

# How Many Teachers Does It Take to Support a Student? Examining the Relationship between Teacher Support and Adverse Health Outcomes in High-Performing, Pressure-Cooker High Schools

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*Although considerable research has demonstrated the importance of supportive teacher-student relationships to students' academic and nonacademic outcomes, few studies have explored these relationships in the context of high-performing high schools. Hierarchical linear modeling with a sample of 5,557 students from 14 different high-performing high schools reveals that students who believe more of their teachers care for them and students who have an adult confidant within the school fare significantly better in terms of academic anxiety, internalizing symptoms, and physical problems related to school stress than their less supported counterparts. Results also show that having support from more teachers may be a stronger protective factor for students in these schools than having a close relationship with a single adult in the school. Implications for practice and future research are discussed.*

Keywords: Teacher support; teacher caring; student-teacher relationships; teacher effects; student stress; academic anxiety

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In high-performing high schools, most students are involved in extracurricular activities, report working hard on their schoolwork, earn good grades, and score highly on standardized tests (Conner, Pope, & Galloway, 2010; Pope, 2001). Looking beneath the surface, however, we find that many of these high-achieving students are suffering (Luthar & Latendresse, 2005). They often experience high levels of stress and academic anxiety (Ansary & Luthar, 2009; Luthar, 2013; Richards, 2009; Suldo, Shaunessy, & Hardesty, 2008). Many report internalizing problems, experiencing physical symptoms due to stress, and compromising their sleep in order to maintain their high grade-point averages (Conner, Pope, & Galloway, 2010; Fuligni &

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Hardway, 2006; Modin, Ostberg, Toivanen & Sundell, 2011; Robinson, Alexandar, & Gradisar, 2009). The “pressure for high-octane achievement” (Luthar, 2013, p. 65) in high-achieving schools has been linked to rates of substance use and non-suicidal self-injury that exceed national norms (Luthar & Barkin, 2012; Luthar & Goldstein, 2008; Yates, Tracy & Luthar, 2008). As a result, some commentators have started referring to high-performing schools as “pressure-cookers” (Ravitch, 2007; Roope, 2012), and others are beginning to raise questions about whether the academic advantage that these schools seem to offer is worth the non-cognitive costs that they exact (Luthar, 2013; Rainey, 2013). Without watering down their curricula or lowering their high academic standards, can these schools do anything to safeguard their students’ mental and physical health? What, if anything, can they do to mitigate the ill-effects of academic stress?

Existing research suggests that teacher-student relationships matter greatly not only to students’ performance in school (Croninger & Lee, 2001; Crosnoe, Johnson & Elder, 2004; Erickson, McDonald & Elder, 2009; Kahne, Sporte, de la Torre & Easton, 2008; Murdock, 1999; Rosenfeld, Richman & Bowen, 2000), but also to their overall health and wellbeing. For example, teacher support has been associated with decreases in health risk behaviors (McNeely & Falci, 2004;) and higher rates of subjective wellbeing (Suldo, Friedrich, White, Farmer, Minch, & Michalowski, 2009). Several studies show that youth who are socioeconomically disadvantaged or who attend under-resourced schools reap considerable benefits from teacher support (Erickson, McDonald & Elder, 2009; Olsson, 2009). Less is known about how teacher support shapes non-academic outcomes for students in more advantaged school and community settings.

This study examines students’ perceptions of teacher support in the context of well-resourced, high-performing schools. We consider how these perceptions vary across schools and students, and how they relate to students’ reports of academic worry, internalizing problems, and physical health symptoms. We focus on these three indicators of health because previous research has found elevated levels of mental and physical health problems for students in high-performing schools, despite their high GPAs (Ansary & Luthar, 2009; Luthar & Barkin, 2012; Luthar, Barkin, & Crossman, 2013; Levine, 2006; Pope, 2001; Suldo, Shaunessy, Thalji, Michalowski, & Shaffer 2009; Yates, Tracy, & Luthar, 2008). At the same time, high-performing schools have reputations for having effective and caring teachers. Accordingly, these schools offer promising sites in which to study the limits and potential benefits of teacher support to youth health.

### **Review of Relevant Literature**

#### *Teacher Support and Student Health*

**Mental health and well-being.** Positive teacher-student relationships are those in which the student feels respected, valued, and supported (Doll, Zucker & Brehm, 2004; Suldo et al., 2009). Researchers have established that teacher support is a powerful protective factor for students’ mental health. Students who perceive their teachers as warm, caring, and emotionally supportive are less likely to become depressed or suffer declines in self-esteem (Colarossi & Eccles, 2003; DeWit, Karioja, Rye & Shain, 2011; Murray & Zvoch, 2011; Reddy, Rhodes, & Mulhall, 2003). Research on the effects of teacher support on student anxiety is more limited and somewhat inconclusive. Some researchers have found that although adolescent anxiety appears to be related to general levels of overall support from family, peers, teachers and other adults, there is no unique effect associated with teacher support specifically

(DeWit et al., 2011; Rueger, Demaray, & Malecki, 2008; Rueger, Malecki & Demaray, 2010). However, more research is needed to investigate the effects of teacher support on *academic* anxiety in particular.

Qualitative research that explores academic anxiety among students in high-performing schools highlights the need for large-scale studies that can provide broader understanding of the role of teacher support in these contexts. In one case study of five successful students who suffered from severe academic anxiety or breakdowns, Pope (2001) observed that the school structure prevented not only teachers, but also school counselors from getting to know their students well and developing close, personal relationships. In a second grounded theory study designed to uncover the coping strategies used by students in high-pressure schools, Suldo, Shaunessy, Michalowski and Shaffer (2008) did not identify “seeking support from teachers” as a prominent theme. Instead, they found that students with high levels of anxiety reported seeking support from classmates and family members. Nonetheless, low anxiety students in this study were twice as likely as high anxiety students to say that they renegotiated workload expectations with their teachers, and that doing so helped them to manage their stress levels (Suldo, Shaunessy, Michalowski, & Shaffer, 2008). Although students might not specifically seek support from their teachers, the possibility remains that support offered by teachers could be helpful to students in high-pressure school contexts. More research on the relationships between perceived teacher support and student anxiety and mental health in the context of high-performing schools is needed.

