EMPIRICAL ARTICLES

School Connectedness Is an Underemphasized Parameter in Adolescent Mental Health: Results of a Community Prediction Study

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There is limited prospective research on the relation between school connectedness (i.e., the extent to which students feel accepted, valued, respected, and included in the school) and mental health symptoms in adolescents. A sample of 2,022 students (999 boys and 1,023 girls) ages 12 to 14 years were measured at 2 time points (12 months apart) on school connectedness and mental health symptoms (general functioning, depression, and anxiety symptoms). School connectedness correlated extensively with concurrent mental health symptoms at both time points (between 38% and 55% covariation with depression, 26% to 46% with general functioning, and 9% and 16% for anxiety symptoms). Using hierarchical linear modeling, school connectedness also predicted depressive symptoms 1 year later for both boys and girls, anxiety symptoms for girls, and general functioning for boys, even after controlling for prior symptoms. The reverse, however, was not true: Prior mental health symptoms did not predict school connectedness 1 year later when controlling for prior school connectedness. Results suggest a stronger than previously reported association with school connectedness and adolescent depressive symptoms in particular and a predictive link from school connectedness to future mental health problems.

The construct of the psychological sense of school membership or school connectedness was first investigated as a critical factor in school retention or dropout (Wehlage, Rutter, Smith, Lesko, & Fernandez, 1989). School connectedness has been defined by Goodenow (1993) as "the extent to which students feel personally accepted, respected, included, and supported by others in the school social environment" (p. 80). The construct is referred to by many other terms, such as school engagement, school bonding, and school attachment, which have many similarities but some differences (Libbey, 2004). This construct is argued to be particularly important for adolescents as they rely less on the family as part of the individuation process and come to rely more on extrafamilial relationships such as those found in schools, with friends, and others (Goodenow, 1993).

The antecedents and outcomes of school connectedness have been widely researched (see L. H. Anderman & Freeman, 2004, for a comprehensive review). Most outcome research into school connectedness has focused on its relation to school-based variables or developmental variables that may be associated with mental health functioning (such as self-esteem). There is little direct research on the relation between school connectedness and adolescent mental health symptoms in general and more specifically with depression and anxiety symptoms for adolescents. In addition, there is

very limited prospective research for future mental health problems, and to date there is no prospective research examining the links between school connectedness and future depressive symptoms. This study is a prospective examination of the link between school connectedness and future depressive and anxiety symptoms as well as general mental health functioning in adolescents age 12 to 14.

School Connectedness and Academic, Developmental, and Health Risk Behavior

School connectedness has been found to correlate strongly and positively with students' academic motivation and with indexes of school performance and adjustment (L. H. Anderman & Freeman, 2004; Furlong et al., 2003; Goodenow, 1993; Hagborg, 1994; Haynes, Emmons, & Ben-Avie, 1997). Osterman's (2000) review of belonging in schools found links between students' sense of belonging and self-esteem, internal regulation, attitudes toward school, motivation, and achievement.

School connectedness has also been found to be connected with variables that are associated with adolescent academic and emotional well-being. Israelashvili (1997) found that sense of school membership positively predicted expectations of future success in a sample of students across Grades 5 to 12 inclusive and differentiated between those students with high expectations for the future and those with low expectations. Israelashvili concluded that students' perceptions of being accepted and respected by their peers and by school staff are important determinants of their expectations of the future. Hagborg (1994) found that eighth-grade students with lower levels of school connectedness were more likely than those with higher school connectedness to be receiving counseling at school for problems, including low self-esteem, family problems, and peer relationship problems. Students with lower levels of school connectedness also recorded significantly lower scores on five of six self-perception scales. Furlong et al. (2003) and Maddox and Prinz (2003) also connected school bonding with self-esteem and self-efficacy, as well as with academic outcomes.

School connectedness has been found in many studies to be negatively linked with delinquency and health-risk behavior. School membership or connectedness was found to be negatively associated with problem behavior in students in Grades 6, 7, and 8 (Simons-Morton, Crump, Haynie, & Saylor, 1999). In one longitudinal study (Catalano, Haggerty, Oesterle, Fleming, & Hawkins, 2004), bonding to the school in Grades 5 and 6 was found to be linked with delayed initiation of alcohol and other drug use and reduced drug abuse in

later life; and bonding during later school years was linked to reduced delinquency and crime, lower probability of gang membership and violence, and delayed sexual activity. School connectedness has also been associated with reduced sexual risk behavior by Resnick et al. (1997) and Kirby (2001).

