

Student Stress in High-Pressure College Preparatory Schools

by

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Abstract

Purpose: To enhance understanding of academic stress in the lives of high-achieving students enrolled in college-preparatory high schools. The three main goals of this study were to explore: 1) the effects of stress, 2) student coping behaviors and support network, and 3) sources of stress in these high-achieving environments.

Method: Three hundred eighty students in grades 9 through 12 from two college-preparatory high schools completed a cross-sectional online survey that included the Students' Life Satisfaction Scale, School Attitude Assessment Questionnaire-Revised, and questions about stress, health, coping, internal and external expectations, peers, support-seeking behavior, and stress reduction.

Results: Students reported a high prevalence of harmful physical and psychological correlates of stress, and related unhealthy behaviors such as widespread and chronic sleep deprivation. Students reported that heavy academic workloads and pressure for success contributed to many of these behaviors. Students generally reported healthy coping behaviors. Students rely on peers most often for academic and emotional support. Students who go to parents often for support reported significantly higher Life Satisfaction. Main sources of stress include academic workload and external motivators such as pressure for high grades and prestigious college acceptance.

Conclusions: The results demonstrate the need for increased attention to school-related stress in high-achieving student populations. Particularly relevant areas of focus are: encouraging healthy sleeping behaviors, reducing physical and psychological correlates of stress, and emphasizing the association between parent/student relationships and student life satisfaction.

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Introduction

Academic stress and college pressure among high-achieving high school students is making headlines, from the New York Times (“Busy Students Get a New Required Course: Lunch”) to the Washington Post (“Too-Busy Teens Feel Health Toll”) to Teen Vogue (“Winners Circle: Competitive Friends”) (Hu, 2008; Boodman, 2008; Chen, 2009). The articles paint a dismal picture of the growing pressure to excel, leading to an epidemic of student stress among top students, with adverse consequences such as poor sleep, cheating, depression, anxiety, and harmful coping mechanisms, including drug and alcohol abuse. While college preparatory high schools appearing in the news are portrayed as particular hotbeds of pressure and stress, few empirical researchers have examined the stress of students in these environments (Conner et al., 2010).

The empirical research that has been done has highlighted some disturbing trends; in addition to the normal stress of developmental changes that accompany the adolescent period, many students today must also cope with the stress of heavy academic workloads, a multitude of extracurricular and athletic engagements, and pressure from the increasingly competitive college application process (Bound, Hershbein, & Long, 2009; Conner, Pope & Galloway, 2010; Suldo, Shaunessy, Thalji, Michalowski & Shaffer, 2009)¹. As competition for acceptance to college increases, and college rank and prestige is viewed as increasingly important by the

¹ 1992 to 2004, the number of applicants to four-year colleges increased 44 percent, growing from 1.19 million to 1.71 million students. As select private colleges increased their number of students attending only slightly, the number of students applying grew by 18 percent (Bound et al., 2009).

American public, stress in high-achieving students is more of a problem today than ever before.

Rationale for Focusing on College-Preparatory Students

Youth in high-achieving academic programs, such as honors programs and college preparatory schools², provide a particularly valuable subpopulation for studying adolescent stress. Past research has predominantly focused on extreme stressors, such as poverty, divorce, or traumatic life events, but more attention recently has been paid to academic work as a major source of stress in the lives of many teens; for example, the Stress in America (APA, 2009) study found that doing well in school was one of the top stressors reported by youth. Furthermore, unlike gifted students who are not enrolled in a special program, these students are surrounded by peers who have equally high workloads and expectations. While many studies examine the gifted or high-achieving students in a school, it is less common for studies to focus on populations composed entirely of high-achieving students, and the effect that this peer group may have on adolescents (Shaunessy, Suldo, Hardesty, & Shaffer, 2006; Suldo, Shaunessy, & Hardesty, 2008).

College-preparatory students are a counter-example to the link between stress and under-achievement that has been a focus of previous literature on stress in adolescence. These youth achieve high levels of academic success even while exposed to the higher levels of stress that likely accompany a heavier workload. A study of students in the elite college-preparatory International Baccalaureate Diploma

² In this study, schools were defined as “college preparatory” schools if the vast majority ($\geq 90\%$) of graduate attended 4-year universities. The school environment must also place particular emphasis on academic success and prestigious college acceptance.

Program found that while students report higher levels of stress, they do not appear to experience impairments in academic functioning which have co-occurred with high stress in other high school populations, such as at-risk youth or ethnic minority students (Suldo et al., 2008; Shaunessy et al., 2006). A greater understanding of this process could provide more comprehensive knowledge about stress and more informed interventions that allow youth to maintain achievement even when exposed to high levels of stressors.

Furthermore, the sources underlying academic stress in this population are becoming increasingly relevant, as today's youth are more likely to attend colleges and universities and the application process becomes increasingly selective (Bowman & Bastedo, 2009). The popularity of advanced college-preparatory high school curricula has increased in American schools, and thus it is becoming increasingly important to understand the environment in these high-achievement programs (Kantrowitz & Wingert, 2006).

This thesis aims to contribute further understanding of the effects of stress, how students deal with stress, and the sources of stress in these high-pressure academic environments.

Question 1: What are the Effects of Stress on Adolescents?

Excessive amounts of stress are associated with many harmful correlates in the lives of adolescents. The direct physiological effect of stress can be observed in biological damage that results from a prolonged stress response (McEwen, 2005). Stress affects brain regions that are responsible for complex cognitive functions, and

persistent stress can seriously harm neurons. Brain function, hormone production and immune responses are all vulnerable to the deleterious effects of stress on the brain (Sapolsky, 1996; McEwen, 2005). Additionally, the effects of stress on the brain are transmitted to the rest of the body through the activation of two pathways. The rapid pathway is the sympathetic neuroendocrine signal transduction pathway, which releases noradrenaline from nerve endings and adrenaline into the bloodstream. The release of these hormones increases arousal and energy and inhibits functions not immediately necessary for survival, such as digestion and growth. The slower pathway involves the hypothalamic-pituitary-adrenal (HPA) axis, which releases cortisol into the blood. Elevated levels of cortisol have pervasive metabolic and psychological effects.

Stress is linked with harmful physiological effects through mechanisms other than these immediate biological pathways. One mechanism, particularly important in the lives of adolescents, is that academic stress may contribute to poor sleep (Lund, Reider, Whiting, & Prichard, 2010). Many studies demonstrate that students consistently fail to get healthy amounts of sleep and that the leading causes for this phenomenon are an excess of homework and stress (Lund et al., 2010; Conner et al., 2010; Noland, Price, Dake, & Telljohann, 2009). Several harmful consequences are associated with too little sleep, such as cognitive impairment, interpersonal difficulty, and, reciprocally, higher stress (Carskadon, Acebo, & Jenni, 2004; McEwen, 2006). Thus, too little sleep may both contribute to and reinforce heavy workloads and academic stress (Noland et al., 2009). In addition to a lack of sleep, stress is

associated with increased prevalence of harmful behaviors, such as drinking, drug abuse, or smoking (Scales, 2008; Brooks et al., 2002; Field & Powell, 2007).

In addition to physiological harms, numerous studies have found an association between stress and damage to psychological and emotional well-being. Stress is strongly associated with psychopathology; stress is a significant risk factor for many mental health disorders, such as anxiety and depression (Jaser et al., 2005; Brooks et al., 2002). Additionally, the psychological correlates of stress are not limited to psychopathology; Garton & Pratt (1995) found that stress is related to reduced self-concept in school students aged 10 to 15, with more stressful events related to greater reductions in self-concept. There is also concern that stress due to the college application process could change the way students learn, forming less adaptive habits and motivations (Bound et al., 2009). Students may invest in signals of ability, such as improving college examination test scores, rather than deep conceptual learning. Time spent in SAT preparation, learning strategies for effective guessing during the exam, may accomplish little to enhance real learning (Bound et al., 2009). Pope (2001) is concerned that, in the face of college admission requirements, grade competition, and test score demands, the American educational system has lost sight of school environments that promote intellectual curiosity, cooperation and integrity. Instead, high-pressure environments foster anxiety, deception, and frustration (Pope, 2001; Conner et al., 2010).

When striving to understand the effects of stress, it is crucial to also consider factors such as resiliency and invulnerability that serve as protective factors against the harmful effects of stress. Phillips (1993) classified the main factors for adolescent

resilience against stress into three different categories. The first category includes personality factors, such as competency, positive self-esteem and internal locus of control. The second category Phillips describes as social milieu factors, citing studies that show that good schools can and do exert an important protective effect for adolescents (i.e., Huebner, Funk, & Gilman, 2000). The third category of protective factors are family factors, since many studies indicate that cleaner, less cluttered household environments with good supervision and well-balanced discipline can help youth successfully adapt to stressful school environments. IQ has also been shown to be a particularly important moderator of risk (Phillips, 1993). Gender may be another factor that is related to the consequences of stress. Some studies have indicated that adolescent females experience more stress and express it as having a greater impact than adolescent males (i.e., Garton & Pratt, 1995; Steiner et al., 2002). However, gender differences remain inconclusive.

Adolescence is a critical period of time when patterns of stress can contribute to long-term health issues. The behavioral patterns that young students develop during adolescence can affect them into adulthood, which is particularly alarming considering the APA report stating that stress is persistent and pervasive in contemporary society among both adults and youth (APA, 2009).

As indicated above, stress has been linked with numerous physiological, psychological, and emotional health issues, but it is unclear which of these and how many are present in a high achieving high school population. The first portion of the present study attempted to address and quantify the effects of stress on high achieving high school adolescents. In the following section, I will discuss previous research

concerning how students deal with stress with the ultimate goal of determining which of these strategies are most prevalent/effective in our population of interest.

Question 2: What does the Current Literature Indicate about how Students Handle Stress and Whom they go to for Help?

Support System. A major concern in literature regarding high-achieving adolescents is that their psychological needs may be masked by a high level of functioning and success, which could render serious issues more difficult for supporting adults to recognize (Peterson, 2006). Much of the research on this topic looks specifically at ‘gifted students’ regardless of academic setting. This research provides great insight into some of the unique problems of academically motivated students; however, ultimately the goal of the present study is to examine stress and its effects in students who vary in academic ability but who are placed in highly competitive academic environments.

Highly successful students may be perceived as a population that is self-sufficient and mentally healthy, and thus parents, teachers, and counselors may be unaware of their psychological needs. Students who excel academically and in extracurricular activities, and whose families are often educated and of higher socioeconomic status, may not appear to need as much counseling as other students (Peterson, 2006). This perception may be partially accurate, since high levels of academic ability may act in other aspects of a youth’s life to mitigate adversity. High academic ability in youth has been correlated with problem-solving abilities, humor, and resilience (Neihart, 2002). However, these students are not exempt from issues

often associated with the adolescent years, and additionally they must balance heavy academic and extracurricular responsibilities. Furthermore, academic giftedness in itself has been suggested as a risk factor for psychological needs (Peterson, 2006). In a review of literature on the impact of giftedness on psychological well-being, Maureen Neihart (1999) concluded that there is empirical and theoretical evidence that supports both of the two contrasting views that giftedness enhances resiliency and that giftedness increases vulnerability. Adults in the lives of these students must question the notions of invincibility surrounding high-ability adolescents. Adults who wish to provide emotional and psychological support for these adolescents must not only focus on their academic talent, but also on their emotional and psychological well-being.

Contributing to the lack of awareness surrounding psychological issues of gifted students is that these youth may be less inclined to ask for help than other adolescents (Peterson, 2006). They may be concerned with living up to high expectations, projecting an image of excellence, or avoiding disappointing parents and teachers. Additionally, they may believe they should be able to handle their issues on their own (Peterson, 1998).

School counselors have the potential to provide emotional and psychological support for students (Peterson, 2003; Wood, 2010). However, it is important that counseling services for gifted children focus on the unique needs of this population (Moon and Hall, 1998). The lack of standardized and empirically-validated practices for counseling gifted students may encumber and inhibit effective counseling for high academic ability students (Wood, 2010). Additionally, graduate programs that prepare

and train school counselors often give little or no attention to the unique needs of high ability students (Peterson, 2006). Because of the lack of empirical research on counseling methods and the minimal preparations given during training curricula, researchers have expressed concern that many school counselors may not be trained to understand or respond appropriately to counseling concerns of this unique population of students (Wood, 2010; Peterson, 2006).

Parents of high-achieving adolescents are in a unique position to provide invaluable support for these youth outside of the school environment. Parents of gifted students can help students reduce and cope with stressors, but certain parenting styles and traits have also been linked with the development of internalization of expectations, perfectionism, and unhealthy coping methods (i.e., Demaray & Malecki, 2002; Speirs Neumeister, 2004). Academically-advanced students have been shown to reflect the perfectionism and achievement goals expressed by their parents (Ablard and Parker, 1997; Neumeister, 2004). In Ablard and Parker's study of gifted students, the parents who expressed performance-oriented, rather than learning-oriented, achievement goals had children who exhibited more dysfunctional perfectionism, and high levels of concern about mistakes, doubts about actions, and worry surrounding parental expectations. Some research has found that gifted adolescents may feel unable to distinguish themselves from their families, thus making identity formation difficult (Peterson, 2002). And as was discussed earlier, high parental expectations for performance can contribute to perfectionism, competitiveness, and psychiatric disorders (Neihart, 1999). Yet while parents may influence youth in harmful ways, they can also play a unique protective role. The

perceived support from parents reported by at-risk youth was one of the best predictors of clinical indicators and school-related indicators in a recent study of Hispanic students at an urban middle school (Demaray & Malecki, 2002).

Teachers may also be an important piece of the support network for students (Peterson, 2003). Teachers can establish trusting, close relationships with students, which has been reported as a marker of quality teaching (Beishuizen et al., 2001). Secure teacher-student relationships have been found to protect youth from harmful coping mechanisms such as drug and alcohol use and suicide attempts (Bergin & Bergin, 2009; Howes & Ritchie, 1999; Resnick et al., 1997)

Peers are another critical part of the support network for this population. Adolescents often report that being with friends constitutes the most important aspect of school life (Corsaro & Eder, 1990). Academically gifted students especially seem to value relationships with peers, reporting themselves to be more intimate with friends than a non-gifted comparison sample (Field et al., 1998). Students' own academic achievement appears to benefit from interaction with high-achieving peers, and it has been widely hypothesized that peer groups affect a wide variety of social, emotional, and psychological indicators of well-being (Hanushek, 2002). However, research on peer influences has been inhibited by conceptual and methodological problems, and thus the precise relationship between peer-groups and well-being is difficult to isolate (Hanushek, 2002).

College-preparatory environments provide some support for emotional and academic stress, but there may also be harms associated with environment. College-preparatory or honors classes may be beneficial because of their provision of an

environment where students of high ability feel less frustration or academic exclusion (Peterson, 2006). However, the heavy emphasis on achievement outcomes may contribute to neglect for important psychological and emotional outcomes such as life satisfaction, happiness, and well-being (Moon, 2003; Peterson, 2003). Furthermore, students may not feel permission or inclination to express concerns because of expectations of self-reliance (Peterson, 2002). Since high ability students may be reluctant to seek help when they need it, it is important to ensure that the support system present in these high-achievement environments is available and utilized by students, and is effective at addressing their unique psychological and emotional needs.

As is apparent from the sections above, much of this literature is focused primarily on gifted students. In comparison, there is relatively little research on typical students in high achieving environments. The present study, which attempts to address this gap, is becoming increasingly relevant as more and more high schools become preoccupied with sending their students to elite universities. While the above section looked at how the interaction between students and their support network affected stress, the following section will address the behaviors individuals use to deal with stress.

Coping. There is a lack of consensus within the literature regarding how to define and analyze various coping strategies (Amirkhan et al., 2007). A commonly cited definition is provided by Lazarus and Folkman (1984): “We define coping as constantly changing cognitive and behavioral efforts to manage specific external or internal demands that are appraised as taxing or exceeding the resources of a person”

(i.e., cited in Amirkhan et al., 2007; Suldo et al., 2008). Importantly, coping does not necessarily imply success with dealing with the stressor (Amirkhan et al., 2007).

