

Original article

Social and School Connectedness in Early Secondary School as Predictors of Late Teenage Substance Use, Mental Health, and Academic Outcomes

Lyndal Bond, Ph.D.^{a,*}, Helen Butler, B.A.(Hons), Dip.Ed., G.Dip. in Adol. Health^a,
Lyndal Thomas, B.Sc.(Hons)^b, John Carlin, Ph.D.^c, Sara Glover, Ph.D.^d,
Glenn Bowes, Ph.D.^e, and George Patton, M.D.^a

^aCentre for Adolescent Health, Royal Children's Hospital, Department of Paediatrics, University of Melbourne and Murdoch Children's Research Institute, Melbourne, Australia

^bKey Centre for Women's Health in Society, University of Melbourne, Melbourne, Australia

^cClinical Epidemiology and Biostatistics Unit, Murdoch Children's Research Institute and University of Melbourne Department of Paediatrics, Royal Children's Hospital, Melbourne, Australia

^dDepartment of Education and Training, Victoria, Australia

^eDepartment of Paediatrics, University of Melbourne, Melbourne, Australia

Manuscript received March 16, 2006; manuscript accepted October 25, 2006

Abstract

Purpose: To examine associations between social relationships and school engagement in early secondary school and mental health, substance use, and educational achievement 2–4 years later.

Methods: School-based longitudinal study of secondary school students, surveyed at school in Year 8 (13–14-years-old) and Year 10 (16-years-old), and 1-year post-secondary school. A total of 2678 Year 8 students (74%) participated in the first wave of data collection. For the school-based surveys, attrition was <10%. Seventy-one percent of the participating Year 8 students completed the post-secondary school survey.

Results: Having both good school and social connectedness in Year 8 was associated with the best outcomes in later years. In contrast, participants with low school connectedness but good social connectedness were at elevated risk of anxiety/depressive symptoms (odds ratio [OR]: 1.3; 95% confidence interval [CI]: 1.0, 1.76), regular smoking (OR: 2.0; 95% CI: 1.4, 2.9), drinking (OR: 1.7; 95% CI: 1.3, 2.2), and using marijuana (OR: 2.0; 95% CI: 1.6, 2.5) in later years. The likelihood of completing school was reduced for those with either poor social connectedness, low school connectedness, or both.

Conclusions: Overall, young people's experiences of early secondary school and their relationships with others may continue to affect their moods, their substance use in later years, and their likelihood of completing secondary school. Having both good school connectedness and good social connectedness is associated with the best outcomes. The challenge is how to promote both school and social connectedness to best achieve these health and learning outcomes. © 2007 Society for Adolescent Medicine. All rights reserved.

Along with connectedness to family, connectedness to school during adolescence has emerged as a key area for building protective factors for positive educational outcomes and lower rates of health-risk behaviors [1–5].

School is particularly important as a social and learning environment, impacting not only on academic and vocational pathways, but also on present and future health and

*Address correspondence to: Lyndal Bond, VicHealth Public Health Fellow Centre for Adolescent Health, 2 Gatehouse Street, Parkville Victoria 3052, Australia.

E-mail address: lyndal.bond@rch.org.au

well being. Young people who are not engaged with learning or who have poor relationships with peers and teachers are more likely to use drugs and engage in socially disruptive behaviors, report anxiety/depressive symptoms, have poorer adult relationships, and fail to complete secondary school [6–12]. Therefore, the potential consequences for young people of becoming disconnected from school are far reaching.

Negative school experiences largely account for young people becoming alienated or disconnected from school [3,13–15]. Research focusing on connectedness to school emphasises the importance of the quality of relationships (peer and teacher) on engagement in learning, and on health and well being [14–16]. Such experiences highlight different social experiences including, for example, being bullied, not getting along with teachers, feelings of not belonging, not doing well at school, and feeling under stress.

Schools are accessible and relatively stable sites within which to locate interventions to promote adolescent connectedness at a time of multiple transitions, during which identity and relationships with family, peers, and school change [17–19]. Doing so may bring about better educational and health outcomes [20,21]. While substantial research has been conducted both from health and educational perspectives, there is clearly a need to better understand what affects connectedness to school, how we can effectively measure this, and how and when we can best intervene.

The temporal relationships between school connectedness and substance use have been examined in several studies [6,11]. Attachment theory [22,23] and models such as the social development model [24] have been used to explain these relationships. Attachment theory proposes that a sense of secure emotional connection to key individuals provides a base for psychological and social development. The social development model builds on this, proposing that connectedness to family, schools, peers, and community, combined with experiences of positive socialization is protective against substance use and antisocial behavior [25].

While the contemporaneous associations between these factors and mental health have been established [2,3,7] less is known about the associations between social connectedness and school connectedness in early adolescence and emotional well being in later adolescence, nor has the nature of the relationship between school and social connectedness been examined.

The aim of this paper is to examine the extent to which social connectedness and connectedness to school in early secondary school is associated with mental health and substance use two years later and educational achievement four years later, adjusting for mental health and behaviors in the earlier years.

The data derive from students involved in the Gatehouse Project, a randomized controlled trial of a multilevel school-based intervention to promote the emotional well being of young people by increasing students' connectedness to

school. The individual component of the intervention focused on cognitive and interpersonal skills underlying emotional well being relevant to the normal developmental experiences of teenagers. The classroom and whole school components sought to make changes to the schools' environment to enhance security and trust, communication and social connectedness, and positive regard through valued participation. Intervention effects in the trial are not the primary focus of this paper and have been reported elsewhere [12,20].

