Health Disparities Between Sexual Minority and Different-Sex-Attracted Adolescents: Quantifying the Intervening Role of Social Support and School Belonging

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Abstract

Purpose: An emerging literature documents that sexual minority youth experience significantly and substantially worse health than their heterosexual peers, but few studies have examined the intervening mechanisms linking adolescents' sexual orientation to their health outcomes. This study hypothesized that social support from parents and friends and school belonging would act as important mediators of this relationship and is among the first to test this proposition empirically.

Methods: The analyses used rich data from an Australian national probability sample of 14–15-year olds (Longitudinal Study of Australian Children, $n = 3204$) and regression models to estimate the associations between sexual attraction and four high-quality indicators of adolescent health/well-being capturing health-related quality of life, socio-emotional functioning, depressive symptoms, and life satisfaction. Mediation tests were subsequently performed to quantify the extent to which three scales capturing social support from parents and friends and school belonging mediated the relationships identified.

Results: Sexual minority status, social support from parents and friends, and school belonging were significantly related to all health/well-being outcomes. Sexual minority adolescents reported significantly lower levels of support and belonging. Collectively, the support and belonging variables were responsible for 49%–70% of the associations between sexual minority status and the health/well-being outcomes, with school belonging being the most important mediator.

Conclusion: These findings have important implications for health equity policy and practice. They suggest that interventions designed to improve the health/well-being of sexual minority adolescents should be directed at eliciting enhanced social support from families and peers and fostering integration at school. School-based interventions may be particularly fruitful.

Keywords: health, school, sexual attraction, social support, youth

Introduction

THERE IS NOW WIDESPREAD recognition that sexual orientation health disparities have an early onset. For example, U.S. research documents lower levels of substance use and suicidal ideation among heterosexual adolescents than among sexual minority adolescents.^{1–3} Studies in countries such as Australia,⁴ New Zealand,⁵ the United Kingdom,⁶ the Netherlands,⁷ and Canada⁸ report similar findings. However, fewer contributions have addressed the mechanisms linking adolescent sexual minority status to health. This is an important avenue for further work, as it can point to malleable factors

that could be targeted by interventions to improve sexual minority health.^{9,10} Guided by the more-developed literature on sexual orientation health disparities in adult populations^{10–12} and theoretical perspectives on adolescent experiences of minority stress,^{13,14} this study focuses on the potential mediating role of social support and school belonging.

Scholarship that considers the intersections among adolescents' sexual orientation, social relations, and health is emerging rapidly. Most studies examine these processes within targeted samples of sexual minority youth, without a comparison group of heterosexual youth. As such, their findings are useful to understand heterogeneity *within* sexual minority

adolescents. This body of research has documented that sexual minority youth who receive greater levels of family/parental support,^{15–19} friend/peer support,^{18,19} community support,¹⁸ and/or school support^{19,20} report better personal outcomes than sexual minority youth who receive less support. This applies to outcomes such as psychological distress and depressive symptoms,^{15–17,19,20} self-esteem,^{17–19} suicidality,¹⁷ and risk behaviors.¹⁷ Furthermore, some support types (e.g., peer support) compensate for the absence of others (e.g., family support), buffering lesbian, gay, and bisexual (LGB) youth against suboptimal health outcomes.¹⁶ It is nevertheless unclear whether or not these associations differ between sexual minority and gender minority/transgender youth, as studies have either aggregated the two groups^{15,17,18,20} or focused exclusively on LGB youth.^{16,19}

Studies examining the role of social relationships in mediating the associations between adolescent sexual orientation and health—that is, health disparities *between* sexual minority and heterosexual youth—are scarcer. As this is the goal of our study, this body of evidence constitutes the focus of our literature review. The few available studies concentrate on family relations,^{21,22} and such an emphasis is well guided: family relations are pivotal to adolescent adjustment,¹⁵ and family connectedness and parental support among LGB adolescents have declined over recent years.²³

