

**The association between socioeconomic deprivation and secondary school students' health:
Findings from a latent class analysis of a national adolescent health survey**

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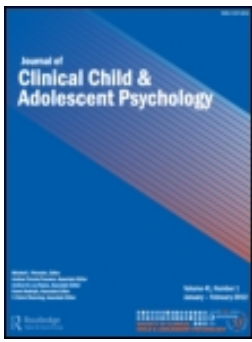
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The Association Between Supportive High School Environments and Depressive Symptoms and Suicidality Among Sexual Minority Students

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The purpose of this study was to determine if sexual minority students in supportive school environments experienced fewer depressive symptoms and lower rates of suicide ideation, plans and attempts (“suicidality”) than sexual minority students in less supportive school environments. In 2007, a nationally representative sample ($N=9,056$) of students from 96 high schools in New Zealand used Internet tablets to complete a health and well-being survey that included questions on sexual attractions, depressive symptoms, and suicidality. Students reported their experience of supportive environments at school and gay, lesbian, bisexual, and transgender (GLBT) bullying, and these items were aggregated to the school level. Teachers ($n=2,901$) from participating schools completed questionnaires on aspects of school climate, which included how supportive their schools were toward sexual minority students. Multilevel models were used

to estimate school effects on depressive symptoms and suicidality controlling for background characteristics of students. Sexual minority students were more likely to report higher levels of depressive symptoms and suicidality than their opposite-sex attracted peers ($p < .001$). Teacher reports of more supportive school environments for GLBT students were associated with fewer depressive symptoms among male sexual minority students ($p = .006$) but not for female sexual minority students ($p = .09$). Likewise in schools where students reported a more supportive school environment, male sexual minority students reported fewer depressive symptoms ($p = .006$) and less suicidality ($p < .001$) than in schools where students reported less favorable school climates. These results suggest that schools play an important role in providing safe and supportive environments for male sexual minority students.

Sexual minority adolescents encompass all those who experience same- or both-sex sexual attractions; comprise those who self-identify as gay, lesbian, or bisexual; and can include many transgender young people (i.e., gay, lesbian, bisexual, and transgender [GLBT] individuals). Population-based samples from a range of countries have reported that between 2.3% and 15.5% of adolescents report same-sex attractions (Bezinovic & Tkalcic, 2005; Bos, Sandfort, de Bruyn, & Hakvoort, 2008; Consolacion, Russell, & Sue, 2004; Galliher, Rostosky, & Hughes, 2004; Hatzenbuehler, McLaughlin, & Nolen-Hoeksema, 2008; Lam et al., 2004; Park, Schepp, Jang, & Koo, 2006; Rivers & Noret, 2008; Russell & Joyner, 2001; Udry & Chantala, 2005; Wichstrom & Hegna, 2003). Although sexual minority youth are low in number, they are overrepresented in terms of the risk factors they face with regards to their mental health. It is now well recognised that they experience significantly higher levels of suicidality (Espelage, Aragon, Birkett, & Koenig, 2008; Fergusson, Horwood, & Beautrais, 1999; Fleming, Merry, Robinson, Denny, & Watson, 2007; Wichstrom & Hegna, 2003) and depressive symptoms (Almeida, Johnson, Corliss, Molnar, & Azrael, 2009; Bezinovic & Tkalcic, 2005; Bos et al., 2008; Espelage et al., 2008; Galliher et al., 2004; Hatzenbuehler, 2009; Lam et al., 2004; Udry & Chantala, 2002, 2005; Williams, Connolly, Pepler, & Craig, 2005) relative to their heterosexual or exclusively opposite-sex attracted peers (Marshall et al., 2011). It is also well recognised that sexual minority youth experience higher levels of violence, including sexual and physical abuse, when compared to their heterosexual peers (Coker, Austin, & Schuster, 2010). Many sexual minority youth are exposed to hostile environments where they may experience and/or witness discrimination and victimization due to their sexuality (Hatzenbuehler et al., 2008; Hillier & Harrison, 2004; Phoenix, Frosh, & Pattman, 2003).

One of the most salient contexts where young people face hostility and victimization is within their school environment. The incidence of victimization within schools is common regardless of a young person's sexual attractions (Due & Holstein, 2008) and the negative impact of victimization, in terms of poor mental health,

is serious and long lasting (Espelage & Swearer, 2003; Reijntjes, Kamphuis, Prinzie, & Telch, 2010; Yeung Thompson & Leadbeater, 2012). There is clear evidence indicating that sexual minority youth are more likely to report being victimized at school, and that for these young people victimization may have an even more profound negative effect than it does on heterosexual youth (e.g., Bontempo & d'Augelli, 2002). For instance, two large studies conducted in the United States examined the effects of victimization for both heterosexual and sexual minority youth on a variety of mental and physical health outcomes, including suicidal ideation (Bontempo & d'Augelli, 2002; Poteat, Mereish, DiGiovanni, & Koenig, 2011). These researchers found that sexual minority youth were more likely to report higher levels of victimization compared to their heterosexual peers and that sexual minority youth who were victimized were more likely to report higher levels of suicidal ideation than victimized heterosexual youth (Bontempo & d'Augelli, 2002; Poteat et al., 2011). In another study, Almeida and colleagues (2009) investigated the effects of discrimination based on perceived sexuality (i.e., others acting negatively toward the individual due to the perception that they are a sexual minority individual) for youth on depressive symptoms, self-harm, and suicidal ideation. They concluded that sexual minority youth were significantly more likely to report experiencing discrimination than their heterosexual peers and that discrimination was associated with increased depressive symptoms for both male and female sexual minority youth. Of note, discrimination increased the risk of self-harm and suicidal ideation among male sexual minority youth but not for female sexual minority youth (Almeida et al., 2009).