Methods

Sample

We used data from a cohort of 2678 young people in 26 secondary schools participating in the Gatehouse Project [20,26]. Government-funded, Catholic, and independent schools in metropolitan and regional Victoria, Australia were involved. All Year 8 students in the 26 schools were invited to participate in the study.

Procedure

We used data collected from students at the beginning of the second year of secondary school (Year 8, average age 14 years) prior to the intervention being implemented, at the end of Year 10 (the last year of compulsory secondary school, average age 16 years), and 1 year post secondary school.

Students completed a questionnaire using laptop computers at school supervised by the research team. Absent students were surveyed at school at a later date or by telephone (6%). Telephone interviews were completed with students who had left the project schools (4%). For the final survey, computer-assisted telephone interviews were conducted.

Ethics approval was obtained from the Royal Children's Hospital Ethics in Human Research Committee, the Department of Education and Training, and the Melbourne Catholic Education Office. Written parental consent was required. Students gave consent on the day of the survey.

Measures

Mental health status. Mental health status was evaluated using a computerized version of the Clinical Interview Schedule – Revised [27], a structured psychiatric interview for nonclinical populations. Participants were defined as having anxiety/depressive symptoms if they scored >12, reflecting a level of minor psychiatric morbidity at which a physician might be concerned [27].

Substance use. Substance use was measured by self-report. Participants who identified themselves as a smoker and/or a drinker completed a retrospective 7-day diary. Regular smoking was defined as smoking on 6 or more days in the

previous week. Regular drinking was defined as drinking on three or more days in the previous week. Marijuana use was defined as any use in the previous 6 months.

Academic outcomes. Completion of Year 12 (final year of secondary school) and university entrance score (TER score) were used as indicators of educational outcome. The TER is a standardized assessment based on a truncated normal distribution (range: 20–99.95). To compare the strength of the associations (odds ratios) between school and social connectedness and the TER score to the other dichotomous outcomes, participants obtaining a score >80 were categorized as obtaining a good score. A score in this range would enable students to be offered places in the major Victorian universities to study arts, sciences, and professional degrees.

Social connectedness. Social connectedness was assessed with three questions adapted from the Interview Schedule for Social Interaction assessing adequacy of attachments [28]. Students were asked to say whether, in their friendship group, they had someone to talk to, someone to depend on when angry or upset, and someone who could be trusted with private feelings and thoughts. The social connectedness scale has an internal consistency of .69. Participants were dichotomized as having either good social connectedness (yes to all three questions), or poor connectedness.

Interpersonal conflict. Two measures of interpersonal conflict were included: having arguments with others, and being bullied recently. Participants were categorized as reporting no arguments, or having arguments with one or more people, recently. Participants were classified as bullied if they answered yes to any of four items addressing types of recent victimization: (1) being teased, (2) having rumors spread about them, (3) being deliberately excluded, or (4) experiencing physical threats or violence [29].

School connectedness. The school connectedness scale originally comprised 23 items and 5 subscales [30]. Factor analysis indicated one factor was an appropriate summary (77% of variance explained). Excluding three items with low factor loadings, the internal consistency was high (Cronbach alpha .87). This instrument covers commitment to school (e.g., Doing well in school is important to me); relationships with teachers (e.g., Teachers at this school are fair); relationships with peers (e.g., I like the other students in my classes); opportunities to participate (e.g., At my school, students have a lot of chances to help decide and plan things . . .); and belonging (e.g., I feel I belong in this school). The 20 items were summed to create a school connectedness score. To examine the effect of low and very low connectedness, categories were defined based on the quintiles of the Year 8 data.

Family measures. Family measures included family structure (intact family, separated/divorced, or other circum-

stances), language other than English spoken at home (LOTE), and parent level of education (maximum in the family).

Method of analysis

Statistical analysis was performed using Stata [31]. Prevalence estimates and logistic regressions were performed using robust “information-sandwich” estimates of standard errors to account for clustering within schools [32]. All multivariate analyses are presented adjusting for the intervention effect. Interactions between the intervention effect and school and social connectedness in the later years were examined adjusting for these variables at baseline (Year 8).

Results

From a possible sample of 3623 students, 74% participated in the first wave of data collection. Forty-seven percent was male. Attrition from Year 8 to Year 10 surveys was 10%. Seventy-one percent (1902) of the original cohort participated in the post secondary school survey. Of those who did not participate in the final wave, significantly more reported very low school connectedness (24% vs. 17%, $p < .001$) and higher rates of substance use (e.g., smoking 3.4% vs. 2%, $p = .029$) in Year 8.

Table 1 presents sociodemographic measures, social and school connectedness, interpersonal conflict, depressive symptoms, and substance use in early and late secondary school for males and females. The prevalence of substance use increased from Year 8 to Year 10. Connectedness to school was lower for Year 10 students than for Year 8 students. The percentage in the study who finished Year 12 (88%) was higher than the state average (about 80% [33]).

Associations between school and social connectedness in Year 8 and depressive symptoms and substance use in Year 10 and educational outcomes

Figure 1a presents simple bivariate associations (Odds Ratios [OR] and 95% confidence intervals [CI]) between high, moderate, low, and very low school connectedness in Year 8 with the health behaviors in Year 10 and educational outcomes. The base for comparison was *very high school connectedness*. Year 8 students with very low school connectedness were more likely to report depressive symptoms and engage in substance use in Year 10, and less likely to finish school or do well.