Maladaptive coping behaviors are often counterproductive, yet still qualify as coping.

A number of harmful coping behaviors have been linked to adolescent stress, such as drinking or drug abuse (Field & Powell, 2007; Suldo et al, 2008). These maladaptive coping mechanisms can be used to cope with stress, but can also later increase it.

Furthermore, coping may imply a conscious effort to reduce stress. Some refer to coping as “deliberate and effortful attempts to manage stress” (i.e. Amirkhan & Auyeung, 2007; Compas, Connor-Smith, Saltzman, Thomsen & Wadsworth, 2001).

Other studies do not imply that consciousness of the behavior as stress-reduction is necessary for the behavior to qualify as coping (Eisenberg, Fabes, & Guthrie, 1997).

In this study, we will focus on behaviors that students self-report to be engaging in to manage their stress, but we will also emphasize that the term ‘coping’ may carry a stigma that can contribute to students being reluctant to identify a behavior as ‘coping,’ such as heavy drinking. Thus, students will be asked to report how frequently they engage in common coping behaviors specifically in response to stress, and how frequently they engage in these behaviors in general.

In one relatively comprehensive review of coping strategies, Skinner, Edge, Altman & Sherwood (2003) divided the most commonly reported strategies into three categories: Problem Solving (strategies aimed at eliminating the source of stress), Avoidance (managing stress by withdrawal), and Seeking Social Support (minimizing stress through attempts to maximize human contact).

What influences the type of coping behavior that a student employs? It may depend on the environment in which the student is experiencing the stressor, the type of stressor the student is reacting to, or individual characteristics of the student that cause them to respond to that certain stressor in a particular way.

The way in which adolescents cope with academic stress may be strongly influenced by the type of environment they encounter both within and outside of their school. Two studies identify coping strategies displayed by students in an IB college-preparatory environment, specifically examining which strategies were reported by the majority of students in the high-achievement program and which strategies were reported by only some students in that environment (Shaunessy & Suldo, 2010; Suldo, Shaunessy, Michalowski & Shaffer, 2008). The strategies most consistently reported across all students in the environment were sleeping and taking deliberate steps to address problems. Nine out of the 12 coping styles listed on the A-COPE were reported as effective and/or used often, but 3 strategies were not commonly reported by students in this high-achieving school environment: seeking professional help, seeking spiritual support, and venting feelings in response to stress. Students also reported coping strategies that are not listed on the A-COPE, including actively managing time to allow for a balanced life, fixating on problems without taking action, sharing assignments with peers, and renegotiating schedules and deadlines. Other coping strategies were reported by some students and not others; a notable example is the tendency to either use problem-solving or to use avoiding work as a strategy. Thus, while some coping strategies were more ubiquitous in the high-

achieving environment, some coping methods were prevalent for some students while not for others.

The influence of the environment outside of school – notably, parental attitudes – on adolescent coping strategies has received some attention in coping literature. Wolfradt, Hempel and Miles (2003) found that perceived parental psychological pressure was positively correlated with anxiety and depersonalization among youth. On the other hand, perceived parental warmth was associated with active coping, and was negatively correlated with anxiety. Howard and Medway (2004) analyzed how attachment to parents influenced adolescent coping with stress. Adolescents' attachment security was positively related to coping through family communication and negatively related to avoidance behaviors such as drinking or drug abuse.

Even when students are exposed to the same school environment, there will be a variation in the coping strategies employed. In addition to family factors, individual student traits explain variation in coping strategies. Researchers have attempted to identify what groups of students commonly engage in certain types of coping behavior. The two studies mentioned previously of college-preparatory IB students identify variation of coping strategies within students in a college-preparatory environment, specifically looking at differences in anxiety and gifted-status of the high-achieving students (Shaunessy & Suldo, 2010; Suldo, Shaunessy, Michalowski & Shaffer, 2008). Shaunessy et al. (2010) compared high-achieving gifted students versus high-achieving students not identified as gifted. Gifted students were more likely than peers not identified as gifted to discuss: avoiding demands by engaging in

activities unrelated to the stressor, working hard to get the work done to eliminate the stressor, seeking social support from friends who are not in the IB program, responding with humor, and reducing their stressors by renegotiating expectations and deadlines with teachers. Gifted students were less likely than peers not identified as gifted to engage in active problem-solving, spend time with close friends, and engage in relaxing activities. Suldo et al. (2008) studied the same population to compare coping strategies of students who reported above-average anxiety and students who reported low anxiety. Students with low anxiety were more likely to describe the following as effective coping strategies: avoiding demands, engaging in positive emotions, and reducing one's workload. Students with above-average anxiety were more likely to discuss social interaction (either seeking social support or being alone) as helpful (Suldo et al., 2008). Additional studies have investigated gender differences in the coping mechanisms employed by high school students. For example, Crepeau-Hobson (1996) found that females reported engaging in more ventilating, cathartic, proactive and self-reliant types of coping strategies, while males often relied more on diversions. Females in this population had significantly higher GPA scores, but also reported more psychosomatic complaints. Other studies have not found gender differences in coping (Donaldson, Prinstein, Danovsky, & Spirito, 2000).

If an individual employs certain types of coping behaviors, it is important to understand whether these coping strategies are fixed or changing. Some literature indicates that there are developmental differences present in strategies used (Fields & Prinz, 1997). Even within the adolescent period, Donaldson et al. (2000) found a shift

in coping mechanisms employed; specifically, that older adolescents tend to use a broader range of coping strategies than younger children. Amirkhan & Auyeung (2007) propose that there could be both personal and situational explanations for variation across developmental time periods. Significant biological, cognitive, and emotional changes occur across the lifespan, and this may contribute to variation in coping strategies. Furthermore, the situations in which children, adolescents and adults face stressors vary widely, as well as the control they have over the situation, highlighting a need to study particular demographics within particular contexts.

Unfortunately, an interpretation of the literature on adolescent coping is complicated by ambiguous and conflicting findings, often as a result of methodological limitations in this research. These limitations include methodological variations, population differences, and measurement inconsistencies (Compas et al., 2001). This study will attempt to determine the most prevalent coping mechanisms in the population of students at college-preparatory schools, and will highlight any discrepancy between what is recognized by students as coping and the overall frequency of the behavior. Analyses will also be performed to highlight trends in coping mechanisms, and patterns of coping within various subgroups of students.

Question 3: What are the main sources of stress for high school students?

Sources of Stress. A wide range of stressors and stressful life events have been studied in adolescents. While stressors more extreme than high academic workload exist (e.g. poverty, divorce, or traumatic life events), the focus of this study on stress related to academic achievement is supported by the prevalence of school-

related stressors reported by students. Several studies have indicated that the stressors most frequently reported by adolescents are related to school, such as studying for tests, getting good grades, completing homework, and managing time (i.e., APA, 2009; Conner, Pope, & Galloway, 2010; de Anda et al., 2000; Lohman & Jarvis, 2000).

Furthermore, these school-related stressors are exacerbated by a focus on post-high school educational goals, particularly college acceptance. In fact, many people view the primary purpose of the high school careers of adolescents as a time to get into college (Mullen, 2009). Accordingly, studies have found a wide range of concerns expressed by adolescents about their impending post high school transitions and future careers (i.e. Code, Bernes, Gunn & Bardick, 2006).

These concerns are all the more troubling as college admissions become increasingly selective (Bound et al., 2009). Moreover, as more students attend college, degrees from the most elite colleges are becoming increasingly valued and sought after (Bound et al., 2009). In recent years, almost all colleges and universities have decreased the percent of applicants accepted, and this change has been the most drastic in the highest ranked institutions (Bound et al., 2009). In the top 20 private and top 20 public universities the percentage of applicants accepted dropped by around 25 percent from 1986 to 2003.

Such changes are reflected in how students and educators approach high school education. For instance, High school students in 2004 engaged in significantly more college-preparation behavior than did their counterparts from 10 or 20 years before (Bound et al., 2009). For example, the percentage of students who report

having applied to 7 or more schools has increased dramatically over the past 20 years. William Shain (2005), the former dean of admissions for Bowdoin College, dismays about the focus of high school students on college acceptance, listing the dangers of this mindset:

(1) Pressuring students – and secondary schools – to schedule courses at a level of rigor beyond their ability or appropriate comfort zone; (2) Excessive focus on all activity choices –for the student and for the family - in terms of the college process. School activities are chosen based on perceived college preferences. Worst of all, summer activities are centered on the study of employment options that admissions offices are believed to prefer (p. 14).

Students in high-achievement programs have been particularly affected by the increasingly heavy focus on acceptance into elite colleges (Suldo et al., 2009). These students typically report they have to cope with a strenuous academic workload, a high pressure environment, peer competition for grades and college admittance, and the internalization of high expectations from home and fellow students (Suldo et al., 2009). Furthermore, high-achieving students in particular use college rankings in their decisions of which college to attend (Griffith & Rask, 2007). While all adolescents cope with biological, social, and emotional changes, this population could potentially help to isolate and highlight the effect of demanding academic responsibilities, the most prevalent source of stress indicated on surveys of youth (Conner et al., 2009; APA, 2009).

Many youth in college-preparatory schools have successfully adapted to the demands of the environment and are achieving high amounts of academic and extracurricular success. However, a crucial point of this study is to investigate the

price, physiologically and psychologically, of adaptation to the stress of the high-pressure environment.

External Expectations versus Internal Motivation. External pressures, such as grades and the college application process, have the potential to directly affect the levels of stress experienced by high school students. However, a heavy focus on external metrics for educational success also has the potential to diminish internal motivation (e.g. a love of learning) leaving students even more susceptible to the stressful impact of external pressure. This section will briefly review psychological literature surrounding external expectations and pressure, and the effect this can have on internal motivation. This review will specifically focus on the goal structure of college preparatory schools, and the influence of parents, teachers, and peers.

In the 1970's, researchers made a fascinating finding: providing participants with external rewards for completing an intrinsically interesting task causes participants to be less intrinsically interested in that task (Deci, 1971, 1972a, 1972b; Kruglanski, Friedman & Zeevi, 1971; Lepper Greene, & Nisbett, 1973). Since these studies emerged, researchers have continued to debate the effect of external rewards and motivations on internal motivations, and the mechanisms through which extrinsic and intrinsic motivations interact. This debate has widespread implications for the schooling system, and particularly when one considers the types of extrinsic rewards that determine high school success and college acceptance.

The rewards present in high school environments may influence students' views about the nature and purpose of learning (Ames, 1992). Research since the 1970s has examined links between classroom environments, goals, and student

motivational patterns (Ames, 1992). Many aspects of high school could be considered external motivators that may diminish internal motivation for learning. Deadlines, for instance, have been shown to decrease subsequent interest in an initially interesting word-game task (Amabile, DeJong, & Lepper, 1976). Additionally, performance-contingent rewards such as grades may affect intrinsic motivation (Deci et al., 1999).

Achievement goals can affect student attitudes towards extrinsic rewards that are performance-contingent, such as grades. Two different types of achievement goal constructs have received the most attention in recent literature: performance goals and mastery goals.

When faced with a mastery goal, individuals focus on learning new skills, trying to understand assigned work, and improving their competence based on self-reflected standards (Ames, 1992). Essential to a mastery goal is the belief that effort and outcome covary; thus, high levels of effort will lead to success or a sense of mastery. Mastery goals tend to maintain achievement behavior through a belief pattern that success is attributed to effort and failure can be remedied by a change in strategy (Elliot & Dweck, 1988).

Performance goals encourage a focus on ability and self-worth as evidenced by one's own performance in comparison with the performance of others (Ames, 1992). With this type of thought process, expenditure of effort can threaten self-concept of ability when trying hard does not lead to success; failure is associated with reduced motivation, since it is believed that failure displays a lack of *ability* rather than a lack of *preparation* (Ames, 1992). Performance-oriented tasks are associated with behavior patterns including avoiding challenging tasks, negative affect and self-

doubt following failure, and positive affect following success with little effort (Elliot & Dweck 1988; Jagacinski & Nicholls, 1987; Meece et al., 1988). Thus, mastery goals are preferable to performance goals in eliciting adaptive work patterns and intrinsic motivation.

An important question is whether performance goals or mastery goals are supported in the environment of college-preparatory schools. High achievement schools are environments in which expectations for success in performance rewards, such as high grades and prestigious college acceptance, may be felt by the majority of the student body (Suldo et al., 2009). A focus on these external expectations abundant in high-achieving environments may hinder students' intrinsic motivation. For example, the pervasive focus on college acceptance in college-preparatory schools may become an external motivator that could diminish intrinsic motivation in aspects of life that are seen as relating to college acceptance, such as learning, community service, or extracurricular activities (Mullen, 2009). Additionally, high expectations in these environments could lead to the utilization of unhealthy behaviors to meet these expectations, or unfair habits such as cheating (Pope, 2001). It is important to explore how performance-contingent rewards will interact with student motivation in these specific school environments.

One especially salient aspect of high-achieving schools may be the social comparison, through which students may make judgments about themselves (Ames, 1992). The current body of literature indicates that performance-contingent rewards, such as grades and college acceptance, significantly affect free-choice intrinsic motivation (although there is some debate about under what circumstances these

rewards will increase or decrease intrinsic motivation) (Deci et al., 1999). Self-concept appears to be an important mediating factor which influences how performance-contingent rewards affect motivation: a number of studies indicate that an individual's sense of competence can increase intrinsic motivation, while an individual's feelings of lack of competence can decrease intrinsic motivation (Ames 1984a, Vallerand & Reid, 1984). Thus, the effect of performance-contingent rewards in college-preparatory school environments may depend on whether these high achieving school environments increase or decrease the sense of competence of the students. On one hand, students may feel competent based on their inclusion in the high-achievement community, since sense of one's ability in performance goals can be based on surpassing normative-based standards (Ames, 1984b). Being a part of the high-achieving group may serve as a performance-contingent reward that signals competence, and thus students may feel high levels of competence that serve to increase intrinsic motivation. On the other hand, if a student's perception of their competence, and thus their reward for performance, is measured against a group of high-achieving peers, students who would be high-achieving in other academic environments may find themselves average in this group of high-achieving peers. Expending effort without achieving success relative to their high achieving peers may damage students' self-concepts (Covington & Omelich, 1979). Students may feel less competent than if they had been judged against a more typical group of peers. With performance-contingent rewards, a portion of people will receive less than maximal rewards because they do not perform up to the specified standards, and thus this

portion will receive negative feedback on competence information. This information has been shown to be highly detrimental to intrinsic motivation (Deci et al., 1999).

Competition amongst peers could also affect intrinsic motivation; peer competition within high-achieving populations has been raised as a concern by researchers. Stress related to the college application process could change the way students learn and behave, with little evidence that increased competition has positive effects and more evidence that increased competition has harmful effects (Bound et al., 2009). Pope (2001) wrote that although teamwork was a value normally espoused in schools, students are often forced to choose between this ideal and getting top grades. However, other researchers have suggested that peer achievement has a positive effect on achievement growth (Hanushek, Kain, Markman, & Rivkin, 2003). Whether the comparison amongst high-achieving peers increases or decreases student intrinsic motivation may also be related to differences in individual students. Students who are high in achievement motivation, meaning they seek challenge, try to outdo others, and strive to attain competence, may respond more positively to an environment where they are compared against highly competent peers (Tauer & Harackiewicz, 1999). Those low in achievement motivation, who dislike evaluation and avoid achievement situations, may find a decrease in intrinsic motivation when compared to high-achieving peers.

Verbal reinforcement may act as an important mediating factor in determining whether students feel competent when given performance-based rewards such as grades. Positive verbal reinforcement present in high-achieving school environments may serve to diminish or increase intrinsic motivation, depending on the manner in

which the reinforcement is applied. High expectations for achievement may be partnered with positive feedback, which has been shown to increase intrinsic motivation (Deci, 1971). Deci, Koestner & Ryan's (1999) meta-analytic review of the effects of extrinsic rewards on intrinsic motivation indicate that positive verbal feedback enhances both self-reported interest and free-choice behavior. The fact that students are labeled as high-achieving students, performing above average, may serve as a verbal reward (Ryan, 1982). However, if students engage in behaviors IN ORDER to gain acknowledgement or approval, verbal rewards can undermine intrinsic motivation (Deci et al., 1999). While acknowledging that students are performing above average can increase intrinsic motivation, statements such as "Excellent, you *should* keep up the good work" [emphasis added] could decrease intrinsic motivation (Ryan, 1982).