Perceived teacher support has also been linked to positive outcomes, such as higher life satisfaction (Murray & Zvoch, 2011; Suldo & Huebner, 2006) and increased happiness (Natvig, Albrektsen, & Qvarnstrom, 2003). Suldo and colleagues (2009) examined students’ reports of their subjective wellbeing in relation to four distinct dimensions of teacher support: *emotional* support, which entails perceptions of trust, love, and care; *instrumental* support, which includes the provision of resources to help someone achieve a specific end; *appraisal* support, which includes offering constructive feedback to help guide future performance; and *informational* support, which refers to the provision of guidance or advice with respect to a specific problem. These researchers found the strongest associations between emotional and instrumental teacher support and students’ subjective wellbeing, with emotional support explaining slightly more of the variance in this outcome than instrumental support. In an earlier study of Northern European students in four countries, Samdal (1998) also found that teacher support was consistently associated with students’ subjective wellbeing.

**Physical health.** Although there is limited research exploring the relationship between teacher support and students’ physical health, some researchers have found associations. For example, McNeely and Falci (2004) found that teacher support protects students against the initiation of health-risk behaviors, such as drug and alcohol use and suicidal ideation; however, these researchers also found that teacher support has little effect on the reduction or cessation of such health-risk behaviors once initiated, with the exception of weapon-related violence. In their sample of urban adolescents, Conner, Mason, and Menis (2012) found widespread student dissatisfaction with their relationships with teachers, but greater dissatisfaction in these relationships was related to higher rates of substance use and abuse. Additionally, in a study of Swedish youth, Modin et al. (2011) found that although teacher support reduced the effect of a demanding school context on students’ physical health, the association between context and students’ health remained significant. In other words, even when they felt supported by their teachers, students in these “high-strain”

conditions reported higher incidences of headaches, upset stomachs, and sleep-related disorders than did students in less pressured school contexts. Clearly, more research is needed on the relationship between teacher support and students' physical health, particularly in pressure-cooker schools.

### *Teacher Support and School Context*

**Small and well-resourced schools.** Relatively few studies focus on the influence of school features on student-teacher relationships; however, teacher support levels are likely to vary across different schools contexts (Bernstein-Yamashiro & Noam, 2013a). Students in under-resourced, urban schools often report poor student-teacher relationships and low levels of support (Conner, Mason, & Mennis, 2012; Theoharis, 2009; Tuck, 2012). Such experiences are often attributed to school overcrowding (Theoharis, 2009). By contrast, affluent suburban school contexts tend to attract more qualified teachers and to offer smaller class sizes and lower teacher-student ratios, which can lead to the development of strong student-teacher relationships (Darling-Hammond & Post, 2000). Research on school connectedness, which includes measures of teacher support, such as "I have a teacher who really cares about me" demonstrates a link between school features, such as enrollment, and student outcomes. For example, studies by McNeely, Nonnemaker, and Blum (2002) and Wilson (2004) showed that students in schools with enrollments exceeding 900 students and students in schools with harsh discipline policies generally reported lower levels of school connectedness.

Findings like these have helped popularize reforms intended to increase personalization within schools. Such reforms include advisory programs, alternative grade spans (e.g. schools that serve students in grades k-8), small learning communities within large schools, and small, autonomous schools. Reviewing the literature on these reforms, Yonezawa, McClure and Jones (2012) concluded that while there is weak quantitative evidence that advisory programs improve teacher-student relationships, there is convincing evidence that cohort models and small-school education reforms can foster greater personalization in schools and make a positive difference in students' school experiences.

**High-performing schools.** Although they tend to offer smaller class sizes than their lower-performing counterparts, high-performing school contexts can be hotbeds of academic stress (Gadin & Hammarstrom, 2003; Luthar, Barkin, & Crossman, 2013; Pope, 2001; Suldo, Shaunessy & Hardesty, 2008), often associated with students' mental health problems (Ansary & Luthar, 2009; Carter, Garber, Ciesla & Cole, 2006; Suldo, Shaunessy & Hardesty, 2008; Suldo, Shaunessy, Thalji, Michalowski, & Shaffer 2009), sleep disturbance (Torsheim & Wold, 2001); substance use rates (Luthar & D'Avanzo 1999; Luthar & Goldstein, 2008; Way, Stauber, & Nakkula, 1994), and self-injury (Selekman, 2010; Yates, Tracy, & Luthar, 2008). In response to adverse health outcomes, several secondary schools have implemented programs or interventions designed to decrease student stress. These interventions include revising homework policies (Rainey, 2013), instituting mindfulness workshops (Bohstedt, 2013; Esposito, 2014), and bringing school stakeholders together to change policies and practices at the school level to improve student wellbeing (Conner, Pope, & Galloway, 2010). Professional development sessions and trainings to help teachers establish strong relationships with students may also help mitigate the deleterious effects of academic stress on healthy youth development (Bernstein-Yamashiro & Noam, 2013b); however, more research is needed on the effects of such programs, especially as calls to increase personalization in schools increase (Yonezawa, McClure, & Jones, 2012).

### *Cumulative Effects of Support*

As noted above, teachers are not the only source of support for youth, and youth turn to different sources of support for different issues (Brion-Meisels, in press). Young people tend to seek out family members for help with emotional problems, while they rely on peers for companionship and social support, and teachers for academic support (Wenz-Gross, Sipperstein, Untch, & Widaman, 1997). Research also suggests that different support providers have differing effects on valued outcomes. For example, low-income youth who were mentored by either an employer or a coach were more likely than youth who were mentored by a teacher to complete a post-secondary degree (Yonezawa, McClure & Jones, 2012). While family support for learning is consistently associated with greater life satisfaction across a range of contexts, teacher support has been found to matter in some samples (Suldo, Shaffer & Riley, 2008), but not in others (Danielsen, Samdal, Hetland, & Wold, 2009; Siddall, Huebner, & Jiang, 2013). In studies by Danielsen et al. (2009) and Siddall et al. (2013) peer support also exerted a significant effect on life satisfaction. In several studies examining the relationships among various sources of support and various indicators of adjustment, including anxiety, self-concept, depression, leadership, and social skills, few unique effects were associated with teacher support, compared to parent support and friend support; however, high levels of global support, averaged across all sources, did matter to psychological and academic adjustment among middle school students (Demaray, Malecki, Rueger, Brown, & Hodgson, 2009; Rueger, Demaray, & Malecki, 2008; Rueger, Malecki, & Demaray, 2010). The researchers speculated that the “cumulative effects of support from multiple sources, including teachers, could play an important role in the lives of children and adolescents” and called for more research on the correlates of teacher support in different domains (Rueger, Malecki, & Demaray, 2010, p. 511).

