, 1.39)	0.98 (0.80, 1.20)	0.94 (0.71, 1.25)
Gender Minority	**1.45 (1.17, 1.80)****	1.18 (0.91, 1.54)	**1.42 (1.12, 1.81)****	1.32 (0.99, 1.77)[a]	**1.66 (1.30, 2.13)*****	**1.66 (1.21, 2.28)****	**1.80 (1.36, 2.37)*****	**1.75 (1.20, 2.56)****
Covariates:								
Age								
Younger Age (< 14)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Older Age (14 and older)	**3.91 (2.98, 5.12)*****	**2.71 (1.84, 3.98)*****	**2.60 (1.88, 3.62)*****	**2.88 (1.83, 4.53)*****	**3.98 (2.63, 6.02)*****	**2.52 (1.55, 4.11)****	1.37 (0.96, 1.95)[a]	0.93 (0.60, 1.45)
Race/Ethnicity								
Racial Ethnic Minority	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
White (non-Hispanic) Race/Ethnicity	0.95 (0.83, 1.09)	0.94 (0.78, 1.13)	1.08 (0.91, 1.28)	1.22 (0.99, 1.50)[a]	1.08 (0.90, 1.28)	**1.27 (1.00, 1.61)***	**0.78 (0.64, 0.95)***	**0.74 (0.56, 0.97)***
Family Socioeconomic Status								
High Family SES	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Low Family SES	**1.17 (1.01, 1.35)***	1.01 (0.84, 1.22)	**1.28 (1.09, 1.52)****	1.16 (0.95, 1.50)	**1.21 (1.02, 1.44)***	1.07 (0.84, 1.35)	1.18 (0.96, 1.45)	1.02 (0.76, 1.37)
Geographic Context								
Urban	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Suburban	**0.72 (0.62, 0.84)*****	**0.71 (0.58, 0.86)****	**0.71 (0.60, 0.86)****	**0.69 (0.56, 0.86)****	**0.73 (0.61, 0.88)****	**0.71 (0.56, 0.91)****	**0.79 (0.63, 0.98)***	**0.70 (0.52, 0.95)***
Small Town or Rural	**0.79 (0.67, 0.92)****	**0.78 (0.64, 0.96)***	**0.83 (0.68, 0.99)***	**0.78 (0.62, 0.97)***	**0.70 (0.58, 0.86)****	**0.66 (0.51, 0.86)****	**0.73 (0.58, 0.93)***	**0.62 (0.44, 0.86)****

OR=Odds Ratio, 95% CI=95% Confidence Interval.

*$p < 0.05$

**$p < 0.01$

***$p < 0.0001$

[a] $p < 0.10$

Table 3

Weighted Multivariable Logistic Regression Models: Differences in Past 12-Month Bullying (Hypothesized Mediator) By Gender Identity (n=5542).

	Any Bullying Experienced	In Person	By Phone Call	Via Text Message	Online	Some Other Way
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Independent Variable:						
Cisgender Boy	1.00	1.00	1.00	1.00	1.00	1.00
Cisgender Girl	1.02 (0.91, 1.15)	**0.88 (0.78, 0.99)***	1.11 (0.93, 1.33)	**1.46 (1.24, 1.71)*****	**1.21 (1.06, 1.39)****	0.88 (0.75, 1.04)
Gender Minority	**3.58 (2.74, 4.68)*****	**2.93 (2.30, 3.72)*****	**1.68 (1.29, 2.19)****	**1.98 (1.55, 2.53)*****	**3.02 (2.43, 3.75)*****	**2.04 (1.62, 2.58)*****
Covariates:						
Age						
Younger Age (< 14)	1.00	1.00	1.00	1.00	1.00	1.00
Older Age (14 and older)	**0.75 (0.62, 0.90)****	**0.65 (0.54, 0.78)*****	1.09 (0.83, 1.42)	1.11 (0.87, 1.42)	**1.31 (1.06, 1.62)***	1.04 (0.81, 1.34)
Race/Ethnicity						
Racial/Ethnic Minority	1.00	1.00	1.00	1.00	1.00	1.00
White (Non-Hispanic) Race/Ethnicity	**1.27 (1.11, 1.45)****	**1.34 (1.17, 1.54)*****	1.06 (0.87, 1.28)	**1.28 (1.07, 1.54)****	1.16 (1.00, 1.35)^{a}	0.92 (0.78, 1.10)
Family Socioeconomic Status						
High Family SES	1.00	1.00	1.00	1.00	1.00	1.00
Low Family SES	**1.28 (1.12, 1.47)****	**1.25 (1.09, 1.43)****	**1.25 (1.03, 1.50)***	1.18 (0.99, 1.40)^{a}	**1.24 (1.07, 1.44)****	**1.27 (1.07, 1.51)****
Geographic Context						
Urban	1.00	1.00	1.00	1.00	1.00	1.00
Suburban	1.01 (0.88, 1.17)	0.94 (0.81, 1.08)	0.92 (0.75, 1.13)	**0.82 (0.68, 0.99)***	1.03 (0.88, 1.21)	0.96 (0.80, 1.16)
Small Town or Rural	1.08 (0.93, 1.25)	1.06 (0.91, 1.23)	1.04 (0.84, 1.28)	1.07 (0.89, 1.29)	1.05 (0.89, 1.24)	0.92 (0.75, 1.12)

OR=Odds Ratio, 95% CI=95% Confidence Interval.

