

A Longitudinal Study of Predictors of Suicide Attempts Among Lesbian, Gay, Bisexual, and Transgender Youth

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Abstract This short-term prospective study examined general and lesbian, gay, bisexual, and transgender (LGBT)-specific risk and protective factors for suicide attempts in an ethnically diverse sample of LGBT youth ($N = 237$, 47.7 % male). A structured psychiatric interview assessed clinical depression and conduct disorder symptoms, as well as past and prospective suicide attempts over a 1-year follow-up period (91 % retention). Participants completed questionnaires measuring general risk factors for suicide attempts, including hopelessness, impulsiveness, and perceived social support. They also completed measures of LGBT-specific suicide risk factors, including gender nonconformity, age of first same-sex attraction, and LGBT victimization. Correlation and multivariate regression analyses were conducted to examine the relations between predictors and suicide attempt, and to identify mediators. Of nine variables examined, seven were related to lifetime history of attempted suicide: hopelessness, depression symptoms, conduct disorder symptoms, impulsivity, victimization, age of first same-sex attraction, and low family support. Depressive symptoms and hopelessness mediated the relation between multiple risk and resilience factors and suicide attempts. Suicide attempt history was the strongest predictor of prospective suicide attempts. Participants who previously attempted suicide (31.6 % of the sample) had more than 10 times greater odds of making another attempt in the 1-year follow-up period than were those who had made no previous attempt. These results highlight the need for

suicide prevention programs for LGBT youth and suggest the importance of addressing depression and hopelessness as proximal determinants and family support and victimization, which have more distal effects.

Keywords Suicide · LGBT · Adolescents · Homosexuality · Sexual orientation

Introduction

Suicide is the third leading cause of death among adolescents and young adults (15–24 years old) in the United States (Centers for Disease Control and Prevention, 2011) and there is some evidence that suicide rates in this group have increased in recent years (Dervic, Brent, & Oquendo, 2008; Spirito & Esposito-Smythers, 2006). Furthermore, a history of suicide attempts has consistently been found to be one of the strongest predictors of future attempts (Goldston et al., 1999; Lewinsohn, Rohde, & Seeley, 1994) and death by suicide (Shaffer et al., 1996). Delineating the processes underlying suicidal behaviors in youth is critical for advancing clinical and prevention efforts, particularly in terms of identifying and targeting those at greatest risk for suicidality, a decidedly pressing issue given the current absence of effective interventions for decreasing suicide reattempts in this age group (Bridge, Goldstein, & Brent, 2006).

Some populations are at greater risk for suicidal behaviors (e.g., suicidal ideation and suicide attempts). Lesbian, gay, bisexual, and transgender (LGBT) youth appear to be one such risk group.¹ The U.S. National Strategy for Suicide

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¹ Throughout the article, the LGBT acronym is used to describe the “LGBT community” or specific study samples that included all LGBT subgroups. The LGB acronym is used for samples that included lesbian, gay, and bisexual participants but did not include or specifically identify transgender participants.

Prevention (U.S. Public Health Service, 2001) and a report of the Institute of Medicine (Goldsmith & Institute of Medicine (U.S.) Committee on Pathophysiology and Prevention of Adolescent and Adult Suicide, 2002) identified LGB youth as a risk population. In the past decade, there has been mounting evidence that adolescent sexual minorities are at greater risk for suicidal behaviors than heterosexual peers (e.g. Kann et al., 2011). Although LGBT youth have not been found to be over-represented in deaths by suicide (Renaud, Berlim, Begolli, McGirr, & Turecki, 2010; Rich, Fowler, Young, & Blenkush, 1986; Shaffer, Fisher, Hicks, Parides, & Gould, 1995), at least 16 studies of lesbian, gay, and bisexual (LGB) youth have reported high rates of suicide attempts, ranging from 20 to 53 % (Haas et al., 2011; McDaniel, Purcell, & D'Augelli, 2001; Savin-Williams, 2001b). Among studies with rigorous school-based sampling designs, all found significantly more suicidal ideation and/or attempts among LGB students than heterosexual peers (reviewed in Haas et al., 2011; McDaniel et al., 2001; Savin-Williams, 2001b). The pattern of results showing differences by sexual orientation in suicide attempts, but not deaths by suicide, may reflect the methodological limitations of performing psychological autopsy studies (King et al., 2008), a tendency to over-report attempts among LGBT youth (Savin-Williams, 2001a), or that LGBT youth may, in fact, be more likely to engage in non-lethal suicide attempt behaviors.

Most studies on suicidality in transgender individuals have focused on those seeking sex reassignment surgery or hormone therapy. However, Grossman and D'Augelli (2007) found lifetime rates of attempted suicide among transgender youth to be around 25 %. Among transgender people of color, risk for suicidality may be higher in youth than in older individuals (Xavier, Bobbin, Singer, & Budd, 2005). Higher rates of attempts and death by suicide have also been found in transgender than heterosexual individuals (Dhejne et al., 2011; Mathy, 2002).

Recently, attention to this issue was reignited by media focus on suicides of several young people in the U.S. (e.g., Parker, 2012), which resulted in the launch of the "It Gets Better" campaign (www.itgetsbetter.org). The campaign's goal was to reduce suicide by LGBT youth with the message that life will get better and therefore suicide is not the proper response to difficult circumstances. Notable contributors to the campaign included President Obama, Secretary of State Clinton, numerous celebrities, and tens of thousands of LGBT individuals.