Researchers who consider differences in social support by students’ socio-economic status have posited that teacher support matters—especially to low-income youth—because these youth might lack a robust network of supportive others in the home or community (Olsson, 2009). Small schools have been seen as a promising vehicle for promoting teacher support and connection. Nonetheless, some critics of small schools have expressed concern that these contexts, while perhaps fostering relationships with at least one caring adult, inadvertently limit students’ access to broader networks of supportive and informative adults (Hammack, 2008). Others, however, express the conviction that having at least one caring adult to whom one can turn is an essential developmental asset, and websites and materials have been developed to promote these ideas in schools (see, for example, Koonz, 2013; Search Institute, 2013). Despite these claims, the comparative worth of one versus many school-based supporters has received scant empirical attention.

### *Limitations of Extant Research*

Extant research has shown that the source of support; parent, peer, or teacher (Demaray, Malecki, Rueger, Brown, & Hodgson, 2009; DeWit, Karioja, Rye & Shain, 2011), the amount or quantity of support (Klem & Connell, 2004), and the type of support; instrumental, emotional, appraisal, or informational (Demaray & Malecki, 2003; Suldo, Friedrich, White, Farmer, Minch, & Michalowski, 2009) all matter to student outcomes. While we know that consistent emotional support from teachers can yield positive outcomes, questions about the role of teacher support remain. In much of the existing literature, researchers measured the frequency with which students feel that their teachers care for them; in few studies have researchers examined whether the number of teachers who express care makes a difference.



Open questions, then, concern the extent of effects and the importance of the number of teachers who students believe support them.

An ancillary question concerns the difference between support from a teacher and support from any adult in the school, such as an administrator, counselor, coach, or librarian. Certainly, there is a wealth of literature on the important role of school counselors, and a number of studies have considered the value of mentors defined as non-parental adults who take a special interest in a young person (DuBois, Holloway, Valentine, & Cooper, 2002; Erickson, McDonald & Elder, 2009; Jacobi 1991). Few comparisons of these school-based support providers exist, however. In particular, we know little about what differences may exist between students who have one adult in the school to whom they can turn for support and students who perceive widespread support from their classroom teachers. In fact, in some studies, these two issues are conflated, as measures of teacher support include an item that assesses whether the respondent believes he or she has a close, trusting relationship with at least one caring adult in the school (Davis, Chang, Adrezejewski, & Poirier, 2010; Green, Rhodes, Hirsch, Suárez-Orozco, & Camic, 2008).

Finally, although many researchers have investigated the effects of teacher support using multiple school sites and analytic models that allow for nested effects (e.g. Colarossi & Eccles, 2003; Phillippo & Stone, 2013; Woolley, Kol, & Bowen, 2009), few researchers have focused on high-performing, high-pressure school contexts and examined the between-school variation within such a sample. This study attempts to address these gaps in the existing research. We were guided by the following research questions:

- 1) What is the relationship between teacher support and students' academic worry, internalizing symptoms, and physical health in the context of high-performing schools?
- 2) To what extent is there variation in health outcomes and teacher support across schools? When taking school differences into account, to what extent do student characteristics, such as ethnicity, gender, grade level and Advanced Placement course enrollment, help explain the differences in these outcomes?
- 3) With respect to physical and mental health outcomes, on average, do students in these high-performing schools benefit more from feeling that most of their teachers support them or from having a close relationship with a single adult in the school?

## Methods

### *Participants*

Our sample is drawn from 14 high-performing high schools in an affluent region of the country. Nine of these schools are elite independent or private schools with strong reputations for academic excellence, while the other five are top tier public schools, which consistently rank among the highest in the state on No Child Left Behind benchmarks. For example, in 2012, three of the five public schools earned rankings of 10 on a 10-point state "academic performance index" scale, one scored an eight, and one scored a nine, rating them among the best schools in the state. At the 11 schools in this sample that offer Advanced Placement courses and report the percentage of their students who pass, passing rates ranged from 77% to 97%, with an average rate of 88%. Furthermore, all participating schools can be considered high-performing insofar as the vast majority of their graduates go on to attend a four-year college or university, with rates ranging from 60% to 100%, and an average four-year college attendance rate of 83%. Table 2 presents additional

information about the participating schools, including enrollment data, the number of faculty, the racial and socioeconomic makeup of the student body, and the tuition costs for the private schools.

Participating schools were part of a larger research and intervention project designed to provide schools with support to improve student health, school engagement, and academic integrity. At all schools taking part in the intervention project, a school leader applied to participate due to concerns about the effects of high levels of student stress within their schools. Principals at each of the participating schools were interested in gathering baseline data on students' experiences in and perspectives on school. At each school, this baseline survey was administered prior to any intervention-related changes made to strengthen school or teacher support for students.

The sample included 5,557 students, with a mean age of 15.64 ( $SD=1.20$ ). The grade distribution of the sample is as follows: 30% ninth graders, 25% tenth graders, 25% eleventh graders; 21% twelfth graders. The sample was 55% female and 52% white, with the remainder of students reporting their ethnicity as Asian (30%) or another minority (African American [2%], Hispanic [6%], or multi-ethnic [10%]). At each school, administrators confirmed that the demographics of the sample participating in this study reflected the racial and ethnic composition of the overall school. The majority of the students reported that their parents were married (81.7%). Sixty-five percent of the students also reported a grade point average (GPA) of 3.5 or higher. Thirty-nine percent of the participants attended private schools, while sixty-one percent attended public schools.