Using data from the National Longitudinal Study of Adolescent to Adult Health, Pearson and Wilkinson²¹ showed that parental closeness, family support, and parental involvement significantly mediated the relationship between sexual minority status and depressive symptoms among 7th–12th graders. Similarly, using data from the NEXT Generation Health Study, Luk et al.²² concluded that family satisfaction was a significant mediator of the association between sexual minority status and trajectories of depressive symptoms among young adults aged 17–21 years. Analyses of the Fragile Families and Child Wellbeing study by Mittleman²⁴ yielded similar evidence for peer victimization, which was found to mediate the relationship between sexual minority status and depressive/anxious symptoms among 15-year olds. Outside of the United States, Bos et al.²⁵ identified a mediating role of relationships with parents, peers, and “class mentors” in the association between sexual minority status and depression within a sample of 13–15-year-old Dutch adolescents. As our focus is on health/well-being status, we do not review studies examining health risk behaviors and suicidality; however, these studies report similar findings.^{26–28}

The present study quantifies the mediating role of parental social support, peer social support, and school belonging in the relationship between sexual minority status and several health/well-being indicators. It aims to add to the current evidence base by comparing results from multiple, high-quality measures assessing different domains of health and well-being (health-related quality of life, socio-emotional functioning, depressive symptoms, and life satisfaction) and deploying high-quality scale measures for the suspected mediators—including a measure of school belonging, a potential mediator not yet considered in this branch of the literature.

Conceptual framework and research hypotheses

Intervening factors linking adolescents’ sexual minority status to their health outcomes must be differentially distrib-

uted among heterosexual and sexual minority youth. As elaborated in the minority stress model, nonheterosexuality remains a stigmatized social status and individuals who identify as a sexual minority often face prejudice, discrimination, and rejection.^{12,29} As a result, sexual minority youth tend to report lower levels of social support than their heterosexual peers.^{30,31} This extends also to parental support, with long-standing evidence that parental rejection of children’s nonheterosexuality leads to detached, conflictual, and/or ambivalent parent–child relations.³² For youth, schools are a critical and compulsory social environment in which they spend a significant amount of time. Schools are also where the bulk of homophobic bullying against sexual minority youth takes place.³³ As a result, sexual minority adolescents’ perceptions of school belonging have been shown to be weaker than those of heterosexual adolescents.^{20,34,35}

Intervening factors linking adolescents’ sexual minority status to their health outcomes must also independently influence health. Social support is a key social determinant of health: it enhances the resources available to individuals to combat stressors and mitigates their health manifestations.³⁶ Consistent with this, analyses of adolescent samples, specifically, yield positive correlations between receipt of social support and health outcomes.^{37,38} Higher levels of school belonging have also been linked to positive health outcomes among youth—an effect that may operate through emotional connections with school peers and staff, which can buffer health stressors and foster participation in developmental activities.^{39,40}

Collectively, the arguments and evidence outlined thus far suggest that social support and school belonging will function as intervening mechanisms in the association between adolescent sexual orientation and adolescent health/well-being. This proposition can be split into a number of testable hypotheses: sexual minority adolescents will report poorer health/well-being (*H1*) and lower social support and school belonging (*H2*) than their different-sex-attracted peers, and social support and school belonging will be positively associated with health/well-being outcomes (*H3*). As a result, social support and school belonging are expected to account for a large share of the observed sexual orientation health disparities (*H4*). The latter is the central hypothesis in this study.

Methods

Data

This research was approved by the Ethics Committee at The University of Queensland and conformed to the principles embodied in the Declaration of Helsinki. The analyses are based on secondary data from the Longitudinal Study of Australian Children (LSAC), a biennial birth-cohort study which has collected information from Australian children since 2004.⁴¹ The LSAC sample is largely representative of two cohorts of Australian children: one born between March 1999 and February 2000 (“K” cohort) and one born between March 2003 and February 2004 (“B” cohort). A sexual-attraction question was asked of K-cohort children in study wave 6 (ages 14/15 years), collected in late 2014. Our analyses are based on 3204 adolescents with complete data participating in that cohort and study wave.

Details about LSAC and our analytic subsample are provided in the Supplementary Data.

Sexual orientation

Information on sexual orientation was collected through a computer-assisted self-interview using the following survey item: *Which of these statements best describes your sexual feelings at this time in your life? I'm attracted only to girls, I'm attracted only to boys, I'm attracted to girls and boys, I'm not sure who I am attracted to, I don't feel any attraction to others.* When only one domain of sexual orientation can be included in surveys of adolescents, it is best practice to ask about sexual attractions.^{4,42–45} This is because many adolescents may not yet have adopted a sexual minority identity,^{46,47} sexual behavior measures are not relevant to sexually inactive youth,⁴⁸ and adolescents perceive sexual attraction as the core dimension of their sexuality.⁴⁹

In this study, we defined sexual minority adolescents as those who indicated that they experienced attractions to members of the same sex or both sexes. Following recent scholarship^{1,4,14} a sexual minority dummy variable was created to distinguish adolescents attracted to members of the same sex, members of the same and different sex, or unsure about their attractions ($n=220$; 6.87%). The key contrast was a dummy variable capturing adolescents expressing attraction to members of the different sex only ($n=2855$; 89.11%). A category not of analytic interest but included as a control included adolescents expressing no sexual attractions ($n=129$; 4.03%).