Although most research has focused on sexual orientation differences in suicide behaviors, several studies have also sought to identify risk and protective factors that may account for the heightened suicide risk in sexual minority populations, which is important for informing the development of prevention and intervention programs. More than 90 % of suicides are associated with mental disorders (Spirito & Esposito-Smythers, 2006) and, as is the case with heterosexual youth, they may increase risk among their LGBT counterparts. A few cross-sectional studies of LGB

youth, utilizing questionnaire measures, have found suicidal thoughts to be associated with anxiety and depression symptoms (D'Augelli, 2002; D'Augelli & Hershberger, 1993; Rosario, Schrimshaw, & Hunter, 2005), and suicidality to be linked with depression symptoms (Safren & Heimberg, 1999). A larger and longitudinal study found associations between suicidal risk and questionnaire measures of depression, conduct disorder symptoms, and eating problems (Wichstrom & Hegna, 2003). A significant limitation of such questionnaire-based measures is that they assess general psychological distress and may overestimate clinical syndromes relative to clinical interviews (Mustanski, Garofalo, & Emerson, 2010). A New Zealand birth cohort study found higher rates of suicide attempts among 28 LGB youth compared to 979 heterosexual youth, with these higher rates associated with depression, generalized anxiety disorder, and substance use disorders as diagnosed through structured clinical interviews (Fergusson, Horwood, & Beautrais, 1999).

In addition to psychiatric diagnoses, several general and LGBT-specific risk and protective factors are worth noting. One general predictor of suicide risk among adolescent sexual minorities that has emerged in several studies is social support, particularly within the family (Liu & Mustanski, 2012; Spirito & Esposito-Smythers, 2006). Hopelessness, a common risk factor for suicidality in heterosexual youth, has also been found relevant to LGB youth (Liu & Mustanski, 2012; Plöderl & Fartacek, 2005; Russell & Joyner, 2001; Safren & Heimberg, 1999; van Heeringen & Vincke, 2000). Some research has found that LGB youth remain at higher risk for attempting suicide than heterosexual youth after controlling for some of these general risk and protective factors (Wichstrom & Hegna, 2003), suggesting the existence of risk factors unique to LGBT youth.

Several LGBT-specific predictors have been explored; studies have linked younger age at coming out (i.e., disclosing sexual orientation) and being more "out" to family and community to increased suicidal ideation and attempts (D'Augelli et al., 2005; Remafedi, Farrow, & Deisher, 1991), whereas others have found the opposite effect (Schneider, Farberow, & Kruks, 1989). Gender non-conformity and LGBT-based victimization also have been linked to suicidality (McDaniel et al., 2001). These LGBT-specific factors may operate by directly increasing risk for suicide or their effects may be mediated by more adolescent-general processes (Hatzenbuehler, 2009; Liu & Mustanski, 2012). Additionally, these risk and protective factors deserve particular attention in LGBT youth because research suggests that these youth may be at higher risk for depression, threats, and victimization, and lower social support (Fergusson et al., 1999; Hatzenbuehler, McLaughlin, & Nolen-Hoeksema, 2008; Russell & Joyner, 2001).

Significant gaps remain in knowledge of suicide risk among LGBT youth. First, the vast majority of studies have relied on cross-sectional designs and self-report assessments of psychopathology symptoms rather than interview-based measures of clinically significant psychopathology. Although

longitudinal cohort studies in general samples of youth have included items about sexual orientation and suicide attempts (Fergusson, Horwood, Ridder, & Beautrais, 2005; Russell & Toomey, 2012; Wichstrom & Hegna, 2003), not a single prospective study of risk factors for suicide attempts has been reported in a cohort of LGBT youth. Longitudinal studies featuring diagnostic interviews are critical for informing clinical and prevention intervention efforts, particularly as they allow for greater confidence in forming inferences about causal pathways between clinically relevant phenomena and suicidality.

Further, the greater generalizability of representative samples has come at the cost of precision in the measurement of sexual orientation, as it is generally not the primary focus of studies utilizing such sampling strategies. For example, some studies have used same-sex behavior to identify LGB youth, which ignores the fact that many youth who report same-sex attractions have not (yet) engaged in same-sex behavior and that not everyone who engages in same-sex behavior identifies as LGBT (see Meyer & Wilson, 2009 on differences in population estimates based on how sexual orientation is defined). Additionally, even very large general samples of youth often have few LGBT respondents, limiting the ability to focus specifically on effects within this group. Another limitation of the extant literature is the lack of data on sexual orientation and suicide among ethnic minority youth; only a few studies have been published among predominantly non-white youth (D'Augelli et al., 2005; Rosario et al., 2005; Rotheram-Borus, Hunter, & Rosario, 1994). Thus, community-based sampling approaches can complement population-based studies in exploring risk/protective factors in diverse LGBT youth.

