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The Effects of Daytime Sleepiness on School Performance in Late Adolescence

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The Effects of Daytime Sleepiness

on School Performance in Late Adolescence

(TITLE)

BY

Lisa R. Ballinger

THESIS

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The Effects of Daytime Sleepiness

on School Performance in Late Adolescence

Lisa R. Ballinger

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Abstract

Daytime sleepiness and grade point average were examined to assess the strength and direction of the relationship. Other variables measured included depression, test anxiety, and stress. Sixty-one participants completed the study, 15 males and 46 females. Average age of the participants was 20.89 ($\underline{SD}$ = 1.18). Participants were given a series of five brief questionnaires. Participants volunteered for the study and completed the survey in a group, classroom setting. Measures included a demographic questionnaire, the Epworth Sleepiness Scale, Beck Depression Inventory, Test Attitude Inventory and the Perceived Stress Scale. It was found that while an inverse relationship exists between daytime sleepiness and grade point average, it did not approach statistical significance. Although sleep may play a minor role in performance levels, results of this study suggest that a decrease in performance is primarily mediated by other factors. Upon separate analysis of women and those who work or participate in extracurricular activities 12 hours or more per week, findings were similar, yielding significant positive correlations between sleepiness and stress, sleepiness and depression, stress and test anxiety, stress and depression, and depression and test anxiety for both groups, as well as the overall sample. There was also a significant correlation between sleepiness and test anxiety for the overall sample and for

women, but not for those who participate in 12 or more hours of activity per week. None of the partial correlations reached significance for the three groups. An analysis of those who skip one or more classes regularly revealed the same six relationships for women and the overall sample. However, it also revealed a significant inverse relationship between grade point average and test anxiety. The same inverse relationship occurred when analyzing the group of participants who work or participate in activities less than 12 hours per week. For this particular group, the only other significant bivariate relationships were between stress and test anxiety, stress and depression, and depression and test anxiety. For the latter two groups, comparing grade point average and test anxiety while controlling for sleepiness resulted in a slight increase. No other partial correlations reached significance. In conclusion, a combination of many negative symptoms is likely to exist in the lives of college students. It appears that these symptoms are intertwined, which complicates the research process. Further examination of these areas is important in order to devise interventions useful for increasing academic potential.

Acknowledgements

Although I frequently felt that I would never finish this project, the end is finally here! I would like to thank Dr. Linda Leal for her wonderful encouragement and support as my thesis chairperson, as well as Dr. John Best and Dr. Keith Wilson for their support as members of my thesis committee. Very special thanks go to Dr. John Best, Dr. Eleanor Midkiff and Dr. Bill Kirk for allowing me to survey students from their classes. Last but definitely not least, thanks and gratitude go to my family for their love and support, not only during this project, but throughout my entire academic career. It has been a long but rewarding struggle.

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Chapter 1

Statement of the Problem

Daytime sleepiness is a condition which can be caused by a number of factors, ranging from difficulty falling asleep at night to a variety of sleep disorders. While there has been considerable research regarding the prevalence and etiology of specific sleep disorders, little has been done to examine the actual effects sleep deficits may have on performance. The goal of this research was to examine the effects of daytime sleepiness on school performance in late adolescence.

Learning problems in children are often attributed to behavioral difficulties or other specific attention or intellectual deficits. In high school or college years, learning problems are often seen as a consequence of work hours, poor study habits, use of alcohol or other drugs, social obligations and involvement in athletics or other extracurricular activities. The amount or quality of sleep could be viewed as an indirect influence, rather than a key contributor, to poor school performance. A reduction in sleep, resulting in greater daytime sleepiness, might frequently be considered the result of one or more of the above-mentioned factors.

Purpose of the Study

The objective of this study was to gain additional knowledge of daytime sleepiness and its possible

relationship to school performance. Various other
related variables were also examined. In gaining and
applying such knowledge, it is desired that students of
all ages might enhance their ability to develop their full
academic potential.

