

**Connection to School as an Indicator of Positive Development**

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## Introduction

The charge of this paper was to identify and validate an indicator of school connectedness using the National Longitudinal Study of Adolescent Health (Add Health). In this paper I identify two indicators of school connectedness that tap the subdomains of *social belonging* and students' *relationship with teachers* and I make recommendations regarding their use in national and state-level monitoring systems.

Resnick and colleagues (1997) used the term school connectedness to describe adolescents' perception of safety, belonging, respect and feeling cared for at school. In a cross-sectional analysis of risk and protective factors for eight different health risk outcomes among adolescents, Resnick et al. (1997) identified school connectedness as the only school-related variable that was protective for every single outcome. Widespread dissemination of this finding, along with its intuitive appeal, has led to an eagerness on the part of state health departments and school boards to monitor how well they are doing in terms of promoting school connectedness.

Despite the interest, the empirical evidence of a causal relationship between school connectedness and adolescent development is rather limited. The next section reviews the theoretical underpinnings of the concept of school connectedness, the empirical evidence of its importance to promoting adolescent development, and the ways it has been previously measured in the National Longitudinal Study of Adolescent Health.

### *Theory Linking School Connectedness to Adolescent Development*

Several theoretical streams have identified aspects of school connectedness as theoretically important for healthy adolescent development. The social development model (Hawkins and Weis 1985), derived from integrating social control and social learning theories,

posits that when students develop a positive social bond with their school, they are more likely to remain academically engaged and less likely to become involved in antisocial behaviors.

Hawkins and Weis (1985) identify three elements of the school social bond: attachment to prosocial peers and school personnel, commitment to conventional academic activities, and belief in the established norms for school behavior. Hawkins and Weis hypothesize that the school social bond inhibits antisocial behavior primarily through fostering association with prosocial peers.

Others have used the term social membership (Wehlage et al. 1989) or sense of community (Battistich and Hom 1997) for the same basic construct that Hawkins and Weis term social belonging. The theoretical orientation of these authors is that social belonging is a primary human need. The basic premise is that positive social relationships foster a sense of social belonging which, in turn, fosters academic engagement (Wehlage et al. 1989; Connell and Wellborn 1991; Furrer and Skinner 2003). In addition, Bollen and Hoyle (1990) suggest that perceived group membership is a prerequisite for following school norms and values.

The social support literature represents a third theoretical stream that has identified students' perceptions of support from teachers and peers as important for promoting development (for a brief review, see Rosenfeld, Richman and Bowen 2000). The mechanisms through which social support at school influences outcomes remains generally unexplored; however, it is typically hypothesized to be reduction in uncertainty. Supportive communication helps students perceive alternatives and recognize that help is available from others, thereby enabling students to develop a sense of control over stressful circumstances (Albrecht and Adelman 1987). Despite different theoretical traditions, the core constructs of personal

belonging, respect and support at school are identified as important by each of these streams of research. These are also the core constructs measured by the questions in the Add Health survey.

### *Evidence Linking School Connectedness to Adolescent Development*

Measures of school belonging, membership, support, and satisfaction have been demonstrated to be associated with several educational outcomes, including attendance (Jenkins 1997; Rosenfeld, Richman and Bowen 1998); school misconduct such as cheating, being suspended, and refusing to follow rules (Jenkins 1997; Hawkins et al. 2001); academic achievement (Rutter et al. 1979; Eccles et al. 1997; Barber and Olsen 1997); student motivation (Goodenow and Grady 1993; Battistich et al. 1995; Roeser et al. 1996; Connell and Wellborn 1991) and early school dropout (Battin-Pearson et al. 2000). These measures have also been linked to health-risk behaviors, in particular substance use (Nutbeam et al. 1989; Nutbeam and Aaro 1991; Elliott 1993; Battistich and Hom 1997; Resnick et al. 1997; Hawkins et al. 2001), but also sexual intercourse (Resnick et al. 1997; Hawkins et al. 2001), mental health (Resnick et al. 1997; Roeser, Eccles and Stroeber 1998) and violence and delinquency (Resnick et al. 1997; Battistich and Hom 1997; Hawkins et al. 2001).