A third gap in existing research is that most research on risk and protective factors has focused almost exclusively on LGBT-specific risk factors (e.g., homophobia) instead of concurrently studying proven risk factors in the general population (Brent, 2009; Spirito & Esposito-Smythers, 2006). Investigating both sets of variables is important to understand how they may be interrelated. Along these same lines, many studies have included a single predictor instead of simultaneously assessing the effects of multiple risk and protective factors. A multivariate approach allows for the assessment of unique versus overlapping effects. Furthermore, inclusion of multiple variables allows for testing of mediation models. Such tests are particularly useful for informing the development of interventions because they help elucidate pathways and mechanisms of effects.

The current study sought to address these research gaps by examining general and LGBT-specific risk and protective factors cross-sectionally and prospectively in an ethnically diverse sample of LGBT youth. We also aimed to build on previous findings by examining interrelations between risk and resilience factors in accounting for suicide attempts within multivariate and mediational models, thereby providing a more thorough analysis of the processes underlying suicidality in this population. Finally, we provided a methodological

enhancement by using a structured interview-based assessment of suicide attempts and clinical disorders and symptomatology.

Drawing on the literature and several prominent theories of suicide, we hypothesized that we would replicate the effects reported in prior studies of major risk and protective factors from general (Dervic et al., 2008; Spirito & Esposito-Smythers, 2006) and LGBT-specific (Haas et al., 2011) studies. Specifically, hypothesized risk effects featured in several theories of suicide (e.g., Abramson, Metalsky, & Alloy, 1989; Joiner, Brown, & Wingate, 2005; Mann et al., 2005; Van Orden et al., 2010; Wenzel & Beck, 2008) include mood and other psychiatric disorders (e.g., conduct disorder), hopelessness, impulsivity, and past suicide attempts. Hypothesized protective effects included greater family and peer support (Van Orden et al., 2010). Although not directly addressed in these theories of suicide, we predicted that LGBT-specific risk factors (i.e., LGBT-specific victimization, earlier age of same-sex attraction, and childhood gender nonconformity) would be associated with suicide attempts over and above these known general risk and protective factors, given the higher risk for suicidality in LGBT youth. Furthermore, given the literature (Dervic et al., 2008; Spirito & Esposito-Smythers, 2006) and theoretical support (Abramson et al., 1989; Van Orden et al., 2010) for depression and hopelessness as proximal risk factors for suicide, we hypothesized that these two risk factors would at least partially mediate the effects of other risk and protective factors. In the case of LGBT-specific factors, this is consistent with the view that LGBT-specific factors may serve as distal predictors of suicidality through the mediation of more general ones (Hatzenbuehler, 2009).

Method

Participants

Participants were 248 LGBT youth, of whom 237 (47.7 % male) met the age requirement at baseline (ages 16–20) and were included in study analyses.² The mean age of the sample at baseline was 18.76 years ($SD = 1.34$) and 33.3 % were under age 18. As shown in Table 1, the largest percentage of our sample identified as Black/African American (56.1 %), followed by other/multi-racial (18.1 %), White (14.3 %), and Hispanic/Latino (11.4 %). For self-reported sexual orientation, 61.6 % identified as gay/lesbian, 28.7 % bisexual, and 9.7 % other (i.e., questioning, queer, unsure).

Procedure and Design

Relevant institutional review boards approved a waiver of parental permission for minor participants under US 45CFR46.408(c)

² Participants self-reported their age and date of birth at baseline. Identification checks were conducted at a later wave of data collection to confirm date of birth, which resulted in the adjusted sample size.

Table 1 Description of LGBT youth sample at baseline ($N = 237$)

Variable	%	<i>N</i>
Birth sex		
Male	47.7	113
Female	52.3	124
Sexual identity		
Male	42.2	100
Female	48.9	116
Male-to-female transgender	5.5	13
Female-to-male transgender	3.4	8
Sexual orientation		
Gay/lesbian	61.6	146
Bisexual	28.7	68
Questioning/unsure/other	9.7	23
Race		
Caucasian	14.3	34
African American	56.1	133
Hispanic/Latino	11.4	27
Other/multi-racial	18.1	43
Living situation		
Living with parents	59.1	140
Other stable housing	35.0	83
Unstable housing	5.9	14
Highest education		
Less than high school	4.6	11
Partial high school	40.1	95
High school	26.6	63
Partial college	22.8	54
College	5.9	14
Mother's highest education		
Less than or partial high school	12.2	29
High school or partial college	42.6	101
College	33.3	79
Unsure	11.8	28
Father's highest education		
Less than or partial high school	13.5	32
High school or partial college	33.8	80
College	27.0	64
Unsure	25.7	61
Socioeconomic status		
Lower class	22.8	54
Middle class	69.6	165
Upper class	7.6	18

and appropriate mechanisms for protecting youth were put in place (see Mustanski, 2011). In those cases, written informed assent was obtained. For all other participants, written informed consent was obtained at time of enrollment into the study. Prior to participant enrollment, trained research staff used a two-step process to determine decisional capacity to consent. In the initial step, and consistent with research by Dunn and Jeste

(2001), an evaluation was made of prospective participants' understanding of the study goals. As a second step, they were assessed for their capacity to understand, appreciate, reason with, and express a choice about participation using a modified version of the Evaluation to Consent Form (Dunn & Jeste, 2001; Moser et al., 2002; UCSF Task Force on Decisional Capacity, 2003). In cases where the interviewers had doubts about decisional capacity, they were instructed to seek the consultation of the principal investigator before proceeding. Using these procedures, none of the youth were deemed incapable of making an informed decision about participation.