Review of Literature

Sleepiness is a self-reported craving or desire for
sleep that may also include such behavioral indicators as
yawning, rubbing the eyes, a glazed expression, and a
general decrease in body movement (Dement & Carskadon,
1982). According to these authors, sleepiness is so
widespread that, in our society, it is considered a normal
and inevitable part of everyday life. The pervasiveness
of sleepiness has led to the idea that it may be caused by
boredom, warm rooms, eating, and the like. However, it
may be that the physiological state of being sleepy is
actually already present, and these situations merely
exacerbate the condition. To those who have
responsibilities such as school, work, or other
activities, the primary importance of sleepiness becomes
the degree to which it impairs functioning. However,
sleepiness has been overlooked as an experimental variable
until recent years. While it is generally assumed that
the sleepy student may do more poorly in school,
documentation of this effect may prove difficult.

A recent study by Coren (1994) examined the prevalance of sleep disturbances in young adults. In his sample, only 36% of subjects were absolutely free of any sleep disturbance. Many had multiple sleep disturbances. The most common complaint was morning fatigue, while the least common was nightmares. Interestingly, Coren found that women had a higher frequency of self-reported sleep difficulties than men. Montgomery (1983) also found similar gender differences. However, several other studies have demonstrated little or no statistically significant gender differences related to sleep disturbances (Carskadon, 1990; Gau & Soong, 1995; Morrison, McGee & Stanton, 1992). This may be because the latter studies surveyed early adolescent participants.

An early study by Anders, Carskadon, Dement and Harvey (1978) stated that important changes in sleep patterns and daytime functioning may occur in middle to late adolescence. They found that a significant number of college undergraduates complained of both excessive sleepiness and falling asleep in the classroom, whereas none of the children in the sample had similar complaints. Carskadon, Harvey, Duke, Anders, Litt and Dement (1980) demonstrated similar results in a study utilizing the Tanner assessment system. There are five stages in the Tanner system, with stage one representing pre-puberty and a lack of secondary sex characteristics. The stages

gradually progress to stage five, indicating adult sexual maturation. The authors found that the participants demonstrated increased daytime sleepiness specifically at Tanner stage three. Further, this change appeared unrelated to the number of hours slept during the night and remained constant in later Tanner stages.

Levy, Gray-Donald, Leech, Zvagulis, & Pless (1986) administered a self-report sleep questionnaire to 361 urban high school students. The authors reported that between the ages of 12 and 18, total sleep hours per week decreased. Also, both perception of sleep adequacy and quality of sleep decreased with age. About one-half of respondents perceived themselves as not getting enough sleep. Sixty-two percent reported they would like to nap in the daytime, and one-third stated they actually did. About 15% reported falling asleep in class. About 11% of participants reported the occasional use of alcohol at bedtime, while 4.6% reported the occasional use of sleep medications. The findings of the study seemed to suggest that both physiologic processes and social pressures may contribute to the sleep patterns of adolescents.

In a later study, Carskadon (1990) examined sleep patterns in adolescents and noted that many do not get sufficient sleep. School schedules often require earlier waking, whereas jobs, studying and social activities often require staying up late. Combinations of these factors

may result in a chronic sleep deficit in late adolescence.
Of the ten college students in this study, nine were in
the "twilight zone" at some point during the day. The
"twilight zone" refers to a score of five minutes or less
on the Multiple Sleep Latency Test, which is performed in
a sleep laboratory. The score corresponds to the length
of time it takes a subject to fall asleep.

Montgomery (1983) also examined tiredness among
college undergraduates and its relationship to both social
and performance consequences. In his study, Montgomery
compared tired and non-tired students. He found that the
grade point average of tired and normal males did not
differ; however, tired females reported significantly
lower grade point averages than both normal females or
tired males. There were no significant differences
between males and females in the number of hours of sleep
usually obtained on school nights. Montgomery's study is
somewhat similar to this research; however, the sleep
measure used by Montgomery has been criticized for its
lack of psychometric support, a factor which this study
has taken into account.

In a sample of 943 adolescents, Morrison, McGee and
Stanton (1992) found that 33% reported sleep difficulties.
Among those reporting sleep problems, depression and
anxiety were more likely to be present. Those
reporting no sleep problems had lower anxiety and

depression scores and fewer behavioral problems as reported by parents. Careful attention to sleep histories may be of importance in the evaluation of adolescents experiencing emotional or behavioral problems.