#### *Procedure*

The research team supported administrators at participating schools in determining optimal sampling. Of the 14 school administrators, seven chose to survey their entire student body; the other seven were supported in developing a process to ensure representative random sampling of their student body. School administrators distributed IRB-approved consent forms asking for student assent and parent consent prior to participation in the study. The school administrators who chose to sample their entire student body had approximately 60% or more of parents consenting, while the other school leaders continued to solicit parental consent until they reached their optimal sample size. Of those students with parental consent, approximately 90% signed assent forms.

Students with assent and consent to participate then completed a confidential 40 minute online survey during the school day. Staff at the school sites administered the survey. These staff members included administrators, counselors, instructional technology specialists, and in some rare cases, classroom teachers. They were given a common script to read to students prior to the survey administration, and project researchers were available to answer student questions during this time. While it is possible that some classroom teachers might have circulated around the room during the survey administration, we do not believe their presence unduly influenced student responses because survey items did not ask students to comment on specific teachers and because teachers did not collect or handle the surveys.

#### *Measures*

Participants completed the Stanford Survey of Adolescent School Experiences, which examined students' perceptions of teacher support as well as their experiences with school engagement, health, and academic integrity. Unless otherwise noted, all items had Likert-type answer choices, ranging from 1 to 5. The majority of scales on the survey were selected based on their common use and high reliability

in numerous research studies. The survey also included questions about each respondent's ethnicity, age, gender, and course enrollments.

**School Support.** Two separate measures were used to gauge students' perceptions of school support. First, we used a nine-item scale devised by Eccles, Blumenfeld, Harold and Wigfield (1990) that asked students to indicate how many of their teachers they believed "really care for students," "value and listen to students' ideas," and "try to get to know students personally." The five answer choices ranged from "none" to "all". We refer to this scale as the teacher support scale ( $\alpha = .84$ ). We chose this scale because it is one of the few established scales that assesses *how many teachers* students feel provide them with support and care. In fact, in a recent review of more than 60 studies examining student-teacher relationships, researchers found more than 43 teacher support scales but only three of which included answer choices that ranged from "none" to "many" or "none" to "all" (Phillippo, Davidson, Conner, & Pope, 2014). Of those three scales, only the nine-item scale used here has been used in research that examines similar outcomes to those of the present study, such as depression or internalizing symptoms (Colarossi & Eccles, 2003).

Second, we asked students whether or not they felt that there was at least one adult in the school to whom they could go if they needed help with a personal problem. We refer to this item as the "one adult confidant" item. Answer choices included "yes" or "no". This item appears on the Psychological Sense of School Membership Scale, which was developed by Goodenow (1993) and has been used in other studies (i.e. Davis, Chang, Carey, & Poirier, 2010).

**Academic Worry.** The academic worries scale was comprised of 9 items developed and validated by West and Wood (1970). Five items, with five answer choices ranging from "never" to "always", asked students to report *how often* they worry about academic-related issues, such as taking tests or completing school assignments. Four items, with five answer choices ranging from "not at all" to "a lot", asked students *how much* they worry about academic-related issues. Reliability analysis yielded an alpha of .85 for these 9 items.

**School Stress.** As a validity check for the academic worries scale, a single item was used to measure the frequency with which students experience academic stress. They were asked to respond to the following question: How often do you feel stressed by your schoolwork or academic experiences? Answer choices ranged from *Never* (1) to *Always* (5). The academic worry and school stress measures were highly correlated,  $r = .612$ ,  $p \leq .000$ .

**Mental Health.** Mental health was measured by 7 items, asking students to report how often they had experienced symptoms of internalizing problems in the month prior to the survey, including feelings of hopelessness, sadness, and despondency. The items on this scale were drawn from the Symptoms Checklist (SCL-90-R), validated by Derogatis, Rickets and Rock (1976) and Derogatis, Savitz, and Maruish (2000). The five answer choices ranged from "never" to "almost every day." Reliability analysis yielded an alpha of .87. Due to reliability concerns, we did not examine items measuring externalizing symptoms.

**Physical Health.** We asked students to report whether or not they had experienced a particular "stress-related" physical symptom in the 30 days prior to the survey. These symptoms included headaches, exhaustion, weight loss, weight gain, sweating, difficulty sleeping, and stomach problems. For each item, students responded with either a "yes" (1) or a "no" (0). We then summed each student's responses to get a total physical health score. Scores then ranged from 0 to 7. Because we did



not expect students' answers to all physical health items to be similar, we did not examine the alpha for this construct.

### *Analytic Plan*

We began by cleansing our data for outliers and deleting cases that had incomplete information. Listwise deletion was used to account for any other missing data. The rates of missing data for our primary variables ranged from 1.3%–6.6%. In order to address our research questions, we used descriptive statistics and ran several inferential statistical tests. We used Hierarchical Linear Modeling (HLM; Raudenbush & Bryk, 2002) to examine the extent to which school versus individual-level differences account for variance in teacher support. HLM is an appropriate tool to address our questions because the student data were drawn from a set number of schools. Thus, the error terms are likely to be correlated and, unlike regression, HLM takes into account correlated error terms. We also used t-tests and analysis of variance mean comparisons (ANOVA) to compare different groups of students. When the independent variables had two or fewer levels, we used independent t-tests, and for more than two levels, we used ANOVAs. Both techniques allowed us to test whether there are significant differences between the means of unrelated groups. Because the independent variables were different for each dependent variable, we did not use multivariate analysis of variance.

### **Results**

A majority of the students in our sample of high-performing schools believed that “most” (57.6%) or “all” (7.5%) of their teachers support them, with a small number of students reporting the perception that only “a few” (6.0%) or “none” (0.2%) of their teachers support them, and slightly more than one-third reporting that “some” of their teachers support them. The mean score for the teacher support measure was 3.6 ( $SD=.66$ ). Furthermore, 71% of the students reported that they have at least one adult in the school to whom they could turn with a personal problem. This is an important figure, given that 56% of students report feeling “often” or “always” stressed by their schoolwork; 81% experienced physical symptoms as a result of stress, such as headaches and exhaustion; and 82% reported experiencing internalizing problems in the month prior to taking the survey, including feelings of depression and hopelessness.