Participants were recruited through a combination of venue sampling (i.e., flyers in neighborhoods frequented by LGBT youth and group listservs; 38 %) and incentivized snowball sampling (i.e., incentivized recruitment of peers by existing participants; 62 %). Data for these analyses were taken from two waves of data collection (baseline and 12-month follow-up) with 91.1 % retention at 12-month follow-up in the overall sample and 89.5 % in the analytic sample. Interviewers administered the structured psychiatric interview and self-report measures were completed using audio computer-assisted self-interview (ACASI) technology. Participants were paid \$40 at each wave.

Measures

Psychiatric Assessment

Prior year DSM-IV symptoms of major depressive disorder (MDD) and conduct disorder (CD) were assessed using the Diagnostic Interview Schedule for Children (DISC) computerized version 4.0 (Shaffer, Fisher, & Lucas, 2004). The DISC is the most widely used structured clinical interview for assessing psychiatric diagnoses in adolescents and is appropriate for use with young adults. The acceptable reliability and validity of the computerized DISC diagnoses and symptom counts have been well-documented. The DISC assesses suicide attempts within the lifetime and most recent 12-month period by asking, "Have you ever, in your whole life, tried to kill yourself or make a suicide attempt?" and "Now thinking about the whole last year—that is, since [NAME EVENT]/[NAME CURRENT MONTH] of last year—have you tried to kill yourself?" Interviewers were advanced psychology students or post-Bachelors-level staff with backgrounds in psychology and experience with LGBT youth. Extensive interviewer training was conducted following the recommendations of Shaffer et al. (2004), and ongoing supervision and observations by a licensed clinical psychologist were used to assure fidelity.

Hopelessness

The 6-item Brief Hopelessness Scale (Bolland, McCallum, Lian, Bailey, & Rowan, 2001) is an adaptation of the Hopelessness Scale for Children (Kazdin, French, Unis, Esveldt-Dawson, &

Sherick, 1983; Kazdin, Rodgers, & Colbus, 1986), designed specifically for use with ethnic minority youth. It was modified to allow for greater sensitivity to response variability by changing item response options from true/false to a 4-point Likert scale (1 = “strongly agree” to 4 = “strongly disagree”), with higher total scores reflecting greater hopelessness. This measure demonstrated adequate internal consistency in the current sample (Cronbach’s $\alpha = .85$). A total score was computed as the mean of all items (e.g., “I might as well give up because I can’t make things better for myself”).

Impulsivity

The Barratt Impulsiveness Scale (BIS-11) is a widely used 30-item measure designed to assess multiple aspects of impulsivity, including motor impulsiveness, perseverance, attention, cognitive instability, cognitive complexity, and self-control (Patton, Stanford, & Barratt, 1995). Participants used a 4-point Likert scale (1 = “rarely/never true of you” to 4 = “almost always/always true of you”) to rate the trueness of each statement (e.g., “I act on the spur of the moment”). A total score was computed by summing all items so that higher scores on this scale are indicative of greater impulsiveness. Its psychometric properties have been well-documented (Stanford et al., 2009) and the Cronbach’s α in the current study was .76. Additionally, higher scores on the BIS-11 have been previously associated with non-suicidal self-harm in adolescents (Janis & Nock, 2009) and suicide attempt history in adult clinical samples (Stanford et al., 2009).

Social Support

The Multidimensional Scale of Perceived Social Support (MSPSS) is a measure of social support that includes 4-item subscales for family support and peer support (Zimet, Powell, Farley, Werkman, & Berkoff, 1990). The multifactor structure of the scale has been supported with confirmatory factor analysis (Canty-Mitchell & Zimet, 2000). In the current sample, the MSPSS demonstrated adequate internal consistency for family (Cronbach’s $\alpha = .90$) and peer support (Cronbach’s $\alpha = .91$). Scores for each of these dimensions were computed by taking the mean of items (e.g., “I can talk about my problems with my family”; “I can count on my friends when things go wrong”) from the 7-point Likert scale (1 = “very strongly disagree” to 7 “very strongly agree”) so that higher scores represent greater social support.

Gender Non-conformity

Childhood gender non-conformity was measured using the 5-item Boyhood Gender Conformity Scale (Hockenberry & Billingham, 1987) in males and a validated 4-item adaptation for girls (Phillips & Over, 1995). The scales consist of items

(e.g., “As a child I preferred boys’ games and toys [soldiers, football, etc.]”) assessing frequency of thoughts and behaviors culturally typified as masculine and feminine on a 7 point Likert scale (1 = “never or almost never true” to 7 = “always or almost always true”). A scale mean was calculated such that higher scores indicated greater non-conformity. The Cronbach’s α was .69 for males and .73 for females.

Age of Same-Sex Attraction

An item from the Sexual Risk Behavior Assessment Schedule for Homosexual Youths (Schrimshaw, Rosario, Meyer-Bahlburg, & Scharf-Matlick, 2006) was used to assess age of first same-sex attraction: “How old were you when you were first sexually attracted to the same sex (in years)?”