There are factors that protect against the negative effects of victimization for sexual minority youth. School engagement (which is broadly defined as students feeling that they are part of their school and that they are respected and cared for by adults at their school) has been found to have a protective or buffering influence on the association between victimization and negative outcomes for sexual minority youth (Russell

& Toomey, 2013). In particular it has been found that sexual minority students with greater school engagement have lower levels of depression, suicidality, drug use, and truancy (Birkett, Espelage, & Koenig, 2009). Similarly, sexual minority youth who perceive school rules and expectations to be clear and consistent are less likely to report mental health problems than their exclusively opposite-sex attracted peers (Sandfort, Bos, Collier, & Metselaar, 2010). It has been suggested that the reason for this association is that orderly and supportive school environments may enhance sexual minority students' sense of belonging and safety at school, which is a recognized protective factor against suicidal ideation and suicide attempts among sexual minority youth (Eisenberg & Resnick, 2006).

Although research suggests that there are a number of important school-level factors (such as the overall school environment) that protect sexual minority youth against poor mental health outcomes, most studies examining school environments (e.g., Birkett et al., 2009; Sandfort et al., 2010) treat the school-level variables, such as school climate, as individual-level measures. This is problematic because studies of the school environment that use individual-level measures are potentially confounded by the fact that students experiencing depression (or other mental health concerns) are more likely to report school factors more negatively than students without these mental health concerns. This is especially challenging for cross-sectional studies where the direction of these associations cannot be ascertained. Of the few studies that have specifically examined school-level factors in relation to outcomes among sexual minority youth, it has been found that the student's school has important impacts on sexual minority young people above and beyond individual-level factors. For example, Goodenow, Szalacha, and Westheimer (2006) found lower suicidality risk among sexual minority students in schools where there was greater supports for these students. Another study looked at levels of GLBT inclusion in the school curriculum by aggregating teacher scores on GLBT-sensitive HIV instruction to the school level (Blake et al., 2001). This study found evidence of the importance of "gay-sensitive instruction" with better health outcomes for GLBT youth who attended schools where these aspects were included in the school curriculum (Blake et al., 2001). Furthermore, Wilkinson and Pearson (2009) examined school-level religiosity and schools' emphasis on football (as indicators of a heteronormative school culture) by aggregating the proportion of students attending religious services and student participation in football to the school level. Their findings suggest that sexual minority students in overly heteronormative school environments experience decreased levels of wellbeing (Wilkinson & Pearson, 2009).

THE PRESENT STUDY

Data for the present study was from a nationally representative sample of high school students in New Zealand. One of the strengths of this sample, which reflects the demographics of New Zealand's young people, is the diversity of young people surveyed. Previous research has documented differences in mental health outcomes among demographic groups of sexual minority youth but not among a wide range of demographic groups (Almeida et al., 2009; Poteat, Aragon, Espelage, & Koenig, 2009). Our first research question was to determine if all demographic groups of sexual minority students experience poorer mental health outcomes compared to their opposite-sex-attracted peers. We hypothesized that demographic variables (age, sex, socioeconomic status, ethnicity, and urban vs. rural location) would moderate the relation between sexual minority status and depressive symptoms and suicide risk.

Our second research question was to examine whether sexual minority status moderates the relationship between school environments and mental health outcomes. We hypothesized that school-level support for GLBT students would be associated with lower levels of depressive symptoms and suicide risk among sexual minority students compared with sexual minority students in less supportive schools. We also hypothesized that there would be no relationship between GLBT-supportive school environments and mental health outcomes among opposite-sex-attracted students. These hypotheses are tested in cross-level interactions between sexual minority status and supportive school environments and their associations with suicidality and depressive symptoms (Duncan, Jones, & Moon, 1998).

There is need for further research that examines whether establishing supportive, safe, and harassment-free school environments for sexual minority youth requires specific approaches such as policies that specifically prohibit discrimination based on sexual identity (Russell, 2011). Previous research has demonstrated the benefits to sexual minority students in terms of general processes within schools that provide supportive school environments to all students (such as school safety) and specific supports for GLBT students such as the inclusion of GLBT content in the school curriculum. However, there are few studies that have examined these aspects together. Based on this previous work, we hypothesized that both general and GLBT-specific supportive school environments would be associated with better mental health outcomes among sexual minority students. We tested this hypothesis through measuring both general support and GLBT-specific aspects of school environments and including these

variables as independent effects (and their cross-level interactions with sexual minority status) in all models of depressive symptoms and suicidality.

METHOD

A two-stage cluster design was utilised to obtain a nationally representative sample of New Zealand high school students. A list of 475 high schools was obtained from the New Zealand Ministry of Education database in June 2006; from the 389 schools with more than 50 students, 115 were randomly selected and 96 agreed to participate, representing an 83% response rate. In each participating school, we randomly selected 18% of all Year 9 to 13 students (ages 13–17 years) from the school roll and invited them to take part. In total 9,107 students took part in the study, representing a 74% response rate. The reasons for students not participating were unknown for the majority of students (45%); 23% were absent from school. Students declining participation (9%) or parents withdrawing their child (1%) were uncommon reasons for not participating. Apart from a slightly higher percentage of male students (54%), the participating students were similar demographically to the national population of high school students in New Zealand (Adolescent Health Research Group, 2007). Written consent was obtained from the principal of each participating school. Prior to the survey, students were given written information about the survey to take home to their parents; parents were able to opt to have their child withdrawn from the study. On the day of the survey, invited students were given a verbal briefing and were provided an opportunity to ask questions, after which each student gave his or her consent to participate at the beginning of the survey. All students in each school were eligible to participate; the only exclusion criteria was the inability to understand written and verbal English at a 12-year-old level of ability. There were no incentives given to participating students.