Figure 1b presents simple bivariate associations (OR, 95% CI) for poor social connectedness (reference category: *good connectedness*), bullied (reference category: *not bullied*), and arguments with others (reference category: *no arguments recently*) at Year 8 with the health behaviors in Year 10 and educational outcomes. Poor social connectedness, being bullied, and having arguments with others in Year 8 were all associated with increased odds of depressive symptoms. The pattern with substance use and educational

Table 1
Sociodemographic measures, social and school engagement, anxiety/depressive symptoms, and substance use in early secondary school (Year 8) and 2 years later (Year 10)

| | Year 8 | | | | Year 10 | | | |
|--|--------|--------|--------|--------|---------|--------|--------|--------|
| | Male | | Female | | Male | | Female | |
| | 1124 | (%)* | 1276 | (%)* | 1124 | (%)* | 1276 | (%)* |
| Parent education level | | | | | | | | |
| Tertiary or post secondary training | 544 | (55.3) | 556 | (48.0) | — | — | — | — |
| Language other than English spoken at home** | 242 | (21.5) | 328 | (25.7) | — | — | — | — |
| Family structure | | | | | | | | |
| Lives with both parents | 920 | (81.2) | 1021 | (80.0) | — | — | — | — |
| Social connectedness | | | | | | | | |
| Good | 902 | (80.9) | 1095 | (86.6) | 925 | (84.6) | 1142 | (91.6) |
| Poor/absent | 213 | (19.1) | 170 | (13.5) | 169 | (15.5) | 105 | (8.4) |
| Interpersonal conflict | | | | | | | | |
| Arguments with others | 366 | (32.6) | 623 | (49.9) | 362 | (32.8) | 638 | (50.6) |
| Bullied | 612 | (54.4) | 648 | (50.6) | 472 | (43.0) | 491 | (39.3) |
| School connectedness | | | | | | | | |
| Very high | 209 | (18.7) | 288 | (22.6) | 120 | (11.5) | 184 | (15.1) |
| High | 193 | (17.3) | 299 | (23.5) | 140 | (13.4) | 204 | (16.8) |
| Moderate | 242 | (21.7) | 252 | (19.8) | 207 | (19.6) | 277 | (22.8) |
| Low | 245 | (22.0) | 246 | (19.3) | 262 | (25.0) | 281 | (23.1) |
| Very low | 226 | (20.3) | 187 | (14.7) | 319 | (30.4) | 270 | (22.2) |
| Anxiety/depressive symptoms | 138 | (12.1) | 266 | (20.9) | 138 | (12.2) | 329 | (26.0) |
| Drinker | 398 | (35.5) | 326 | (25.8) | 780 | (70.3) | 839 | (66.4) |
| Smoker | 152 | (13.6) | 197 | (15.8) | 279 | (25.2) | 351 | (27.8) |
| Regular smoker | 20 | (1.8) | 26 | (2.1) | 152 | (13.8) | 170 | (13.6) |
| Tried marijuana | 86 | (8.7) | 62 | (4.9) | 236 | (21.7) | 230 | (18.7) |

* Percent calculated on valid responses.

** Over 20 different languages were reported including: Arabic, Greek, Italian, Chinese, Vietnamese, Cambodian, etc.

outcomes varied. Students who had experienced bullying in Year 8 were less likely to complete secondary school.

Interactions between the intervention and school connectedness

The focus of the Gatehouse Project intervention was to increase connectedness to school—analyses were therefore undertaken to examine possible interaction effects between the intervention and school and social connectedness in predicting health and educational outcomes. Adjusting for baseline school connectedness, there were significant interaction effects between the intervention and school connectedness at Year 10 for smoking ($p = .029$) and regular smoking ($p = .037$) only. On examination, it was found that students in the intervention schools with good school connectedness in Year 10 were less likely to smoke or smoke regularly (9.5%, 3.4%) than students in the control schools (20.1%, 12.6%). There was no difference in prevalence of smoking (19.3% intervention vs. 19.4% control) or regular smoking (3.3% intervention vs. 3.8% control) for those who had low school connectedness.

To determine if the association between school connectedness and smoking could be explained by the intervention, the association between low school connectedness in Year 8 and smoking in Year 10 was examined using control stu-

dents only. These associations were significant for both smoking (OR: 1.6; 95% CI: 1.2, 2.1; $p < .001$) and regular smoking (OR: 1.9; 95% CI: 1.4, 2.7; $p < .001$). Thus, while the intervention may have had an effect on the protective relationship of school connectedness for smoking, the importance of school connectedness for reduction in smoking remained for the control students. Subsequent analyses therefore included all participants.

There was no interaction between the intervention effect and social connectedness for any outcome ($p > .1$).

Interactions between school connectedness and social connectedness

As a major focus of this paper was to examine the relationships between social and school connectedness, interaction terms between these two variables were examined, after dichotomizing school connectedness (very high to moderate and low to very low). There were statistically significant interactions between social connectedness and connectedness to school for depressive symptoms, substance use, and school completion. In view of these interactions, a four-level composite variable was created to compare those with good social and school connectedness with the others.