Maddox and Prinz's (2003) review of school bonding focused on behavioral outcomes of school bonding, including substance use, delinquency, academic performance, antisocial behaviors, and risky behavior. They reported studies indicating that school bonding mediates the effects of parental attachment on substance use, risky behavior, and delinquency. School connectedness has also been found to reduce adolescent involvement in health-risk and deviant behavior, particularly the use of alcohol, marijuana, cigarettes, and violence (Dornbusch, Erickson, Laird, & Wong, 2001; Resnick et al., 1997). Dornbusch et al. speculated that lower levels of attachment to school may result in association with peers who are similarly not connected to school, resulting in increased pressure to commence deviant behavior.

After reviewing evidence related to prevention of school violence, Mulvey and Cauffman (2001) found that attachment to the school, described as a sense of belonging to the school and belief in the fairness of school rules and discipline, was more effective in reducing school violence than zero-tolerance policies and strict discipline. Reinke and Herman (2002), while critiquing the work of Mulvey and Cauffman, also linked school climate and school connectedness with the prevention of school violence. In addition, Wilson (2004) found that of the environmental variables of school connectedness, school size, ethnic makeup, school performance, and school climate, school connectedness was the strongest negative predictor of violent behavior and aggressive victimization. Thus there is extensive research showing the link between school connectedness and academic outcomes, health-risk behavior, delinquency, violence, and other markers of psychological well-being such as self-efficacy.

School Connectedness and Adolescent Mental Health Symptoms

Surprisingly, there has been little research into the relation between school connectedness and mental health symptoms in adolescents (L. H. Anderman & Freeman, 2004). One study by Resnick et al. (1997) among 12,000 adolescents from Grades 7 to 12, found that perceived school connectedness was negatively correlated with emotional distress, suicidality, violence, and substance use. Emotional distress was measured using a 17-item scale that included symptoms of depression such as feeling depressed, moodiness, sadness, and poor appetite, as well as fearfulness, crying,

and loneliness. Resnick et al. found that school connectedness accounted for 13% to 18% of the variance in emotional distress in different age groups. In a cross-sectional study using hierarchical linear modeling (HLM), E. M. Anderman (2002) found that students' higher individual levels of school connectedness were related to increased optimism and lower levels of depression and problem behavior as well as improved academic performance. This study measured depression with a brief nine-item scale. In schools with higher aggregated levels of school connectedness, the strength of the link between individual connectedness and depression was significantly reduced, indicating that a higher overall level of belonging may result in generally improved psychological health. However, when aggregated school connectedness was high, individual connectedness was negatively linked with social rejection, suggesting that when the general level of connectedness is high, those who are not connected will experience greater rejection than if the overall level of connectedness is lower.

One of the few studies to relate school connectedness to a full measure of depressive symptoms was conducted by Jacobson and Rowe (1999). This study explored genetic and environmental influences on the relations between school connectedness, family connectedness, and depressed mood in adolescents with a mean age of 16 years. Jacobson and Rowe found correlations of .35 for boys and .37 for girls between school connectedness and adolescent depressed mood as measured by the Center for Epidemiological Studies Depression Scale (Radloff, 1977), indicating that school connectedness and depression shared about 13% of variance. This information is limited by the cross-sectional design in terms of whether school connectedness predicts future mental health problems or vice versa. A recent study by Jaccard, Blanton, and Dodge (2005) on peer influence on risk behavior highlighted how cross-sectional data may have over inflated the magnitude of this relation and underscored the importance of conducting a prospective study.

In the only prospective study in this area, Kuperminc, Leadbetter, and Blatt (2001) examined the relation between school connectedness and internalizing and externalizing symptoms in sixth- and seventh-grade students in one large school with a sample of 460 students. This study used the internalizing and externalizing problems scales of the Youth Self-Report (Achenbach, 1991). The internalizing scale includes the withdrawn, somatic complaints and anxious–depressed subscales, so it is not specific to either anxiety or depression. Kuperminc et al. found that perceptions of school social climate, a construct similar to school connectedness, accounted for an additional 2% and 5%, respectively, of the variance in internalizing and externalizing problems 1 year later after controlling for prior levels of emotional problems and other background variables (e.g., vulnerability to criticism and interpersonal efficacy). Interestingly, follow-up analyses indicated that emotional background did not predict future perceptions of school climate. Thus the Kuperminc et al. study is the only one to suggest that school connectedness predicts future mental health problems and not the other way around.

It is of interest to note that prospectively the prediction of internalizing problems in the Kuperminc et al. (2001) study was substantially less than in the Jacobson and Rowe (1999) cross-sectional study that linked school connectedness specifically to depression. This difference is almost certainly a function of the prospective nature of the Kuperminc et al. study, but it could also be a measurement function, suggesting the need to tease out specific predictions for depression and anxiety symptoms.