The student survey was carried out from March through October 2007 and administered using Audio Computer-assisted Self-interviewing on Internet tablets (Denny et al., 2008). No keyboard data entry was required; questions and answers could also be heard through headphones, and responses were made by touching the screen with a stylus. Students could skip any question or section of the survey at any point. The average time taken to complete the questionnaire was 73 min. Trained study personnel administered the survey in school venues (such as halls or gymnasiums). The privacy of participants was maintained by the use of the individual handheld tablets, by careful spacing of seating arrangements, and by having survey staff and participants in the venue only at the time the survey

was being administered. No personally identifying details were collected. Information brochures and verbal explanations stressed that participation was voluntary and anonymous and that students could leave the survey at any time and return to class. Alternatively, students could stay and do other tasks on the tablets. After sensitive questions and at the end of the survey, “safety” messages were given that provided advice about how to seek help, which included the contact details of people to talk to. A small take-home thank-you card, which also included this information, was given to each participant at the end of the survey.

All 96 participating schools were also invited to take part in a school climate survey, of which 91 schools agreed. All teachers in these schools were invited to take part in a teacher school climate survey. The purpose of the survey (and the voluntary and confidential nature of it) was specified in a written participant information sheet and in verbal explanations at staff meetings. All participating teachers gave their informed consent to participate in this study. Data on reasons for nonparticipation were not collected. In total 2,901 out of a possible 3,945 teachers completed the school climate questionnaire, representing a 74% response rate. The average number of teachers participating from each school was 32 (range = 5–103), and the mean response rate at the school level was 69% (range = 17–100%). A greater proportion of teachers were female (57%), and the majority were 40 years of age and older (63%). Ethical approval was obtained from the University of Auckland Human Participants Ethics Committee for all aspects of this study.

Student-Level Measures

Sexual attraction was assessed by the question, “Which are you sexually attracted to?” with the following response options: “The opposite sex (e.g., I am a male attracted to females or I am a female attracted to males),” “The same sex (e.g., I am a male attracted to males or I am a female attracted to females),” “Both sexes (e.g., I am attracted to males and females),” “Not sure,” and “Neither.” Seventy-three students (0.9%) reported same-sex attractions and 270 reported both-sex attractions (3.5%). Students who responded “Not sure” ($n = 143$) or “Neither” ($n = 146$) and students who did not answer this question ($n = 1,105$) were excluded from subsequent analyses.

A well-validated 10-item measure of depressive symptoms during adolescence, the Reynolds Adolescent Depression Scale–Short Form (RAD-SF) was used (Milfont et al., 2008). The RADS-SF scores ranged from 10 to 40 with a mean score of 19.14 ($SD = 6.19$) and Cronbach’s alpha of 0.88. Suicide ideation, plans, and attempts over the last 12 months were assessed with

three questions: “During the last 12 months have you seriously thought about killing yourself (attempting suicide)?” “During the last 12 months have made a plan about how you would kill yourself (attempt suicide)?” and “During the last 12 months have tried to kill yourself (attempted suicide)?” with the response options 1 (*not at all*), 2 (*not in the last 12 months*), 3 (*once or twice*), and 4 (*three or more times*). Students responses were combined in a suicidality scale, with a range from 1 to 4 with a mean score of 1.24 ($SD = 0.59$) and Cronbach’s alpha of 0.86. Analysis of the distribution of this scale showed that it was highly skewed with a median of 1.0 and skewness of 2.77.

Age, sex, and ethnicity were determined by self-report. Ethnicity was assessed using the standard ethnicity question developed for the New Zealand census where participants can select all of the ethnic groups with which they identify. Approximately 40% of students identified with more than one ethnic group. To facilitate statistical analyses, discrete ethnic populations were created using the New Zealand census prioritization method (Lang, 2002) by assigning students to one ethnic group in the following order: Māori (18.7%), Pacific (10.2%), Asian (12.5%), and New Zealand (NZ) European (52.6%)/Other (5.9%) ethnicities.

The socioeconomic status of each student was measured by eight items: parents’ worry about having enough money to buy food, with response options 0 (*never*), 1 (*occasionally*), 2 (*sometimes*), 3 (*often*), and 4 (*all the time*); number of times the family has moved homes (0, 1, 2, ≥ 3 times); number of cars, telephones, computers/laptops, televisions at the student’s home (0, 1, 2, ≥ 3 for each item); alternative rooms at home used as bedrooms with response options 0 (*none*), 1 (*other rooms that are not bedrooms*), 2 (*garage or caravan*), and 3 (*living room*); and the New Zealand Deprivation Score 2006 (NZDep). During the survey, students were asked to provide their home address in order to ascertain the small area geographical unit or meshblock in which they lived. To protect the participating student’s anonymity, the home address was not saved. Each participating student’s NZDep was calculated by linking their residential meshblock number to their respective neighbourhood NZDep. NZDep is an area-based socioeconomic deprivation index that assesses eight dimensions of deprivation (recipient of state-funded benefits, home ownership, single-parent families, unemployment, lack of educational qualifications, overcrowding, no access to a telephone, no access to a car) using 2006 New Zealand census data. These eight measures were combined into a socioeconomic deprivation scale and grouped into tertiles, from lowest to highest, with the highest group representing students most at-risk from socioeconomic deprivation.

The student’s meshblock was also used to classify students’ residential location into main urban (cities, major

urban areas or large regional centres with a minimum population of 10,000 people), minor urban (urbanized settlements with a population between 1,000 and 9,999 people), and rural (rural centers and locations with populations less than 1,000 people).

School-Level Measures

Structural characteristics of schools were obtained from the New Zealand Ministry of Education and included school type (coeducation, boys-only schools, and girls-only schools), school funding (private, state integrated, and public), and school size based on the student roll (<399 students, 400–799 students, 800–1,199 students, and 1,200 students or more). Both public and state-integrated schools receive their funding from the New Zealand government; state-integrated schools often have a religious affiliation (similar to Catholic schools in other countries). Private schools rely on students’ fees for funding but also receive approximately 25% of their funding from the government. School-level socioeconomic status was based on Ministry of Education school decile (which indicates the extent to which the school draws its students from low socioeconomic communities). The lowest decile schools are the 10% of schools with the highest proportion of students from low socioeconomic communities (Ministry of Education, 2009).