LGBT Victimization

A 10-item measure assessed the frequency of lifetime experiences of victimization “because you are, or were thought to be, gay, lesbian, bisexual, or transgender” (D’Augelli, Hershberger, & Pilkington, 1998). Items addressed verbal threats and insults, being chased, having property damaged, and being physically or sexually assaulted. Lifetime frequency ratings range from never (coded 0) to three or more times (coded 3) and a composite of these items was created by taking the mean across items. The Cronbach’s α in our sample was 0.87.

Analytic Strategy

Baseline descriptive statistics were calculated to summarize sociodemographic and primary study variables. Zero-order Spearman correlations were calculated to examine associations between the primary predictor variables of interest and suicide attempts across the lifetime and within the past 12 months, as reported at the baseline visit and the follow-up visit 1 year later. A multivariate logistic regression analysis was conducted and allowed for an evaluation of multiple risk factors for lifetime suicide attempts within a multivariate model. In the regression analyses, we adjusted for two tests on the dependent variable by applying a Bonferroni correction where significance was defined as $p < .025$.

A mediating variable transmits the effect of an independent variable onto a dependent variable (MacKinnon, Fairchild, & Fritz, 2007). Statistically, mediation is one explanation for when an independent variable has a bivariate effect that is attenuated when it is included in a multivariable analysis because its effect is mediated by another variable in the model. Following recommendations by MacKinnon et al. (2007), we tested the significance of mediation effects based on distribution of the “ab” products confidence limits using the PRODCLIN program (MacKinnon & Fritz, 2007). If the 95%

confidence intervals of the product do not include zero, then the mediation effect is considered significant at $p < .05$. Complete mediation, rather than partial mediation, was determined if the effect of the independent variable became non-significant when the mediating variable was included in the model.

Finally, a prospective logistic regression analysis was conducted predicting suicide attempts over the 12-month follow-up period. Variables were included in this prospective analysis if they were significant in the multivariate cross-sectional analyses. Lifetime history of suicide attempts was also included as a predictor in this model.

Results

Recruitment Effects

The majority of participants were peer-recruited and to test for potential recruitment sources effects on our findings, cross-tabulations and chi-square tests were calculated. No recruitment source had consistently higher levels of mental disorders or suicidality and all chi-square tests were non-significant, suggesting no evidence of systematic source effects.

Descriptive Statistics and Group Differences

Table 2 contains descriptive statistics for each variable separately for participants who are male, female, and transgender. Because of the small number of transgender participants ($n = 21$), we collapsed together transgender men and women. Consistent with our previous report (Mustanski et al., 2010),

14 % of participants met DSM-IV criteria for MDD, with symptom counts ranging from 0 to 19, not including the suicide item. In the current sample, 18 % of youth met DSM-IV criteria for CD, with symptom counts ranging from 0 to 22. Approximately one-third of youth (35.4 %) agreed with one or more of the loneliness items and one-quarter (27.0 %) indicated they had minimal family support (i.e., disagreed with at least three of the support items). In addition, the majority of participants (88.2 %) reported experiencing some form of victimization (due to being LGBT) within their lifetime. Significant differences were found between gender subgroups on several primary study variables, including lifetime suicide attempt and suicide attempt in the past year. For each of these suicide attempt outcomes, transgender youth had the highest endorsement, followed by females, and then males. For three suicide risk factors, hopelessness, victimization, and childhood gender non-conformity, transgender youth again had the highest risk scores, but with males next and then females lowest. Therefore, the effect of including gender identity as a covariate in regression analyses was explored. As overall findings did not change when controlling for gender identity, results from the more parsimonious analyses where it is excluded are reported below.

Cross-Sectional Analyses

Potential general and LGBT-specific risk and protective factors for suicide were examined using correlational analyses (see Table 3). In all analyses that included MDD symptomatology, the suicide item was removed so as to avoid artificially inflating any observed relation with suicide attempts. General

Table 2 Descriptives of primary study variables

	% / Mean (SD)				χ^2/t test ^a	<i>p</i>
	Total sample	Gender identity				
		Male	Female	Transgender		
Sample size	237	100	116	21		
Lifetime suicide attempt history	31.6 %	25.0 %	33.6 %	52.4 %	6.82	.04
Suicide attempt in past year	7.2 %	1.0 %	10.3 %	19.0 %	11.84	<.01
Suicide attempt during 12-month follow-up	5.5 %	3.0 %	6.9 %	9.5 %	2.02	ns
MDD symptoms	9.95 (4.36)	9.69 (4.18)	10.09 (4.47)	10.43 (4.77)	<1	ns
Impulsivity	64.76 (10.80)	63.83 (11.57)	65.69 (10.09)	64.00 (10.89)	<1	ns
Hopelessness	1.65 (0.61)	1.64 (0.64)	1.59 (0.56)	2.01 (0.66)	4.22	.02
Family support	4.26 (1.74)	4.41 (1.79)	4.18 (1.72)	4.01 (1.58)	<1	ns
Peer support	5.46 (1.41)	5.48 (1.42)	5.44 (1.40)	5.42 (1.54)	<1	ns
CD symptoms	8.68 (4.60)	9.06 (4.53)	8.24 (4.54)	9.25 (5.24)	1.01	ns
LGBT victimization	0.77 (0.71)	0.86 (0.70)	0.55 (0.59)	1.53 (0.73)	21.61	<.01
Age of same-sex attraction	10.94 (3.82)	10.76 (3.86)	11.25 (3.78)	10.00 (3.80)	1.07	ns
Childhood gender non-conformity	3.13 (1.58)	3.29 (1.45)	2.75 (1.60)	4.55 (1.17)	13.11	<.01