### *Variation in Teacher Support and Health Outcomes Across Schools*

Using HLM, we found a significant but fairly small amount of the variance in the two school support measures is explained by differences among our schools. We built unconditional multi-level models in which both measures of school support were separately included as outcome variables nested in schools, with no level-1 variables included in the models. Estimating a model with no predictors helps to measure the magnitude of variation between schools (Raudenbush & Bryk 2002). In this unconditional model predicting teacher support, we found  $\gamma_{00} = 3.66^{***}$  ( $SE = .06$ ,  $t$ -ratio = 60.69,  $df = 12$ ,  $p < .001$ ). In the teacher support model, the level-2 variance component was significant ( $\mu_0 = .05^{***}$ ) and the level-1 residual variance,  $r = .39$ . The intraclass correlation results for the unconditional model predicting teacher support was  $\rho = .11$ , signifying that 11% of the variance can be explained by the differences between schools with 89% remaining at the student-level.

Similarly, a statistically significant but small amount of school level variation accounted for the differences in our three health outcome variables of interest. Unconditional models with all three outcomes in separate models had the following results: Internalizing symptoms, fixed effect,  $\gamma_{00} = 2.60^{***}$  ( $SE = .05$ ,  $t$ -ratio = 55.91,

$df = 10, p < .001$ ). Physical stress symptoms, fixed effect,  $\gamma_{00} = 2.34^{***}$  ( $SE = .05, t\text{-ratio} = 44.70, df = 10, p < .001$ ). Academic worry, fixed effect,  $\gamma_{00} = 3.50^{***}$  ( $SE = .03, t\text{-ratio} = 110.10, df = 12, p < .001$ ). Examining the random effect models, we found the level-2 (or school level) variance components for all three unconditional models were significantly different from zero. The variance components were the following: internalizing symptoms,  $\mu_0 = .02^{***}, r = 1.07$ ; physical stress symptoms  $\mu_0 = .02^{***}, r = 3.30$ ; academic worry  $\mu_0 = .01^{***}, r = .59$ . Intraclass correlation results for the models were similar across three of the three outcomes: internalizing symptoms  $\rho = .02$ ; physical stress symptoms  $\rho = .01$ ; academic worry  $\rho = .02$ , suggesting a significant, but relatively small amount (1% and 2%) of the variance in these outcomes can be explained by school differences with the remaining 99% and 98% at the student level.

*Relationships Among School Support and Health Outcome Variables*

After establishing that there was considerably less school-level variation than student-level variation in students’ perceptions of teacher support, and even less variation at the school-level in their reports of health outcomes, we sought to understand the relationships among these variables. As can be seen in Table 1, both measures of support correlated significantly with our outcome variables of interest: academic worry, internalizing symptoms, and physical health.

Table 1: *Correlations Among Variables*

	1	2	3	4	5
1. Teacher support	1	.27**	-.18**	-.28**	-.22**
2. One adult		1	-.05**	-.11**	-.02
3. Academic worry			1	.43**	.34**
4. Internalizing symptoms				1	.48**
5. Physical problems					1

Notes. \*  $p \leq .05$ ; \*\*  $p \leq .01$ .

Using HLM analyses, we examined to what extent teacher support is associated with health outcomes, taking into account differences in these outcomes by student characteristics and schools. Before building HLM models, however, we first conducted a series of mean comparisons with all of the outcome variables by ethnicity, gender, grade level, and number of Advanced Placement classes a student reported taking. There were no significant differences in any of the outcome variables by the number of AP classes students reported taking, thus, we did not include this variable in our HLM analyses. The level-1 variables included student gender, ethnic background, and grade level, all of which were dummy coded based on our mean comparison results. We used multiple ethnic group dummy code variables and report only the significant predictors. Other than indicating the school that students attended, we did not include any other level-2 variables in our models. The independent variables were group mean centered when the level-2 variables were introduced into the models, and restricted maximum likelihood estimation was used to estimate the level-2 models.

The fixed effects and random effects models, with student characteristics and teacher support as predictors, are displayed in Tables 3 and 4. The estimates in these tables are standardized, using z-scores, and are therefore comparable. Results indicate that older minority students had higher rates of internalizing symptoms than their younger white counterparts; older minority females reported more physical symptoms than their younger white male counterparts, and younger Asian females

Table 2: *Participating School Demographics*

School	Public or private	Enrollment	# of Faculty	Socio-economically disadvantaged	Race/ethnic demographics	Number of study participants
A	Public	2212	89	3.6% receive free or reduced price lunch	10.6% White 84.8% Asian 0.6% A.A./ Black 2% Hispanic/Latino/a 0% Multiracial 1.8% Other	1124
B	Public	1386	71	2.4% receive free or reduced price lunch	71.2% White 10.5% Asian 0.5% A.A. / Black 7.9% Hispanic/ Latino/a 8.1% Multiracial 1.6% Other	837
C	Public	1314	64	6.4% receive free or reduced price lunch	54.3% White 12.7% Asian 0.8% A.A./ Black 20.4% Hispanic/ Latino/a 7.8% Multiracial 3.8% Other	350
D	Public	2312	111	13.2% receive free or reduced price lunch	38.6% White 36.9% Asian 1.7% A.A./ Black 16.8% Hispanic/ Latino/a 2.9% Multiracial 3.1% Other	438
E	Public	2000	121	31% receive free or reduced price lunch	46% White 4% Asian 3% A.A./ Black 43% Hispanic/ Latino/a 4% Other	506
F	Private, religious	256	43	20% receive needs-based aid; tuition cost \$37,250	75% White 25% "Persons of color, multiracial, or international students with foreign student visas."	171
G	Private, religious, single-sex (m)	981	105	No financial aid information available; tuition cost \$8,360	59% White 11% Asian 1% A.A./ Black 13% Hispanic/ Latino/a 14% Multiracial 2% Hawaiian/ Pacific Islander	92
H	Public	1854	117	8.2% receive free or reduced price lunch	43.5% White 40.2% Asian 1.6% A.A./ Black 8% Hispanic/ Latino/a 5.3% Multiracial 0.9% Other	351
I	Private	300	42	No financial aid information available; tuition cost \$29,850	Not specified	178
J	Private, religious	1468	188	25% receive needs-based aid; tuition cost \$18,350	59% White 8.4% Asian 4% A.A./ Black 6.6% Hispanic/ Latino/a 14.2% Multiracial 1.6% Other	649
K	Private, religious single-sex (m)	1600	123	No financial aid information available; tuition cost \$18,260	Not specified	440
L	Private	389	54	22% receive needs-based aid; tuition cost \$37,200	60% White 40% "Students of color"	315
M	Private, single-sex (f)	260	45	22% receive needs-based aid; tuition cost \$36,800	55% White, 45% "Students of color"	127
N	Private	311	70	22% receive needs-based aid; tuition cost \$34,530	60% White 40% "Students of color"	234