It is essential to also recognize that students' motivation toward school is influenced not only by their school environment and experiences but also by the environment and attitudes present in their homes (Deci, Vallerand, Pelletier & Ryan, 1999). Parental involvement can influence student motivation, but there is debate in the literature about whether involved parenting and/or high parental expectations increases or decreases intrinsic motivation. An early study examined the effects of parental involvement on the stress of the college application process (Hansell, 1982). This study found that students whose parents were most heavily involved in school activities experienced the greatest increase in blood pressure, measured by the study as a biological marker of increased stress, in response to college application-related stimulus. Yet other studies have found that involved parenting was correlated with

increased student achievement and motivation (Grolnick, Ryan, & Deci, 1991). An important balance to achieve intrinsic motivation is to have students perceive their parents as supportive, but not controlling.

High personal expectations can also be a source of stress for high-achieving and gifted students (Suldo et al., 2009). It is important to investigate the effects of an environment where high expectations are the norm and peers are also high-achievers. The effect of a rigorous academic and residential environment was examined through a survey instrument and interviews with junior or senior high school students attending a public residential academy for gifted students (Neumeister, Williams, & Cross, 2007). Overall, the majority of participants reported a decrease of their personal perfectionism as a result of their academic environment. However, perfectionism is a multidimensional construct and researchers often refer to more than one type of perfectionism. Self-oriented perfectionism is having high expectations or standards for oneself, and these individuals tend to describe their perfectionism in part as an aspect of their inborn personalities (Schuler, 2002). Socially-prescribed perfectionism is defined as perceiving others as having high expectations for you, and is described as rooted in a fear of failure and a perception of self-worth as contingent upon success (Speirs Neumeister, 2004; Hewitt & Flett, 1991). In response to their new, rigorous academic environment, some socially-prescribed perfectionists reported an increase in perfectionism, while some self-oriented perfectionists reported an initial increase followed by a decrease in their perfectionism (Neumeister et al., 2007).

In addition to affecting the intrinsic motivation for learning and levels of perfectionism, the focus on college-acceptance present in some college preparatory programs may change the type of learning that occurs. For example, hours spent in SAT preparation classes that focus on strategies for guessing or time use may accomplish little to enhance learning (Bound, 2009). Additionally, AP courses that are often taken to benefit college applications have been found to be ineffective courses, with too much material crammed in at the expense of understanding (National Research Council, 2002).

This study will investigate the motivations for completing academic work reported by students in college preparatory schools. In the area of motivation, the current study explores students' reports of expectations for academic success and college acceptance, including personal expectations, parental expectations, and peer expectations. Critically, do student reports of their own motivations and others' expectations give insight into how these students perceive and cope with stress?

College-Preparatory Environments

In a cross-cultural comparison between Japanese, Chinese and American high school students, only in the United States did high-achieving high school students indicate more frequent feelings of stress than the lower achieving students (Crystal et al., 1994). As the college application process becomes increasingly competitive and notions of a "successful" high school career become more demanding, it is likely that many high-achieving youth will experience even higher levels of academic stress. College preparatory curricula, such as the International Baccalaureate (IB) program

and Advanced Placement (AP) classes, are becoming more popular (Kantrowitz & Wingert, 2006), and it is probable that an environment with higher expectations and an increased academic workload can trigger increased academic stress. Furthermore, as workload increases, students may have less time for healthy behaviors such as sleeping and relaxation, further reinforcing the cycle of stress.

While media attention surrounding youth in high-achieving environments has been high for years, empirical literature specifically examining these environments is limited. However, greater work in this area could contribute to an enhanced theoretical understanding of stress and could enhance the development of programs to decrease the impact of stress for all youth.

Students who participate in rigorous academic programs allow researchers a distinctive opportunity to understand the link between stress and positive outcomes such as superior academic functioning, and thus gain further insight into a more comprehensive theory of stress. While adolescent stress has often been linked in the literature to academic underachievement (Alva & de Los Reyes, 1999; Cunningham et al., 2002; Gillock & Reyes, 1999; Schmeelk-Cone & Zimmerman, 2003), these high-achieving youth often maintain very high levels of academic achievement as well as other positive life success measures, despite a more stressful academic environment (Shaunessy et al., 2006; Suldo et al., 2008). An important question is to find what helps to moderate the underachievement consequence of stress in youth who succeed in high pressure academic environments. One possibility is that youth in high achieving environments face very different types of stressors than those currently studied in the literature. Another interesting possibility is that many

consequences from stress are present in youth in high-achieving settings, but that they manifest in different ways, other than underachievement.

Three papers specifically discuss the relationship between high-achievement environments and student stress. Shaunessy, Suldo, Hardesty & Shaffer (2006) in a pilot study, Suldo, Shaunessy & Hardesty (2008) in their follow-up, and Suldo et al. (2009) in a more specific analysis of stressors. These authors all studied students in the International Baccalaureate (IB) program, a challenging program for academically advanced high school students. Shaunessy et al. (2006) found that both self-reported perceptions of academic abilities and grade point averages (GPA) from students in the IB program were higher than those of peers in the general education curriculum, while levels of social-emotional functioning were the same for both groups. Psychological well-being was assessed using the following measures: Students' Life Satisfaction Scale (SLSS; Huebner, 1991); Multidimensional Students' Life Satisfaction Scale (MSLSS; Huebner, Laughlin, Ash, & Gilman, 1998); Youth Self-Report of the Child Behavior Checklist (YSR; Achenbach & Rescorla, 2001); and Negative Peer Affiliations (NPA; Heinze, Toro, & Urber, 2004; Roeser et al., 2000). The authors concluded that students in the IB program were able to manage higher academic demands without harmful consequences on their well-being. Furthermore, perceptions of school climate were more positive from students within the IB program than in the general education curriculum. They therefore concluded that participation in the rigorous curriculum was not harmful to school and psychosocial functioning.

Suldo et al. (2008) followed this study by specifically investigating and comparing levels of perceived stress and coping styles both between IB and general curriculum students and within the IB student population. Students in the IB program reported significantly higher levels of perceived stress than students enrolled in the general curriculum program, as measured by the Perceived Stress Scale. This finding is explained by the authors as logically following the fact that the IB program allows highly motivated students to take on a higher and more challenging workload. However, this finding is different from the previous literature on adolescent stress, since the authors found that higher levels of perceived stress were not associated with lower academic achievement; instead, students in the IB program reported both higher GPAs and higher self-reported perceptions of academic abilities. Yet within the IB student population, higher levels of perceived stress did co-occur with compromised mental health and lower levels of life satisfaction. This finding is consistent with other literature about stress, which, as reported earlier, found that coping mechanisms accounted for a significant portion of the variance in both psychopathology and mental health outcomes such as global life satisfaction (i.e., Jaser et al., 2005; Garton & Pratt, 1995). Family communication was found to be the most adaptive coping mechanism, while substance abuse was associated with lower levels of life satisfaction. While coping styles were associated with social-emotional functioning, coping styles were less associated with school functioning. No association with GPA and coping style was found (Suldo et al., 2008).

Suldo et al. (2009) investigated the specific sources of stress reported by IB students, and how these stressors differed from general education students. The

primary source of stress experienced by IB students was related to academic functioning, while the primary source of stress of general education students was associated with parent-child relations, academic struggles, conflict with family, and peer relations. Correlations between stressors and academic achievement revealed interesting differences between IB and GE students. Among IB students, lower grades were associated with more stress related to academic struggles, while with GE students higher levels of stress related to academic requirements were related to higher grades. The authors found that correlations between psychopathology and stressors were stronger in IB students than general education students. Stress associated with academic requirements, parent-child relationships, and stressful adolescent events predicted greater levels of externalizing and internalizing pathology among IB students.

A mixed picture of the high achieving youth within the IB program has emerged. Both positive and negative factors appear to be related to the unique environments and lifestyles of high achievement programs. High achievement and academic success can correlate with success and well-being in many social, emotional and academic measurements. Indeed, confidence in academic abilities can be a strong protective force against difficult life circumstances; a study showed academic self-esteem was a major contributor to academic success for minority youth in an urban, high-risk neighborhood (Cunningham et al., 2002). However, there are also potential harms from prolonged stress that can arise from an increased workload and higher expectations. Thus, although these students are often thought of as a “low risk” group,

the prevalence of academic stress indicates that researchers should reevaluate the risk factors that might exist in this population (Luthar & Latendresse, 2005).

Present Study

First, this study aims to provide a meaningful picture of students' health and functioning in college-preparatory academic settings. To achieve this goal, this study asks three main questions:

- 1) What are the effects of stress in this population?
- 2) How do these high-achieving students deal with stress?
- 3) What are the sources of stress in the college-preparatory environment?

A second portion of the study aims to isolate the effects of stress on and within the population. This section will attempt to distinguish the health consequences and coping mechanisms that are related specifically to stress from those that stem from more general adolescent concerns and school experiences. The differences that exist between students who experience greater and lesser amounts of stress will be analyzed. If there are greater negative consequences for the students who are more stressed, the students who are particularly at risk can be identified.

Methods

Participants

Participants in this study were students enrolled in two high schools, recruited by a school-wide email explaining the study and providing a link to the online survey. These schools were selected because they are college-preparatory schools with an emphasis on academic success, where approximately 90% or more of graduating students attend four-year colleges after graduation. One high school is a public school located in Massachusetts, with a total of 1098 students, in which 89% of students attend 4-year universities after graduation. Five out of 268 students in the senior students are national merit semifinalists, and approximately 60% of AP Placement Exams score 4 or higher. The other high school is a private school located in Washington State, with 530 total students and 47% students of color. One hundred percent of students are college-bound after graduation. Thirty-six out of 127 senior students are national merit semifinalists, and 74% of AP Placement Exams score 4 or higher.

Recruitment

Approval to conduct the study was received from the administration of both participating schools, and from the Wesleyan University Institutional Review Board. In the spring of 2009, participation was sought from all students in both schools (1098 students in the MA school, 530 in the WA school) through a school-wide email that included a short explanation of the study and a link to participate in the online survey. No incentives or inducements for participation were offered to students,

beyond the opportunity to contribute to the current body of knowledge. A letter was sent to the parents of all students at the schools explaining the survey and providing contact information for the principal investigators.

Informed Consent and Debriefing

Students participated by clicking on the link to the survey in the email and filling out the survey on-line. When students clicked the link, they were first brought to a consent form and submitted electronic consent if they wished to participate. After the survey ended, or after a participant elected to exit the survey before completion, a debriefing form appeared providing additional information about the survey and providing contact information for mental health professionals and stress reduction resources at the school of the participant.

Measures

The survey included six sections, comprising both validated measures and questions written by the principal investigators. [For a full version of the survey, please contact the author.] Several questions were written by the principal investigators, rather than relying only on validated scales, so that this survey could explore specific areas relevant to the overall questions of the survey but unavailable in a current published scale. Validated scales were included in the survey to ensure that results were psychometrically reliable and valid. Scales were chosen for their relevance to the student population and the environment of the high schools.

Section 1: General Information. This section asked general questions about demographic information, GPA/SAT scores, sleep patterns, and meal and exercise patterns. Grade point averages (GPAs) and Scholastic Aptitude Test (SAT) scores were provided by the self-report of the students. A Meal Relaxation score was calculated from a series of responses to the question “My meals are often ____.” Responses included positively coded items: Social occasions with family/friends, Relaxing, and negatively coded items: Rushed, Fit in between work, On the go, and Often skipped. In this section, students also completed the Students Life Satisfaction Scale (Huebner, 1991).

Section 2: Physical and Psychological Symptoms, Behaviors and Coping. A matrix listed a series of physical and psychological responses to stress and students were asked to rate how frequently they experienced these symptoms. A list of behaviors was presented and students were asked to list how frequently they engaged in these behaviors specifically for coping, and how frequently they engaged in these behaviors in general.

Section 3: Support Network. A series of questions asked students to rank the efficacy and helpfulness of various support options for academic help and emotional stress, including teachers, parents, school counselors, peers/friends, and coaches. Students were also asked how frequently they use these support options. Students also completed the *School Attitude Assessment Questionnaire-Revised* (McCoach & Siegle, 2003). Students were also asked to rank their agreement about a series of statements about falling behind, and the availability of people to help them catch up.

Section 4: Expectations. This section asks a series of questions about the students' perceptions of their ability to meet their own internal expectations and the external expectations of teachers, parents, and peers. Students are also asked to rank the importance of their academic success and their college acceptance for these people.

Section 5: Peer Influence. A series of questions assessed the perceived level of peer competition, and the role of peers in academic satisfaction, academic success, and stress management.

Section 6: Stress management. This section asked about the influence of college and personal goals on academic work. Students were also asked about the barriers to stress reduction, and what the student would do if the barriers for stress reduction were reduced.

Psychometric properties of the validated scales.

Students' Life Satisfaction Scale. The Students' Life Satisfaction Scale (SLSS; Huebner, 1991) is a seven-item scale that has been used widely to assess global life satisfaction in children and adolescents. Each item is a statement about quality of life, and the student marks the degree to which they agree with the statement on a 6-point Likert scale ranging from 1 = strongly disagree to 6 = strongly agree. Composite scores are obtained by summing all of the items (two are reverse-coded) and dividing by seven. Higher scores indicate higher levels of life satisfaction.

The SLSS has been used in several published studies, and particularly appropriate to the present study is the use of this life satisfaction measure in a few populations of high-achieving students (i.e. Shaunessy et al., 2006; Suldo et al, 2009;

Suldo et al., 2008). The discriminant validity of the SLSS has been supported through significant negative correlations with measures of depression and loneliness, and convergent validity has been supported through a significant positive correlation with a measure of self-esteem (Huebner & Adlerman, 1993). Additional evidence of cross-method convergent validity are provided by the pattern of correlations between SLSS scores, demographic variables, IQ scores, locus of control, and self-reported and parent-reported life satisfaction (Huebner et al., 1993; Gilman & Huebner, 1997). High reliability is indicated by the Cronbach's alpha of .88 in the present study.

School Attitude Assessment Questionnaire. The School Attitude Assessment Survey – Revised (SAAS-R; McCoach et al., 2003) is a 35-item scale designed to measure affect related to school, and assesses seven different factors: Academic Self-Perceptions, Attitudes toward teachers (and classes), Attitudes toward school, Goal Valuation, and Motivation/Self-Regulation. Each item is a statement about school or academic achievement, and the student marks the degree to which they agree with the statement on a 7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree. Responses to the items in each factor are summed, and this total is divided by the number of items in that factor.

Criterion-related validity has been supported through a connection between high-achievement and the factors of the SAAS-R (Suldo, Shaffer, & Shaunessy, 2008). Convergent validity is supported through correlations in the expected directions between the SAAS-R factors and measures of school climate, school satisfaction, academic self-efficacy, in-school conduct, time spent on homework, and GPA (Suldo, Shaffer, & Shaunessy, 2008). Suitable reliability is indicated by the

Cronbach's alpha of the various sections: Academic Self-Perceptions (seven items; $\alpha=.82$), Attitudes toward teachers (and classes) (seven items; $\alpha= .90$), Attitudes toward school (five items; $\alpha= .92$), Goal Valuation (six items; $\alpha= .93$), and Motivation/Self-Regulation (ten items; $\alpha= .91$).

Results

Participants

Participation was sought from all students in both schools. Participation rates were 11.29% for the Massachusetts school and 48.3% for the Washington high school, with a combined total of 380 students participating in the study. Forty-seven participants were removed from the data set because they had not completed a sufficient portion of the survey to contribute to the analyses in a meaningful way, leaving a final sample of 333 students. The final sample included 106 students from the Massachusetts school and 227 students from the Washington school. The participation rate for the Washington high school in particular is high in comparison with other online surveys of adolescents in the literature, especially considering that no incentives were offered. As shown in Table 1, there was a relatively even distribution of students across grade levels, with slightly more students participating in younger grades; this was roughly proportional to the number of students in each grade. More female students participated in both schools. Students were not asked to report race, ethnicity, or socioeconomic status.