^a Statistics are Chi-square tests for proportions and *t*-test for means for the gender identity subgroups

Table 3 Spearman correlations between primary study variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Lifetime suicide attempt history	–											
2. Suicide attempt in past year	.41***	–										
3. Suicide attempt during 12-month follow-up	.28***	.41***	–									
4. MDD symptoms	.33***	.20**	.10	–								
5. Impulsivity	.17*	.11	.09	.30***	–							
6. Hopelessness	.29***	.23***	.24***	.20**	.28**	–						
7. Family support	–.14*	.03	–.02	–.29***	–.15*	–.25***	–					
8. Peer Support	–.12	–.02	–.02	–.26***	–.21***	–.33***	.29***	–				
9. CD symptoms	.14*	.13	.12	.32***	.25***	.16*	–.12	–.20**	–			
10. LGBT victimization	.29***	.09	.06	.28***	.17**	.21***	–.21***	–.25***	.22***	–		
11. Age of same-sex attraction	–.16*	–.14*	–.19**	–.10	.04	.01	.06	.03	–.15*	–.36***	–	
12. Childhood gender non-conformity	.07	.01	.13	.19**	.09	.11	–.20**	–.13	.03	.34***	–.35***	–

Except for suicide attempt during 12-month follow-up (#3), all variables were assessed at baseline

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

risk factors positively correlated with lifetime suicide attempts included MDD and CD symptomatology, impulsivity, and hopelessness. Among LGBT-specific risk factors, LGBT victimization was positively correlated, and age of same-sex attraction was negatively correlated, with history of attempted suicide. That is, greater experiences of LGBT victimization and younger age of same-sex attraction were associated with increased likelihood of past suicide attempts. Childhood gender non-conformity was not significantly associated with a history of suicide attempts. Among the putative protective factors included in our analyses, perceived support from family, but not peers, was negatively correlated with suicide attempt history.

In regards to reported suicide attempts in the past year, significant positive correlations were found with MDD symptoms and hopelessness and a significant negative correlation with age of same-sex attraction. Suicide attempts during the prospective 12-month follow-up period were positively correlated with hopelessness and negatively correlated with age of same-sex attraction. Baseline reports of lifetime and past year suicide attempts also showed medium-to-large associations with attempts during the prospective follow-up period.

All significant predictors from the correlational analysis were entered simultaneously into a logistic regression model to determine their unique and overlapping effects in relation to lifetime history of suicide attempts, as well as to identify potential mediators (see Table 4). In the multivariate model with seven predictors, only depressive symptoms and hopelessness remained significantly associated with lifetime history of attempted suicide. Each depressive symptom increased the odds of a lifetime suicide attempt by 17 % and each unit

Table 4 Multivariate logistic regression model of lifetime suicide attempt

	B	SE	Wald	OR	95 % CI
MDD symptoms	.16	.05	12.41***	1.17	1.07–1.28
Impulsivity	.01	.02	0.01	1.00	0.97–1.04
Hopelessness	.99	.29	11.33***	2.69	1.51–4.77
Family support	.09	.10	0.70	1.09	0.89–1.34
CD symptoms	–.01	.04	0.06	0.99	0.92–1.07
LGBT victimization	.43	.25	3.01	1.53	0.95–2.48
Age of same-sex attraction	–.06	.05	1.78	0.94	0.86–1.03

MDD symptoms symptoms of major depressive disorder excluding suicide; *CD symptoms* baseline symptoms of conduct disorder

*** $p < .001$

increase in hopelessness more than doubled the odds. Effects did not meaningfully change in a model that controlled for gender, race, age, and sexual orientation. The effects of impulsivity, family support, CD symptoms, LGBT victimization, and age of first same-sex attraction had previously been significant in the bivariate analyses, but their effects were no longer significant in the multivariate model.

Mediation Analysis

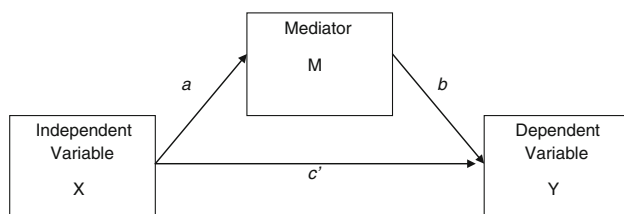
As MDD symptoms and hopelessness were found to be associated with CD, LGBT victimization, and perceived family support in our correlational analyses (see Table 2), we sought to determine if the associations between CD, LGBT

Table 5 Tests of mediation and confidence limits of the indirect effect estimated with PRODCLIN