Health outcomes

This study considered four high quality health/well-being measures available in LSAC. The first outcome is the Pediatric Quality of Life Inventory (PedsQL) total score—a validated instrument measuring adolescent health-related quality of life (Cronbach's $\alpha=0.92$).⁵⁰ In the PedsQL, parents report how much of a problem for the child 23 items had been during the past month, with possible responses ranging from 0 = “never a problem” to 4 = “always a problem.” The PedsQL total score was constructed by taking the mean of all items and rescaling it to range from 0 (worst possible outcome) to 100 (best possible outcome).

The second outcome is the Strengths and Difficulties Questionnaire (SDQ)—an adolescent-reported validated instrument capturing adolescents' social, behavioral, and emotional functioning ($\alpha=0.84$).⁵¹ The 20 items that comprise the SDQ are scored on a 3-point response scale (from 0 = “not true” to 2 = “certainly true”) and encompass four subscales (conduct problems, emotional problems, peer problems, and hyperactivity and inattention). Scores for all items were summed to create the SDQ total score, which ranges from 0 (best possible outcome) to 40 (worst possible outcome).

The third outcome is the Short Mood and Feelings Questionnaire (SMFQ)—an adolescent-reported validated instrument designed to identify depression ($\alpha=0.94$).⁵² For each of the 13 items that comprise the SMFQ, adolescents were asked how much they had felt that way over the past 2 weeks. Responses were measured on a 3-point scale (from 0 = “not true” to 2 = “true”) and summed to create an over-

all score ranging from 0 (best possible outcome) to 26 (worst possible outcome).

The fourth and final outcome is an adolescent-reported single-item measure of overall life satisfaction (“In general, I am happy with how things are for me in my life right now”) on a 5-point scale (1 = “Strongly Disagree”; 5 = “Strongly Agree”).

The SDQ and SMFQ were reverse coded to ensure that higher scores indicated better health/well-being. For comparability, all outcomes were standardized when included in the regression models.

Mediators

Three factors were evaluated as potential mediators of the association between adolescent sexual attraction and health/well-being: social support from parents, social support from friends, and school belonging.

Social support was captured using two 8-item, child-reported, validated scales of social support from parents ($\alpha=0.94$) and friends ($\alpha=0.90$) from the Inventory of Parent and Peer Attachment.⁵³ Social support from parents was captured through the child's degree of agreement (1 = “almost never or never true”; 4 = “almost always or always true”) with statements such as “My parents accept me,” “I share my thoughts and feelings with my parents,” or “I trust my parents.” The mean of the 8 items was calculated to create an overall score ranging from 1 to 4, where higher scores denote closer attachment to parents. Social support from friends was captured through the child's degree of agreement (1 = “almost always true”; 5 = “almost never true”) with statements such as “I tell my friends about my problems and troubles,” “I feel my friends are good friends,” or “I trust my friends.” The mean of the 8 items was calculated to create an overall score ranging from 1 to 5, which was then reverse coded so that higher scores indicate closer attachment to peers.

School belonging was captured using a 12-item version of the Psychological Sense of School Membership scale, a validated instrument capturing the extent to which adolescents feel accepted, respected, included, and supported by others at school. This was based on agreement (1 = “not at all true”; 5 = “completely true”) with statements such as “People at this school are friendly to me,” “It is hard for people like me to be accepted here,” and “I can really be myself at this school” ($\alpha=0.87$).⁵⁴ Items were reverse coded as needed and summed to create an overall score (possible range: 12–60), with higher values denoting greater levels of school belonging.

The mediating variables were also standardized for inclusion in regression models.

Control variables

A set of control variables was included in all regression models to account for potential confounding. These variables resemble those in cognate studies of sexual orientation and adolescent outcomes^{1,4,14,22} and included: sex (male/female), age (in months), language spoken at home—a proxy for ethno-cultural background (English/other), father's presence (yes/no), mother's presence (yes/no), and number of siblings (0/1/2/3+). Means or percentages and standard deviations (SDs) on all variables (before standardization) are presented in Table 1.