Complicating the review of the literature is the inconsistent use of terminology. For example, Moody and Bearman (2002) measure school attachment with Bollen and Hoyle's (1990) three-item measure of social belonging. In contrast, Jenkins (1997) measures school attachment with a nine-item scale developed from responses to questions about whether the students have positive relationships with their teachers. Hawkins and colleagues (2001) combine three subscales: commitment to school, attachment to teachers, and attachment to school, the latter of which is very similar to Bollen and Hoyle's social belonging measure. Moreover, it is

not clear from previous research, which is primarily cross-sectional, whether connection to school actually promotes these positive outcomes. It is possible that connection to school is merely a correlate, and both connection to school and positive outcomes are produced by a third factor. It is also possible that the direction of causality is in the opposite direction, in particular for the academic outcomes. Positive feelings about school may be a result of academic success rather than its cause (Coleman and Collinge 1993). Ongoing intervention studies being conducted by Battistich and Hom (1997) and Elliott (2003) should provide more definitive evidence.

#### *Previous Measures of School Connectedness in Add Health*

Three different measures of school connectedness have been developed from the Add Health data. Resnick et al. (1997) used an 8-item scale ( $\alpha = .78$ ) that included the adolescent's perceptions of belonging, feeling cared for and respected by teachers, having trouble getting along with teachers and fellow students, and feeling safe at school. McNeely, Nonnemaker and Blum (2002) used a five-item measure ( $\alpha = .79$ , in-school survey) that included the adolescent's perception of belonging, being treated fairly by teachers, and the perception of feeling safe. This same measure was used in a separate sample of 4773 7<sup>th</sup>–12<sup>th</sup> graders attending public schools (Bonny et al. 2000). Finally, a three-item measure was used by Moody and Bearman in the in-school Add Health sample ( $\alpha = .79$ ) (Moody and Bearman 2002). This three-item measure was developed by Bollen and Hoyle (1990) to measure social belonging.

## Methods

### *The Sample*

Data are drawn from the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative sample of American adolescents in grades 7-12 in 1995. The primary sampling frame for Add Health was U.S. high schools. A stratified sample of 80 high schools was selected with probability proportional to the school's enrollment. A single feeder school was selected for each high school with probability of selection proportional to the percentage of the high school's entering class that came from the feeder school. School varied in size from less than 100 to more than 3,000 students. Add Health includes private, religious, and public schools from communities located in urban, suburban, and rural areas of the country (Udry 1998; Tourangeau and Shin 1999).

All students in the eligible grade range at the participating schools were asked to complete in-school questionnaires during the 1994-95 academic year. Based on rosters of students from each school and the in-school questionnaires, students were selected for Wave 1 in-home data collection. The response rate was 78.9%, yielding a sample of 20,745 youth completing in-home questionnaires. Of these, 1,821 cases were not assigned sampling weights. A second interview was conducted during the following academic year for all students except the 12<sup>th</sup> graders and a few select subsamples. The Wave 2 response rate was 88.2% (n=14,738).

The present analysis uses two samples. For the psychometric analyses, I use the Wave 1 in-home weighted sample (n=18,924) because it includes the 12<sup>th</sup> graders and is representative of the full 7<sup>th</sup>-12<sup>th</sup> grade age range. To test the predictive validity of the indicators, I restrict the

sample to those students who responded to both Wave 1 and Wave 2 surveys and who were assigned survey weights at Wave 2 (n=13,570).

### *Measures of School Connectedness*

Add Health contains seven questions that tap aspects of connection to school. Three of the questions were developed by Bollen and Hoyle (1990) to measure social belonging. Students were asked how much they agreed or disagreed with the following statements: “You feel close to people at your school,” “You feel like you are part of your school,” and “You are happy to be at your school.” If the survey was administered during the summer, the questions were asked in the past tense, for example, “Last year, you felt part of your school.” Responses were a five-item Likert scale ranging from “strongly agree” to “strongly disagree.”