Table 3: *Multi-level, Fixed Effects Models Predicting Outcomes of Interest From Teacher Support*

	Coefficient	Standard error	p-value
Intercept	2.60	.05	<0.001
Ethnicity (white)	-0.12	.04	<0.001
Grade level (11 <sup>th</sup> or 12 <sup>th</sup> )	0.16	.03	<0.001
Teacher support	-0.46	.02	<0.001
Intercept	2.34	.05	<0.001
Gender (female)	.81	.05	<0.001
Ethnicity (minority)	.25	.07	<0.001
Grade level (11 <sup>th</sup> or 12 <sup>th</sup> )	.21	.05	<0.001
Teacher support	-.7	.04	<0.001
Intercept	3.50	.03	<0.001
Gender (female)	.29	.02	<0.001
Ethnicity (Asian)	.24	.03	<0.001
Grade level (12 <sup>th</sup> )	-.20	.03	<0.001
Teacher support	-.24	.02	<0.001

Notes. For the independent variable, the category in the parentheses is coded as 1, while all other respondents (not in the referent group) are coded as 0.

Table 4: *Random Effects Models Predicting Outcomes of Interest From Teacher Support*

	Standard deviation	Variance component	Df	$\chi^2$	p-value
<i>Model 1 predicting internalizing symptoms</i>					
Intercept	0.15	0.02	10	74.00	<0.001
level-1 (within school)	1.00	1.01			
<i>Model 2 predicting physical health</i>					
Intercept	.14	.02	10	42.07	<0.001
level-1 (within school)	1.71	2.94			
<i>Model 3 predicting academic worry</i>					
Intercept	.11	.01	12	121.34	<0.001
level-1 (within school)	.73	.53			

reported more worry than their peers. Teacher support was also negatively associated with each of the three outcomes (academic worry, internalizing symptoms, and physical health), taking into account student characteristics. Specifically, the teacher support coefficients suggested that, over and above student characteristics, for every increase of one unit of internalizing symptoms there was a corresponding decrease of  $-0.46$  in teacher support; for every increase in physical health problems by one unit, there was a corresponding decrease of  $-0.70$  in teacher support; and for every increase in academic anxiety, there was a decrease in teacher support of  $-0.24$ . The  $0.70$  decrease in teacher support we found for physical symptoms was nearly three times as strong as the  $0.24$  decrease in teacher support associated with academic anxiety.

We then did parallel analyses with whether or not students have one adult to go to as a predictor in all three models. (See Tables 5 & 6.) Results were similar to the models with teacher support as predictors: having one adult to go to was significantly negatively associated with each outcome, even taking into account student characteristics. The coefficients for having one adult to go to indicated that, over and above student characteristics, for every increase of one unit of internalizing symptoms there was a corresponding decrease of  $-.24$  in having one adult to go to; for every increase in physical health problems by one unit, there was a corresponding decrease of  $-.20$  in having one adult to go to; and for every increase in academic anxiety, there was a decrease in having one adult to go to of  $-.07$ .

Table 5: *Multi-level, Fixed Effects Models Predicting Outcomes of Interest From Whether Student Has One Adult to go to in School*

	Coefficient	Standard error	p-value
Intercept	2.60	.05	<0.001
Ethnicity (white)	-.10	.04	.008
Grade level (11 <sup>th</sup> or 12 <sup>th</sup> )	.20	.03	<0.001
Has one adult to go to	-.24	.03	<0.001
Intercept	2.34	.05	<0.001
Gender (female)	.80	.06	<0.001
Ethnicity (minority)	.31	.07	<0.001
Grade level (11 <sup>th</sup> or 12 <sup>th</sup> )	.26	.05	<0.001
Has one adult to go to	-.20	.06	<0.001
Intercept	3.50	.03	<0.001
Gender (female)	.29	.02	<0.001
Ethnicity (Asian)	.21	.03	<0.001
Grade level (12 <sup>th</sup> )	-.19	.03	<0.001
Has one adult to go to	-.07	.02	.002

Notes. For the independent variable, the category in the parentheses is coded as 1, while all other respondents (not in the referent group) are coded as 0.

Table 6: *Random Effects Models Predicting Outcomes of Interest From Whether Student Has One Adult to go to in School*

	Standard deviation	Variance component	Df	$\chi^2$	p-value
<i>Model 1 predicting internalizing symptoms</i>					
Intercept	.15	.02	10	69.15	<0.001
level-1 (within school)	1.04	1.09			
<i>Model 2 predicting physical health</i>					
Intercept	.14	.02	10	39.62	<0.001
level-1 (within school)	1.77	3.12			
<i>Model 3; predicting academic worry</i>					
Intercept	.10	.01	12	116.67	<0.001
level-1 (within school)	.74	.55			



*Comparing Effects of Teacher Support and One-Adult Variables on Health Outcomes*  
 Next, we sought to explore how our two measures of teacher support compared in their protective benefits. Although the HLM results suggested that these two measures tell a consistent tale across schools that more support is better, the storyline became slightly more nuanced when we considered the two measures in tandem. Using multivariate linear regressions that control for gender, grade level, and ethnicity, we found that the one-adult item does not add to the explanatory power of the model for physical symptoms or academic worry, and it only modestly improves the effect size for internalizing symptoms from .11 to .12. The regression results showed that teacher support accounts for significantly more of the variance in stress-related physical symptoms, academic worry, and internalizing symptoms than the one-adult item does. (See Table 7.)