Table 1

Descriptive Statistics for Participants

	MA high school		WA high school		Total Sample	
	n	%	n	%	n	%
Gender						
Female	73	68.9%	134	59.3%	207	62.3%
Male	33	31.1%	92	40.7%	125	37.7%
Grade						
9	29	27.4%	71	31.4%	100	30.1%
10	34	32.1%	59	26.1%	93	28.0%
11	22	20.8%	51	22.6%	73	22.0%
12	21	19.8%	45	19.9%	66	19.9%

Section I: Effects of Stress

In this study, students were presented with questions about their general physical and psychological health, and questions about the impact of stress on their well-being. Students were presented with a list of harmful correlates of stress, and asked about the frequency they experienced the symptoms on the list, if at all. These correlates of stress range from psychological issues, such as ‘Withdrawal from others’ and ‘Racing thoughts’ to physical issues, including ‘Headaches’ and ‘Chest pains.’ Many of the harmful correlates of stress are related to other aspects of health, including: sleep habits, meal patterns, and exercise quantity and quality. This study explored each of these topics individually, as well as associations between them. This study also utilized previously published and validated scales to assess students’ life satisfaction and attitudes surrounding school.

Physical and psychological correlates of stress. Students reported frequently experiencing several physical and psychological issues in response to their stress. The symptoms are listed below in Table 2, with the percent of students who report experiencing the symptom *at least once a week* and *almost daily*. A large percentage of students are experiencing a significant number of symptoms: 69.7% of students (n=175 students) reported experiencing 5 or more symptoms of stress *at least once a week*.

Table 2

The percentage of students who experience the symptom of stress at least once a week, and the percentage who experience it almost daily

Symptom	% of students who experience this:	
	At least once a week	Almost daily
Lack of concentration	67.8	22.4
Inability to begin work	57.6	22.8
Irritability	55.3	11.7
Mood swings	52.6	11.3
Constant fatigue	48.4	20.4
Restlessness	43.8	9.4
Racing thoughts	42.8	16.9
Inability to sleep	42.3	9.9
Anger	39	4.8
Back pain	35.5	11.3
Neck stiffness	35.3	9.6
Nail biting	33.8	19
Skin problems	33.8	9.3
Headaches	32.2	6.1
Over eating	30.6	6.5
Withdrawal from others	29	5.9
Stomach aches	28.7	3.4
Feelings of helplessness	26.9	5.5
Loss of appetite	25.3	2.1
Depression	24.7	6.2
Aggressiveness	24.5	7.2
Dizziness	22.2	4.4
Crying	22.1	3.8
Grinding teeth	17.2	6.5
Twitches	17.1	4.1
Nausea	16.4	1.4
Nightmares	15.1	2.1
Weight loss or gain	14.5	2.4
Jaw pains	13.8	3.8
Panic attacks or anxiety attacks	12.8	2.1
Chest pains	12.2	1.4
Rapid or difficult breathing	11.3	1.7

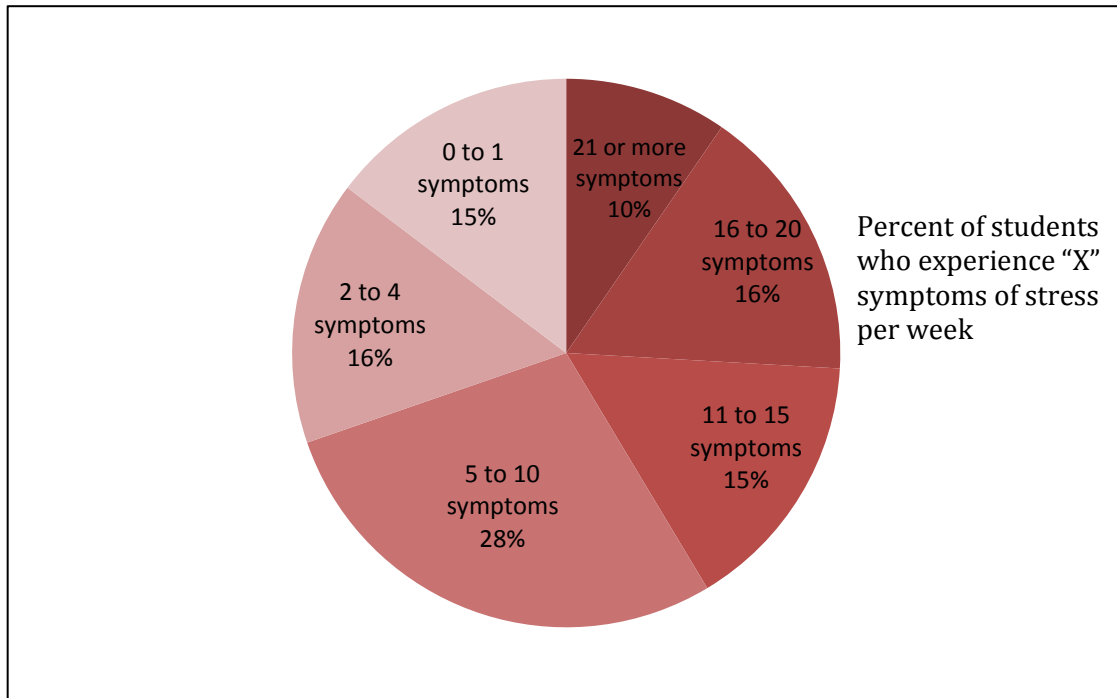


Figure 1. The number of symptoms of stress that students report each week.

The frequency and number of symptoms that students report are indicative of the far-reaching effects of stress in their lives. While there are other contributing factors to the symptoms listed above, students were asked to report how often they experienced these symptoms as responses to stress. Thus, these responses indicate how often students attribute these symptoms as being related to their stress level. Furthermore, not only do students perceive these as relating to stress, the data indicate that the higher the student's stress level, the more symptoms they reported. The association between stress and the prevalence of symptoms per week is a large and significant, $r(258) = 0.387$, $p < .001$.

Certain symptoms appear to be more directly related to student stress. The following symptoms are correlated with degree of stress with $r \geq 0.3$ and $p < 0.01$:

headaches, stomach aches, constant fatigue, mood swings, lack of concentration, irritability, crying, and feelings of helplessness.

Furthermore, the correlates of stress listed above (see Table 2) are associated with other measures of health explored in this study: sleep habits, eating patterns, and exercise behavior. There is a significant correlation between hours of sleep per night and symptoms of stress, $r(249) = -0.508$, $p < .001$. Number of symptoms per week is also significantly correlated with the relaxing quality of meals, identified in this study as the Meal Relaxation composite score, $r(243) = -0.397$, $p < .001$. Lastly, the number of symptoms experienced per week is significantly correlated with certain rationales for exercise; for example, physical symptoms per week is correlated with reporting that exercise is less often motivated by personal enjoyment, $r(249) = -.157$, $p < .05$ and more often motivated by peer/parental pressure, $r(287) = .293$, $p < .001$. Additionally, the number of symptoms that students experience per week is largely and significantly correlated with Students' Life Satisfaction Scale score (Life Satisfaction), $r(321) = -0.508$, $p < .001$. There is no significant correlation between physical symptoms of stress and measures of academic achievement, such as GPA or SAT scores.

Sleep: Quantity and Quality.

Quantity of Sleep. Students in this study reported widespread and chronic sleep deprivation. Eighty-six percent of students get fewer than 8 hours of sleep on an average weeknight. Fifty-four percent of all students get fewer than 7 hours of sleep. Almost a quarter of all students, twenty-three percent, get fewer than 6 hours of sleep on the average weeknight. Only 13.8% of students reported sleeping the amount of

hours that is recommended for adolescents by the CDC (Center for Disease Control, 2010). Student responses reflect awareness of this deficit; only 21.3% of students agreed with the statement 'I get enough sleep.'

Students with higher stress levels reported fewer hours of sleep on the average weeknight, $r(330) = -0.289$, $p < .001$. Of the 139 students who identified themselves as 'somewhat stressed' or 'very stressed,' 31.7% get fewer than six (6) hours of sleep. Only 7.9% of the 'somewhat stressed' or 'very stressed' students got at least 8 hours of sleep on the average weeknight. Of the 139 students who are 'somewhat stressed' or 'very stressed,' only 11.6% reported that they believe they get enough sleep. The higher the stress level of the student, the less likely they were to report that they get enough sleep, $r(330) = -.302$, $p < .001$.

Grade level has a significant effect on how many hours of sleep students report, $F(1,326)=6.791$, $p < .001$. Sophomore and Junior students reported fewer hours of sleep than Freshman and Senior students³. There were no significant gender differences in hours of sleep.

Quality of sleep. In this study, students were also asked about what interfered with their sleep. The vast majority of students (79.4%) reported that academic work interfered with sleep. Approximately half of students (51.2%) reported that extra-curricular activities interfered with sleep. Few students (8.4%) reported that a job interfered with their sleep.

There is a large and significant association between student stress and the degree to which academic work interferes with sleep, $r(326) = .286$, $p < .001$. There is

³ This survey was taken during the spring, after college applications had been completed. This timing may have affected the amount of sleep that senior students reported.

a smaller but still significant correlation between stress and the extent to which extracurricular activities interfere with sleep, $r(327) = .126, p < .05$. In this population, no significant correlation exists between stress level and jobs interfering with their sleep.

There are many reasons why academic work can interfere with sleep. One reason is that academic work can take up time so that students have fewer hours to sleep. Another reason is that stress related to academic work can disrupt or hinder sleep. Sixty-five percent of students reported that they often fall asleep thinking about work that they have left to do. Students who are more stressed report more often falling asleep thinking about work that they have left to do. There is a large and significant correlation between stress level and how often students report that they fall asleep thinking about work that they have left to do, $r(328) = .420, p < .001$.

Thus, stress impacts many facets of student sleep habits. The vast majority of students do not get sufficient sleep⁴, and this is particularly true for the most stressed students. Academic work interferes with sleep for the vast majority of students, both because of time dedicated to completing work and because students continue to think about academic work as they are trying to fall asleep. Students who are more stressed sleep less and report that academic work intrudes more on their sleep.

Eating Patterns. Students in this study do not frequently skip meals: five to seven days a week 77.8% of students eat breakfast, 90.6% eat lunch, and 96.4% eat dinner. Stress is not associated with the frequency that students report eating dinner or breakfast. Only the correlation between stress level and the frequency of eating lunch

⁴ This is referring both to 78.7 percent of students' self-reported belief that they do not get enough sleep, and that 86.2% of students do not get the amount of sleep recommended by the CDC (CDC, 2010).

is significant, $r(328) = -0.118$, $p < .05$, indicating that more stressed students tend to skip lunch, the meal during the school day, more frequently.

In addition to questions about meal frequency, students were asked to rank their agreement with several statements about meal quality. A Meal Relaxation Score was computed based on whether students described their meals as often being relaxing and/or being social occasions with family and friends. Students also reported whether meals were rushed, fit in between work, on the go, or often skipped, and these items were negatively coded and added to the meal relaxation score.

While correlations between stress and meal frequency are small or non-significant, correlations between stress and meal quality are large and significant, $r(317) = -.316$, $p < .001$.

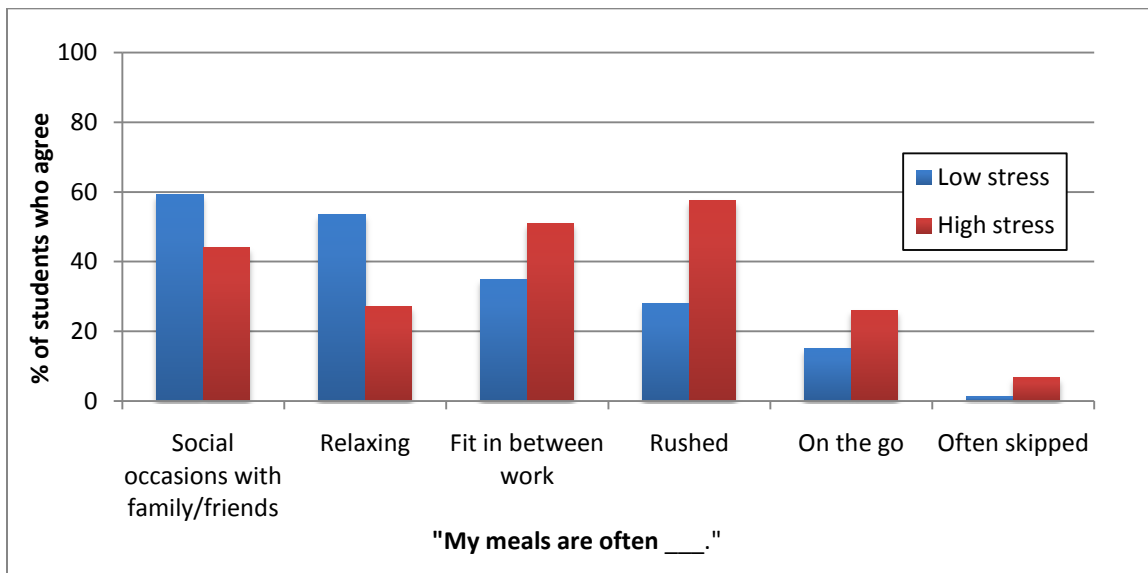


Figure 2. Percent of students endorsing statements about meal quality, by student stress level.

Thus, while stress does not appear to affect how often meals are skipped, stress does effect the relaxing quality of those meals (see Figure 2).

Exercise. Students in this sample report frequent exercise; 88.5% of students exercise at least three days a week. Both schools report high participation rates in school athletics, which likely contributes to this trend of frequent exercise. Frequency of exercise is related to student stress; there is a small but significant negative correlation between stress level and frequency of exercise, $r(330) = -0.125$, $p < .05$, indicating that higher stress levels correlate with less frequent exercise. However, even the most stressed students exercise on average 4 or more days per week.

In addition to their frequency of exercise, students were also asked about their motivations for exercise, including: personal improvement; personal enjoyment; physical improvement; relaxation/ stress alleviation; peer/ parental pressure. The percent of students who endorsed each of these motivations is displayed in Figure 3.



Figure 3. Students reported what motivates their exercise.

Stress is associated with students' motivations for exercise. Students who are more stressed exercise less frequently for personal enjoyment reasons, $r(326) = -0.118$, $p < .05$; however, the majority of stressed students still report that they exercise for personal enjoyment. Additionally, students who are more stressed exercise more frequently because of peer/parental pressure, $r(324) = 0.176$, $p < .01$; almost one out of three stressed students report that their exercise is motivated by peer/parental pressure. Stress level is not significantly associated with three of the rationals for exercise: Personal improvement, physical improvement, and relaxation/stress alleviation.

Thus, while almost all students in this sample exercise regularly, stress-level differences occur with reported motivations for exercise.

Psychological health. In addition to physical health, the psychological well-being of students was explored, through the use of two previously validated and population-appropriate scales.

Students' Life Satisfaction Scale (Huebner, 1991). The seven-item scale was used to assess global life satisfaction in the students. Each item is a statement about quality of life, and the student indicates the degree to which they agree with the statement on a 6-point Likert scale ranging from 1 = strongly disagree to 6 = strongly agree. Composite scores were obtained, and the means are presented below.

The mean composite Life Satisfaction score of the students in this sample is 4.23 (SD=1.012), which is similar to other populations of high-achieving students in published studies. For example, Shaunessy et al. (2006) reported a mean of 4.28 for Gifted IB students and 4.07 for High-Achieving students not identified as gifted.

Students with higher stress levels reported significantly lower levels of life satisfaction; there is a large and significant negative correlation between student stress and the composite Life Satisfaction score, $r(321) = -.399, p < .001$.

Life Satisfaction score is correlated with many other indicators of psychological and physical wellbeing. Higher Life Satisfaction is correlated with positive indicators of well-being including hours of sleep per night, $r(322) = .347, p < .001$. Lower Life Satisfaction is correlated with indicators of poor health, including number of physical symptoms experienced per week, $r(246) = -.508$.