Table 2 shows the percentage of students in each of the four categories of school and social connectedness for the

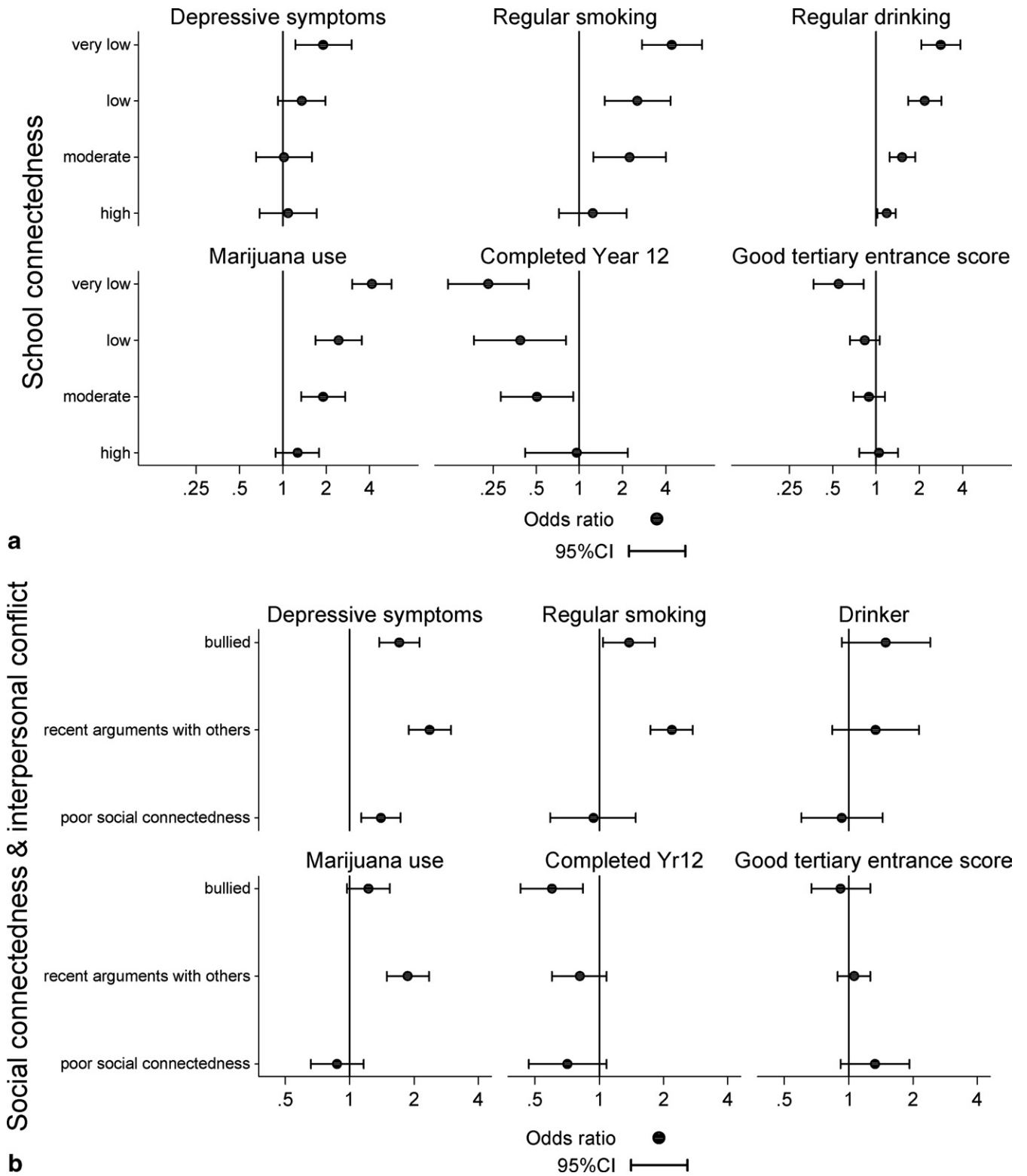


Figure 1. (a) Simple bivariate associations between school connectedness in Year 8 and depressive symptoms and substance use in Year 10 and school outcomes, represented as ORs, with 95% CI, compared to reference category of very high school connectedness. (b) Simple bivariate associations between social connectedness and interpersonal conflict in Year 8 and depressive symptoms and substance use in Year 10 and school outcomes represented as ORs, with 95% CI, compared to reference category of good social connectedness, no recent arguments with others, and not bullied, respectively.

Table 2
Interaction between school and social connectedness in Year 8, with subsequent health behaviors in Year 10, and educational outcomes

| | n | Depressive symptoms % | Regular smoker % | Drinker % | Tried marijuana % | Completed Year 12 % | Good tertiary entrance score % |
|---|-----|-----------------------|------------------|---------------|-------------------|---------------------|--------------------------------|
| School and social connectedness | | | | | | | |
| Good school connectedness and good social connectedness | 877 | 16.1 | 7.9 | 60.2 | 12.1 | 94.2 | 44.5 |
| Good school connectedness and poor social connectedness | 178 | 23.1 | 8.9 | 61.6 | 13.9 | 88.9 | 56.9 |
| Low school connectedness and good social connectedness | 784 | 23.4 | 21.4 | 78.1 | 31.2 | 62.9 | 35.1 |
| Low school connectedness and poor social connectedness | 255 | 25.0 | 15.9 | 75.6 | 21.8 | 83.7 | 39.9 |
| $\chi^2(3 \text{ df}), (p\text{-value})$ | | 16.5 (.001) | 58.7 (< .001) | 62.6 (< .001) | 84.9 (< .001) | 39.6 (< .001) | 18.2 (< .001) |

health and education outcomes. Having both good school and good social connectedness in Year 8 was associated with the best outcomes. This table shows that the prevalence of depressive symptoms was approximately the same for all categories except good school/good social connectedness. There was no interaction between the intervention effect and this combined variable for any outcome ($p > .1$).

Multivariable predictors of depressive symptoms and substance use

Table 3 presents multivariable analyses including the combined school and social connectedness measures at Year 8, adjusting for sociodemographic variables and

health behaviors at Year 8. Comparing to the baseline of good school and social connectedness, participants with low school connectedness but good social connectedness at Year 8 were at elevated risk of anxiety/depressive symptoms, regular smoking, drinking, and using marijuana in Year 10. Those with low school and social connectedness were also at increased risk of being a drinker in Year 10. Having arguments with others at Year 8 also elevated the risk of these outcomes in Year 10.