Thus, the strength of the prediction by school connectedness of future depressive symptoms and anxiety symptoms as well as future general functioning is still unknown. There is a strong need for a prospective study that can particularly illuminate the impact of school connectedness on future depressive symptoms in 12- to 14-year-old adolescents, when the incidence of adolescent depression is known to increase sharply (Burke, Burke, Regier, & Rae, 1990; Lewinsohn, Clarke, Seeley, & Rohde, 1994). Current empirical evidence does not make clear the importance of school connectedness in preventing adolescent mental health problems, and in particular depression, at this important stage of life.

Given the dearth of prospective studies in this area, this study sought to gain further understanding of the links between school connectedness and future depressive and anxiety symptoms and the overall functioning of Grade 7 to 9 adolescents in 14 schools drawn from three states in Australia. The study aimed to extend significantly the findings of the cross-sectional studies by Jacobson and Rowe (1999), E. M. Anderman (2002), and Resnick et al. (1997) to investigate the chronological precedence of the link between school connectedness and mental health problems by utilizing a prospective design. By utilizing specific measures of depression and anxiety and drawing samples from a number of schools, this study also aimed to extend the findings of the longitudinal study by Kuperminc et al. (2001), who used a nonspecific measure of internalizing problems in one school.

We predicted (a) that school connectedness would correlate strongly and negatively with concurrent and future self-report symptoms of depression and anxiety and with deficits in overall functioning; (b) that school connectedness would predict depressive symptoms, anxiety symptoms, and general functioning 1 year later after controlling for prior levels of the respective symptoms; and (c) that consistent with the Kuperminc et al. (2001) findings, prior mental health would not predict

school connectedness 1 year later after controlling for prior school connectedness. These hypotheses were tested separately for boys and girls given the well-known gender differences in incidence of internalizing disorders for adolescents and extensive explanatory debate about these differences (e.g., Cyranowski, Frank, Young, & Shear 2000; Nolen-Hoeksema & Girgus, 1994).

Method

Participants

Participants were initially 2,567 eighth-grade students (1,293 boys and 1,274 girls) ages 12 to 14 years from 14 public high schools in Queensland, New South Wales, and Tasmania, Australia, drawn from two consecutive cohorts, 2001 and 2002. (In Australia we typically do not have middle schools. So although these are high school students they are the age of middle school students in the United States.) These students represent 62.17% of the potential participants, with the range of participation rates from school to school at 39.11% to 79.11% ($SD = 13.59$). (Participation rates are modeled in the prediction analyses, given the interschool variability in this regard.) Students were recruited with their parents to take part in a project evaluating a universal school-based preventive intervention addressing individual risk factors for depression (funded by the Australian National Health and Medical Research Council). The sample reflected the ethnic mix of the Australian population with approximately 72% of those supplying ethnic information being Caucasian Anglo Australians and 0.8% Aboriginal or Torres Strait Islander. The remaining students reported 70 different ethnic origins, with 9.1% of European origin, 6.3 % of Asian origin, 4.6% from the Pacific region, 3.1% of Middle Eastern origin, 2.6% of New Zealand or Maori origin, 1% of African origin, 0.1% from North America, 0.1% from South or Central America, and 0.1% from Russia. The ethnic mix appears to be different from those reported in studies in the United States, which usually include large proportions of students of Hispanic and African American origin.

Measures

As part of this project we investigated the influence of school connectedness on students' mental health and functioning. At Time 1 (T1) and Time 2 (T2; 12 months later) students completed, among other measures, the Children's Depression Inventory (CDI; Kovacs, 1992), the adolescent self-report version of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), the Psychological Sense of School Membership Scale (PSSM; Goodenow, 1993), and the Spence Children's Anxiety Scale (SCAS; Spence, 1998).

CDI. The CDI (Kovacs, 1992) is a well-known and reliable measure of depressive symptoms in children and adolescents. For each of the 27 items on the CDI, respondents choose one of three responses scored 0, 1, or 2. Clinical and subclinical cutoffs are provided. Lower scores on the CDI indicate better functioning. The version of the CDI used in this study excluded one item related to suicidal thoughts to avoid potential iatrogenic effects. The psychometric properties of the CDI have been examined in many studies reporting internal consistency reliability coefficients ranging from .71 to .89 and test–retest reliability coefficients ranging routinely from .56 to .87 (Reynolds, 1994). Cronbach's alpha for the 26-item version used in this study ranged from .89 to .91 for the different test times. Mean CDI score was 7.54 ($SD = 7.55$) at T1 and 8.23 ($SD = 7.99$) at T2.