Another three items ask the adolescent about his or her perceptions of their teacher. The first question follows asks students to report how much they agree or disagree with the statement, “The teachers at your school treat students fairly.” Response categories range from “strongly agree” to “strongly disagree.” A second question asks, “Since school started this year, how often have you had trouble getting along with your teachers?” The five response categories are “never,” “just a few times,” “about once a week,” “almost every day,” and “every day.” The third question about teachers appears in a different section of the survey that asks about how much different people in the young person’s life care about him or her. The question is, “How much do you feel that your teachers care about you?” The five response categories are “not at all,” “very little,” “somewhat,” “quite a bit,” and “very much.”

A final question that has been used to measure school connectedness is a perception of school safety (McNeely, Nonnemaker and Blum 2002; Resnick et al. 1997). Students were asked

how much they agree or disagree with the statement, “You feel safe in your school.” The five response categories ranged from “strongly agree” to “strongly disagree.” Responses to six of the seven school connectedness questions were reverse-coded so that a higher score reflected a more positive response.

### *Psychometric Analysis*

To determine if these seven items comprise one or more dimensions of school connectedness, the underlying organization of the variables is examined using zero-order correlations, principal components analysis and confirmatory factor analysis. Confirmatory factor analysis was used to test a model consisting of two correlated factors, social belonging and relationship with teachers. Confirmatory factor analysis involves specifying a measurement model and then testing the fit of the model. The specified model implies a variance-covariance structure, which is calculated using parameter estimates based on the data, and then compared to the actual variance-covariance structure of the data. If the two variance-covariance structures are similar (within sampling error), the model is taken to fit the data well (Long, 1983).

The social belonging factor was measured by the three indicators of social belonging identified by Bollen and Hoyle (1990) and used by Moody and Bearman (2002). The relationship with teachers factor was measured by the three questions about whether students think their teachers care about them, their teachers are fair and whether they have trouble getting along with their teachers.

AMOS 4.0 (Arbuckle and Wothke 1999) was used to calculate parameter estimates. AMOS uses full information maximum likelihood estimation in the presence of missing data to produce the parameter estimates. For the model to be identified, one of the factor loadings was



set equal to one on each factor, and the variances of both the common and unique factors were set to 0. An additional necessary restriction imposed on the model for identification is that the errors in the observed variables (the unique factors) be uncorrelated with each other. The common factors were allowed to be correlated. In addition, the mean of one indicator was set to the sample mean for each factor loading. This additional constraint was required due to the presence of missing data and the requirement to estimate the saturated model in addition to the model specified above (Arbuckle and Wothke 1999). The fit of the model was determined by assessing the magnitude of the discrepancy between the sample and fitted covariance matrices using multiple fit indices (Hu and Bentler 1995).

### *Predictive Validity of Measures*

The predictive validity of the measures was examined by determining whether the school connectedness measures at Wave 1 were associated with school-related and health-related outcomes approximately one year later. Two school-related outcomes were selected, grade-point average and the whether the adolescent was suspended from school between the Wave 1 and Wave 2 interviews. *Grade-point average* (gpa) was measured by taking the average letter grade for the last grading period for up to four subjects: English or language arts, mathematics, history or social studies, and science. If students received grades in at least two subjects their gpa was calculated. If they took fewer than two of these subjects, did not receive letter grades, or were not in school at Wave 2, they were excluded from the analysis. *Out-of-school suspension* is a dichotomous variable (yes/no) measured by responses to the question, “During this school year, have you received an out-of-school suspension?” Given that the survey was administered at

different times during the school year, the length of time during which students had the opportunity to be suspended varied. It is not known to what extent this variation is nonrandom.

The two health-related outcomes are weapon-related violence and cigarette use. *Weapon-related violence* is a dichotomous variable indicating whether the adolescent committed at least one of the following acts in the year between the Wave 1 and Wave 2 surveys: threatened to use a weapon to get something from someone, pulled a knife or gun on someone, shot or stabbed someone, used a weapon in a fight, or hurt someone badly enough to need bandages or medical care. Thirteen percent of the sample responded affirmatively to at least one of these items. *Cigarette smoking* is measured with an indicator of whether or not the adolescent is a regular smoker, defined as having smoked on 20–30 days in the past 30 days. An additional indicator for whether the adolescent is a non-smoker at Wave 2 is used to model the probability of quitting.