Table 7: *Regression Analyses for Academic Worry, Physical Health Symptoms and Internalizing Symptoms*

	Academic Worry		Physical Health Symptoms		Internalizing Symptoms	
	$\beta$	95% CI	$\beta$	95% CI	$\beta$	95% CI
Gender (1=female)	.16***	[.21, .30]	.21***	[.67, .88]	.19***	[.33, .46]
Grade level	-.05**	[-.05, -.01]	.05**	[.03, .13]	.08***	[.05, .10]
White (1= White)	-.16***	[-.30, -.20]	.08***	[.17, .40]	-.01	[-.09, .05]
Non-Asian minority (1=non-Asian minority)	-.07***	[-.21, .08]	.10***	[.31, .62]	.03*	[.00, .18]
Teacher Support	-.19***	[-.25, -.18]	-.23***	[-.72, -.55]	-.26***	[-.46, -.37]
One adult	.01	[-.03, .07]	.01	[-.07, .16]	.05***	[-.18, -.04]
$R^2$	.08		.11		.12	
$F$	62.39***		83.79***		91.75***	

Note. \* =  $p < .05$ ; \*\* =  $p < .01$ ; \*\*\* =  $p < .001$ .

Among the 29% of students in our sample who did not feel that there was an adult in the school to whom they could turn for help, 40% felt that “most” or “all” of their teachers supported them. This result affirmed that our two measures of support, although correlated ( $r = .27^{**}$ ), do not capture the same construct. Students may feel supported by most of their teachers, but unable to turn to any one of those teachers or other adults at the school for help with a personal matter. Given this result, we ran a cross-tabulation to compare students’ responses to the teacher support scale and the one-adult item. We first collapsed the teacher support scale into a dummy variable: means at or below 3.4 represent respondents’ perceptions that “some, few, or no teachers support” them, and means of 3.5 or higher indicate perceptions that “most or all teachers support” them. We then ran a cross-tabulation with the one-adult item. Results showed that most of our respondents (49%) fit into the fourth category of highly supported. Category 1, not supported, claimed 16% of our sample, while category 2 (generally supported) claimed 12% and category 3 (specifically supported) claimed 22% (see Table 8.)

Table 8: *Number and Percentage of Students Responding to One Adult and Teacher Support Measures*

	Some, few, or no teachers support	Most or all teachers support
Do not have an adult confidant in school	1. Not supported (N= 788, 16%)	2. Generally supported (N=596, 12%)
Do have an adult confidant in school	3. Specifically supported (N=1057, 22%)	4. Highly supported (N=2367, 49%)

When compared across categories, we found, as might be expected, that unsupported and highly supported students differed significantly from one another on academic worry, internalizing problems, and physical health effects, with the highly supported faring considerably better (see Table 9.) We also found, perhaps more surprisingly, that generally and specifically supported students differed significantly from one another as well on these measures, with generally supported students always faring better than specifically supported students. In fact, generally supported students did not differ significantly from highly supported students with respect to their levels of academic worry, and they reported the fewest physical ill effects of stress of any group (see Table 9.) Specifically supported students, meanwhile, did not differ significantly from unsupported students in their reports of academic worry or physical health, and they fared only marginally better on internalizing symptoms. The answer to our third research question, then, seems to be that students who believed that more of their teachers support them were better off, on average, than those who believed that only some, a few, or none of their teachers support them, *even if* they had an adult confidant in the school to whom they could go if they were struggling with a problem.

Table 9: *Mean Differences in Mental and Physical Health Outcomes Across Support Groups*

	1. Not Supported N=788 (16.3%)	2. Generally Supported N=596 (12%)	3. Specifically Supported N=1057 (22%)	4. Fully Supported N=2367 (49%)	
Academic Worry	3.69 <sup>b</sup>	3.38 <sup>a</sup>	3.65 <sup>b</sup>	3.35 <sup>a</sup>	$F(3, 6428) = 74.46^{***}$
Internalizing Symptoms	2.99 <sup>d</sup>	2.41 <sup>b</sup>	2.82 <sup>c</sup>	2.28 <sup>a</sup>	$F(3, 6100) = 164.40^{***}$
Physical Symptoms	2.73 <sup>b</sup>	1.81 <sup>a</sup>	2.66 <sup>b</sup>	1.92 <sup>a</sup>	$F(3, 6324) = 101.28^{***}$

*Note.* Each category differs significantly from the other categories with which it does not share a superscript letter.

### Discussion

The results of this study show that although most students in high-performing schools felt supported by most of their teachers and have at least one adult in the school to whom they feel they can turn with a personal problem, some did not. These less supported students suffered significantly more psychological and physical ill health effects than their more supported counterparts. They experienced considerably more academic anxiety, they reported more frequent internalizing symptoms, and they claimed higher rates of physical problems associated with stress. While our findings

are consistent with previous research on the relationship between teacher support and students' mental health (Colarossi & Eccles, 2003; DeWit, Karioja, Rye & Shain, 2011; Murray & Zvoch, 2011; Reddy, Rhodes, & Mulhall, 2003), our study extends extant research by including measures of academic worry and physical health.

Our results also build on previous research by addressing the question of how many teachers or adult supporters students might need for optimal health outcomes in these high-pressured school contexts. Certainly, we find that in terms of mental and physical health outcomes, it is better to perceive that more teachers care than few teachers care. Similarly, it is better to have at least one adult in the school to whom one can turn than to have no adult in this capacity. However, students without an adult confidant, who nevertheless perceive that most or all of their teachers care for them, fare significantly better than students who have an adult confidant in the school, but who perceive that only some, few, or none of their teachers care for them. This finding raises important implications for practice.