$^{*}p < 0.05$

$^{**}p < 0.01$

$^{***}p < 0.0001$

$^{a}p < 0.10$

Table 4

Weighted Multivariable Logistic Regression Models: Association Between Past 12-Month Bullying (Hypothesized Mediator) and Ever and Regular Past 12-Month Substance Use (Outcomes) (n=5542).

	Drink Alcohol		Smoke Cigarettes		Marijuana Use		Non-Marijuana Illicit Drug Use	
	Ever	Regular	Ever	Regular	Ever	Regular	Ever	Regular
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Mediator:								
No Bullying Experienced	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Any Bullying Experienced	**2.09 (1.84, 2.37)*****	**1.82 (1.54, 2.16)*****	**2.03 (1.74, 2.38)*****	**1.95 (1.61, 2.37)*****	**1.81 (1.54, 2.12)*****	**1.75 (1.41, 2.17)*****	**2.58 (2.10, 3.18)*****	**2.32 (1.74, 3.11)*****
Covariates								
Age								
Younger Age (< 14)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Older Age (14 and older)	**4.28 (3.62, 5.62)*****	**2.67 (1.95, 4.21)*****	**2.80 (2.02, 3.89)*****	**3.07 (1.95, 4.84)*****	**4.25 (2.81, 6.43)*****	**2.68 (1.64, 4.37)*****	**1.50 (1.05, 2.14)***	1.01 (0.65, 1.57)
Race/Ethnicity								
Racial/Ethnic Minority	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
White (non-Hispanic) Race/Ethnicity	0.91 (0.79, 1.05)	0.92 (0.76, 1.11)	1.04 (0.88, 1.24)	1.18 (0.95, 1.46)	1.03 (0.87, 1.23)	1.22 (0.96, 1.54)	**0.73 (0.60, 0.90)****	**0.70 (0.53, 0.93)***
Family Socioeconomic Status								
High Family SES	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Low Family SES	1.13 (0.98, 1.31)^{a}	0.98 (0.81, 1.18)	**1.25 (1.06, 1.48)****	1.13 (0.92, 1.39)	1.19 (1.00, 1.42)*	1.05 (0.83, 1.33)	1.14 (0.93, 1.41)	0.99 (0.74, 1.33)
Geographic Context								
Urban	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Suburban	**0.70 (0.60, 0.81)*****	**0.69 (0.57, 0.84)****	**0.70 (0.58, 0.84)*****	**0.68 (0.55, 0.85)****	**0.71 (0.59, 0.86)****	**0.69 (0.55, 0.88)****	**0.76 (0.61, 0.95)***	**0.68 (0.50, 0.92)***
Small Town or Rural	**0.76 (0.65, 0.89)****	**0.76 (0.62, 0.94)***	**0.80 (0.67, 0.97)***	**0.76 (0.60, 0.95)***	**0.68 (0.56, 0.83)****	**0.64 (0.50, 0.84)****	**0.70 (0.55, 0.89)****	**0.59 (0.42, 0.83)****

OR=Odds Ratio, 95% CI=95% Confidence Interval.

* $p < 0.05$

** $p < 0.01$

*** $p < 0.0001$

^{a} $p < 0.10$

Table 5

Quantifying Mediational Effects: Estimating the Proportion of Effect Accounted for in the Relation between Gender Minority Status and Substance Use (Outcome) by Any Past 12-Month Bullying (Social Stress Mediator).

	Gender Minority		
	Without Hypothesized Mediator	**With Hypothesized Mediator**	**Proportion of Effect**
	aOR (95% CI)	**aOR (95% CI)**	**Percent (95% CL)**
Any Use, Past 12 Months			
Ever Drink Alcohol	**1.45 (1.17, 1.80)****	1.22 (0.98, 1.53)	**43.21 (27.10, 59.33)*****
Ever Smoke Cigarettes	**1.42 (1.12, 1.81)****	1.22 (0.95, 1.56)	**46.83 (24.27, 69.40)*****
Ever Marijuana Use	**1.66 (1.30, 2.13)*****	**1.46 (1.14, 1.89)****	**27.73 (15.35, 40.10)*****
Ever Non-Marijuana Illicit Drug Use	**1.80 (1.36, 2.37)*****	**1.48 (1.12, 1.97)****	**33.86 (22.13, 45.59)*****
Regular Use, Past 12 Months			
Regular Marijuana Use	**1.66 (1.21, 2.28)****	**1.48 (1.07, 2.04)***	**26.75 (10.55, 42.96)****
Regular Non-Marijuana Illicit Drug Use	**1.75 (1.20, 2.56)****	**1.48 (1.01, 2.17)***	**32.93 (15.75, 50.11)****

aOR=Adjusted Odds Ratio, 95% CI=95% Confidence Interval. Referent for Gender Identity = Cisgender Boys. Cisgender Girls Not Shown (no estimates statistically significant at the alpha 0.05-level). All Models Adjusted for Covariates: Age, Race/Ethnicity (White Non-Hispanic vs Racial/Ethnic Minority), Family Socioeconomic Status (SES) (Low vs High), and Geographic Context (Urban, Suburban, Rural).

Models Without Hypothesized Mediator=Substance use regressed on gender identity and covariates. Models With Hypothesized Mediator=Substance use regressed on gender identity, any past 12-month bullying (mediator), and covariates.

Proportion of Effect: Estimates the percentage of mediation in the relation between gender identity and substance use provided by bullying. The p-value is the probability of rejecting the null hypothesis of no mediation by bullying (test of indirect effects).

*$p < 0.05$

**$p < 0.01$

***$p < 0.0001$

a$p < 0.10$