SDQ. The SDQ (Goodman, 1997) is a 25-item measure of children's and adolescents' well-being with five subscales: Hyperactivity, Emotional Symptoms, Conduct Problems, Peer Problems, and Prosocial Activities. The Prosocial scale is not included in measuring overall functioning. Lower scores on the SDQ indicate better functioning. The SDQ is available in parent, teacher, and youth self-report versions and has been found (Goodman & Scott, 1999) to correlate well with more lengthy measures of adolescent well-being and behavior, for example the Child Behavior Check List (Achenbach, 1991). Interrater correlations among parent, teacher, and self-report versions have been found to be generally better than for other similar measures (Goodman, 2001). In this study, the youth self-report version was administered with the overall SDQ score used as a measure of general functioning. The youth self-report version has been found to have a similar five-factor structure and generally similar internal reliabilities to the parent and teacher report versions (Goodman, 2001) with total scale reliability of .80 (Goodman, 2001) or .82 (Goodman, Meltzer, & Bailey, 1998). In a pilot study of the self-report version of the SDQ, Goodman et al. found that the overall score on the youth self-report form adequately discriminated between clinical and community samples. Goodman et al. concluded that the self-report SDQ is suitable for use in comparing groups in research although not as a tool for clinical diagnosis. In this study, Cronbach's alpha for the self-report version was .85 and the overall mean was 10.08 ($SD = 6.37$) at T1 and 10.29 ($SD = 6.43$) at T2.

PSSM. The PSSM (Goodenow, 1993) is an 18-item measure of school connectedness. Items probe a sense of belonging (e.g., "I feel like a real part of [name of school]"), respect (e.g., "I am treated with as much respect as other students"), encouragement (e.g., "People here know I can do good work"), and acceptance

and inclusion (e.g., "I am included in lots of activities at [name of school])." Responses to items are scored on a 5-point Likert scale ranging from 1 (*not at all true*) to 5 (*completely true*). One third of the items are worded in a negative direction. Goodenow reported that in two studies with suburban students, internal reliabilities (Cronbach's alpha) was .88 for both studies and means were 3.86 and 3.84 (*SD* = .72 for both studies). Scores on the PSSM correlated significantly with teacher-rated social standing and with self-reported student motivation, grades, and teacher-rated student effort (Goodenow, 1993). Cronbach's alpha for this study was .89 with means at T1 of 3.69 (*SD* = 0.68) and at T2 of 3.65 (*SD* = 0.70).

SCAS. The SCAS (Spence, 1998) is a 45-item measure of children's anxiety with 44 items included in the score; the Item 45 is for unspecified situations and is not included in the score. The SCAS provides a total score of anxiety symptoms and six subscales: Panic Attack and Agoraphobia, Separation Anxiety, Physical Injury Fears, Social Phobia, Obsessive–Compulsive, and Generalized Anxiety Disorder/Overanxious Disorder. Six positive items are not scored. Higher scores indicate greater anxiety. The SCAS has been found to have good psychometric properties (with Cronbach's alpha of .92), to correlate strongly with other measures of childhood anxiety, and to discriminate between anxious and depressive symptoms (Spence, 1998). In this study, Cronbach's alpha was .89, with a mean at T1 of 19.13 (*SD* = 14.60), and at T2 of 19.34 (*SD* = 15.24).

Procedure

With the approval of the relevant education authorities, letters describing the project and informed consent forms were sent to students' homes from their schools. Informed consent was obtained from parents and informed assent from youth. The completed con-

sent forms were returned to the schools then forwarded to the researcher.

Questionnaires were completed under examination conditions during school time with supervision by teachers and project psychologists. Questionnaires were administered on three separate occasions (pretest, posttest, and 12-month follow-up), giving us the opportunity to do follow-up predictive analyses between the posttest (T1; held in July–August of 2001/2002) and follow-up 12-months later (T2; July–August of 2002/2003).

Results

Due to attrition over the 18-month period of the overall project and absences on testing days, the number of students at T1 for the purpose of this study was 2,022 (999 boys and 1,023 girls) and at T2 1 year later was 1,740 (852 boys and 888 girls). This represents a 14% attrition rate between T1 and T2. In a school in which the reasons for attrition were analyzed, 51% of the attrition was due to adolescents no longer attending the school, 19% was due to absence on the day of testing, 12% were at school but failed to attend follow-up testing; the circumstances of the remaining 18% could not be reliably ascertained.