Multivariable predictors of education outcomes

Multivariable analyses in Table 4 examining associations with education outcomes show that compared to

Table 3
Multivariate associations between mental health and substance use in Year 10 and social and school attachment in Year 8, adjusting for mental health and behavior status at the beginning of Year 8

| | Anxiety/depressive symptoms | | | Regular smoker | | | Drinker | | | Marijuana use | | |
|---------------------------------------|-----------------------------|--------------|---------|----------------|--------------|---------|----------|--------------|---------|---------------|--------------|---------|
| | OR (adj) | 95% CI | p-value | OR (adj) | 95% CI | p-value | OR (adj) | 95% CI | p-value | OR (adj) | 95% CI | p-value |
| Status in Year 8 | | | | | | | | | | | | |
| Female | 2.54 | (1.69, 3.83) | < .001 | .986 | (.68, 1.42) | .941 | .93 | (.67, 1.30) | .682 | .89 | (.82, 1.28) | .519 |
| Not living with both parents | 1.30 | (.89, 1.89) | .169 | 1.68 | (1.21, 2.34) | .003 | 1.00 | (.73, 1.37) | .984 | 1.37 | (.96, 1.96) | .083 |
| School and social connectedness | | | | | | | | | | | | |
| Good school/social connectedness | 1.00 | | | 1.00 | | | 1.00 | | | | | |
| Good school/poor social connectedness | 1.40 | (.88, 2.28) | .168 | 1.32 | (.66, 2.73) | .421 | 1.12 | (.77, 1.62) | .547 | 1.00 | (.59, 1.70) | .988 |
| Low school/good social connectedness | 1.34 | (1.04, 1.76) | .026 | 2.00 | (1.38, 2.88) | .001 | 1.87 | (1.25, 2.23) | .001 | 2.02 | (1.63, 2.52) | < .001 |
| Low school/social connectedness | 1.27 | (.86, 1.88) | .208 | 1.32 | (.75, 2.33) | .317 | 1.48 | (1.08, 2.02) | .018 | 1.18 | (.70, 1.92) | .550 |
| Interpersonal conflict | | | | | | | | | | | | |
| Arguments with others | 1.39 | (1.04, 1.85) | .030 | 1.44 | (1.04, 1.99) | .029 | 1.48 | (1.16, 1.89) | .003 | 1.59 | (1.19, 2.12) | .003 |
| Bullied | 1.29 | (1.00, 1.68) | .052 | .92 | (.63, 1.34) | .644 | .88 | (.70, 1.28) | .203 | .94 | (.75, 1.18) | .557 |
| Anxiety/depressive symptoms | 3.17 | (2.31, 4.35) | < .001 | 1.34 | (.83, 2.17) | .214 | .95 | (.70, 1.28) | .714 | 1.17 | (.84, 1.63) | .332 |
| Smoker | 1.06 | (.88, 1.64) | .780 | 4.77 | (3.48, 6.53) | < .001 | 3.21 | (1.72, 5.97) | .001 | 2.57 | (1.53, 4.34) | .001 |
| Drinker | 1.22 | (.83, 1.79) | .305 | 2.19 | (1.60, 3.00) | < .001 | 2.80 | (2.09, 3.75) | < .001 | 1.81 | (1.32, 2.46) | .001 |
| Tried marijuana | 1.00 | (.66, 1.53) | .985 | 1.30 | (.80, 2.09) | .270 | .91 | (.51, 1.63) | .748 | 2.04 | (1.24, 3.36) | .007 |
| Intervention effect | 1.07 | (.78, 1.48) | .643 | .734 | (.50, 1.07) | .10 | .90 | (.57, 1.41) | | .85 | (.67, 1.08) | 0.17 |

Table 4

Multivariate associations between educational outcomes and social and school connectedness and mental health and behavior status at the beginning of Year 8

| | Completed Year 12 | | | High university entrance score | | |
|---|-------------------|--------------|-----------------|--------------------------------|--------------|-----------------|
| | OR (adj) | 95% CI | <i>p</i> -value | OR (adj) | 95% CI | <i>p</i> -value |
| Status in Year 8 | | | | | | |
| Female | 2.42 | (1.36, 4.28) | .004 | 1.21 | (.74, 1.98) | .422 |
| Not living with both parents | .54 | (.29, 1.02) | .060 | .84 | (.49, 1.43) | .500 |
| Parent has tertiary or post secondary training | 2.99 | (1.98, 4.54) | < .001 | 3.91 | (2.99, 5.12) | < .001 |
| School and social connectedness | | | | | | |
| Good school connectedness and good social connectedness | 1.00 | | | 1.00 | | |
| Good school connectedness and poor social connectedness | .48 | (.22, 1.04) | .061 | 1.69 | (.92, 3.09) | .085 |
| Low school connectedness and good social connectedness | .35 | (.22, .54) | <.001 | .82 | (.59, 1.13) | .208 |
| Low school connectedness and poor social connectedness | .41 | (.19, .88) | .025 | .95 | (.57, 1.57) | .831 |
| Interpersonal conflict | | | | | | |
| Arguments with others | .97 | (.65, 1.45) | .895 | 1.28 | (.91, 1.80) | .145 |
| Bullied | .69 | (.47, 1.02) | .062 | .96 | (.70, 1.32) | .785 |
| Anxiety/depressive symptoms | .68 | (.41, 1.13) | .128 | .79 | (.61, 1.01) | .062 |
| Smoker | .43 | (.21, .91) | .030 | .70 | (.40, 1.22) | .198 |
| Drinker | 1.09 | (.65, 1.82) | .739 | .70 | (.49, 1.00) | .049 |
| Tried marijuana | .97 | (.54, 1.72) | .901 | .56 | (.30, 1.01) | .054 |
| Intervention effect | 1.40 | (.70, 2.82) | .323 | 1.76 | (.94, 3.27) | .073 |

good school and social connectedness, all other combinations of connectedness decreased the likelihood of completing school. Smoking in Year 8 independently decreased the odds of completing school and there was some indication that experiencing victimization in Year 8 decreased the likelihood of completing school.