Variables	<i>a</i>	SE <i>a</i>	<i>b</i>	SE <i>b</i>	95 % CI of mediation effect
IV: Family support Med: MDD symptoms DV: Lifetime suicide attempt	−0.72	.16	0.19	.04	−.23 to −.06
IV: Family support Med: Hopelessness DV: Lifetime suicide attempt	−0.08	.02	1.08	.26	−.15 to −.03
IV: Conduct disorder symptoms Med: MDD symptoms DV: Lifetime suicide attempt	0.32	.06	0.18	.04	.03 to .09
IV: Conduct disorder symptoms Med: Hopelessness DV: Lifetime suicide attempt	0.02	.01	1.04	.26	.01 to .05
IV: LGBT victimization Med: MDD symptoms DV: Lifetime suicide attempt	1.65*	.39	0.17	.04	.11 to .48
IV: LGBT victimization Med: Hopelessness DV: Lifetime suicide attempt	0.22*	.05	0.97	.26	.08 to .39

IV independent variable; Med mediator; DV dependent variable; SE standard error

* Independent variable remains a significant predictor ($p < .01$) after the mediator is entered into the model, suggesting partial mediation

**Fig. 1** Illustration of mediation analysis**Table 6** Multivariate logistic regression model of suicide attempt during 1-year prospective follow-up

	<i>B</i>	SE	Wald	OR	95 % CI
MDD symptoms	−0.02	.08	0.09	0.98	0.84–1.14
Past suicide attempt	2.35	.85	7.73**	10.52	2.00–55.27
Hopelessness	0.60	.43	1.98	1.82	0.79–4.19

** $p < .01$

victimization, and perceived family support and lifetime suicide attempts were mediated by MDD symptoms and hopelessness, respectively. Included in Table 5 are the *a* and *b* parameters shown in Fig. 1 along with their corresponding standard errors and the 95 % confidence intervals of the mediation effect, as calculated using the PRODCLIN program.

The 95 % confidence interval in each case did not include zero, indicating significant mediation. Partial mediation was established if the independent variable remained significant after the mediator was entered into the regression model. Total mediation was found for all effects, except for partial mediation of the relationship between LGBT victimization and suicide attempt history.

Longitudinal Analyses

Finally, a longitudinal logistic regression analysis was performed predicting reported suicide attempt at the 12-month follow-up with baseline depressive symptoms, hopelessness, and lifetime suicide attempts entered simultaneously as predictor variables. Each of these predictors was significant in bivariate analyses (see Table 3). In this multivariate model, only past suicide attempts predicted suicide attempts within the 12-month follow-up period (see Table 6). Specifically, LGBT youth who attempted suicide in the past had 10 times greater odds of making another attempt during the 1-year prospective follow-up period. During the 1-year follow-up, 13 (5.5 %) participants reported a suicide attempt, including 10 participants with a history of attempted suicide prior to study enrollment. Of the 75 youth who had a lifetime history of attempted suicide at baseline, 10 (13.3 %) made another attempt during the 1 year prospective follow-up period.

Discussion

The current study was the first to our knowledge to report prospective predictors of suicide attempts among a diverse cohort of LGBT youth. We sought to examine the relative contributions and interrelations between multiple risk and protective factors for attempted suicide using multivariate and mediational analyses. It thus contributes to the literature on suicide in this population in several important ways.

In examining the role of general risk factors for suicide in LGBT youth, we found symptoms of depression and CD, hopelessness, and impulsivity to be correlated with lifetime history of suicide attempts. Among LGBT-specific risk factors assessed in our study, early age of first same-sex attraction and LGBT victimization were also associated with lifetime suicide attempt history, as has been previously found in the literature (McDaniel et al., 2001). In contrast, no significant association was observed between childhood gender non-conformity and suicide attempt history. This lack of association was inconsistent with other studies that have found such an association (D'Augelli et al., 2005; Fitzpatrick, Euton, Jones, & Schmidt, 2005; Plöderl & Fartacek, 2009). For example, one study of a sample of young adult gay men found an association between childhood femininity and suicidality that was mediated by experiences of bullying (Friedman, Koeske, Silvestre, Korr, & Sites, 2006). In contrast, a recent study of transgender youth also found no significant association (Grossman & D'Augelli, 2007). The lack of association in this study could be due to cohort differences in the effects of childhood gender non-conformity, such that it has less negative effects in more contemporary samples. It is also possible we failed to detect a true effect because our brief measure only had a minimally acceptable internal consistency.

The importance of LGBT-specific factors adds to the literature demonstrating that, in addition to general risk factors, there are also unique risk factors specific to LGBT youth that collectively may explain the higher rates of suicidal behavior that has been reported in this population (McDaniel et al., 2001; Savin-Williams, 2001b; Spirito & Esposito-Smythers, 2006). Additionally, we found some evidence for the role of general protective factors in lowering risk for attempted suicide. In particular, social support from parents, but not from peers, was associated with reduced risk for lifetime suicide attempts. This pattern parallels prior research on the mental health of LGBT youth that found that the influence of parental support is particularly important, relative to peer support, at young ages (Mustanski, Newcomb, & Garofalo, 2011; see Plöderl & Fartacek, 2005 for a similar result among adults). This latter finding is also consistent with the view that thwarted belongingness, or the sense of being disconnected from others and the lack of close others to turn to for support, has an important role in risk for suicidality (Van Orden et al., 2010).