Analyses were conducted to test if those participants who subsequently dropped out of the study differed from the surviving sample on the major T1 measures. Not unexpectedly, there were small but significant differences in the means. The attrition sample were marginally less connected to school at T1, $F(1, 1943) = 7.12$, $p < .01$, had more depressive symptoms, $F(1, 1899) = 13.23$, $p < .001$, and showed more general functioning problems, $F(1, 1928) = 8.18$, $p < .01$, but did not differ on anxiety.

We predicted that school membership (PSSM) would correlate strongly with concurrent and future measures of depressive symptoms, anxiety symptoms, overall functioning, and conduct problems. Table 1 shows the means and standard deviations and correla-

Table 1. *Means, Standard Deviations, and Intercorrelations of School Connectedness and Mental Health Symptoms at T1 and T2*

Variable	Male M	Male SD	Female M	Female SD	1	2	3	4	5	6	7	8
1. PSSM–T1	3.65	0.69	3.73	0.67	—	–.62*	–.60*	–.30*	.60*	–.49*	–.49*	–.29*
2. CDI–T1	7.34	7.32	7.73	7.76	–.63*	—	.77*	.51*	–.46*	.62*	.56*	.35*
3. SDQ/Total–T1	10.40	7.06	9.63	6.10	–.51*	.63*	—	.60*	–.50*	.59*	.70*	.49*
4. SCAS–T1	16.33	14.21	22.02	14.45	–.32*	.46*	.42*	—	.27*	.37*	.44*	.58*
5. PSSM–T2	3.64	0.69	3.68	0.71	.56*	–.45*	–.38*	–.29*	—	–.74*	–.68*	–.40*
6. CDI–T2	7.46	7.63	8.89	8.18	–.41*	.53*	.42*	.34*	–.67*	—	.80*	.57*
7. SDQ/Total–T2	10.21	6.66	10.32	6.17	–.41*	.47*	.52*	.37*	–.60*	.76*	—	.60*
8. SCAS–T2	16.15	16.14	22.24	13.72	–.14*	.27*	.23*	.43*	–.34*	.54*	.54*	—

Note: T1 = Time 1; T2 = Time 2; PSSM = Psychological Sense of School Membership; CDI = Children's Depression Inventory; SDQ/Total = Strengths and Difficulties Questionnaire–Total score; SCAS = Spence Children's Anxiety Scale. Females are presented above the diagonal.
*$p < .01$ (two–tailed).

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tion matrix of these measures at both T1 and T2 for boys and girls.

Of particular note (derived from Table 1) is the large 38.4% and 54.8% covariation between school connectedness (PSSM) and concurrent depression (CDI) at T1 and T2, respectively, for girls. Similarly for boys, the covariation between school connectedness and concurrent depression was 40% and 45% for T1 and T2, respectively. For general functioning, there was a 36% and 46% covariation with concurrent school connectedness at T1 and T2 for girls; this was 26% and 36%, respectively, for boys. The lowest (but still highly significant) covariation was found for anxiety symptoms, with a covariation of 9% and 16% at T1 and T2 for girls and 10% and 12% for boys. The correlation between school connectedness at T1 and T2 was .56 and .60 for boys and girls, respectively, indicating that sense of school membership was moderately stable over time.

A series of hierarchical linear regressions using HLM (Raudenbush & Bryk, 2002) were conducted to determine whether individual school connectedness predicted mental health functioning a year later over and above prior mental health problems and school-level clustering effects. The HLM procedure is considered the procedure of choice when individuals are nested within groups such as schools (Raudenbush & Bryk, 2002). For this study, the HLM procedure was used to model variance in mental health problems at both student and school levels. The Level 2 variables were School Size (measured by the total numbers in the cohort), Participation Rates, and aggregate level of PSSM–T1 in each school (i.e., mean School connectedness). These variables were selected as a potential source of between-school variance that needed to be taken into account. There is some evidence of the relation among school size, school connectedness, and related variables (e.g., McNeely, Nonnemaker, & Blum, 2002). With large variations in recruitment rates between schools, it appeared wise to consider this factor in the analyses. Aggregate school connectedness for the school has also been found to be a factor moderating the impact of individual connectedness on various outcomes (E. M. Anderman, 2002).