TABLE 1. DESCRIPTIVE STATISTICS

	<i>All</i>		<i>Different-sex attracted</i>		<i>Sexual minority</i>	
	<i>Mean/%</i>	<i>SD</i>	<i>Mean/%</i>	<i>SD</i>	<i>Mean/%</i>	<i>SD</i>
Sexual attraction						
Different-sex attracted	89.11%					
Sexual minority	6.87%					
No sexual attractions	4.03%					
Outcomes						
SDQ total score ^a	22.19	5.89	22.51	5.70	17.86	6.53
PedsQL total score	78.04	14.85	78.54	14.68	72.19	15.40
SMFQ ^a	21.58	6.58	21.79	6.47	18.07	7.36
Life satisfaction	3.83	1.10	3.85	1.10	3.41	1.15
Suspected mediators						
Social support (parents)	3.32	0.74	3.35	0.73	3.00	0.82
Social support (friends)	4.07	0.75	4.09	0.73	3.89	0.83
School belonging	49.45	7.47	49.79	7.30	45.70	7.95
Controls						
Female	49.10%		47.25%		69.09%	
Age (in months)	178.96	4.14	179.03	4.147	179.04	4.00
Language other than English	8.99%		8.83%		8.64%	
Number of siblings						
Zero	11.67%		10.96%		20.91%	
One	46.44%		46.59%		45.00%	
Two	29.06%		29.35%		25.00%	
Three or more	12.83%		13.10%		9.10%	
Mother present	97.50%		97.48%		96.82%	
Father present	82.40%		82.73%		75.00%	
Observations	3204		2855		220	

LSAC, K cohort, wave 6 (2014).

^aReverse coded.

LSAC, Longitudinal Study of Australian Children; PedsQL, Pediatric Quality of Life Inventory; SD, standard deviation; SDQ, Strengths and Difficulties Questionnaire; SMFQ, Short Mood and Feelings Questionnaire.

Analytic strategy

Mediation by social support and school belonging in the association between adolescent sexual attraction and health/well-being outcomes was assessed by applying Baron and Kenny's⁵⁵ approach to the conceptual model presented in Figure 1. Pathways *a*, *b*, *c*, and *c'* in the diagram were mapped onto the four hypotheses formulated in the conceptual framework. In this framework, mediation occurs when (1)

statistically significant associations are observed for pathways *a*, *b*, and *c*, and (2) the association in pathway *c* is significantly larger than that in pathway *c'*. Ordinary least squares (OLS) regression models were used to identify the adjusted associations between sexual minority status and the suspected mediators (pathway *a*) and those between the suspected mediators and the health/well-being outcomes (pathway *b*). Nested OLS regression models were then fitted to identify pathways *c* and *c'*: model 1 included only the

FIG. 1. Conceptual diagram. PedsQL, Pediatric Quality of Life Inventory; SDQ, Strengths and Difficulties Questionnaire; SMFQ, Short Mood and Feelings Questionnaire.

TABLE 2. ADJUSTED ASSOCIATIONS BETWEEN SEXUAL MINORITY STATUS AND MEDIATORS (PATHWAY A)

	<i>Social support (parents)</i> Coefficient (95% CI)	<i>Social support (friends)</i> Coefficient (95% CI)	<i>School belonging</i> Coefficient (95% CI)
Sexual minority	−0.43** (−0.56 to −0.29)	−0.33** (−0.47 to −0.20)	−0.50** (−0.64 to −0.37)

LSAC, K cohort, wave 6 (2014). $n=3204$. Coefficients from ordinary least squares regression models adjusted for sex, age, English-speaking background, number of siblings, father's presence, and mother's presence.

Statistical significance: ** $p < 0.01$.

CI, confidence interval.

sexual orientation variables and the controls (pathway c), whereas models 2–5 added the suspected mediators—one at a time and altogether (pathway c'). The estimated coefficient on the sexual minority dummy variable in model 1 was then formally compared to the same coefficient in models 2–5 using Wald tests.

Results

Results in Table 2 represent pathway a . We hypothesized that sexual minority adolescents would report lower social support and school belonging than their different-sex-attracted peers ($H2$). Consistent with this, we found that sexual minority status was negatively and significantly associated with the suspected mediators, net of confounds. The magnitude of the association ranged from 0.33 SDs for social support from friends ($\beta = -0.33$; $p < 0.01$) to 0.50 SDs for school belonging ($\beta = -0.50$; $p < 0.01$).