General supportive school environments were assessed based on responses to seven questions from the student survey, on aspects of teacher and student relationships, student connection to school, and school belonging. These questions included, “How do you feel about school” with response options “I like school a lot,” “I like school a bit,” “It’s OK,” “I don’t like school,” “I don’t like school at all”; “Do you feel like you are part of your school?” with response options “yes” and “no”; “How much do you feel that people at school care about you (like teachers, coaches, or other adults)?” with response options “not at all,” “some,” and “a lot”; “How often do the teachers at your school treat students fairly?” with response options “hardly ever,” “sometimes,” and “most of the time”; “Do you get along with your teachers?” with response options “usually,” “sometimes,” “hardly ever,” and “not at all”; “Teachers go out of their way to help students” and “Students at this school have trouble getting along with each other” with response options “strongly disagree,” “disagree,” “neither agree or disagree,” “agree,” and “strongly agree.” Factor analysis demonstrated that all items loaded on a single factor with factor loadings of at least 0.40. These responses were standardized and then combined and aggregated to the school level in a supportive school environment scale with a mean score of 0.018 ($SD = 0.16$) and Cronbach’s alpha of 0.86.

To assess school safety with respect to sexual minority students, the prevalence of bullying perceived to be due to same-sex/both-sex attractions was assessed with two questions. The first was an overall bullying question, and students were provided a definition of bullying based on the Revised Olweus Bully/Victim Questionnaire (Solberg & Olweus, 2003). Students were then asked, "This year how often have you been bullied in school?" with response options "I haven't been bullied in school," "I haven't been bullied this year," "It has happened once or twice," "About once a week," "Several times a week," and "Most days." Students who responded that had it happened once or twice or had happened more often were then asked, "What was the reason you were bullied (you may answer as many as apply)?" with the response options including "I was bullied because I am gay or because people thought I was gay." Students' responses to this question were then aggregated to the school level as the overall prevalence of GLBT bullying within the school. The overall prevalence of bullying perceived to be due to sexual orientation was 1.9% and ranged from 0 to 8.3% between schools.

The school support for GLBT students was also assessed through the teacher survey with four questions: "The staff at this school support students who identify as gay, lesbian, bisexual, or transgender"; "This school meets the needs of students who identify as gay, lesbian,

bisexual, or transgender"; "Some staff lack the skills needed to work effectively with students who identify as gay, lesbian, bisexual, or transgender"; and "The needs of students who identify as gay, lesbian, bisexual, or transgender are inefficiently addressed at this school" with response options 1 (*strongly disagree*), 2 (*disagree*), 3 (*neither agree nor disagree*), 4 (*agree*), and 5 (*strongly agree*). The last two questions were reverse scored and response options were combined (Cronbach's alpha = .68) and aggregated to the school level. The mean score of the GLBT supportive environment scale was 3.09 ($SD = 0.22$), with higher scores indicating more supportive environments for GLBT students.

Data Analyses

General linear models accounting for nesting of students within schools were used to estimate the association between individual and school-level characteristics on depressive symptoms and suicidality among students. Random effects were specified for the sexual attraction variable allowing the relationship between depressive symptoms and suicidality and the sexual attraction of students to vary between schools. To examine whether this relationship varies by school-level variables, cross-level interactions between the sexual attraction variable and school-level variables were estimated. Based on previous research, associations between

TABLE 1
Demographic Characteristics of Sample

	<i>Opposite-Sex Attracted Students % n = 7,370</i>	<i>Sexual Attraction Same-Sex Attracted Students % n = 73</i>	<i>Both-Sex Attracted Students % n = 270</i>	p
Total	95.6	0.94	3.47	
Age				.07
15 Years and Younger	64.1	51.4	62.2	
16 Years and Older	35.9	48.6	37.8	
Sex				<.001
Female	46.0	36.8	55.7	
Male	53.9	63.2	44.3	
Ethnicity				.59
Asian	11.8	12.6	10.2	
Māori	18.4	15.4	18.7	
Pacific	8.7	7.0	5.7	
NZ European/Other	61.1	65.0	65.4	
Socioeconomic Deprivation Tertile				.78
i	35.6	33.7	34.0	
ii	33.6	31.3	36.8	
iii (Highest Deprivation)	30.8	35.0	29.2	
Geographical				.23
Main urban	69.5	75.1	74.1	
Minor urban	13.9	15.4	11.1	
Rural	16.4	9.6	14.8	

Note. $N = 7,713$.

TABLE 2
Suicide Attempts and High Depression Symptoms Comparing Opposite-Sex-Attracted, Same-Sex-Attracted, and Both-Sex-Attracted Students by Demographic Characteristics

	Suicide Attempt in the Past 12 Months (%)			p*	High Depression Symptoms (%)			p*
	Opposite-Sex-Attracted Students n = 7,313	Same-Sex-Attracted Students n = 72	Both-Sex-Attracted Students n = 270		Opposite-Sex-Attracted Students n = 7,370	Same-Sex-Attracted Students n = 72	Both-Sex-Attracted Students n = 270	
Total	4.0	13.9	31.7	<.001	9.5	21.2	32.3	<.001
Age				.15				.01
15 Years and Younger	4.4	15.8	27.6		9.8	31.6	39.3	
16 Years and Older	3.2	11.9	11.8		8.9	14.9	20.9	
Sex				.06				.34
Female	5.8	11.4	24.3		13.3	24.6	39.8	
Male	2.2	15.4	18.2		6.1	22.6	22.5	
Ethnicity				<.001				.41
Asian	2.1	22.3	25.9		10.9	44.5	34.6	
Māori	6.3	18.2	26.0		10.6	27.2	22.1	
Pacific	7.8	—	46.7		9.6	20.1	28.6	
NZ European/Other	3.0	12.8	17.5		8.8	18.4	35.0	
Socioeconomic Deprivation Tertile				.17				.55
i	2.2	7.5	9.1		7.2	12.4	28.4	
ii	3.8	18.7	20.7		7.8	19.6	47.2	
iii (High Deprivation)	6.2	16.0	33.4		14.1	37.5	41.0	
Geographical location				.03				.03
Main Urban	2.7	41.2	22.1		7.9	34.4	41.0	
Minor Urban	3.9	18.1	32.1		8.6	19.9	47.2	
Rural	4.2	9.5	20.1		10.0	22.8	28.4	

Note. N = 7,713.