The first step in the analysis was to determine the extent of the variance in the predictions accounted for by the Level 2 effects and therefore the importance of the clustering of the data within the schools in the overall analyses of the second major hypothesis. In HLM the examination of the Level 2 effects was done by partitioning the variance at Level 1 and Level 2. The proportion of variance that occurred at Level 2, known as the intraclass correlation for Level 2, for each analysis provides an indication of the magnitude of the Level 2 effects (Lee, 2000). Table 2 shows the variance components for Level 1 and Level 2 and the intraclass correlation levels for three analyses of the hypothesis (conducted separately for boys and girls): Model A dependent variable (DV) is the CDI at T2, the Level 1 independent variables (IVs) are the CDI–T1 and PSSM–T1, and the Level 2 variables are school size, participation rates, and school aggregate PSSM; Model B DV is the SDQ Total–T2, and the Level 1 IVs are SDQ Total–T1, PSSM–T1, and Level 2 variables as stated previously; Model C DV is SCAS–T2, and Level 1 IVs are SCAS–T1 and PSSM–T1 and Level 2 variables as stated previously.

It can be seen that the variance components for Level 2 were mostly insignificant with the intraclass correlations ranging from less than 1% to a maximum of 6% of the total outcome, suggesting that the clustering of the data within schools had minimal effects on the data. Thus we proceeded to analyze the relation between school connectedness and mental health symptoms at the student level.

In Table 3 we present the results of the three analyses described in Models A, B, and C that were specific to the examination of the second hypothesis. In this instance, we were interested in the extent to which PSSM–T1 would predict three separate mental health outcomes at T2 after controlling for prior respective mental health symptoms.

With regard to predicting depression at T2, prior depression (CDI–T1) predicted depression at T2 (CDI–T2) for both boys (coefficient = 0.58, $p < .001$) and girls (coefficient = 0.58, $p < .001$). Taking prior symptom levels into account, school connectedness still

Table 2. *Variance Components at Level 1 (Student), Level 2 (School), and Level 2 Intraclass Correlations for Analyses Predicting Student Adjustment at T2 From Adjustment and School Connectedness at T1*

Variable	Level 1	Level 2	df	χ^2	p	ICC	Z	ICC
Gender = 1 (Male)								
CDI–T2	40.09	0.82	10	11.12	.34	.020	.06	ns
SDQ/Total–T2	26.22	0.69	10	12.60	.24	.020	.06	ns
SCAS–T2	166.18	1.43	10	9.29	.50	.008	.02	ns
Gender = 2 (Female)								
CDI–T2	33.84	2.32	10	22.03	.01	.060	.19	ns
SDQ/Total–T2	16.83	0.07	10	11.21	.34	.004	.01	ns
SCAS–T2	90.85	2.05	10	14.44	.15	.020	.06	ns

Note: ICC = intraclass correlation; CDI = Children's Depression Inventory; SDQ/Total = Strengths and Difficulties Questionnaire–Total score; SCAS = Spence Children's Anxiety Scale.

Table 3. *HLM Results Predicting Mental Health Variables at T2 With the Corresponding T1 Mental Health Variable and PSSM–T1 as the Individual Level Predictors*

Level 1 Variable	OLS Coefficient	SE	T Ratio	df
Model A: Predicting CDI–T2				
Males				
CDI–T1	0.58	.07***	7.52	13
PSSM–T1	–2.07	.53**	–3.39	11
Females				
CDI–T1	0.58	.06***	9.07	13
PSSM–T1	–1.94	.70*	–3.39	11
Model B: Predicting SCAS–T2				
Males				
SCAS–T1	0.46	.07***	7.49	13
PSSM–T1	0.19	.87	0.48	11
Females				
SCAS–T1	0.65	.06***	11.28	13
PSSM–T1	–1.81	.82*	–2.20	11
Model C: Predicting SDQ/Total–T2				
Males				
SDQ/Total–T1	0.59	.09***	6.32	13
PSSM–T1	–0.88	.45*	–2.45	11
Females				
SDQ/Total–T1	0.68	.05***	13.14	13
PSSM–T1	–0.50	.36	–1.76	11

Note: HLM = hierarchical linear modeling; T1 = Time 1; T2 = Time 2; PSSM = Psychological Sense of School Membership; OLS = ordinary least squares; CDI = Children's Depression Inventory; SCAS = Spence Children's Anxiety Scale; SDQ/Total = Strengths and Difficulties Questionnaire–Total score.
*$p < .05$. **$p < .01$. ***$p < .001$.

predicted future depressive symptoms for both boys (coefficient = –2.07, $p < .01$) and girls (coefficient = –1.94, $p < .05$). These coefficients suggest that for every increase of 1 unit of school connectedness there was a corresponding decrease of –2.07 in T2 depression scores on the CDI for boys. Similarly, for girls the significant coefficient of –1.94 suggests that each unit increase in school connectedness yielded a corresponding decrease of 1.94 in T2 depression scores on the CDI.