The relationship between the school connectedness measures and the outcomes are examined using OLS and logistic regression. For all outcomes except cigarette use, the models include the Wave 1 measure of the outcome, sociodemographic characteristics, family characteristics, and individual characteristics. The background characteristics are presented in Appendix A. For cigarette use, two models are tested to explore the effect of school connectedness on the initiation of regular smoking and on quitting. First, I model the probability that a nonsmoker at Wave 1 becomes a regular smoker by Wave 2. Next I model the probability that regular smokers at Wave 1 quit smoking by Wave 2. I did not use factor scores for the school connectedness measures but rather created scales by averaging the items that make up each scale. This method was chosen because it is the method typically used for measuring indicators by state and local departments of health and education. The analyses were done in Stata 6.0 (StataCorp., 1999) using weights and adjusting for the complex sampling design.

## Results

### *Psychometric Analysis*

The bivariate correlations of the seven items are presented in Table 1. The three items developed by Bollen and Hoyle (1990) to measure social belonging are highly correlated ( $r = .40$  to  $r = .60$ ). The correlation between these three items and the remaining items is moderate, ranging between .19 and .40. Table 2 presents results from principal components analysis of the seven items. Using the criteria of retaining factors that have a minimum eigenvalue of one and the scree criterion, two factors were retained. The varimax and oblique solutions yielded similar results, and the oblique rotation was selected because of the relatively high inter-factor correlation ( $r = .40$ ). The factor structure accounted for 59 percent of the total variance.

[Table 1 about here]

The three social belonging measures (Bollen 1991) loaded on the first factor whereas the three student-teacher relationship items loaded on the second factor. We label the first principal component *social belonging* and the second component *relationship with teachers* to reflect these factor loadings. Students' report of how safe they feel at school had moderate factor loadings on both factors (.45 and .28, respectively).<sup>1</sup> The alpha coefficients, presented at the bottom of Table 2 for the full sample, demonstrate that inclusion of the feeling-safe-at-school item decreases the internal consistency of a scale derived from the first factor and only minimally increases the

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<sup>1</sup> Maximum likelihood factor analysis produced similar results. Unlike principal components analysis, the scree criterion suggested a one-factor solution, but when two factors were specified, the rotated factor pattern matched the principal components results.

internal consistency of a scale derived from the second factor. Since parsimony is an important feature of an indicator, this item was excluded from subsequent confirmatory factor analysis.

[Table 2 about here]

The two-factor solution was tested using confirmatory factor analysis (see Table 3). Consistent with the findings from the principal components analysis, the three items representing social belonging have higher factor loadings than the three items representing relationship with teachers. The correlation between the two latent factors is .62. Table 3 presents three measures of model fit. The null hypothesis for the chi-square test is that the observed covariance structure is equal to the model covariance structure. Therefore, the smaller the chi-square statistic, the better the model fit. If the chi-square statistic divided by its degrees of freedom is five or less, the model is usually considered an acceptable fit. However, in large samples, a trivial difference between the sample covariance matrix and the fitted model may result in a large chi-square statistic and rejection of the specified model (Hu and Bentson 1995). Therefore, the chi-square statistic must be compared to other fit indices. Hu and Bentson (1999) suggest that if the CFI is greater than .96 and the RMSEA is less than .10, the data adequately fits the model. The values of the CFI and the RMSEA indicate that the model is an acceptable fit.<sup>2</sup>

[Table 3 about here]

The internal consistency of the social belonging and relationship with teachers scales is presented in Table 4. The reliability of the social belonging scale is adequate for all gender-ethnicity groups. In general, the reliability is slightly higher for females than males. It is highest

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<sup>2</sup> A one-factor model that excluded the student-teacher relationship factor (not shown) fits the model better than the two-factor model ( $\chi^2/d.f. = 1.56$ ; CFI = 1.00; RMSEA = .005). This is consistent with both the higher inter-correlations between the three social belonging variables.

for White and American-Indian females and lowest for Asians of both genders. The scale exhibits excellent reliability across both age groups and across all types of family structure.