Life Satisfaction is also associated with academic success. Composite Life Satisfaction Scores of the students are significantly correlated with GPA in the positive direction, $r(274) = .230, p < .001$, and with self-perceived success in the positive direction, $r(232) = .377, p < .001$.

School Attitude Assessment Survey-Revised (McCoach et al., 2003). The scale assesses attitudes toward school and teachers, and also assess motivation, goal-valuation, and academic self-perceptions. The means for each sub-scale are presented below in Table 3.

Table 3

Scores of factors on the School Attitude Assessment Survey – Revised

	Mean	N	Min	Max	SD
Academic Self-Perceptions	5.26	245	2	7	1.03
Attitudes toward teachers (and classes)	5.46	243	1.29	7	1.04
Attitudes toward school	5.72	246	1	7	1.31
Goal Valuation	6.45	241	2.17	7	0.83
Motivation / Self-Regulation	5.61	240	1.2	7	1.02

Overall, the students in this sample display positive attitudes towards school and their teachers. The highest mean of the sub-scales is Goal Valuation, indicating that these students place significant importance on academic success. The lowest mean of the sub-scales is Academic Self-Perceptions, indicating that relative to their high valuation of school and their inclusion in a high-performing program, these students have low perceptions about their ability to excel academically.

Student stress is significantly correlated with three of the five factors of the SAAS-R. Stress level is largely and significantly correlated with Goal Valuation, $r(238) = 0.304$, $p < .001$. This indicates that higher levels of stress are associated with higher importance placed on success in school. The Academic Self-Perceptions factor is also largely and significantly correlated with student stress level, $r(242) = -0.237$, $p < .001$. This indicates that lower perceptions of one's academic ability are associated with higher stress levels. The Motivation/Self-Regulation factor is also positively associated with stress level: higher levels of motivation are correlated with higher stress levels, $r(242) = 0.172$, $p < .01$. Stress is not significantly associated with the other two factors of the SAAS-R: Attitudes towards Teachers (and Classes) and Attitudes toward School.

In addition to stress-level differences, there were significant differences present within the sample when responses from students from the public college-preparatory school in MA were compared with the private college-preparatory school in WA. Significant differences, as measured by the 2-tailed p value of $< .05$, appeared in all sub-scales, with the exception of the Goal Valuation sub-scale. Private school students reported significantly lower academic self-perceptions, $t(243) = -2.05$, $p < .05$;

more positive attitudes towards teachers, $t(241) = 7.73, p < .001$; more positive attitudes towards their school, $t(244) = 4.15, p < .001$; and higher motivation, $t(238) = 2.16, p < .05$.

Gender differences were also investigated, and the only significant gender difference present was in the Academic-Self-Perceptions, where females reported significantly lower perceptions of their academic abilities, $t(242) = -3.42, p = .001$. Quantitative school success, as measured through GPA, was significantly correlated with all of the sub-scales in the SAAS-R, except Attitudes toward Teachers. GPA is positively correlated with Academic Self-Perceptions, $r(213) = 0.498, p < .001$; with Motivation/Self-Regulation, $r(208) = 0.354, p < .001$; with Goal Valuation, $r(207) = 0.285, p < .001$; and with Attitudes toward School, $r(212) = 0.264, p < .001$.

In addition to within-sample comparisons, interesting differences arise when the mean composite scores of the students in this sample are compared with other populations of high-achieving students in other published studies. For example, Suldo et al., (2008) reported SAAS-R scores for a sample of high school students from a school in which there is both a high-achievement and an average-achievement program. The largest difference between the two samples was in the Academic Self-Perception subscale, where the high-achievement students in Suldo et al.'s (2008) sample who attend a school with average-achieving students reported much higher academic self-perceptions. The high-achievement students in Suldo et al.'s (2008) sample also reported high means in the Goal Valuation subscale, although this difference was narrow. Students in college-preparatory programs from this study

reported higher means in Attitudes toward teachers, Attitudes toward school, and Motivation/ Self-Regulation.

In summary, stress is highly associated with lower overall Life Satisfaction. Stress also impacts many factors related to satisfaction with school, including academic Self-Perceptions, Goal Valuation, and Motivation/Self-Regulation. Thus, while stress is not related to quantitative measures of school success such as GPA, it is related to how well students perceive themselves to be performing, and their overall happiness and satisfaction in their school environment.

Section II: How students deal with stress

Students in high-pressure academic environments often report high levels of stress, and potentially serious physical and psychological health consequences, while still functioning at a very high level in their academic and extracurricular activities. Therefore, an essential question is how these students cope with the stress and pressure that they report. An understanding of how these students deal with stress provides insight into their ability to maintain functioning at a high level while under stress. Additionally, how students are dealing with stress can enhance our understanding of how schools and families can strengthen students' support network and provide healthy and effective resources for academic help and stress reduction.

Previous research has indicated that, when examining student coping with stress, it is important to consider the support network inside *and* outside of the school environment (Hansell, 1982). Students in this study were asked about how frequently they went to various people (i.e. parents, teachers, peers, school counselors) for

academic help and for emotional support, and how effective they perceived these resources to be at providing this support. Additionally, students were asked about whether they perceived a stigma or other barriers to asking for help. Students answered a series of questions about how they would about seeking help feel if they had fallen behind in their academic work. Lastly, other research has hypothesized that high levels of stress could be a contributing factor for certain unhealthy behaviors (Compas et al., 2001). In this study, students were presented with a series of behaviors, such as listening to music, and asked how often they engaged in the behavior to cope with stress, and in general.

Support Network. This study aimed to understand where students receive academic and emotional support. For emotional support, peers/friends are relied on often by most students, and are very effective at providing emotional support for most students (76.8%). Fewer students (57%) reported that their parents were effective at providing emotional support or that they went to their parents often (46.8%). Very few students reported going to other resources often for emotional support; more than 95% of students do not often go to school counselors, private counselors, coaches, teachers, tutors, and other adults. Similarly low percentages of students rated those people as effective at providing emotional support (see Table 4 for full data).

For academic help, more students report that teachers are effective (67%) than believe peers/friends are effective (54%). Despite this, more students frequently go to peers/friends for academic support (62.3%) than frequently go to teachers often (45.9%). Parents are utilized as an academic resource less than they are used as an emotional-support resource: 37% of students go to their parents often for academic

help and 42% of students report that their parents are effective at this help. Similar to emotional help, few students reported going to other resources often for academic help.

Table 4

Students' Support Network

	Academic Guidance		Emotional Support	
	Go to often	Perceive as effective	Go to often	Effective
Peers/Friends	62.3	54.4	71.6	76.8
Parents	37	42	46.8	57
Teachers	45.9	67	1.2	8.2
School Counselors	4.7	11.9	4.8	11.4
Tutors	8	19	0.4	1.7
Private counselors	2.4	1.1	4	9.5
Coaches	3.6	5.5	4	10.6
Other Adults	5.2	6	4.8	10.6

Students were also asked who they go to FIRST when feeling overwhelmed with stress. The majority reported that the people they frequently turn first to peers/friends (77.5%) or parents (51.2%).

Stress is associated with student help-seeking behavior. Students with higher stress reported that parents are less effective at providing emotional support, $r(246) = -0.139, p < .05$. Furthermore, students with higher stress reported that teachers are less effective at providing academic help, $r(248) = -0.134, p < .05$. Students with lower stress levels more frequently went to school counselors for emotional support, $r(244) = .174, p < .01$, and private counselors for academic support, $r(248) = .128, p < .05$.

Life Satisfaction is also associated with support-seeking behavior. Students with higher Life Satisfaction more frequently go to parents for emotional help, $r(242)$

= .242, $p < .001$, and academic help, $r(246) = .265$, $p < .001$. Additionally, students with higher Life Satisfaction also report their parents are more effective at providing emotional help, $r(241) = .420$, $p < .001$ and academic help, $r(242) = .292$, $p < .001$. The significant and large associations between parental support and student life satisfaction underscore the powerful and protective role that supportive and effective parenting can play in this environment.

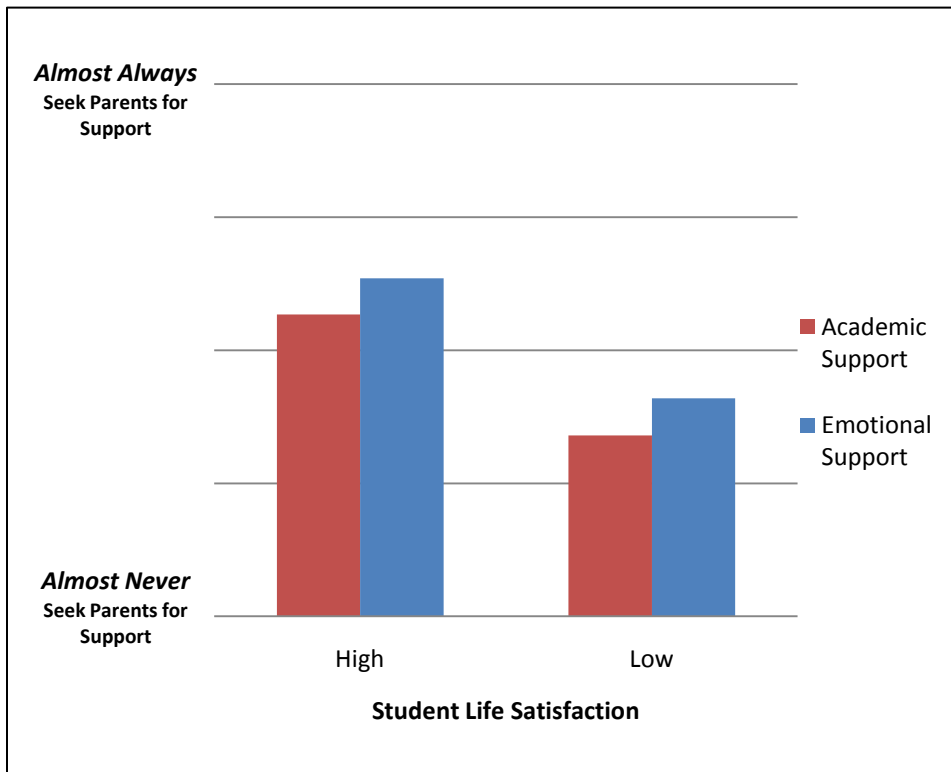


Figure 4. Likelihood of seeking parents for support: interactions between life satisfaction of students and their appraisal of parental support.

Students' utilization of the support network is also associated with their GPA. Students who have higher GPAs go to parents more frequently for academic help, $r(220) = .202$, $p < .01$, and emotional support, $r(216) = .177$, $p < .01$. Additionally, students with higher GPAs find their parents to be more effective academic help, $r(216) = .183$, $p < .01$, and for emotional help, $r(215) = .204$, $p < .01$.

Attitudes towards seeking help. Students were asked about the availability of help for catching up, and the acceptability of seeking help for catching up. Despite student perceptions that there *are* resources available, students appear to have an aversion to seeking help. The majority of students (69.4%) reported that they need to be able to catch up on their own, while only 28% stated that they need to get help to catch up. This does not appear to be due to a lack of available help, since 52% of students reported that “there are lots of people available to help me,” contrasted with only 11% who reported that “there aren’t enough people available to help me.” Thus, students feel the need to catch up on their own, *despite* the available help.

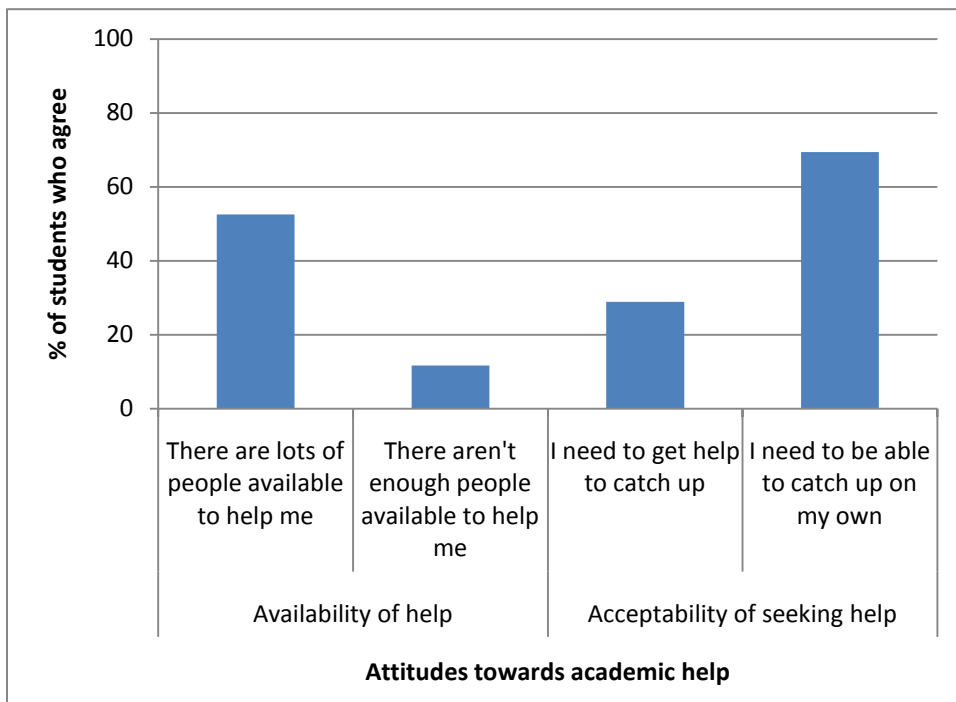


Figure 5. Student attitudes towards the availability and acceptability of seeking help.

Students with higher stress levels react differently towards seeking or accepting help when they are falling behind. Agreement with the statement ‘There are lots of people available to help me’ was negatively correlated with stress, $r(245) = -0.276, p < .001$. Thus, students with higher stress levels perceived fewer resources to

help them when they were struggling with academic work. However, there was no significant correlation with stress and perceived need to catch up on one's own.

The majority of students expressed confidence in their ability to catch up; 63% agreed with the statement 'I will catch up soon.' Thus, while the majority of students believe they need to be able to catch up on their own, despite the available help, most students also feel confident in their ability to catch up. However, students with higher stress believe more often that they will not be able to catch up, $r(244) = .177, p < .01$. Expressing confidence in one's ability to catch up soon is not only associated with stress, it is also highly correlated with overall Life Satisfaction, $r(239) = .272, p < .001$.

Students were also asked questions regarding a stigma toward being behind in academic work. Forty-five percent of students agreed that they were "embarrassed to be behind." Fifty-six percent of students blamed themselves for falling behind, agreeing with the statement "It's my fault for falling behind." However, there was widespread acknowledgment that falling behind in a rigorous academic environment was very common; 72% of students agreed that "being behind happens to everyone eventually."

Higher levels of stress correlate with more agreement with the statement 'It's my fault for being behind,' $r(246) = .148, p < .05$. Additionally, more stress is associated with greater embarrassment for being behind, $r(245) = .249, p < .001$.

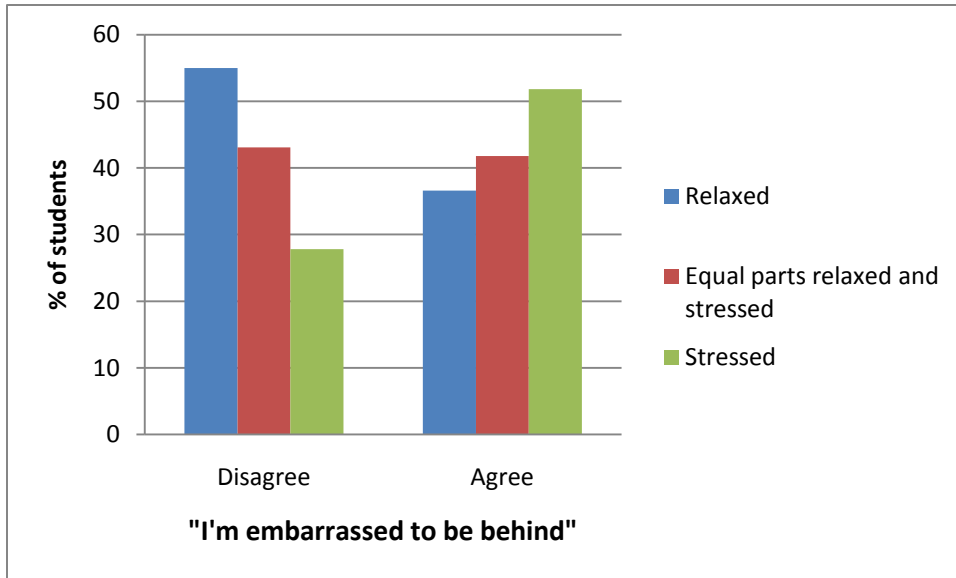


Figure 6. Stress-level differences in student endorsement of the statement: ‘I’m embarrassed to be behind.’