With regard to predicting anxiety symptoms at T2, prior anxiety (SCAS–T1) predicted SCAS–T2 for both boys (coefficient = 0.46, $p < .001$) and girls (coefficient = 0.65, $p < .001$). Taking prior symptom levels into account, school connectedness still predicted future anxiety symptoms for girls (coefficient = –1.81, $p = .05$) but not for boys (coefficient = 0.19, *ns*). These coefficients suggest that for every increase of 1 unit of school connectedness, there was a corresponding decrease of –1.81 in T2 anxiety scores for girls.

For the model predicting general functioning at T2, prior general functioning (SDQ Total–T1) predicted SDQ Total–T2 for both boys (coefficient = 0.59, $p < .001$) and girls (coefficient = 0.68, $p < .001$). Taking prior symptom levels into account, school connectedness still predicted future general functioning for boys (coefficient = –0.88, $p < .05$) but not for girls (coefficient = –0.50, *ns*). These coefficients suggest that for every increase of 1 unit of school connectedness, there was a corresponding decrease of 0.88 in general functioning for boys at T2.

Thus, in sum, taking prior mental health symptoms into account, individual school connectedness predicted future depression scores for boys and girls, future anxiety for girls, and general functioning scores for boys.

To further test the hypotheses that connectedness predicts mental health and not vice versa, we examined whether mental health symptoms predicted future school connectedness when taking prior school connectedness into account. Three analyses were conducted with T2 school connectedness as the dependent variable on each occasion. The Level 1 independent variable always included T1 school connectedness and either CDI–T1, SCAS–T1, or SDQ Total–T1.

The results of Table 4 indicate that none of the Level 1 mental health variables predicted future school connectedness when controlling for prior school connectedness. The overall pattern of results would lead one to conclude that, for adolescents, school connectedness predicts future mental health problems rather than mental health problems predicting future school connectedness.

Discussion

The results clearly support the first hypothesis that school connectedness would correlate strongly and negatively with concurrent and future self-report symptoms of depression and anxiety and with deficits

Table 4. *HLM Results Predicting PSSM at T2 With the PSSM–T1 and a Mental Health Variable at T1 as the Individual Level Predictors*

Level–1 Predictors	OLS Coefficient	SE	T Ratio	df
Male				
Depression and School Connectedness				
CDI–T1	–0.01			
PSSM–T1	0.50	.04***	11.47	13
Anxiety and School Connectedness				
SCAS–T1	0.01			
PSSM–T1	0.53	.03***	15.03	13
General Functioning and School Connectedness				
SDQ/Total–T1	–0.02			
PSSM–T1	0.46	.03***	16.29	13
Female				
Depression and School Connectedness				
CDI–T1	–0.02			
PSSM–T1	0.54	.06***	9.15	13
Anxiety and School Connectedness				
SCAS–T1	–0.01			
PSSM–T1	0.61	.05***	12.49	13
General Functioning and School Connectedness				
SDQ/Total–T1	–0.03			
PSSM–T1	0.49	.05***	10.12	13

Note: HLM = hierarchical linear modeling; PSSM = Psychological Sense of School Membership; T1 = Time 1; T2 = Time 2; OLS = ordinary least squares; CDI = Children's Depression Inventory; SCAS = Spence Children's Anxiety Scale; SDQ/Total = Strengths and Difficulties Questionnaire–Total score.
*$p < .05$. **$p < .01$. ***$p < .001$.

in overall functioning. The second hypothesis (that school connectedness would predict depressive symptoms, anxiety symptoms, and general functioning 1 year later after controlling for prior levels of the respective symptoms) was supported for both boys and girls with regard to depressive symptoms, for girls with regard to anxiety, and for boys on general functioning. The third hypothesis was also generally supported in that prior mental health did not predict school connectedness 1 year later after controlling for prior school connectedness. Of particular interest are the large correlations between school connectedness and concurrent depression and general functioning measured at two separate time spans (between 38% and 55% covariation with depression and 26% to 46% with general functioning). The size of the relation with depression was substantially higher than reported previously in the literature. Jacobson and Rowe (1999) found approximately 13% covariation using the Center for Epidemiological Studies Depression Scale. It is also higher than the relation of Resnick et al. (1997) linking school connectedness to general emotional distress. It is difficult to explain why the size of the covariation with depression is so much higher in this study than previously reported. The specific measurement choices in this study, for example the use of a depression measure specifically designed for children (CDI), would seem one possible explanation. The CDI includes items related to social rejection (Rudolph & Conley, 2005), a variable found in the E. M. Anderman (2002) study to be related to school connectedness.