The student-teacher relationship scale exhibits lower reliability. For all groups, the Cronbach's alpha coefficient is at or below .70. In contrast to social belonging, the scale tends to have slightly higher reliability among males compared to females. It performs poorly (Cronbach's alpha coefficient < .60) for Hispanic, African-American, American-Indian, and Asian females. It also performs poorly for Asian males. The lower internal consistency among girls is most likely due to limited variability among females in responses to the question, "How often do you have trouble getting along with your teacher." Across all ethnicities, girls were less likely to report any trouble getting along with their teacher. This was particularly true of Asian girls, 95% of whom reported never or just a few times having trouble getting along with their teacher. Eighty-five percent of Asian males said they never or just a few times had trouble getting along with their teacher. The reliability of the student-teacher relationship scale decreases slightly with age. It does not vary substantially by family structure.

[Table 4 about here]

Table 5 demonstrates that the two school connectedness measures have good variability across all subgroups. The skewness of the distributions across subgroups is minimal, with the negative values indicating a slight skewness to the left. The kurtosis, a measure of the peakedness of the distribution, is near the desired value of three, which indicates the variables are normally distributed.

[Table 5 about here]

### *Construct and Discriminant Validity*

Table 6 examines the construct and discriminant validity. The two scales measuring school connectedness are significantly related ( $r = .45$ ), and their inter-correlation is stronger than their correlation with any other variable in Table 6.<sup>3</sup> Of the two dimensions of school connectedness, one would logically expect the student-teacher relationship measure to be more closely related to classroom functioning because it directly involves the teacher. Conversely, one would expect the social belonging measure to be more closely related to measures of peer relationships at school. The correlations between the student-teacher relationship and students' reports of having trouble paying attention in class and having trouble completing homework are in the expected direction and are stronger than the correlation of social belonging with these variables. However, both social belonging and relationship with teachers are equally correlated with the two peer variables, perception that students at school are prejudiced and report of having trouble getting along with other students. The associations between the school connectedness measures and perceptions of prejudice are quite modest for all groups except American-Indian students and students of other race/ethnicity (results not shown).

[Table 6 about here]

### *Predictive Validity*

The description of the sample used to test for predictive validity is presented in Table 6. On average, most students feel a sense of belonging and that their teachers respect and care about

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<sup>3</sup> The correlation between the two factors estimated by confirmatory factor analysis is .62; the higher correlation obtained from CFA reflects decreased measurement error resulting from separating the common and unique variance components.

them. The value of both scales is 2.7 out of a possible 4 points. Nonetheless, there is good variability in the measures, and the responses span the full possible range of 0 to 4.

Thirteen percent of students reported that they had engaged in weapon-related violence in the previous year. This is a decline from the 22 percent who reported engaging in these same behaviors during the year prior to Wave 1. The decline may be due to the fact that middle school students are more likely to report engaging in weapon-related violence, and the Wave 2 sample excluded 7<sup>th</sup> graders. It may also be due to loss of follow-up among the students at highest risk of committing violence. Eleven percent of the students reported receiving an out-of-school suspension. Most of the schools reported fairly harsh disciplinary policies, including out-of-school suspension, for relatively minor infractions such as smoking at school (McNeely, Nonnemaker and Blum 2002). The average grade-point average was 2.83, approximately a B-. Sixty-five percent of the students had not smoked in the previous 30 days. Of those who did report smoking, half were experimental smokers (less than 20 cigarettes a day) and half were regular smokers.