In addition to stress, Life Satisfaction scores correlate with ideas about stigma toward being behind. Lower Life Satisfaction score is correlated with agreement with the statement ‘It’s my fault for falling behind,’ $r(241) = -0.208, p < .01$, and agreement with the statement ‘I’m embarrassed to be behind,’ $r(240) = -0.176, p < .01$.

Coping Behaviors. Certain ‘coping behaviors’ may be used by students as a response to feeling overwhelmed with stress. Students in this study provided information about the prevalence of various behaviors often thought to be associated with stress. Table 5 lists the behaviors about which students were asked; respondents reported both the frequency of the behavior for stress reduction, and the frequency of the behavior in general, for any reason (including, but not limited to, stress reduction). The table displays the percent of students who engaged in the behavior at least once a week, and the percent that reported never engaging in the behavior. These data are selected for reporting below for brevity, full data (the percent of students who report engaging in each behavior: never, less than once a month, one to three

times a month, once a week, two to three times per week, and almost daily) are reported in Appendix A.

The most frequent behaviors that students reported specifically in response to stress included: listening to music, talking to friends, exercising, and talking to parents.

Table 5

Frequency of behaviors for stress reduction and general frequency

Activity	Purpose	Never	At least once a week
Listen to music	Cope with stress	6.5	81.3
	In general	1.4	96.3
Talk to friends	Cope with stress	14.1	62.4
	In general	1.4	97.9
Exercise	Cope with stress	24	51.2
	In general	5.2	87.8
Talk to parents	Cope with stress	22	45.5
	In general	3.1	94.8
Meditate or use some other form of relaxation	Cope with stress	56.3	21.8
	In general	52.4	23.5
Talk to other adults	Cope with stress	45.5	20.9
	In general	6.2	85.5
Overeat	Cope with stress	57.2	20
	In general	47.6	24.2
Diet	Cope with stress	74.2	15.5
	In general	62.4	19.5
Use alcohol	Cope with stress	83.3	3.4
	In general	69.9	6.9
Cut, burn, brand, pierce, or tattoo	Cope with stress	82.4	2.4
	In general	93.1	1.7
Use marijuana	Cope with stress	90.1	2
	In general	82.5	2.8
Smoke cigarettes	Cope with stress	95.9	1.6
	In general	95.9	1.7
Use other drugs (LSD, Ecstasy, Acid, Mushrooms)	Cope with stress	98.6	0.3
	In general	97.3	1

In Figure 7, the comparison is shown between how often behaviors are reported in general, and how often these behaviors are reported as stress reduction.

Only the most commonly reported behaviors are included in this graph.

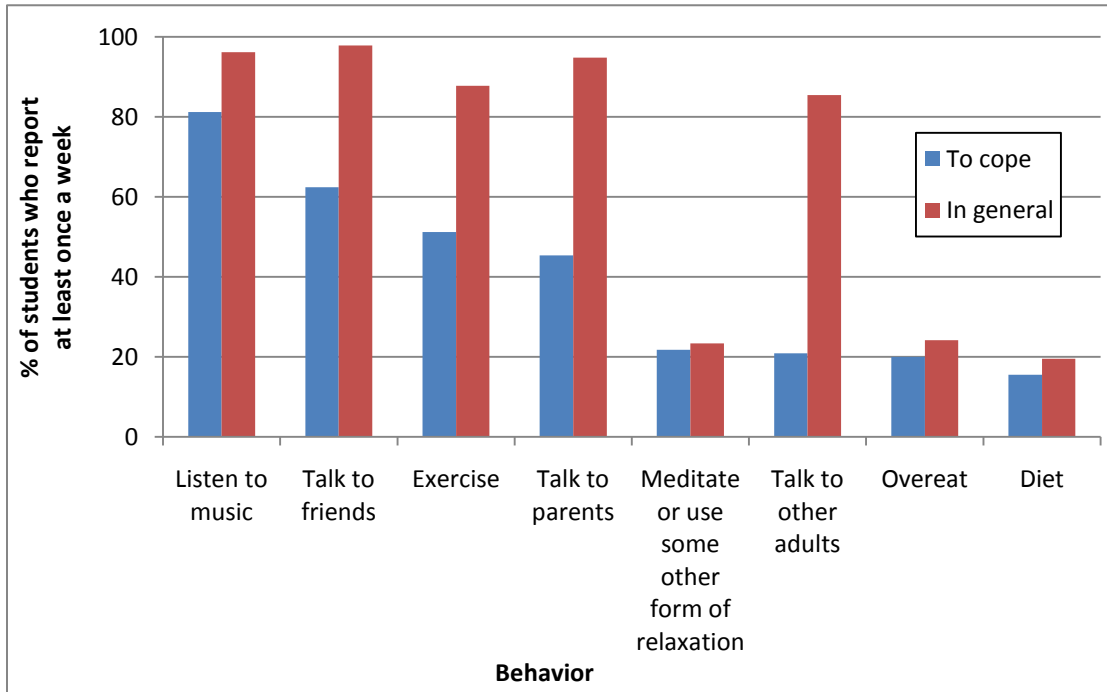


Figure 7. Percent of students who frequently engage in behaviors specifically for coping and in general.

Previous researchers have expressed concern that stress in high-achieving populations may contribute to excessive use of harmful behaviors as coping mechanisms. It is important to note that this sample of high-achieving students reported much less frequent use of harmful behaviors, such as alcohol, drug, or cigarette use, than were reported in the 2009 National Youth Risk Behavior survey (Table 6; Center for Disease Control, 2009). Lack of sleep was the risk behavior for which high-achieving students in this study reported higher rates than the national average.

Table 6

Risk behavior frequency: Comparison between high-achieving students in this sample and national averages from the 2009 National Youth Risk Behavior survey (Center for Disease Control, 2009)

Risk Behavior	National Youth	High-Achieving Students
Smoking cigarettes in past month	19.5%	2.4%
Drinking in past month	41.8%	16.5%
Marijuana use in past month	20.8%	7.6%
Sleep 8 or more hours on the average school night.	30.9%	13.8%

Students who experience more stress report engaging in four coping behaviors more frequently; these four behaviors are: Talk to parents, $r(288) = .136, p < .05$; Listen to music, $r(290) = .175, p < .05$; Diet, $r(288) = .142, p < .05$; and Overeat, $r(287) = .243, p < .001$. Higher stress level is also associated with increased frequency of certain behaviors in general. More stressed students diet more often, $r(284) = .151, p < .05$, overeat more often, $r(287) = .215, p < .001$, and exercise less frequently, $r(286) = -.159$. None of the substance-related behaviors were significantly associated with student stress level.

Associations between school GPA and coping behaviors were also explored. Only substance-related coping behaviors were significantly correlated with GPA. Negative correlations emerged between GPA and marijuana use, $r(249) = -0.175, < .01$; cigarette use, $r(288) = -0.162, < .05$; and the use of other drugs (LSD, Ecstasy, Acid, Mushrooms), $r(288) = -0.189, < .01$. Thus, more frequent use of these substances is associated with lower GPA scores. Many coping behaviors are

significantly negatively correlated with overall Life Satisfaction, indicating that increased frequency of the behaviors are associated with lower levels of life satisfaction. These behaviors include: using marijuana, smoking cigarettes, using other drugs (LSD, Ecstasy, Acid, Mushrooms), Dieting, Overeating and Cutting or other self-harm behaviors. Numerical values for these correlations can be found in Appendix B. Only one coping behavior was positively associated with higher life satisfaction; talking to parents as a coping mechanism for stress was correlated with higher levels of life satisfaction; $r(284) = 0.123, p < .05$.

In summary, students most often rely on peers for emotional and academic support. However, students who do rely on parents frequently for academic and emotional support have higher Life Satisfaction scores and higher GPAs. While the majority of students report that there are resources available to help them, they still believe they should be able to catch up on their own.

Section III: Sources of Stress

Studies that have investigated stressors for high-achieving adolescents suggested that, broadly, 'academic work' or 'school,' is a top stressor among high-achieving students, but these descriptors tell the research community little about what aspects of the school or home environment increase or propagate stress (i.e., Michalowski, 2010). In this study, students were presented with questions about factors that may increase their stress level. Students were presented with a list of potentially stressful aspects of a high-achievement environment, and asked about how much they felt each factor increased their stress level, if at all. These factors

highlighted in this study are: academic workload, college goals, and high internal and external expectations. Additionally, each of these factors were explored through a series of specific questions. All of these topics will be described individually, and associations between them will be explored.

Factors increasing stress level. Students responded to a list of various potentially stress-inducing factors, and described the effect that these factors had on their stress level. The largest contributor to student stress level was homework load: 84.6% of students reported that their homework load had a major effect on increasing their stress level. Personal drive was also reported to have a high effect on stress level by 65.5% of students. College goals had a high effect on increasing stress level for 57.7% of students. The expectations of their parents had a high effect on increasing their stress level for 51.1% of students.

Through a series of more in-depth questions, this study investigated each of the stressors above, which a majority of students described as having a high effect on increasing their stress level: academic workload, college goals, and internal and external expectations (personal drive and expectations of parents/teachers/peers).

Academic Workload. As described above, homework load was almost universally endorsed by students as having a high effect on increasing their stress. There are many reasons that homework load may increase student stress. Two potential contributing factors that were explored in this study are the time that is expected to be spent on academic work, and the motivation for completing academic work (internal motivations versus external motivations).

Academic workload: time commitments. Students were asked about how much time they felt they were expected to spend on academics, and were additionally asked how much time they actually felt they spent on academics. Seventy-three percent of students spend what they describe as ‘A lot’ of time on academics. Eighty percent of students believe their parents expect them to spend a lot of time on academic work, and 84.2% report that teachers expect them to spend a lot of time on academic work. Only in the question about the expectations of peers did students report more moderate time expectations.

Do the high expectations of parents and teachers contribute to increasing the actual time spent? Students did not report this to be the case. A logistic regression indicates that the expectations of parents, teachers and peers do not significantly predict time actually spent on academics; only personal expectations significantly predicted the actual time spent on academics, $\beta = .554$, $t(236) = 10.24$, $p < .001$. Personal expectations explained a significant portion of the variance in time spent on academics, $R^2 = .304$, $F(1, 236) = 104.816$, $p < .001$.

Students who experience more stress spend more time on their academic work, $r(236) = .294$, $p < .001$: Additionally, students who spend more time on their work tend to have higher GPAs, $r(204) = .251$, $p < .001$. However, despite these two relationships, no significant correlation exists between GPA and stress level. Thus, while increased time spent on work is related to GPA, and increased time spent on work is related to perceived stress, increased stress does not seem to result in a higher GPA.

Students in high-achieving environments often have other commitments to balance along with academics. Students were asked to report how much time they are expected to spend on these other commitments, relative to the time they spend on their academic workload. Students report that they are expected to spend less time on the following activities than they would spend on academics: extra-curricular activities, athletics, social activities, and a job/work.

Academic workload: motivations for completing academic work. This study explored whether homework was completed for intrinsic motivation reasons, such as interest in academic work, or external motivators, such as good grades or college acceptance (Figure 8). Completing work in order to achieve a good grade and in order to gain college acceptance were the top two motivations reported in this study; both of these are considered external motivations. By comparison, reported levels of intrinsic motivation for work were lower.

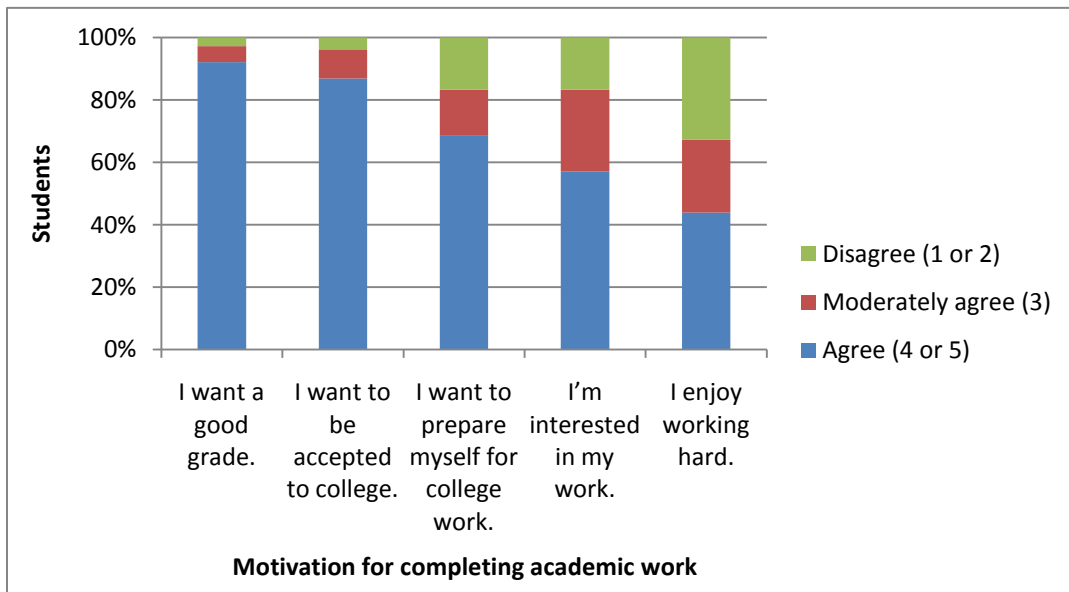


Figure 8. Student intrinsic and extrinsic motivations for completing academic work.

Stress level is significantly associated with motivations for completing academic work. Stress is correlated with the extrinsic motivation of completing work in order to get a good grade, $r(213) = .340, p > .001$, and completing work in order to be accepted to college, $r(211) = .272, p > .001$. Thus, students who are motivated more by these extrinsic motivators have significantly higher stress levels. Stress is also significantly correlated with 'I want to prepare myself for college work,' $r(212) = .208, p < .01$. Remarkably, there is no significant association between stress and the intrinsic motivations of 'I am interested in my work' and 'I enjoy working hard.'

Not only are the extrinsic motivators associated with higher levels of stress, but intrinsic motivators are associated with higher Life Satisfaction. Students with higher Life Satisfaction more often reported 'I enjoy working hard,' $r(206) = .363, p < .001$, and 'I am interested in my work,' $r(206) = .306, p < .001$. Additionally, the only motivation for completing academic work that is associated with a higher GPA is agreement with the statement, 'I enjoy working hard,' $r(180) = .158, p < .05$.

An important note is that there is a significant difference between the two schools included in our sample in responses to 'I'm interested in my academic work,' $r(212) = -.246, p < .01$. Thus, students at the private school in Washington are significantly more motivated by an interest in their academic work than are students in the public college-preparatory program in Massachusetts.

College Goals. In addition to academic workload, pressure surrounding college acceptance has been discussed in the literature as a possible contributor to high-achieving student stress (Conner et al., 2010; Suldo et al., 2009; Pope, 2001).

Students in this study responded to a series of questions about the pressures surrounding college acceptance.

Table 7

Student concerns about college acceptance⁵

College-related concern	Percent of students
I am worried about college acceptance	79.9
I feel that I am expected to get accepted in to a prestigious university.	74.3
I feel I will have disappointed myself if I do not get in to a prestigious university.	71.4
I feel I have disappointed my parents if I do not get in to a prestigious university.	60.6
I feel that my peers may judge me if I do not get in to a prestigious university.	60.2

Senior students were excluded from this analysis since questions discuss college acceptance, and seniors have already gone through the college application and acceptance process by the time of the survey.