*p value indicates the interaction between demographic variables with the sexual attraction status of students in the relationship with suicide attempt or high depression symptoms.

TABLE 3
School-Level Variables by School Characteristics

	N	Supportive School Environments		Prevalence of GLBT Bullying		Teachers' Reports of GLBT Supportive Environments	
		M	p	%	p	M	p
Overall (M, range)		0.02 (−0.45 – 0.57)		1.9 (0 – 8.3%)		3.09 (2.67 – 3.72)	
Size			.8		.65		.25
0–399	37	0.04		2		3.11	
400–799	26	0.02		1.88		3.03	
800–1,199	17	0.03		1.97		3.12	
1,200+	16	−0.05		1.65		3.11	
School Type			.76		<.001		.07
Boys	16	0.05		2.8		2.97	
Girls	12	0.11		0.66		3.09	
Coeducation	68	−0.01		1.92		3.12	
School Funding			<.001		.29		.42
State	67	−0.04		2		3.12	
Integrated	22	0.13		1.57		3.02	
Private	7	0.26		1.97		3.04	
School Decile			.44		.36		.73
1–3	15	0.03		1.47		3.09	
4–7	52	−0.02		2.14		3.11	
8–10	25	0.04		1.6		3.06	

Note. N = 96. GLBT = gay, lesbian, bisexual, and transgender.

school-level characteristics, the sexual attractions of students, and their mental health outcomes was expected to vary by sex (Almeida et al., 2009; D'Augelli et al., 2005). A three-way interaction of school-level variables, student sex, and sexual attractions confirmed that the relationship between overall supportive school environments and depressive symptoms varied by sex, $F(2, 7221) = 5.09$, $p = .006$, and for suicidality, $F(2, 7330) = 6.30$, $p = .002$. The relationship between school support for GLBT students and depressive symptoms also varied by sex, $F(2, 7221) = 7.04$, $p < .001$. Accordingly, analyses were performed separately for males and females. All analyses controlled for student-level variables: age, ethnicity, and socioeconomic deprivation quartile. The final sample for the multilevel analyses was 7,338 students due to missing information from the student questionnaire, especially the sexual attraction

question and five schools with missing school-level information from the teacher survey. Findings were considered statistically significant at the $p < .01$ level. To understand the direction of statistically significant interactions, graphs plotting the predicted values of the depressive symptom scores and suicidality scores by the sexual attraction variables and school-level variables were performed. Estimation techniques used residual maximum likelihood with ridge-stabilized Newton-Raphson algorithm using the MIXED procedure in SAS version 9.2.

RESULTS

Table 1 presents the prevalence of same-sex-, both-sex-, and opposite-sex-attracted youth. Overall 73 students

TABLE 4
Multilevel Fixed Estimates for Depressive Symptoms

Parameter	Male		Female	
	Estimate (SE)	p	Estimate (SE)	p
Student Level				
Intercept	16.4 (1.50)		19.47 (1.76)	
Age		.02		.46
15 Years and Younger	0		0	
16 Years and Older	0.44 (0.18)		-0.16 (0.22)	
Ethnicity		<.001		.001
NZ European/Other	0		0	
Asian	1.24 (0.28)		1.28 (0.34)	
Māori	-0.31 (0.24)		0.21 (0.28)	
Pacific	-0.63 (0.35)		-0.42 (0.4)	
Socioeconomic Deprivation Tertile		<.001		<.001
i	0		0	
ii	0.71 (0.21)		0.77 (0.25)	
iii (High Deprivation)	1.76 (0.23)		2.36 (0.27)	
Sexual Attraction		.002		.26
Opposite-Sex-Attracted	0		0	
Same-Sex-Attracted	-0.34 (13.76)		19.77 (33.31)	
Both-Sex-Attracted	33.81 (9.21)		-13.76 (8.99)	
School Level				
GLBT Bullying	2.82 (5.81)	.54	3.08 (7.65)	.68
School Support for GLBT Students	0.1 (0.48)	.13	-0.16 (0.57)	.96
Supportive School Environment	-0.39 (0.84)	.001	-1.22 (0.76)	.44
Cross-Level Interactions				
GLBT Bullying × Sexual Attraction		.19		.85
Opposite-Sex-Attracted	0		0	
Same-Sex-Attracted	70.07 (55.43)		-55.68 (101)	
Both-Sex-Attracted	-39.94 (31.55)		1.45 (42.77)	
School Support for GLBT Students × Sexual Attraction		.006		.09
Opposite-Sex-Attracted	0		0	
Same-Sex-Attracted	0.89 (4.43)		-5.08 (11.06)	
Both-Sex-Attracted	-9.28 (2.92)		6.21 (2.91)	
Supportive School Environment × Sexual Attraction		.006		.52
Opposite-Sex-Attracted			8.88 (8.95)	
Same-Sex-Attracted	-25.26 (9.3)		2.24 (3.74)	
Both-Sex-Attracted	-8.88 (5)		2.24 (3.74)	

Note. GLBT = gay, lesbian, bisexual, and transgender.