Results in Table 3 represent pathway b . In $H3$, we hypothesized that social support and school belonging would be positively associated with health/well-being. Consistent with this, we found that all forms of support were related to better adolescent health/well-being, net of confounds. A SD increase in parental social support was associated with health/well-being improvements ranging from 0.21 SDs (PedsQL: $\beta = 0.21$; $p < 0.01$) to 0.44 SDs (SDQ: $\beta = 0.44$; $p < 0.01$). Similarly, a SD increase in social support from friends improved health/well-being by 0.17 SDs (PedsQL: $\beta = 0.17$; $p < 0.01$) to 0.38 SDs (SDQ: $\beta = 0.38$; $p < 0.01$). For school belonging, the analogous effect range was 0.32 SDs (PedsQL: $\beta = 0.32$; $p < 0.01$) to 0.64 SDs (SDQ: $\beta = 0.64$; $p < 0.01$).

Table 4 presents the results of nested models of pathways c and c' . We hypothesized that sexual minority adolescents would report poorer health/well-being than their different-sex-attracted peers ($H1$) and that social support and school belonging would mediate this association ($H4$). Consistent with

$H1$, sexual minority status was negatively and significantly associated with all health/well-being outcomes, net of confounds and before including the mediators (model 1; pathway c). That is, sexual minority adolescents experienced worse health/well-being than different-sex-attracted adolescents across all four domains. These health differences amounted to 0.70 SDs for the SDQ ($\beta = -0.70$; $p < 0.01$), 0.47 SDs for the SMFQ ($\beta = -0.47$; $p < 0.01$), 0.37 SDs for life satisfaction ($\beta = -0.37$; $p < 0.01$), and 0.35 SDs for the PedsQL ($\beta = -0.35$; $p < 0.01$).

Consistent with $H4$, the estimated associations between sexual minority status and health/well-being were however substantially smaller in the model including all mediators (model 5; pathway c'): 0.35 SDs for the SDQ ($\beta = -0.35$; $p < 0.01$), 0.20 SDs for the SMFQ ($\beta = -0.20$; $p < 0.01$), 0.18 SDs for the PedsQL ($\beta = -0.18$; $p < 0.01$), and 0.11 SDs for life satisfaction ($\beta = -0.11$; $p > 0.05$). The coefficient on sexual minority status in the life satisfaction model was no longer statistically significant. As shown in Table 5, reductions in the magnitude of the sexual minority coefficient between models 1 and 5 ranged between 70% (life satisfaction) and 49% (PedsQL) and were in all cases statistically significant ($p < 0.05$).

The results of models 2 to 4 in Tables 4 and 5 provide insights about which of these factors has a stronger mediating effect. School belonging had the most pronounced effect: reductions in the magnitude of the sexual minority coefficient were largest in models including the school belonging index (45%–59%). The second strongest mediation effect was for parental social support (24%–40%) and the weakest for social support from friends (15%–24%). For the latter, mediation effects were not statistically significant ($p > 0.1$).

Discussion

Consistent with our first hypothesis ($H1$) and with tenets of the minority stress model, Australian sexual minority

TABLE 3. ADJUSTED ASSOCIATIONS BETWEEN MEDIATORS AND HEALTH/WEELL-BEING OUTCOMES (PATHWAY B)

	<i>SDQ</i> Coefficient (95% CI)	<i>PedsQL</i> Coefficient (95% CI)	<i>SMFQ</i> Coefficient (95% CI)	<i>Life satisfaction</i> Coefficient (95% CI)
Panel 1: Social support (parents)	0.44** (0.41 to 0.47)	0.21** (0.17 to 0.24)	0.36** (0.33 to 0.40)	0.35** (0.32 to 0.38)
Panel 2: Social support (friends)	0.38** (0.35 to 0.42)	0.17** (0.13 to 0.20)	0.26** (0.23 to 0.30)	0.27** (0.24 to 0.31)
Panel 3: School belonging	0.64** (0.61 to 0.67)	0.32** (0.29 to 0.35)	0.46** (0.43 to 0.49)	0.44** (0.41 to 0.47)

LSAC, K cohort, wave 6 (2014). $n=3204$. Coefficients from ordinary least squares regression models adjusted for sex, age, English-speaking background, number of siblings, father's presence, and mother's presence.