Around the country, schools have instituted various programs designed to build strong teacher-student relationships. Organizations such as The Coalition of Essential Schools (2013), Educators for Social Responsibility (2010), The Search Institute (2013), and the Association for Supervision and Curriculum Development's Whole Child Initiative (2013), for example, have called upon high schools to implement policies and practices that encourage greater personalization of learning, create more opportunities for students and teachers to get to know one another, and focus on establishing a caring and supportive school climate. Several of these organizations focus on implementing programs to promote specific caring relationships between a teacher and a student. For instance, it is estimated that thousands of secondary schools now utilize advisory periods, in which one teacher regularly meets with a small group of students in order to get to know them outside the classroom (Educators for Social Responsibility, 2010; Yonezawa, McClure, & Jones, 2012). Advisors can play a number of roles, including a first-responder for academic and/or social and emotional crises, a central point person for parents and other teachers to contact when they have concerns about a particular student, a confidant to offer general support, and an academic advisor to help with scheduling classes and writing college letters of recommendation. Similarly, a number of schools in California have participated in "dot projects" (Project Cornerstone, 2011) in which teachers identify those students in the school with whom they have strong relationships, using sticky dots on class lists. Students without any dots or with few dots are then flagged so that a school counselor or specific teacher can work to develop relationships with them. Our findings suggest that such practices may be warranted if they help students perceive at least one caring adult at school. However, these practices that promote one-to-one student-teacher relationships may not be sufficient in the context of high-performing, high-pressure schools. Based on the results above concerning adverse health effects, it seems that it may be more important for students in these schools to believe that most or all of their teachers care about them than to have one strong relationship with a supportive, caring school-based adult. Thus, schools might benefit from professional development sessions, such as those advertised on the websites of many of the organizations listed above, that help all faculty and staff members at school sites learn about the positive effects of students' perceptions of teacher support. These sessions might help teachers understand the importance of their role as providers of social and emotional support to students (Phillippo & Stone, 2013) and learn how to communicate their interest in students' wellbeing and enact those behaviors that students find most supportive, such as demonstrating fairness, flexibility, warmth, and responsiveness (Bergin & Bergin, 2009).

Because our sample of high-performing schools included independent schools as well as public schools, small schools and large schools, schools with traditional schedules and schools with innovative, alternative schedules, we expected to find substantial variation across schools in our independent and dependent variables. The relatively small amount of the variance across schools in both of our school support measures and our mental and physical health outcomes discouraged us from pursuing other level-2 variables in our HLM analyses. The lack of variation may suggest that the different policies and practices these schools have in place may not matter as much to student health outcomes as individual student characteristics do. It may be that some students in high-performing schools are more at risk for adverse health outcomes regardless of school-level features. Our results suggest, for example, that older, female, minority students are more susceptible to physical health problems related to stress than their younger, male, white counterparts. This possibility raises a consideration for practice: school counselors and teachers might use such research as a rationale to identify and more effectively convey support to these vulnerable groups of students. This finding also suggests one direction for future research: scholars can work with schools to determine if there are school-wide interventions or shifts in practice or policy that yield protective benefits for the students who appear to be suffering disproportionately.

Discussion of the implications of this study must be tempered by an acknowledgement of its limitations. First, our research focused on a specific group of high-performing, well-resourced schools, where some studies have documented high levels of academic anxiety and physical symptoms due to stress. Therefore, it is unwarranted to generalize from this context to other school contexts where stress levels may differ considerably and where students may have less access to other adults (coaches, mentors, clergy, etc.). Future research can explore to what extent the findings of this study hold up in other school contexts and to what extent the positive effects of teacher support persist above and beyond the positive effects of support from other sources, beyond the school. Second, we rely exclusively on student self-report, and we recognize that social desirability factors may compel some students to under-report their mental or physical health symptoms or to over-report the level of teacher support they experience. Third, our measure of physical health only asks students to report “stress-related” symptoms they have experienced in the past month. This wording is limiting in that it prevents us from measuring students’ overall health, irrespective of what they think the trigger of their symptoms might be, and insofar as “stress-related” might include familial stress or social stress, as well as academic stress. To this end, we do not know that these symptoms were necessarily brought about by academic stress, even though there is a strong and significant correlation between our measures of stress-related physical symptoms and school stress.

Fourth, much of our analysis involves student responses to a single item—the “one adult confidant”—the reliability of which we cannot assess, apart from its moderate correlation with the teacher support scale. Our analyses were also limited in that when students responded affirmatively to this particular “one adult” item, we did not then follow up by asking to whom they turned. Was that adult a teacher, a counselor, an administrator, a coach or some other figure in the school? Future research could examine more fully how within-school support providers compare in terms of their effect on student wellbeing. Finally, because our data are cross-sectional, rather than longitudinal, we cannot make causal claims. For example, we cannot say that lower levels of teacher support cause elevated mental and physical health symptoms. Rather, we believe our results may suggest a few different pathways.

It may be that teacher support benefits students, but it could also be the case that teachers avoid problematic or unappealing students, or that teachers unwittingly fail to convey adequate support to students who are struggling. Future longitudinal research could examine these possible mechanisms.

### Conclusion

The story of “the one teacher who turned my life around” is a powerful narrative in American schooling. While we do not wish to underestimate the effect any one teacher can have on a young person, and we acknowledge that it may be the case that having one adult confidant is more important for students in some school settings than in others, our research suggests that in high-performing schools, where there is little school-level variation in mental and physical health outcomes and perceptions of teacher support, students are better off when they believe that more of their teachers care for them, even if there is not one adult in their school to whom they would turn with a personal problem. Although we understand that most teachers do indeed care about their students, the findings of this study reinforce the notion that teachers need not only care about their students, but also take steps to help more of their students *perceive* this caring relationship. Rather than attempting to forge close, confidential relationships with a few select students, we suggest teachers focus on sending messages of general care and respect to all of their pupils.

Future studies can build on this work by investigating how these two distinct measures of school support—the number of teachers who convey support and having one adult confidant—compare in different school settings, with different populations of students. Such research will deepen our understanding of what all students need to thrive not only academically, but also mentally and physically. At a time when national estimates suggest that 20–25% of adolescents are experiencing symptoms of emotional distress, including depression, anxiety, self-mutilation and substance abuse (Knopf, Park, & Mulye, 2008), the need to identify school and classroom-based practices that adolescents perceive as supportive and caring is a matter of great urgency and importance. After all, as Noddings (2005) explains, “Schools cannot accomplish their academic goals without attending to the fundamental needs of students for continuity and care” (p. 63).

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