Good school connectedness together with poor social connectedness increased the odds of obtaining a good tertiary entrance score, although this association was not statistically significant. Having anxiety/depressive symptoms, being a drinker, and having tried marijuana in Year 8 decreased the likelihood of obtaining a good score.

Discussion

From the bivariate analyses, this study has shown that young people are more likely to have mental health problems and to use substances in the later years of schooling if they report low school connectedness and interpersonal conflict in early secondary school. These findings provide support for findings from previous cross-sectional studies examining the risk and protective factors for mental health and substance use [2,3,34].

While our research and that of others [1,10,19,35] demonstrates that low school connectedness in early secondary school is a good predictor of health risk behaviors and poor academic achievement, a more complex picture emerges from the multivariable analyses. In this study, young people who were socially connected yet not connected with school were more likely to become regular smokers and use mar-

ijuana. Later drinking was associated with low levels of both school and social connectedness. Thus, those who do not have good school connectedness, but do have good social relationships, are at greater risk of engaging in health risk behaviors. School connectedness appears therefore to be an important protective factor for substance use, which is congruent with previous research [25,34].

We have also shown that connectedness to school may be as important for good mental health outcomes as social connectedness. The combination of good school and social connectedness was associated with the lowest risk of depressive symptoms. This study found that young people with any other combination of school and social connectedness were at increased odds of experiencing depressive symptoms. However, the only group for which this was statistically significant was those with low school connectedness/good social connectedness. The small numbers of participants in the other two categories (good school/poor social connectedness and low school/poor social connectedness) may have limited the study's ability to determine if these elevated ORs were good estimates for these groups. These results indicate that any combination of connectedness other than that of good school/social connectedness increases the likelihood of experiencing subsequent depressive symptoms; however, a study that included a greater number of participants with good school/poor social connectedness or poor school/social connectedness is needed to further test this. The explanations for this increased risk of experiencing depressive symptoms are likely to be different for the young people in each category. The young people

who seek academic achievement in the absence of good social connection might be one group who have high expectations or may have a neurotic investment in achievement in the absence of good social support or intimacy. Young people with low school connection, on the other hand, may encounter a number of emotional hazards as a result of their disconnection from schools. While not a comprehensive list of possible explanations, what is important is that what the risk factor represents may be quite different for each group. Further investigation of these subgroups is needed to better understand these mechanisms.

The finding that good social connectedness was not independently predictive of later mental health is perhaps surprising, given the measure of social connectedness that was used. We were not assessing how popular students were, nor how many friends they had, but whether they had someone who knew them well, whom they could depend on and confide in and trust, factors usually strongly related to good mental health [7,36].

Although both low school connectedness and poor social connectedness were associated with not completing school, the greatest risk was for those students with low school connectedness but good social connectedness. There was some indication in the data that good school connectedness coupled with poor social connectedness was positively associated with good academic achievement. Given the measure of social connectedness focused on adequacy of attachments, this is a concerning finding. As stated above, these young people may have a less than healthy investment in achievement in the absence of good social support.

These varied dimensions and patterns of connection with different outcomes indicate that there is a need to better understand school and social connectedness. How do they matter—for what outcomes and for whom? How can we better describe and measure them so that schools can plan effective action?

A simplistic conclusion from this study would be to encourage young people to be academically oriented and to discourage them from having friends, but this assumes that school connectedness is only about being engaged in learning and social connectedness only about having friends. It also ignores the fact that relationships are a vital component of being engaged in learning [20]. School connectedness, as assessed in this study and by others [5,37,38] involves a commitment to school and a belief that school is important, but also includes student-teacher relationships, relationships with peers, opportunities to be involved, and feelings of belonging. Young people connected to school demonstrate a disposition towards learning, a capacity to work with others and therefore a capacity to function in a social institution [20], p. 8. Indeed, recognizing that a major part of school is social and emotional in nature is important. Enabling, encouraging, and resourcing schools to focus on relationships—between students, between teachers and stu-

dents, and between students and learning, is likely to be key to effective interventions.

As learning occurs in the context of relationships, the student-teacher relationship may be more important than relationships with peers for continued engagement with school and learning [10]. It is therefore not just what we teach but how we teach it that is important to attain and maintain students' connectedness to school and learning. That is, it is important that teachers focus not only on the curriculum content but also on the context, relationships, and processes for learning and teaching [21].

How we manage relationships with students who are disengaging or disengaged from school is crucial. Studies of social development have demonstrated that students who do not find rewarding experiences and positive relationships in school will seek them elsewhere, potentially in behaviors and relationships that place them at risk [24].