[Table 7 about here]

The results from the multivariate models examining the relationship between school connectedness and the Wave 2 outcomes are summarized in Table 8. For each outcome, four models are presented. The first model contains just two independent variables, the social belonging measure and the Wave 1 (baseline) measure of the outcome variable. Similarly, the second model contains just the student-teacher relationship and the baseline value of the outcome. The third model contains both school connectedness measures. The final model adds the background characteristics listed in Appendix A. The models for cigarette use are slightly

different in that they model the transition to regular use *conditional* on not smoking, and the transition to not smoking, *conditional* on having been a regular smoker in the 30 days prior to the Wave 1 interview.

[Table 8 about here]

*School-related outcomes.* Models 1 and 2 in Table 8 show that each school connectedness variable, taken alone, is associated in the expected direction with grade-point average and out-of-school suspension. However, when social belonging and the student-teacher relationship measure are included in the same model, social belonging is no longer associated with either GPA or out-of-school suspension. The magnitude of the association between student-teacher relationship and the outcomes remains unchanged with the addition of social belonging and the control variables. The strength of the association between the student-teacher relationship and GPA is quite modest. A one-unit change in the five-point student-relationship scale is associated with an increase of .04 points in GPA. The association of student-teacher relationship with out-of-school suspension is slightly stronger than for GPA. For each one-point increase in the student-relationship scale, a student is .58 times as likely ( $e^{-.55}$ ) to receive an out-of-school suspension. An alternative model specification that modeled out-of-school suspension conditional upon having never been suspended yielded similar results (results not shown).<sup>4</sup>

*Weapon-related violence.* The story for weapon-related violence is the same as for the school-related outcomes. A positive student-teacher relationship at Wave 1 is associated with a

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<sup>4</sup> An examination of potential collinearity between social belonging and student-teacher relationship in the GPA model suggests that collinearity does not explain the lack of association between social belonging and GPA once student-teacher relationship is added to the model. The weighted bivariate correlation between the two variables is .45, the variance inflation factor (VIF) for all variables is 3.5 or less, and the mean VIF is 1.6. Chatterjee, Hadi and Price (2000) suggest that if the largest VIF is under 10 and the mean VIF is not considerably larger than one, multicollinearity is not a problem.



lower probability of engaging in weapon-related violence during the subsequent year. Social belonging, however, is not associated with weapon-related violence once the student-teacher relationship is taken into account. The strength of the association between the student-teacher relationship scale and the probability of engaging in weapon-related violence is modest (OR=.70).

*Cigarette use.* Once again, the student-teacher relationship but not social belonging at school is protective against the initiation of regular smoking. For each one-point increase in the student-teacher relationship scale, a nonsmoker is .53 times less likely to initiate regular smoking. In contrast to the findings for the initiation of regular cigarette use, neither school connectedness variable was associated with smoking cessation.

*Conditioning Effects of Demographic Characteristics.* To determine whether the association between student-teacher relationship and the health-related outcomes varied by age, gender, or race/ethnicity, interaction terms were included in the model. Specifically, for each outcome, three separate models were estimated, each one containing the two school connectedness measures, the full set of control variables and an interaction term between student-teacher relationship and age, gender and race/ethnicity, respectively. The association between student-teacher relationship and weapon-related violence is slightly stronger among Asian students than among students of other ethnic groups. In contrast, student-teacher relationship is slightly less protective against being suspended among older students. Finally, the student-teacher relationship is more protective against the initiation of regular cigarette smoking among American Indian students (results not shown). The lack of a clear pattern of findings across findings across outcomes, combined with the fact that only three out of 30 statistical tests were statistically significant, suggests that the results are due to sampling distribution. In general,

the association between the student-teacher relationship and the outcomes is consistent across demographic subgroups.

## **Discussion**

The goal of this paper was to take the items available in the Add Health dataset and identify one or more indicators of school connectedness. Exploratory and confirmatory factor analysis identified two potential indicators, *social belonging* and *relationship with teachers*. The social belonging measure was based on a scale developed and validated by Bollen and Hoyle (1990) in a sample of college students and a sample of adult community members. This analysis here showed that the three items also seemed to tap the same underlying construct in this nationally representative sample of middle and high school students.