Statistical significance: ** $p < 0.01$.

TABLE 4. ADJUSTED ASSOCIATIONS BETWEEN SEXUAL MINORITY STATUS AND HEALTH/WEALTH/BEING OUTCOMES, INCORPORATING MEDIATORS (PATHWAYS C AND C')

	Model 1 Coefficient (95% CI)	Model 2 Coefficient (95% CI)	Model 3 Coefficient (95% CI)	Model 4 Coefficient (95% CI)	Model 5 Coefficient (95% CI)
Panel 1: SDQ					
Sexual minority	-0.70** (-0.84 to -0.57)	-0.52** (-0.64 to -0.40)	-0.58** (-0.70 to -0.45)	-0.39** (-0.49 to -0.28)	-0.35** (-0.45 to -0.25)
Social support (parents)		0.43** (0.40 to 0.46)			0.18** (0.15 to 0.21)
Social support (friends)			0.37** (0.34 to 0.41)		0.07** (0.04 to 0.10)
School belonging				0.63** (0.60 to 0.65)	0.51** (0.48 to 0.54)
Panel 2: PedsQL					
Sexual minority	-0.35** (-0.48 to -0.22)	-0.27** (-0.40 to -0.13)	-0.30** (-0.43 to -0.17)	-0.19** (-0.32 to -0.07)	-0.18** (-0.31 to -0.05)
Social support (parents)		0.20** (0.17 to 0.23)			0.08** (0.04 to 0.11)
Social support (friends)			0.16** (0.13 to 0.19)		0.00 (-0.03 to 0.04)
School belonging				0.31** (0.28 to 0.34)	0.28** (0.24 to 0.32)
Panel 3: SMFQ					
Sexual minority	-0.47** (-0.60 to -0.33)	-0.31** (-0.44 to -0.19)	-0.38** (-0.51 to -0.25)	-0.24** (-0.36 to -0.12)	-0.20** (-0.32 to -0.08)
Social support (parents)		0.36** (0.32 to 0.39)			0.19** (0.16 to 0.22)
Social support (friends)			0.26** (0.23 to 0.29)		0.03 (-0.00 to 0.07)
School belonging				0.45** (0.42 to 0.48)	0.35** (0.31 to 0.39)
Panel 4: life satisfaction					
Sexual minority	-0.37** (-0.51 to -0.24)	-0.23** (-0.35 to -0.10)	-0.28** (-0.41 to -0.15)	-0.15* (-0.28 to -0.03)	-0.11 (-0.23 to 0.01)
Social support (parents)		0.34** (0.31 to 0.38)			0.18** (0.15 to 0.22)
Social support (friends)			0.27** (0.23 to 0.30)		0.05** (0.02 to 0.09)
School belonging				0.44** (0.41 to 0.47)	0.33** (0.29 to 0.37)

LSAC, K cohort, wave 6 (2014). $n = 3204$. Coefficients from ordinary least squares regression models adjusted for sex, age, English-speaking background, number of siblings, father's presence, and mother's presence.

Statistical significance: * $p < 0.05$, ** $p < 0.01$.

TABLE 5. COMPARISON OF SEXUAL MINORITY COEFFICIENTS ACROSS MODELS

	<i>Model 2 vs. model 1</i> (parental social support)		<i>Model 3 vs. model 1</i> (social support from friends)		<i>Model 4 vs. model 1</i> (school belonging)		<i>Model 5 vs. model 1</i> (all mediators)	
	% difference in coefficient	p value of difference	% difference in coefficient	p value of difference	% difference in coefficient	p value of difference	% difference in coefficient	p value of difference
Panel 1: SDQ	26.01	0.023	17.78	0.088	44.79	<0.001	50.70	<0.001
Panel 2: PedsQL	24.37	0.185	15.27	0.288	44.64	0.048	48.95	0.034
Panel 3: SMFQ	32.56	0.053	18.62	0.181	48.53	0.007	57.18	0.002
Panel 4: life satisfaction	39.52	0.062	24.15	0.177	59.08	0.010	69.98	0.003

Based on results presented in Table 4. “% difference” calculated as $[(\beta_{\text{Model 1}} - \beta_{\text{Model 2}}) / \beta_{\text{Model 1}}] \times 100$. “p value of difference” is the p value from a one-sided Wald test.