College-related concerns are highly associated with student stress level. ‘I am worried about college acceptance’ is most highly correlated with stress level, $r(234) = .458, p < .001$. Students who feel they are expected to get accepted into a prestigious university also have higher stress levels, $r(235) = .317, p < .001$. Worry that peers may judge them if they do not get into a prestigious university is also significantly associated with stress, $r(235) = .280, p < .001$. Students with higher stress levels also report more agreement with the statement ‘I feel I will have dissapointed myself if I do not get in to a prestigious university,’ $r(234) = .265, p < .001$. Feeling that they will

⁵ To calculate these statistics, I am adding the percentage of students who responded on a 5-point likert scale that they ‘Completely agree’ (5), ‘Almost always agree’ (4) or ‘Agree often’ (3). Students who reported that they ‘Agree a little’ (2) or ‘Do not agree’ (1) were not marked as ‘agreeing’ with the statement.

have disappointed their parents if they do not get into a prestigious university is also highly correlated with stress level, $r(235) = .153, p < .001$. These associations indicate that not only is college-related stress prevalent among many of the students at these schools, as was displayed in Table 7, but also that students with higher levels of college worry suffer from significantly more overall stress.

In addition to associations between stress and college worry, having a higher GPA is positively correlated with feeling as if you are expected to get accepted into a prestigious university, $r(204) = .253, p < .001$ and that peers may judge you if you do not get into a prestigious university, $r(205) = .168, p < .05$. Thus, students with high GPAs may feel more pressure to gain acceptance to prestigious universities.

Internal and External Expectations. High personal drive and high external expectations have been suggested as a major source of stress in a high-pressure environment (Suldo et al., 2009; Pope, 2001). In this study, students responded to several questions regarding their personal expectations and the expectations of parents, teachers, and peers.

Ability to meet expectations. Students were asked about how often they are able to meet the expectations of their parents, their teachers, and themselves. When asked how often they could meet their own expectations, 15.9% of students reported 'Never or Rarely,' 31.4% reported 'Sometimes,' and just over half of students (52.7%) reported that they could 'Commonly or Always' meet their own expectations. Students reported similar percentages when asked how often they could meet their parents' expectations: 16.3% reported 'Never or Rarely,' 21.3% reported 'Sometimes,' and 62.5% reported 'Commonly or Always.' More students believe

they can meet their teachers' expectations: 5.4% reported 'Never or Rarely,' 21% reported 'Sometimes,' and 73.5% reported 'Commonly or Always.'

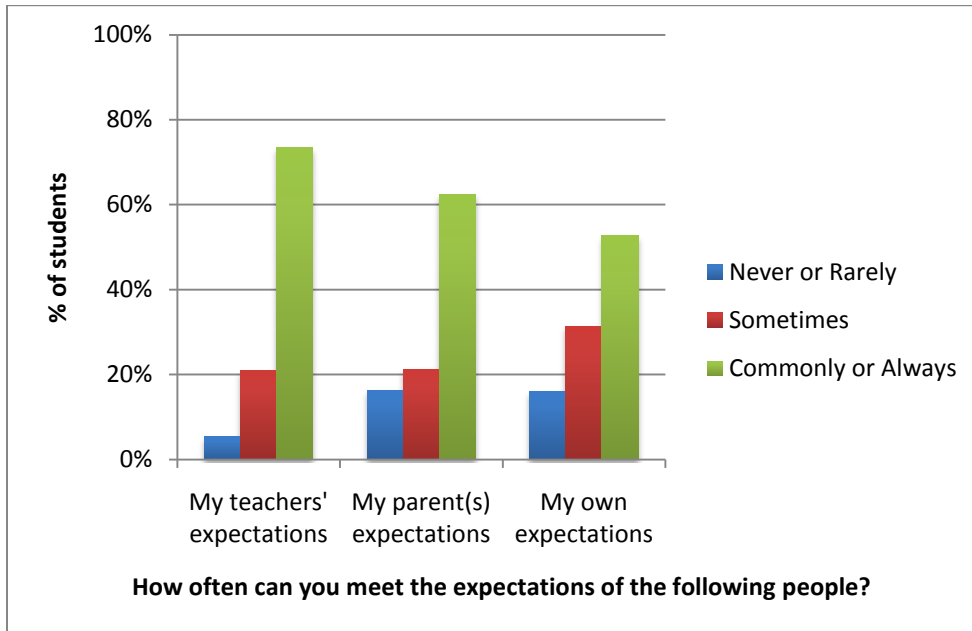


Figure 9. Students' perceptions of their ability to meet the expectations of teachers, parents, and themselves.

Ability to meet personal expectations is strongly associated with student stress. Student's ability to meet their personal expectations is significantly and negatively correlated with their stress level, $r(236) = -.370, p < .001$. Additionally, the greater difficulty students had meeting their own expectations, the more they reported that their personal drive increased their stress level, $r(232) = -.251, p < .001$.

Students' ability to meet their personal expectations is associated with how often students felt they could meet the expectations of parents, $r(237) = .297, p < .001$, and teachers, $r(235) = .388, p < .001$. Ability to meet personal expectations is likely not simply about meeting a certain quantitative GPA cutoff; there is no significant association between ability to meet personal expectations and GPA.

Importance of academic success. In addition to their ability to meet expectations, students were asked how important they perceive their academic success to be for themselves, and the importance they perceive it has for their parents, teachers, and peers. Students reported almost universally that their academic success is very important to themselves and their parents. Eighty-nine percent of students reported that their own academic success was very important to them; as indicated by a 4 or 5 on a 5-point likert scale, with 1=Not very important, 3= Moderately important, and 5=Very important. Ninety percent of students reported that their own academic success was very important to their parents. Sixty-seven percent of students reported that their academic success was very important to their teachers, and thirty-one percent reported that their academic success was very important to their peers.

The importance of academic success to themselves is positively correlated with stress level, $r(237) = .195, p < .01$. This indicates that higher stress levels are associated with greater importance of academic success. Additionally, greater importance of success is positively correlated with GPA, $r(205) = .329, p < .001$.

In addition to the importance of academic success, students were asked about the success they felt they achieved. While all of the subjects were enrolled in a college-preparatory program for high-achieving students, only 27.7% of students reported they achieved a very high amount of academic success, and 45% reported a slightly high amount of success. Twenty-three percent of students reported only a moderate amount of success. Three percent reported a slightly low or very low amount of success. This helps to indirectly assess students' personal drive and

expectations, by assessing how much credit they give themselves for success achieved.

Students' beliefs that they achieve academic success are significantly associated with higher life satisfaction; self-reported success achieved is very highly correlated with overall Life Satisfaction score, $r(232) = .377, p < .001$. This correlation has a greater magnitude than the correlation between GPA and life satisfaction, $r(276) = .231, p < .001$. This indicates that perceptions of success are more strongly associated with Life Satisfaction than quantitative measures of success, such as GPA.

Peer Competition. Pop culture and some research have expressed concerns that peer competition in high-achieving environments is a prevalent and damaging force that increases stress level. This study investigated students' perceptions of peer competition and expectations. For almost every question, more stressed students perceived more peer competition than their less-stressed peers.

While a slight majority of students (55%) report that peers are commonly or always competing for academic success, the vast majority (72%) still report that peers are willing to aid fellow classmates and want each other to succeed (59.1%). Stress is positively correlated with the perception that peers are competing, $r(220) = .264, p < .001$; thus, students who are more stressed reported higher levels of peer competition. Peers may also influence how students assess their academic performance and their stress level: the majority (56%) of students commonly or always use peers as the basis for how they judge their own academic performance, and this is highly associated with higher stress levels, $r(220) = .318, p < .001$. Almost half of students (47%) reported that peers commonly or 'always' expect them to be

stressed, and to handle stress well (45%). The perception that peers expect them to be stressed is correlated with stress level, $r(218) = .215, p < .001$, indicating that students who experience more stress perceive that this stress is reinforced by the expectations of peers.

Barriers to Stress Reduction. An essential portion of understanding sources of stress is not only to explore the impact and contributing factors of stress in this population, but also ways in which students believe stress could be reduced. Students were asked what barriers exist that inhibit stress reduction. Pressure for college was listed as a barrier by the highest percentage of students, with 61.6% of students agreeing that it inhibited their stress reduction. Pressure from parents was listed as a barrier by 43.6% of students. Ironically, 'I don't have time for stress reduction' was listed as a barrier by 38.9% of students. Thirty-one percent of students reported that they were worried that they would be less productive if they were less stress. Pressure from teachers (31.1% of students) and pressure from peers (28.7% of students) are also barriers to stress reduction for some students. Only 6.1% of students reported that they didn't engage in stress reduction because they like stress. The full results of stress-reduction barrier questions are listed in Figure 10.

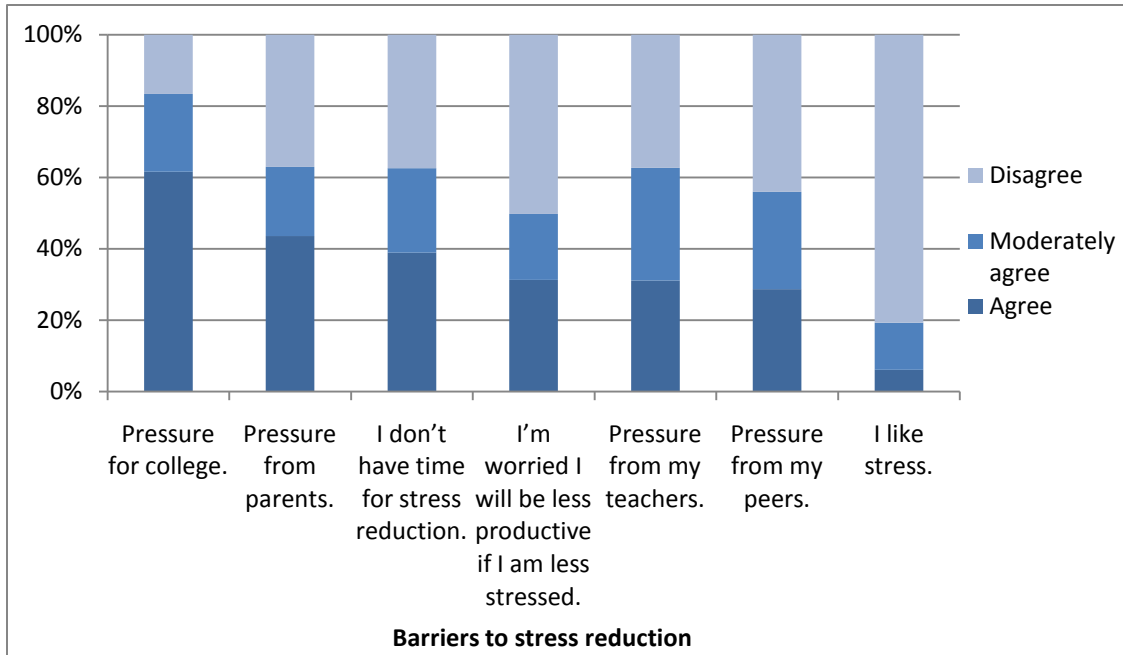


Figure 10. Barriers to stress reduction.

What would students do if the barriers to stress reduction were removed?

Many students indicated they would engage in more healthy behaviors; 83% of students said they would sleep more, 69% of students said they would exercise more, and 66.6% of students said they would eat more healthily. Students also reported that social activities would increase if their stress was reduced; 85.3% of students reported they would spend more time with friends, and 78.1% of students would spend more time on extra-curricular activities. Thirty-one percent of students would take a lighter workload, and 13.3% of students would seek professional help.

In summary, academic workload and desire for prestigious college acceptance have a large effect on the stress of these students. While stress is significantly associated with the extrinsic motivations of completing work to get a good grade or college acceptance, there is no association between stress and the intrinsic motivations of interest in work and enjoying working hard. Despite high-performance

in school, students report difficulty meeting their own expectations and the expectations of their parents.

Discussion

The college-preparatory students in this sample are high-functioning adolescents: they complete rigorous high-school curricula, 71.8% maintain a GPA average of As, A-s and B+s, and an estimated 96% of them will attend 4-year colleges or universities. In addition to impressive academic work, the majority of these students participate in school athletic teams, and many engage in community service and extra-curricular activities. These students report high average Life Satisfaction and few substance-abuse related behaviors.

Yet, in addition to the above picture of high functioning, there is also cause for concern. Chronic sleep deprivation is rampant, and students report an alarmingly high prevalence of physical and mental correlates of stress. Students report being motivated more often by extrinsic factors, such as good grades and college acceptance, rather than intrinsic factors, such as the desire to learn. Despite the fact that almost all students perform at a very high academic level, one out of six students report that they can ‘never or rarely’ meet their personal expectations; the same number that report they can ‘never or rarely’ meet the expectations of their parents. Three out of four students are worried about college acceptance, and feel they will have disappointed their parents if they do not get into a prestigious university.

Pop culture movies have depicted the correlates of high-pressure, and have displayed college-preparatory environments as microcosms full of risky behaviors and substance abuse. News articles and, more recently, scholarly journal articles, have struggled to present an accurate and informative picture, but the understanding

of stress for adolescents in these high-achieving environments remains vague and murky. What is the reality of high-achieving environments?

This study explored stress in these high-achieving environments through a survey of students in two different college-preparatory schools: a private school in Washington State and a public school in Massachusetts. To provide an accurate and in-depth picture of student stress, this study explored 1) the effects of stress, 2) how students deal with stress, and 3) sources of stress present in the high-achieving environment.

One theme that emerged from this study is the double-edged sword of students' placing a high importance on academic success, while reporting low self-perceptions about their abilities to achieve this success; many report a perceived inability meet their own high expectations and the external expectations present in the college-preparatory environment. A second theme that emerged in multiple sections is the powerful role that parents in the stress management of the students.

Section I: The effects of stress

Students reported many harmful correlates of stress play and heavy academic workloads. The prevalence and frequency of a multitude of physical and psychological responses to stress was much higher than the author had hypothesized. More than one out of five students report experiencing constant fatigue, inability to begin work and lack of concentration *almost daily* due to stress. Approximately half of students report experiencing irritability, mood swings restlessness, racing thoughts and inability to sleep *at least once a week* due to stress. A third of students feel anger,

back pain, neck stiffness, and headaches at least once a week due to stress. And one out of four students report such series symptoms as depression, feelings of helplessness, and withdrawal from others at least once a week due to stress. Twelve percent of students report anxiety attacks or panic attacks at least once a week due to school-related stress. The percent of students who report experiencing these symptoms, and many more, and the frequency they report, is alarming. Furthermore, students with higher levels of stress report higher frequency and a greater number of these symptoms.

These symptoms are likely contributed to by the harmful health-related behaviors in which students engage, often in an attempt to complete school-related work. One example is a lack of sleep; there exists a large and significant association between hours of sleep per night and the symptoms of stress discussed above. Lack of sleep may particularly contribute to symptoms such as constant fatigue, inability to begin work, mood swings, and other issues that are connected to sleep deprivation (Roberts, Roberts, & Duong, 2009). Thus, the prevalence of many symptoms may be partially explained by the widespread and chronic sleep deprivation that students reported, with 86.2% of students sleeping fewer than the hours recommended for adolescents by the CDC. Almost a quarter of students get fewer than six hours of sleep a night. Unfortunately, the widespread lack of sleep reported by these students is likely not an anomaly for high-achieving high school environments. In a study of high-achieving school environments in California, Conner et al. (2010) reported that the average was 6.8 hours of sleep per night; the students in this sample averaged 6-7 hours as well.

While many symptoms of stress may be linked to sleep deprivation, promoting good physical health in students may not be as simple as encouraging them to get more sleep. Students reported almost universally that it is their academic work that limits the amount of sleep that they get. Seventy-nine percent of students report that academic work interferes with their sleep; the same pattern was found in Conner et al.'s (2010) sample, where two-thirds of students reported that schoolwork often or always kept them from sleeping more. The present study explored further the interaction between academic work interfering with sleep: 65% of students report that they often fall asleep thinking about more academic work that they have left to do. Academic stress and little sleep may reinforce each other, with students sleeping less due to academic stress and then experiencing more stress because of their sleep deprivation.