(0.9%) reported same-sex attractions and 270 students (3.5%) reported both-sex attractions. There were proportionally more males in the same-sex attracted group and proportionally more females in the both-sex attracted group compared to their opposite-sex attracted peers ($p < .001$). There were no differences in the proportion of same-sex attracted students by age, ethnicity, socioeconomic tertile, or geographical location of the students.

Table 2 presents dichotomized outcomes for severe depressive symptoms using established cutoffs for the New Zealand population of high school students (Milfont et al., 2008) and the proportion of students who had made a suicide attempt in the previous 12 months. Both-sex-attracted students reported the highest rates of suicide attempts in the previous 12 months (31.7%), compared to same-sex-attracted students

(13.9%) and opposite-sex-attracted students (4.0%, $p < .001$). Mean levels of suicidality were also higher among both-sex-attracted students ($M = 1.88$), 95% confidence interval (CI) [1.74, 2.01], and same-sex-attracted students ($M = 1.56$), 95% CI [1.35, 1.76], compared to opposite-sex-attracted students ($M = 1.22$), 95% CI [1.20, 1.23], $p < .001$ (data not shown). Similarly, both-sex-attracted students and same-sex-attracted students had higher rates of depressive symptoms than heterosexual students (32.3% and 21.2% vs. 9.5%, $p < .001$). Mean levels of depressive symptoms were higher among both-sex-attracted students ($M = 22.8$), 95% CI [21.1, 24.5], and same-sex-attracted students ($M = 24.1$), 95% CI [23.1, 24.9], compared to opposite-sex-attracted students ($M = 18.8$), 95% CI [18.6, 19.1], $p < .001$ (data not shown). Table 2 presents the differences between demographic variables and sexual attraction and their

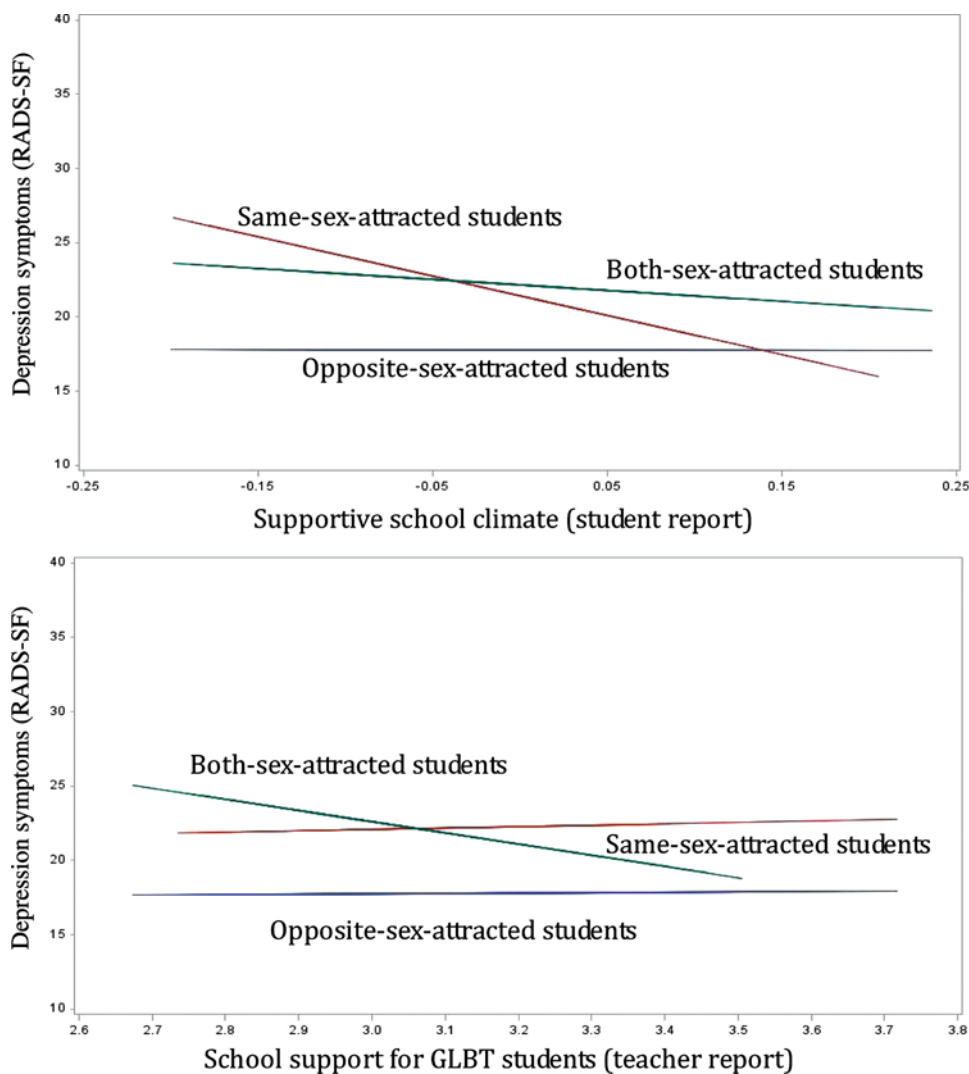


FIGURE 1 Depression symptoms, sexual attraction, and school climate among male high school students. Note. GLBT = gay, lesbian, bisexual, and transgender.

relationship with suicide attempts and high depression symptoms. Differences between both-sex-attracted, same-sex-attracted, and opposite-sex-attracted students in relation to suicide attempts were higher among Asian, Māori, and Pacific sexual minority students compared to NZ European/Other ethnicities ($p < .001$). Otherwise there were few significant differences by demographic variables in the relationship between sexual attraction and mental health outcomes.