The interaction effect observed between the intervention and school connectedness with respect to smoking risk provides some support for focusing interventions on relationships affecting school connectedness. In this study, we found that the young people in the intervention schools who were strongly connected to school in Year 10 were also much less likely to smoke than those in the control schools. The fact that there was no apparent effect on students with low school connectedness is disappointing but perhaps not entirely surprising. It reflects the challenge of trying to use school-based interventions to influence the health risk behavior of students who are disengaging or already disengaged from school. While the Gatehouse Project focused on changing whole school structures, policies, programs, and culture, as well as curriculum activities, this takes time, and is challenging. For most schools, the extent of change in the lifetime of the project was probably not sufficient to impact on students already disengaged or disengaging.

Describing and measuring connectedness

As described above, there is substantial overlap between school and social connectedness. Our findings suggest that future work should strive for greater coherence between the language of constructs and the language of measurement to better understand school and social connectedness and to inform and evaluate interventions focused on increasing connectedness.

The complex relationships between school and social connectedness and the outcomes examined in this study may be more easily investigated with more sophisticated or comprehensive instruments. It was not possible with the instrument used in this study to unpack those aspects of school connectedness most related to the health and education outcomes. While our measure may be limited, this field of study is generally not well defined having a multitude of overlapping concepts, labels, and concomitant measures

(e.g., school engagement, school commitment, belonging, school satisfaction, etc.) [5,39].

Similarly, our assessment of social connectedness was limited to asking about having someone on whom to trust and depend. While this is an important aspect of social connectedness, it does not begin to cover other relevant areas, such as having social competencies to relate appropriately to peers and adults. The strong associations between interpersonal conflict in early secondary school and later mental health and substance use indicate that capacity for dealing with conflict is important.

Limitations and strengths of the study

While attrition across data collection periods for the school-based surveys was low, attrition for the final wave was higher, raising issues of representativeness for this wave of data collection. As reported, the percentage in the study that finished Year 12 (88%) was somewhat higher than the state average of about 80%. Of those who did not participate in the final wave, significantly more reported low school engagement and higher rates of substance use in early Year 8. As the results above demonstrate, these young people are likely to be at higher risk of not completing Year 12.

Our assessment of educational outcomes was limited to school completion and a tertiary entrance score. These may not be comprehensive indicators of success. Not completing school does not always have negative consequences; however, noncompleters are less likely to be in consistent employment than those who do complete secondary school, and those without access to further study have, on average, poorer economic and mental health outcomes [33,35].

We did not have a measure of school achievement for the participants in Year 8 and were therefore unable to adjust for prior achievement in our analyses. It could be argued that students who do well in school also report higher levels of school connectedness, thus the effect of early school connectedness on later achievement is merely an indicator of continued school achievement rather than an independent predictor. Studies examining the relationship between academic achievement and school connectedness, however, report only low to moderate correlations, indicating that there are many adolescents who are academically capable but not connected to school [19,37]. It is therefore unlikely that the associations reported in this study can be attributed entirely to prior academic achievement.

This study provides longitudinal data from a large, representative sample of secondary school students, examining the effect of social relationships and school connectedness in early secondary school on both health and educational outcomes in later years. The study also allows the contemporaneous examination of multiple outcomes and the capacity to assess the independent effects of common risk and protective factors. It provides strong evidence for the importance for young people of establishing and maintaining

good social relationships and engagement with school, and a need to understand ways that this can be promoted and supported, i.e., through systemic support for whole school planning, a focus on social development and relationship building in teacher pre-service training and learning, and structured opportunities for ongoing teacher reflection on practice [9,40].

Conclusions and implications

Overall, young people's experiences of early secondary school and their relationships at school continue to predict their moods, their substance use in later years, and their likelihood of completing secondary school. Students with good school and good social connectedness are less likely to experience subsequent mental health issues and be involved in health risk behaviors, and are more likely to have good educational outcomes. School connectedness, however, includes relationships with peers, teachers, and learning. Thus, the challenge is not whether school or social connectedness is more important, but how we can promote both school connectedness and social connectedness in forms that promote learning and well being.

Acknowledgments

We would like to acknowledge the invaluable contribution made to this study by the school communities. The Gatehouse Project was supported by grants from the Queen's Trust for Young Australians, Victorian Health Promotion Foundation, National Health and Medical Research Council and Department of Human Services, Victoria; Murdoch Children's Research Institute, Sidney Myer Fund; and the Melbourne Catholic Education Office. Lyndal Bond was funded by a Victorian Health Promotion Foundation Public Health Fellowship.

References

- [1] Resnick MD, Harris LJ, Blum RW. The impact of caring and connectedness on adolescent health and well-being. *J Paediatr Child Health* 1993;29(Suppl 1):s3–9.
- [2] Resnick MD. Protective factors, resiliency, and healthy youth development. *Adolesc Med* 2000;11:157–64.
- [3] Glover S, Burns J, Butler H, et al. Social environments and the emotional wellbeing of young people. *Family Matters* 1998;49:11–6.
- [4] Blum RW, Libbey HP. School connectedness—strengthening health and education outcomes for teenagers. *J School Health* 2004;74:231–2.
- [5] Libbey HP. Measuring student relationships to school: Attachment, bonding, connectedness, and engagement. *J School Health* 2004;74:274–82.
- [6] Resnick MD, Bearman PS, Blum RW, et al. Protecting adolescents from harm: Findings from the National Longitudinal Study on Adolescent Health. *JAMA* 1997;278:823–32.
- [7] Bond L, Carlin JB, Thomas L, et al. Does bullying cause emotional problems? A prospective study of young teenagers. *Br Med J* 2001;323:480–4.