One could also speculate that the magnitude of the correlation could be a feature of Australian schools. Australian school culture would differ from that of North America (e.g., generally no middle schools, school uniform policies), but this explanation seems unlikely. The size of the correlations in this study would suggest that school connectedness is potentially an underemphasized parameter in adolescent depression in particular. It is interesting to note that the relation between school connectedness and anxiety (between 9% and 16%) was substantially weaker than the relation with depression or general functioning, suggesting for the first time a hierarchy of mental health symptoms associated with poor school connectedness. These data suggest that depression and anxiety symptoms should be disaggregated in studies that look at links with school connectedness.

With regard to the HLM predictive analyses, the strongest and most consistent link between school connectedness and mental health symptoms 1 year later was with depressive symptoms. School connectedness predicted future depressive symptoms for both boys and girls, even taking into account prior depressive symptoms. The results show that the direction of the prediction is from school connectedness to depression rather than the other way around. This study builds on Kuperminc et al.'s (2001) research conducted in one school that showed a link between school connectedness and future internalizing symptoms but not vice versa. To our knowledge, this is the first time that school connectedness has been specifically shown to

predict future depressive symptoms in adolescents as well as the first predictive study of future mental health problems across a number of schools. The HLM analysis and the correlations indicate that school connectedness affects depressive symptoms to a greater extent than anxiety symptoms. In the Kuperminc et al. study, these depression and anxiety symptoms were considered as internalizing problems together, suggesting they may have found a stronger link to future depressive symptoms if they had examined these as separate syndromes.

The prediction of future anxiety from school connectedness was confined to girls only. It would seem, therefore, that concerns about acceptance and connections to teachers and peers are more powerful predictors of anxiety in girls. This data might support the growing body of research that adolescent girls are particularly sensitive to social evaluations (Calvete & Cardenoso, 2005). However, future research is required to confirm this finding. As we did not specifically test for gender interaction effects, it would be premature to make definitive conclusions about gender differences in relation to these results.

The SDQ scale of general functioning was predicted by prior school connectedness for boys but not for girls. Why school connectedness predicted later overall functioning for boys but not for girls is not clear. The General Functioning scale includes a Conduct Problem subscale, and it could be speculated that boys may have a particular expression of school connectedness through future conduct difficulties. As mentioned, there is extensive prior research supporting the link between school connectedness and delinquency and health risk behavior (e.g., Catalano et al., 2004).

This study is limited by the self-report nature of the measures, even though in relation to internalizing problems in particular these are very reliable indicators (Reynolds, 1994). In a study of peer influence on risky behavior, self-report data was shown to be a potential source of inflation of effect magnitude (Jaccard et al., 2005). Additional research is therefore required to examine the relation between school connectedness and future clinical diagnoses. Such research could involve multisource data from parents, teachers, and possibly clinical interviews.

Another potential limitation to the accuracy of the predictions is the fact that sample attrition did impact on the key variables with a slight overrepresentation of participants on the more pathological end of the spectrum in the attrition group. This probably had the effect of diluting the predictions found in this study.

Notwithstanding these limitations, these findings add to the emerging evidence of a link between school connectedness and adolescent mental health and advance the evidence of school connectedness as a correlate and predictor of adolescent depressive symptoms in particular. Associations between school connectedness and future depression were found for both boys and girls and were in the direction of school connectedness to depression rather than the other way around. This has implications for clinical assessment, treatment, and prevention. Certainly some of the known successful treatments for adolescent depression, for example interpersonal therapy and cognitive–behavioral therapy, may impact to some extent on the individuals' capacity for school connectedness, but routine assessment of school connectedness and individual and ecological interventions targeting schools may also be required. These could include more attention to school consultations or a more explicit focus on the content of school connectedness in the individual treatment approaches.

Preventive interventions developed to improve school connectedness by informing and equipping teachers with skills and strategies to foster school connectedness could complement interventions that address other individual risk factors for depression and other adolescent problems. There is a large body of literature discussing and evaluating factors that promote school connectedness (e.g., L. H. Anderman & Freeman, 2004; Blum, McNeely, & Rinchart, 2002; Furlong et al., 2003; Klem & Connell, 2004; Roeser, Eccles, & Sameroff, 2000; Wentzel, 1998). Common themes include involving students in classroom decisions, avoiding any form of discrimination, rewarding effort rather than achievement, and building strong relationships with all students.

Future research should focus on developing and evaluating interventions to assist in achieving these objectives. Research suggests that a significant proportion of the differences in school connectedness can be predicted by classroom management and inclusion in extracurricular school activity (McNeely et al., 2002) and that an intervention targeting teachers to promote a climate of warmth, acceptance, inclusion, and equity may indeed prove successful, particularly in the prevention of future depressive and other mental health symptoms.

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