Table 3 presents school-level characteristics with respect to student reports of general supportive school environments, prevalence of GLBT bullying, and teachers' reports of GLBT supportive school environments. There were few differences in these school-level measures by the size of school or the school decile. Boys-only schools were associated with a higher prevalence of GLBT bullying compared with girls-only

schools or coeducational schools ($p < .001$). In private and state-integrated schools, students report a more supportive school environment compared to students from publically funded schools.

Table 4 presents the multilevel fixed estimates for depressive symptoms by individual student variables and school-level variables among males and females separately. There were significant interactions between sexual attraction and teachers reports of supportive school environments for GLBT students in the relation to depressive symptoms among male students ($p = .006$) and sexual attraction and an overall supportive school environment on depressive symptoms for male students ($p = .006$), whereas for females there were no significant interactions between sexual attraction and any of the school-level variables on depressive symptoms.

TABLE 5
Multilevel Fixed Estimates for Suicidality (Suicide Attempts, Plans, and Thoughts)

Parameter	Male		Female	
	Estimate (SE)	p	Estimate (SE)	p
Student Level				
Intercept	1.15 (0.12)		1.18 (0.18)	
Age		.24		.007
15 Years and Younger	0		0	
16 Years and Older	0.01 (0.01)		-0.06 (0.02)	
Ethnicity		.72		<.001
NZ European/Other	0		0	
Asian	0 (0.02)		0.02 (0.03)	
Māori	0.02 (0.02)		0.11 (0.02)	
Pacific	0 (0.03)		0.15 (0.04)	
Socioeconomic Deprivation Tertile		.003		<.001
i	0		0	
ii	0.02 (0.01)		0.05 (0.02)	
iii (High Deprivation)	0.06 (0.01)		0.11 (0.02)	
Sexual Attraction		.04		.39
Opposite-Sex Attracted	0		0	
Same-Sex Attracted	-2.53 (1.19)		2.76 (3.46)	
Both-Sex Attracted	1.13 (0.79)		-1.04 (0.93)	
School Level				
GLBT Bullying	-0.13 (0.47)	.86	-0.31 (0.79)	.95
School Support for GLBT Students	-0.01 (0.03)	.12	0.01 (0.05)	.85
Supportive School Environment	-0.05 (0.06)	<.001	-0.12 (0.07)	.55
Cross-Level Interactions				
GLBT Bullying × Sexual Attraction		.08		.52
Opposite-Sex Attracted	0		0	
Same-Sex Attracted	6.29 (4.81)		-3.24 (10.44)	
Both-Sex Attracted	-4.89 (2.73)		4.85 (4.44)	
School Support for GLBT Students × Sexual Attraction		.05		.15
Opposite-Sex Attracted	0		0	
Same-Sex Attracted	0.92 (0.38)		-0.82 (1.15)	
Both-Sex Attracted	-0.15 (0.25)		0.54 (0.3)	
Supportive School Environment × Sexual Attraction		<.001		.46
Opposite-Sex Attracted	0		0	
Same-Sex Attracted	-2.43 (0.8)		0.57 (0.94)	
Both-Sex Attracted	-1.14 (0.43)		0.42 (0.38)	

Note. GLBT = gay, lesbian, bisexual, and transgender.

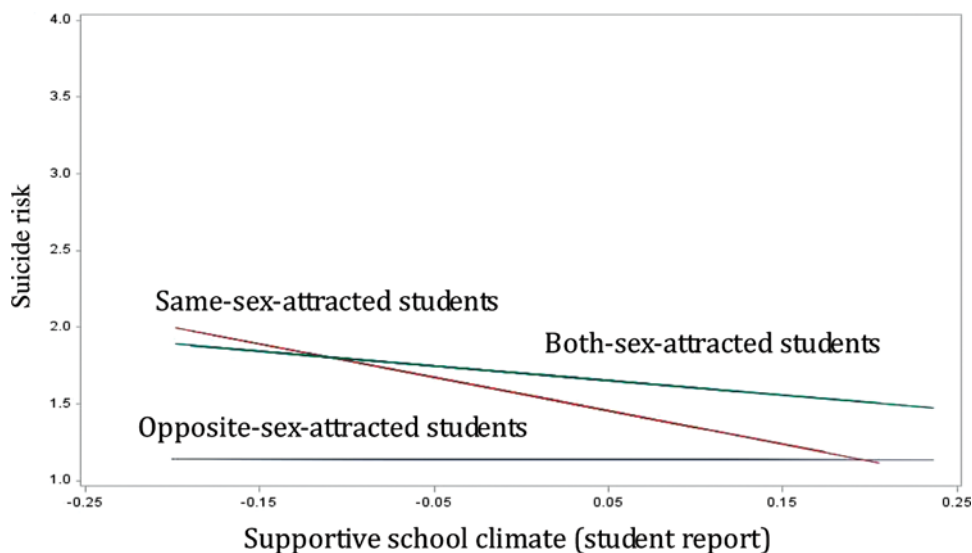


FIGURE 2 Suicide risk, sexual attraction, and supportive school climate among male high school students ($N=4,187$).

Figure 1 shows the direction of the statistically significant interaction effects. In schools where students reported a more generally supportive school climate, both-sex-attracted and same-sex-attracted male students reported fewer depressive symptoms than both-sex-attracted and same-sex attracted male students in less supportive school environments. Both-sex-attracted male students reported fewer depressive symptoms in schools where teachers reported a more supportive school environment for GLBT students compared to both-sex-attracted male students in schools where teachers reported a less supportive school environment for GLBT students. Of note, there were no differences in the depressive symptoms reported by opposite-sex-attracted male students between these different school environments.

Table 5 presents the multilevel fixed estimates for suicidality by individual student variables and school-level variables separately for male and female students. There were no significant interactions between sexual attraction and school-level variables for suicidality symptoms among female students. For male students there was a significant interaction between sexual attraction and generally supportive school climates on suicidality ($p < .001$). Figure 2 presents the direction of the interaction effect. Both-sex-attracted and same-sex-attracted male students reported less suicidality in schools where students reported a more supportive school environment compared with both-sex-attracted and same-sex attracted students in schools where students reported a less supportive school environment.