- [8] Barclay JR, Doll B. Early prospective studies of high school dropout. *School Psychol Quart* 2001;16:357–69.
- [9] Doll B, Hess RS. Through a new lens: Contemporary psychological perspectives on school completion and dropping out of high school. *School Psychol Quart* 2001;16:351–6.
- [10] Marcus RF, Sanders-Reio J. The influence of attachment on school completion. *School Psychol Quart* 2001;16:427–44.
- [11] Catalano RF, Kosterman R, Hawkins JD, et al. Modeling the etiology of adolescent substance use: A test of the social development model. *J Drug Issues* 1996;26:429–55.
- [12] Bond L, Thomas L, Coffey C, et al. Long-term impact of the Gatehouse Project on the incidence of cannabis use in 16 year olds: A school-based cluster randomised trial. *J School Health* 2004;74:23–9.
- [13] Nutbeam D, Smith C, Moore L. Warning! Schools can damage your health: Alienation from school and its impact on health behaviour. *J Paediatr Child Health* 1993;29(Suppl 1):s25–30.
- [14] Osterman KF. Students' need for belonging in the school community. *Rev Educ Res* 2000;70:323–67.
- [15] Samdal O, Nutbeam D, Wold B, et al. Achieving health and educational goals through schools—a study of the importance of school climate and the students' satisfaction with school. *Health Educ Res* 1998;13:383–97.
- [16] Russell J. Enabling learning: The crucial work of school leaders. Melbourne: Australian Council for Educational Research, 2002.
- [17] National Research Council and Institute of Medicine. Community Programs to Promote Youth Development. Washington, D.C: National Academy Press, 2002.
- [18] Dwyer P, Wyn J. Youth, education and risk: Facing the future. London: Routledge/Falmer, 2001.
- [19] Willms JD. Student Engagement at School: A Sense of Belonging and Participation. Results from PISA 2000. OECD, 2003.
- [20] Bond L, Patton GC, Glover S, et al. The Gatehouse Project: Can a multi-level school intervention affect emotional well-being and health risk behaviours? *J Epidemiol Community Health* 2004;58:997–1003.
- [21] National Research Council and Institute of Medicine. Engaging Schools. Washington, D.C: The National Academic Press, 2004.
- [22] Bowlby J. Attachment and loss: Sadness and depression. London: Hogarth Press, 1980.
- [23] Berkman LF, Glass T. Social integration, social networks, social support and health. In: Berkman LF, Kawachi I (eds). *Social Epidemiology*. Oxford: Oxford University Press, 2000:137–73.
- [24] Catalano RF, Hawkins JD. The social development model: A theory of antisocial behavior. In: Hawkins JD (ed). *Delinquency and Crime: Current Theories*. New York: Cambridge University Press, 1996.
- [25] Catalano RF, Haggerty KP, Oesterle S, et al. The importance of bonding to school for healthy development: Findings from the Social Development Research Group. *J School Health* 2004;74:252–61.
- [26] Patton G, Glover S, Bond L, et al. The Gatehouse Project: A systematic approach to mental health promotion in secondary schools. *Aust N Z J Psychiatry* 2000;34:586–93.
- [27] Lewis G, Pelosi AJ, Glover E, et al. The development of a computerised assessment for minor psychiatric disorder. *Psychol Med* 1988; 18:737–45.
- [28] Henderson S, Jones PD, Byrne DG, et al. Measuring social relationships the interview schedule for social interaction. *Psychol Med* 1980;10:723–34.
- [29] Bond L, Wolfe S, Tollit M, et al. A comparison of the Gatehouse Bullying Scale and the Peer Relations Questionnaire for students in secondary school. *J School Health* 2007;77:75–9.
- [30] Arthur MW, Hawkins JD, Pollard JA, et al. Measuring risk and protective factors for substance use, delinquency, and other adolescent problem behaviors: The Communities That Care Youth Survey. *Eval Rev* 2002;26:575–603.
- [31] Stata Statistical Software: Release 9. College Station, TX: StataCorp LP, 2005.
- [32] Carlin JB, Wolfe R, Coffey C, et al. Analysis of binary outcomes in longitudinal studies using weighted estimating equations and discrete-time survival methods: Prevalence and incidence of smoking in an adolescent cohort. *Stat Med* 1999;18:2655–79.
- [33] McMillan J, Marks GN. School leavers in Australia: Profiles and pathways. Camberwell, Victoria: The Australian Council for Educational Research Ltd. Longitudinal Surveys of Australian Youth, 2003.
- [34] McNeely C, Falci C. School connectedness and the transition into and out of health-risk behavior among adolescents: A comparison of social belonging and teacher support. *J School Health* 2004;74: 284–92.
- [35] Teese R, Polesel J. Undemocratic Schooling: Equity and Quality in Mass Secondary Education in Australia. Melbourne: Melbourne University Press, 2003.
- [36] Henderson S. Interview Schedule for Social Interaction (ISSI). In: Henderson S, Byrne DG, Duncan-Jones P, (eds). *Neurosis and Social Environment*. Sydney: Academic Press, 1981.
- [37] Goodenow C. The psychological sense of school membership among adolescents: Scale development and educational correlates. *Psychol Schools* 1993;30:79–90.
- [38] Haynes NM, Emmons C, Ben-Avie M. School climate as a factor in student adjustment and achievement. *J Educ Psychol Cons* 1997;8: 321–9.
- [39] Anderson C. The search for school climate: A review of the research. *Rev Educ Res* 1982; 52:368–420.
- [40] Parliament of Victoria EaTC. Step up, step in, step out: Report on the inquiry into the suitability of pre-service teacher training in Victoria. Victoria: Victorian Government Printer, 2005.