I have yet to identify the source of the three items measuring the student-teacher relationship and do not know if they were conceptualized to measure a single construct. Together, the items ask about multiple aspects of the student-teacher relationship, including fairness, caring and discord. Barber (1997) describes three domains of adolescent-adult relationships—connection, regulation, and autonomy-granting—each of which make unique contributions to adolescent development. The student-teacher relationship measure potentially taps two or more of these domains. This would explain the lower inter-item correlations, factor loadings, and reliabilities for this scale. The low alpha reliability could also be due to the mixed levels of observation contained within the scale. Two of the questions comprising the student-teacher relationship scale ask the respondents about their personal relationship with their teacher, whereas the third asks the respondent to rate how fair the teachers in school are to all students. Nunnally and Bernstein (1994) caution against over-interpreting factor loadings and reliabilities

for scales with just three items. Some even argue that it is not legitimate to develop scales with just three items. Therefore, despite the relatively low alpha coefficient for the student-teacher relationship ( $\alpha = .63$ ), it was included in the models exploring predictive validity.

A positive student-teacher relationship at Wave 1 is associated with a lower probability of engaging in risky behaviors, being suspended and earning poor grades during the subsequent year. Surprisingly, however, social belonging is not associated with these outcomes once the student-teacher relationship is taken into account. This finding is particularly surprising because coefficients for variables measured with error (i.e., low reliability) are biased towards zero, and so one would expect social belonging to have higher predictive validity than the student-teacher relationship.

This finding suggests that the association between student-teacher relationship and the outcomes is not mediated by a sense of social belonging, as suggested by social support models and the theoretical framework of Wehlage and colleagues (1989). This model does not rule out the possibility that the direct effect of social belonging is mediated by a positive student-teacher relationship, but the theoretical argument that a feeling of social belonging fosters a positive relationship with teachers is less compelling. More likely is that the association between student-teacher relationships on student outcomes operates independently of social belonging. Only one study that I am aware of has compared the different aspects of the school social bond against one another (Jenkins 1997). She found that attachment—a measure of the warmth and support students feel from their teachers—predicted nonattendance, school misconduct and school crime. She also found that the importance of attachment relative to other measures of the school bond (e.g., school motivation and engagement, involvement and belief in the fairness of school rules) varied across outcomes.

In this paper, the student-teacher relationship was more strongly associated with so-called antisocial behaviors of weapon-related violence, being suspended and becoming a regular smoker. The association with GPA was much smaller, and the association with smoking cessation nonexistent. It is possible that the student-teacher relationship is more protective for certain outcomes than for others.

By separating school connectedness into two separate albeit related dimensions, this paper contributes to specificity of measurement in the burgeoning field of school connectedness. The broader measures of school connectedness that have received the most attention to date (Resnick et al. 1997; Hawkins et al. 2001) combine general feelings about school (e.g., “I like school”) with academic motivation (e.g., “I do extra school work on my own”), perceptions of safety, or relationships with teachers. This research suggests that not all aspects of school connectedness are equally protective. Although the measure of social belonging has better psychometric properties than does the student-teacher relationship measure, the longitudinal analyses suggest that the student-teacher relationship is substantively more important for the outcomes measured.

Two limitations of this study should be noted. First, the development of the school connectedness measures was based on the items available in Add Health. Were a more theoretically driven approach used and additional measures available, other dimensions of connectedness might have surfaced. Second, the predictive validity of these items should be interpreted with caution. Although the baseline measures of the outcomes were included in the models, it is quite probable that there are still unmeasured factors that influence both the outcome and a student’s perception of her relationship with her teacher. Ramsey’s test for omitted variables in the GPA model suggests this is the case ( $F = 74.06$ ;  $p < .001$ ). Therefore, the

relationship between the student-teacher relationship and the health and educational outcomes may be spurious.

In sum, this paper identified a measure of student-teacher relationships that is both brief and has good predictive validity, selection issues notwithstanding. The disadvantage of the indicator is its relatively poor psychometric properties. Nonetheless, as a general measure of the student-teacher relationship, it might merit inclusion as a monitoring tool until the specific domains of school connectedness and their relative importance to both positive and negative aspects of adolescent development are determined.

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