Our findings also helped to address the need for more sophisticated multivariate models delineating the interrelations between different risk and protective factors for suicidal behavior in LGBT youth. In our analyses, multiple factors had bivariate associations, but only MDD symptoms and hopelessness remained significant in a multivariate model. Specifically, LGBT victimization appears to function as a LGBT-specific distal risk factor, possibly heightening susceptibility to suicidal behavior through its effect on general and more proximal risk factors (i.e., hopelessness and MDD symptomatology). This finding was very much congruent with Hatzenbuehler's (2009) contention that (1) LGBT individuals experience more stressors in large part because of stigma relating to their sexual orientation; (2) this greater experience of stressors in turn increases distress and emotion dysregulation; and (3) these manifestations of distress confer risk for psychopathology (e.g., suicidality). Moreover, family support may exert its promotive effect indirectly by reducing hopelessness and MDD symptoms. Finally, these proximal risk factors may also serve as a mediational pathway underlying the relation between CD symptoms and suicide attempts. This pattern of mediation suggests that preventing victimization of LGBT youth could decrease suicide attempts by decreasing hopelessness and depression. Similarly, family-based interventions that increase support could reduce hopelessness and depression symptoms, thereby reducing the likelihood of a suicide attempt. These results also suggest that when LGBT youth experience MDD, effective treatment may reduce the likelihood of a suicide attempt. To confirm these mediation effects, they should be replicated using longitudinal mediation models.

Perhaps most importantly, the present study provided the first prospective evaluation of the relative associations between multiple general risk factors and suicide attempts in LGBT youth. A history of attempted suicide was the strongest predictor of future attempts, even after controlling for concurrent symptoms of MDD and hopelessness. In fact, the effects of MDD symptoms and hopelessness became small and non-significant after controlling for past attempts, suggesting that the influence of these variables is already captured by knowing if the participant had previously made a suicide attempt. LGBT youth with a history of suicide attempts were more than 10 times as likely as those without a history of attempted suicide to make an attempt within a 12-month follow-up period. Indeed, 76.9 % of prospective suicide attempts were made by individuals with a history of past attempts. Our findings were consistent with those of previous longitudinal research on suicide in non-LGBT samples. One prospective study with bipolar individuals, for example, reported 12 suicide attempts occurring within a 2-year period (19 % of sample), all of which were by individuals with a history of past attempts (Galfalvy et al., 2006). As such, suicide attempts should be considered an important risk marker for future attempts among LGBT youth.

Overall, our findings suggest the importance for suicide prevention programs to address both general and LGBT-specific risk factors, while also promoting social support systems available to LGBT youth, especially within families. Within this population are two groups that may deserve particular attention for suicide prevention efforts. First, it would be important to attend to youth with a history of past attempts as they are most likely to make a future attempt. Second, our findings suggest the need to focus prevention and support efforts on youth who experience an early age of same-sex attraction, as they appear to be at greater risk for suicidality, possibly a consequence of fewer internal coping resources that emerge later in development (Seiffge-Krenke, Aunola, & Nurmi, 2009) as well as greater cumulative victimization and negative parental reactions (D'Augelli et al., 1998).

This study was characterized by several strengths that allow it to make a unique contribution to the limited previous research regarding the mental health of LGBT youth. Among them were its young and ethnically diverse community sample, longitudinal design with excellent retention across 1 year (91 %) and a rigorous assessment of *DSM-IV* diagnoses and symptoms by means of an established diagnostic interview. However, findings must be interpreted within the context of study limitations. One limitation is that we did not use a random sample. Such designs are extremely difficult because probability samples rarely include sufficient numbers of LGBT youth to allow for analyses of risk and protective factors within this group. We attempted to reduce bias in our community sample by encouraging peer recruitment and by not recruiting at venues that would yield an over-representation of individuals with mental disorders (e.g., support groups). Furthermore, a priori statistical comparisons of mental health outcomes by recruitment source produced no consistent or significant differences.

Second, our sample size may have limited our ability to detect the significance of small effects. For example, 13 (5.8 %) participants reported a suicide attempt during the prospective 1-year follow-up period. Prospective studies of suicide attempts are extremely rare and often capture a similar number of attempts as the current study (e.g., Galfalvy et al., 2006); nevertheless, the low rate limits power. Third, cross-sectional analyses must be interpreted with an understanding that retrospectively reported attempts, particularly lifetime attempts, could have preceded the occurrence of independent variables such as hopelessness or MDD symptoms. Inference about results of the mediation analyses would have been stronger if the study design would have included three time points with sequenced assessment of the independent variables, then mediators, and then the suicide outcome. Research in this area would benefit from large-scale longitudinal cohort studies that would have more power to detect effects and make inferences about causal relationships.

The developmental period of adolescence and an LGBT self-identification/orientation (Spirito & Esposito-Smythers,

2006) have been found to be associated with heightened susceptibility for suicidality and, as such, LGBT youth represent a particularly high-risk group (Haas et al., 2011). The current findings underscore the need for increased prevention efforts and specifically point to the value of targeting youth who have made a prior attempt and who acknowledge their same-sex attractions at younger ages. Results suggest the value of addressing LGBT-victimization and family support as distal determinants, and hopelessness and feelings of depression as proximal determinants. Future longitudinal research in larger cohorts would be immensely valuable in increasing understanding of risk and protective factors that should be included in suicide prevention and treatment programs. Of particular value would be research that helps identify the predictors of depression and hopelessness in this population, as they were the most proximal drivers of suicide attempts.

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