Eating patterns are also associated with the experience of physical symptoms of stress. On the surface, student meal behavior appears healthy; the vast majority of students do not skip meals. However, this does not tell the whole story of eating patterns: almost half of students report that their meals are rushed and fit in between work. Students' rushed meals may be both because of and contributing to higher stress levels; many students may rush through meals because of academic stress, and thus do not relax and enjoy their meal times. This may further increase their stress: the relaxing quality of meals is highly correlated with number of physical symptoms of stress that students experience. Thus, students' often rush through meals, and these rushed meals contribute to higher levels of stress and of harmful correlates.

In addition to the many physical symptoms that arise out of the high stress of college-preparatory schools, this environment seems to play a large role in shaping students' perceptions of themselves and their schools. The effects of stress are visible in how students perceive their school and their role in school. Students place a very high importance on academic success, while simultaneously reporting doubt that they can achieve that success, because of their low academic self-perceptions. Students almost universally endorsed Goal Valuation statements such as 'Doing well in school is important for my future.' Students reported the least agreement with the Academic Self-Perceptions statements; one out of three students did not agree with the statement 'I am smart in school,' despite their enrollment in a high-achieving program, and the fact that approximately 96% of these students will go on to attend 4-year colleges. Students' low opinion of their academic ability, combined with the incredibly high importance they place on academic success, is a pattern that repeatedly emerged in a variety of questions throughout the survey.

This problem is only exacerbated by student stress; students with higher stress levels place a higher importance on school yet have lower perceptions of their academic abilities. Causation and directionality cannot be determined, but an interaction between academic self perceptions and stress level indicates that student stress is intimately tied with their perception of their academic abilities.

Previous studies on high-achieving students indicate that low academic self-perceptions may be limited to students in school environments with primarily only other high-achieving peers. Thus, the finding of low academic self-perceptions may not be generalizable to high-achieving students who are also in schools with average-

achieving programs. Suldo et al. (2008) studied high-achieving students in an IB program within a high school that also included average-achieving students. When comparing the SAAS-R scores of Suldo et al.'s sample of high-achieving students versus the present study's sample, the largest difference was in the Academic Self-Perceptions subscale: Suldo's high-achieving student sample reported were a 5.69, while our sample averaged 5.26. Interestingly, the average of the present study's sample is closer to the average-achieving students in Suldo's sample, who averaged 5.27. This discrepancy between Suldo's high-achieving sample and this study's high-achieving sample indicates that the presence of average-achieving youth within the same school environment may contribute to higher academic self-perceptions of high-achieving youth.

Overall, the number of pervasive physical and mental symptoms that students report is disturbing, particularly considering their widespread and frequent presence in an otherwise young and healthy population. The stress-related behaviors that have harmful effects on student health, such as lack of sleep and rushed meals, both arise from and contribute to the problem of high student stress. The harmful behaviors that both result from and contribute to stress are self-reinforcing and linked in a dangerous spiral that is associated with a multitude of detrimental physical and psychological correlates of stress.

Section II: How students deal with stress

An important piece of students coping is who they go to for support, and how effective these people are at providing academic and emotional support. For

emotional support, over 70% of students go to their peers/friends often, and believe that they are effective at providing support. While going to peers for support seems more universal, students are split when it comes to going to parents for support: 46.8% of students go to their parents often for emotional support, and 57% believe their parents are effective at providing that support.

Whether or not students are in the half that perceive parents as an effective and frequently utilized resource for emotional and academic support makes a major difference in a multitude of measures of well-being. Parents were the only member of students' support network for which there was a large and significant correlation between how frequently students sought them for support and students' Life Satisfaction score⁶. Students with higher Life Satisfaction also reported that parents are more effective in providing emotional support and academic help. While causal links cannot be determined, it is likely that perceiving parents as effective support resources, and going to them frequently for help, may contribute toward higher student Life Satisfaction.

In addition to higher life satisfaction and lower stress, students who seek support from parents have higher quantitative school success, as measured through GPA. Higher GPAs are associated with students more frequently going to parents for academic help, $r(220) = .202, p < .01$ and emotional help, $r(216) = .177, p < .01$; and whose parents are effective for academic help, $r(216) = .183, p < .01$, and for emotional help, $r(215) = .204, p < .01$.

⁶ An association was also found between Life Satisfaction and the ability of friends/peers to provide emotional support, $r(242) = .157, p < .05$; however, the magnitude of this correlation is much smaller than that regarding the efficacy of parents in providing support.

Thus, while the highest percentage of students report going to peers most frequently for emotional and academic support, the students who do go to parents for support have higher levels of well-being on many measures, including Life Satisfaction, stress, and GPA. The frequency with which students go to peers highlights the potential importance of effective peer-to-peer support programs. Additionally, the powerful role that parents can play indicates the importance of helping parents learn how to be effective supporters of their children. Parents may be a powerful protective factor against the harmful correlates of stress in these high-pressure environments.

Beyond parents and peers, few other emotional support resources are used by a large percentage of students: under 5% of students reported going often to school counselors, private counselors, coaches, teachers, tutors, or other adults. An increase in the use of school counselors, teachers, etc. in these environments may be an important step toward improving student well-being; the students who do often see school counselors rate them as an effective resource.

Another indicator of how students deal with stress is their attitudes toward falling behind and seeking help. In an environment where all students are expected to perform at a very high level, many students feel hesitant to seek help, regardless of the available support network. The vast majority of students reported feeling as if they needed to be able to catch up on their own, despite their feeling that, “there are a lot of people available to help me.” Such stress on personal reliance may account for students’ high expectations of themselves, and an aversion to falling behind; while 72.2% of students agreed that, in this rigorous academic environment, “Being behind

happens to everyone eventually,” a majority of students still agreed that “It’s my fault for falling behind” and just under half reported “I’m embarrassed to be behind.” This reinforces the possibility that students hold themselves to high standards, and many take personal responsibility for failing to meet those standards. Students with higher stress accept more blame and report more embarrassment for falling behind.

In addition to thoughts and attitudes about their support network and help-seeking behavior, this study sought to explore the behaviors that students utilize to cope with stress. Previous researchers and media reports have expressed concerns that high-achieving (and often high socio-economic status) students will turn to substance-abuse in order to cope with a high-pressure environment (Pope, 2001). However, the students in this study report a much lower frequency of substance-abuse-related behaviors –both to cope with stress and in general - than national studies adolescents have reported. In fact, the behaviors that most students report using to cope with stress are fairly healthy behaviors, the most common being: listen to music, talk to friends, exercise, and talk to parents.

One possibility is that students may have difficulty accurately perceiving and reporting when a behavior is being used as a coping mechanism for stress, as this requires much internal insight that may be difficult to achieve for high school students. To address this, students were asked not only how frequently they engaged in a behavior to cope with stress, but also how frequently they engage in the behavior in general; thus, if students did not identify a behavior as a coping mechanism, the researchers would still have access to the overall frequency of the behavior. Using this system, the researchers were able to assess that even the overall (non-coping)

reports of all substance abuse were very low. Because this survey relies on self-report data, it is possible that students under-reported their substance abuse, despite the complete anonymity of the survey.

An interesting pattern that emerged when comparing the in-general frequency with the specifically to-cope frequency of a behavior is that for dieting, overeating, meditating, and smoking cigarettes, almost all of the overall frequency of the behavior is accounted for in its use as stress reduction. For example, 24.2% of students report overeating at least once a week; and 20% report overeating *in response to stress* at least once a week. Thus, when students overeat, they are almost always reporting that this is a coping mechanism for stress.

In conclusion, peers and parents play an integral role in the support network of many students. Increasing the frequency that parents and school counselors are utilized for emotional support may be a particularly positive entry point for successful stress interventions.

Section III: Sources of stress

Academic workload was almost universally endorsed as having a high effect on increasing stress of students. The vast majority of students report spending ‘a lot’ of time on academics, and students almost universally report that they are expected to do this by parents and teachers. Additionally, students report that they put effort into their academic work most frequently in order to get a good grade or gain college acceptance, and less often because they are interested in their work and/or enjoy

working hard. These external rewards are highly associated with higher student stress levels.

An important difference between schools appeared with questions surrounding the intrinsic motivator “I am interested in my academic work.” The students from the private school in Washington state reported much greater interest in their work than did students at the public college-preparatory school in Massachusetts. Upon further investigation, this pattern of reporting more interest in schoolwork was repeated in several questions throughout the study: it is possible that the private school either attracts students with greater interest in academic work, or that the work assigned in the private school is more interesting to students.

Worry about college acceptance, and especially prestigious college acceptance, was a large and pervasive concern for the vast majority of students. All questions regarding college-related worry were positively associated with greater student stress.

Expectations for high levels of success are reported by the majority of students, who reported that their personal drive and their parents’ expectations had high effects on increasing their stress level. Students report difficulty meeting these expectations. Despite performing at a very high level, one out of six students report that they can ‘never or rarely’ meet their personal expectations or the expectations of their parents. While students place a high value on success, few feel that they achieve this success. One possible explanation is that students who are high-achievers with high internal expectations may choose to attend college-preparatory, high-pressure schools. Additionally, high-pressure environments may cause students to internalize

high external expectations, and thus students' personal expectations may become increasingly difficult to meet. Yet another contributing factor may be the parents who choose to send their children to these schools. Most likely, a combination of these three factors occur in mutually-reinforcing cycles. While the causes of high personal expectations cannot be determined in this study, it is apparent that very high expectations are pervasive amongst students and contribute significantly to student stress.

High stress may also be a part of the school culture; just under half of students reported that peers always or commonly expected each other to be stressed, and expected that fellow students should be able to handle stress well. In this high-achieving environment, being surrounded by high-achieving peers may contribute to students' high stress levels and low satisfaction with their academic performance. More than half of students commonly or always use peers as a basis for how they judge their own academic performance, which is highly associated with higher stress levels.

Interestingly, students' perceptions of their academic success can act as a protective force against reduced Life Satisfaction. There is a stronger correlation between life satisfaction and self-perceptions of academic success than between life satisfaction and quantitative success, as measured by GPA. Thus, in an environment where students are surrounded by high-achieving peers and high expectations, it is particularly important to ensure that students are reminded of the success they do achieve.

An essential question surrounding stress in these environments is what students believe hinders stress reduction. Pressure for college, pressure from parents, and not having time for stress reduction were the most commonly reported barriers. A third of students expressed concern that they would be less productive if they were less stressed. If these barriers to stress reduction were removed, students would engage in healthier behaviors: five out of six students would sleep more and spend more time with friends, and two thirds would exercise more and eat more healthily. These perceived barriers to stress reduction are important considerations when designing an intervention in high-achieving environments.

In summary, the main sources of stress encountered in this study are high personal and external expectations, and pressure surrounding external motivators, such as academic workload, grades and college acceptance. If these barriers were removed, students believe they would engage in healthier lifestyle habits.

Limitations and Future Directions

One limitation that we attempted to address in the design of the study was that students can only report their perceptions, and it can be difficult to accurately reflect on themselves and their lives. To account for the limitations of self-report data, students were asked a mix of questions both designed to elicit their perceptions (i.e., “Do you get enough sleep?”) and questions designed to elicit information that could be understood more objectively (i.e., “How many hours of sleep do you get on the average weeknight?”).

A second concern with self-report information is that students may have, at times, chosen to mis-report their experiences (ie. drinking and drug questions). This was controlled for by making all survey responses completely anonymous; there was no way to identify the names of any students who had taken the survey. This information was provided to the students, and thus ideally students would have seen little reason to answer misleadingly.

Additionally, adolescence comes with many challenges, and it can be difficult to piece apart which findings are caused by the stress in high-achieving environment and which are caused by the adolescent time period in general. To account for this, when possible, data in this study were compared with other samples of adolescents who are not in college-preparatory environments. When we were prevented from comparing our data to national averages due to a lack of previously published scales on our questions of interest, we compared our data internally; students with high stress and students with low stress were compared with each other, in hopes that, if a significant association between student stress and the particular question emerged, we can reasonably assume that the issue is related to student stress.

In future studies, researchers should try to determine the direction of causality within some of the interesting relationships that have emerged from this study. This study succeeded in pulling out a number of important factors relating to stress and high-achieving high school populations. For instance, of the many members of a student's support network, including peers who are often hypothesized to play a vital role in an adolescents Life Satisfaction, we found that parents were the only support network members for which there was a strong correlation between students' Life

Satisfaction and their perceptions of their parents as a resource for academic and emotional support. Perhaps students with better relationships with their parents have higher Life Satisfaction because of their positive family relationships. Or, conversely, perhaps students who feel more satisfied with life are happier at home and thus report better relationships with their parents. We can hypothesize that seeking parents for help and having helpful parents increases Life Satisfaction. Future studies could test this by implementing an intervention aiming to improve student/parent relationships, and comparing subsequent reports of life satisfaction to the baseline.

Future studies should both explore mediating factors as well as attempt to determine the causal relationship between these factors. For example, students who report going to their parents more frequently for emotional and academic support have higher GPAs. Perhaps a positive relationship with parents helps students focus more on their school work. Or, perhaps a mediating factor, such as parental level of education, improves both how frequently students go to their parents for academic help *and* students academic performance in school. Thus, the survey instrument was limited in providing causal relationship or a complete analysis of mediating factors.

Another area for follow-up research is to investigate other forms of high-achieving environments. These environments are by no means limited to college-preparatory schools. Academic stress present in high-achieving environments could benefit from further research with similar questions in populations such as college students and graduate school students. Furthermore, this work should be extended to middle-class students in less prestigious school environments, given that pressure for

prestigious college acceptance is increasingly nationwide, not just amongst high-income families.

This study provided a unique window into the under-studied area of stress in college-preparatory environments. It is my hope that this area will continue to receive the attention of researchers, clinical psychologists and administrators, in order to address the myriad of harmful effects of stress that students disclosed in this study. The necessary first step for any improvement is to document the nature and degree of the stress experienced in this population. While this study highlighted many correlates of stress in this population, these findings also raise many possible areas for interventions on aspects of the environment that are related to stress.

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Appendix A

Table of Coping Behavior Frequency

Table A1

Student responses to the question: Indicate over the past three months, using the scale below, how often you've done each of the following behaviors SPECIFICALLY TO HELP MANAGE YOUR STRESS:

	Never	Less than once a month	One to three times a month	Once a week	Two or three times per week	Almost daily
Talk to friends	14.1	9.7	13.8	16.6	17.9	27.9
Talk to parents	22	17.2	15.5	18.6	12	14.8
Talk to other adults	45.5	18.8	14.7	11.6	6.2	3.1
Use marijuana	90.1	5.8	2	1	1	0
Use alcohol	83.3	9.2	4.1	3.4	0	0
Smoke cigarettes	95.9	1.4	1	.3	.3	1
Use other drugs (LSD, Ecstasy, Acid, Mushrooms)	98.6	.7	.3	0	.3	0
Listen to music	6.5	4.1	8.2	10.6	19.8	50.9
Diet	74.2	7.2	3.1	5.5	4.5	5.5
Meditate or use some other form of relaxation	56.3	13.3	8.5	9.9	7.8	4.1
Overeat	57.2	11.7	11	8.6	5.2	6.2
Exercise	24	12.2	12.5	14.6	14.3	22.3
Cut, burn, brand, pierce, or tattoo	82.4	3.4	1.7	0.7	1	0.7

Appendix B

Coping Behaviors and Life Satisfaction

Table A2

Significant correlations between coping behaviors and Life Satisfaction.

Coping Behavior	Correlation with Life Satisfaction
Cut, burn, brand, pierce or tattoo	$r(284) = -.300, p < .001.$
Overeat	$r(283) = -.290, p < .001$
Diet	$r(284) = -.210, p < .001$
Smoke cigarettes	$r(286) = -.189, p < .01$
Use marijuana	$r(286) = -.130, p < .05$
Use other drugs (LSD, Ecstasy, Acid, Mushrooms)	$r(286) = -.127, p < .05$
Talk to parents	$r(284) = .123, p < .05$