adolescents experienced poorer health-related quality of life and socio-emotional functioning, more depressive symptoms, and lower life satisfaction than their different-sex-attracted counterparts. This pattern of results and the magnitude of the estimated effects (0.35–0.70 SDs) are consistent with earlier international^{6,7} and Australian⁴ evidence. Also consistent with expectations (H2) and the minority stress framework, sexual minority adolescents reported significantly and substantially lower levels of social support from parents and friends and school belonging—in the range of 0.33–0.50 SDs. These are comparable to estimates reported in earlier scholarship from the United States,^{31,34} the Netherlands,²⁵ and New Zealand.⁵ Consistent with the third hypothesis (H3), our Australian analyses also underscored the importance of social support and school belonging for adolescent health^{38–40}; one-SD increases in these measures were associated with increases of 0.17–0.64 SDs in the health/well-being outcomes.

Altogether, these results suggested that social support and school belonging would mediate the relationship between adolescent sexual minority status and health/well-being. The subsequent analyses are among the first to provide empirical evidence in support of this point. Consistent with the last and main hypothesis (H4), social support from parents and friends and school belonging were collectively responsible for 49%–70% of the association between sexual minority status and health outcomes. The explanatory power of these different support sources in the models was slightly larger than that attributed to family and peer support in earlier United States and Canadian research on various mental health outcomes^{22–24} and to relationships with parents, peers, and “class mentors” in earlier research on depression using a Dutch sample.²⁵

School belonging played the strongest mediating role in the association between adolescent sexual minority status and health/well-being, suggesting that integration of sexual minority adolescents within schools is critical to closing health disparities. This finding is noteworthy, as earlier studies comparing the outcomes of sexual minority and heterosexual/different-sex-attracted youth had focused on support from family and friends,^{21,22,25} but had not considered school belonging. It is nevertheless consistent with results from previous analyses of sexual minority subsamples. For example, Hatchel et al.²⁰ found that school belonging was an important mediator of the relationship between victimization and depression among lesbian, gay, bisexual, transgender, and questioning youth. Our finding may reflect that—within this generation of Australian teens—parents generally support their nonhetero-

sexual children, and these children have access to networks of supportive peers. However, schools are heteronormative social environments that remain “compulsory” for sexual minority adolescents and represent contexts where these adolescents have little choice to decide with whom they interact.^{13,14} Furthermore—unlike countries such as the United States—Australia lacks school-based programs aimed at reducing stigma and bullying toward sexual minority youth.⁹

Study strengths and limitations

This study had a number of strengths: it relied on a national probability sample; it leveraged high-quality measures of sexual orientation, health/well-being, social support, and school belonging; and it considered a new country context (Australia).

Study limitations included the absence of objectively measured health outcomes, lack of information on domains of adolescent sexual orientation other than sexual attraction (i.e., sexual identity and behavior), and a relatively modest subsample of sexual minority adolescents ($n=220$). The latter precluded us from stratifying the analyses by sex or undertaking comparisons between different sexual minority categories (i.e., same-sex attracted, both-sex attracted, and “unsure” adolescents). In addition, the available data were cross-sectional, and longitudinal data would have been better suited to assess the mediation processes of interest.

The scope of our analyses was also restricted by having no information on the degree to which sexual minority adolescents were “out” about their identity and/or attractions to different social partners (e.g., parents, peers) and in different social contexts (e.g., at school, at home) or about their perceived degree of acceptance of their sexuality. Although this does not affect our main conclusions, it is likely that these factors moderate the relationships under consideration—for example, the importance of family/school support for health disparities may differ between sexual minority youth who are out and those who are not out. Studies of representative samples that account for moderation by these and other factors are required.

Conclusion

Our findings suggest that interventions designed to improve the health/well-being of sexual minority adolescents should be directed at eliciting enhanced social support from families and peers and fostering integration at school. Examples of support-based interventions to eradicate sexual

minority disadvantage have been discussed in the literature—including attachment-based family therapy, the establishment of Gay–Straight Alliances in schools, and educational programs aimed at parents and school staff.⁹ The results suggest that school-based interventions may be particularly fruitful. However, the findings also indicate that equalizing support to sexual minority adolescents from parents, peers, and schools is not sufficient to fully close outcome gaps. This highlights the importance of further identifying other mechanisms contributing to the health/well-being disadvantage experienced by nonheterosexual adolescents.

Disclaimer

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Supplementary Material

Supplementary Data

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