DISCUSSION

This study demonstrates the importance of both general supportive school environments and specific supports

for sexual minority students in schools. Although previous research has highlighted the vulnerability of sexual minority students in terms of discrimination, victimization, and poorer mental health outcomes such as depression and suicidality, our study suggests that these risks may be, in part, due to characteristics of the school they attend. Specifically, male sexual minority students who attend schools with a generally supportive school environment and support for GLBT students report lower rates of both depressive symptoms and suicide risk. This is first study to use independent teacher ratings of their school's support for sexual minority students to examine school environments and mental health outcomes among same-sex-attracted students. These findings suggest that there may be benefits for sexual minority students in schools where a dual approach is taken to both increase the overall supportiveness of the school and specific strategies to promote the safety and well-being of sexual minority students in the school environment.

Of note, our results indicated that more positive school environments are associated with fewer depressive symptoms and less suicidality among male sexual minority students, but not for female sexual minority students. It is well recognised that male students are more likely than female students to engage in overt perpetration of victimization or bullying of fellow students (Bosworth, Espelage, & Simon, 1999; Olweus, Jimerson, Swearer, & Espelage, 2010), as is evident in the current study by the high rates of GLBT bullying in boys-only schools. Studies have found that same-sex-attracted male students are more likely to report experiencing victimization due to their sexual attractions compared with female-same-sex attracted students (Almeida et al., 2009; D'Augelli et al., 2005; Poteat et al., 2009). For

example, Almeida and colleagues (2009) found that perceived discrimination reported by sexual minority males was associated with increased levels of depressive symptoms, but not among sexual minority females. Gender role nonconformity of sexual minority individuals is judged particularly harshly by boys (Horn, 2007), presumably because sexual minority males are a “threat . . . to heterosexual privilege in a male-dominated society” (Szalacha, 2003, p. 77) and this could help to account for the sex differences observed in the current study.

The current study also highlighted the diversity of experiences among sexual minority youth. Similar to previous research, students who reported sexual attractions to both sexes experienced the highest rates of mental health concerns compared to students who reported only same-sex attractions (Marshall et al., 2011). We were also able to identify demographic groups of sexual minority students at risk of poor mental health outcomes. For example sexual minority students from minority ethnic groups in New Zealand (Māori, Asian, and Pacific ethnicities) had higher rates of mental health concerns compared with sexual minority students from the main ethnic group (NZ European). These findings support previous research that marginalisation and isolation are common experiences for sexual minority youth, and this may be compounded for students who also belong to ethnic minority groups (Consolacion et al., 2004; Scourfield, Roen, & McDermott, 2008). Future research needs to recognise the diversity of experiences for sexual minority youth, and the need to identify subgroups of sexual minority students at risk of poor psychosocial outcomes as intervention efforts may be more effective if tailored to the specific needs of these groups.

Another notable finding is that there was no association between generally supportive school environments and suicidality or depressive symptoms for opposite-sex-attracted students. A recent systematic review found little evidence that school environments play a major role in the development of adolescent mental health concerns (Kidger, Araya, Donovan, & Gunnell, 2012). This may reflect that for the majority of students who are opposite-sex-attracted, supportive school environments are normative and therefore of less consequence than for sexual minority students, where supportive school environments may matter a great deal.

There are a number of limitations to the findings presented. First, although the broad school climate was assessed from the perspective of the students, only the teachers were asked about specific elements of the school climate with respect to supporting GLBT students. This may not accurately reflect levels of school support that are important for sexual minority students, as teachers' perceptions may not match the actual experience or needs of students. Second, the study is cross-sectional

and inferences around the direction of the associations cannot be made with certainty; it may be that male same-sex-attracted students with poorer mental health perceive their school environments more negatively than male same-sex-attracted students with better mental health. However, this would not explain why the relationship was not seen among exclusively opposite-sex-attracted students or the findings to do with teacher reports of the school environment. A further limitation is that the sample did not include all possible participants. Students who were absent from school, had dropped out of school, or did not answer the sexual attraction question were not included in the analyses. Nonparticipation may bias our findings in unexpected ways; for example, it is well recognized that the students who have dropped out of school have poorer mental health than those attending school (Denny, Clark, & Watson, 2004). With the exception of the RADS-SF scale, measures used have not been empirically validated. However, questionnaire items were carefully developed with expert input, the questionnaire was piloted prior to use, and cognitive testing was utilized to ensure questions were understood by study participants (Adolescent Health Research Group, 2007). Finally, the suicidality scale was highly skewed, reflecting that most students have low levels of suicide ideation and attempts. This may violate assumptions of normality required for linear regression. Further analyses were undertaken dichotomizing this scale, which showed similar results suggesting that the linear regressions reported are robust to violations of the normal distribution of the suicidality scale.

The strengths of this study lie in the ability to examine the impacts of school-level effects on sexual minority young people. Our results support recent shifts away from viewing sexual minority students as inherently at risk of poor mental health outcomes, to viewing the environments around them as crucial to their emotional and mental well-being (Russell, 2011). Our analyses reflect a socioecological approach that recognizes the importance of supportive home, school, and community environments for overall healthy youth development (Bronfenbrenner, 2004; Hong & Garbarino, 2012). Findings from our study support the inclusion and implementation of general and specific school strategies to support sexual minority students, such as school nondiscrimination and antibullying policies specifically aimed at addressing GLBT bullying and victimization; training teachers on effective interventions to prevent harassment; availability of information, resources, and support at school about sexual minority students; presence of school-based support groups or gay-straight alliances (frequently called Diversity Groups in New Zealand); and inclusion of GLBT people or issues in school curriculum (Russell, 2011).

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