Daytime sleepiness appears to be a common condition among adolescents (Carskadon, 1990). In addition to hindering learning potential, other negative consequences may result from sleepiness, such as an increase in automobile accidents, increased stimulant use to improve alertness or development of the Delayed Sleep Phase Syndrome (DSPS).

DSPS is a serious condition which alters biological functions. The condition is characterized by difficulty falling asleep at a socially acceptable time and difficulty being aroused in the morning (Thorpy, Korman, Spielman & Glovinsky, 1988). The cause of DSPS is unclear, and its prevalence is unknown. Most commonly seen in adolescents, DSPS has been found to produce daytime sleepiness, poor school performance and behavioral problems. A sleep cycle disturbance that is established early in life may be difficult to correct (Salzarulo & Chevalier, 1983). The discovery of a childhood origin for certain sleep problems seen in adults may be a vital prevention factor.

Carskadon (1989-90) reported that daytime sleepiness was much greater with students reporting more work hours

or time spent with extracurricular activities. In her study, the group with the greatest work and activity hours reported falling asleep in classes at least once per week. Girls were more likely to report struggling to remain awake, while boys were more likely to report falling asleep behind the wheel of a car. Reports of daily coffee and tea useage was also considerably higher in the group with more work and activity hours. Additionally, alcohol and cigarette consumption, as well as marijuana use, was higher for the group with greater commitments to outside activities. Daily use of caffeinated soda was high and stable across all groups, both low and high work and activity, as well as among gender. The results of this study suggest that excessive sleepiness among adolescence is a potentially serious health and safety threat. Ultimately, daytime sleepiness is an important variable in the lives of adolescents which warrants further examination.

Description of Variables

Daytime sleepiness was chosen as a broad category to encompass a variety of sleep disturbances or problems which may cause sleepiness, ranging from mild sleep difficulties to serious sleep disorders, such as narcolepsy or breathing-related disorders. It appears reasonable that more significant levels of sleepiness would more adversely affect concentration, thus impairing

performance levels. Daytime sleepiness in the present study was assessed on a general level, rather than focusing on a specific point in time, such as the day of testing. Participants completed a self-report sleep scale for this measure.

The sample in this study consisted of a group of late adolescent college students. As a performance variable, grade point average was chosen since a major part of a college student's day is spent in school, and college is an important and critical aspect of their development and success. It is important to identify those factors which enhance or inhibit school performance in order to maximize a student's learning potential. Each participant's level of school performance was determined by obtaining their grade point average from records, with their consent.

Several other variables, previously identified as predicting poor school performance, were analyzed as possible mediating factors between sleepiness and school performance. The first variable was depression. According to Kovacs and Goldston (1991), school performance appears to be consistently affected by depression. Patient complaints of hyposomnia and hypersomnia were also linked to depression. Resulting attentional problems and reduced motivation make learning tasks difficult. Subsequent academic failure undermines a student's self-esteem and contributes to a negativistic

learning environment.

According to Hill (1994), between 5 to 12% of adolescents in the general population complain of insomnia. Of those, high rates of anxiety or depression often co-existed. It was also found that subjects complaining of insomnia were more likely to be female, have personal and family problems, low self-esteem and moodiness. Because depression is more likely to occur in females than in males, it is possible that many of the female adolescents reporting insomnia in this study were depressed.

Clark, Daugherty, Zeldow, Gotterer, & Hedeker (1988) found that students with higher grade point averages reported fewer depressive symptoms consistently across four years of medical school. In a study by Montgomery (1983), depression was also consistently linked with fatigue. However, the direction and cause of either relationship is unclear. It is possible that daytime sleepiness, as well as school performance, could be either a consequence or a contributing factor to depression.

According to a study by Blankstein, Flett, Watson and Koledin (1990), test anxiety is also linked with sleep disturbance and poorer school performance. The link between sleep disturbance and test anxiety is logical due to the previously established relationship between anxiety and insomnia. In a sample of 48 female and 32 male

introductory psychology students, Koledin (1990) found a consistently significant association between test anxiety and indices of sleep disturbance. Test-anxious individuals were also more likely to report that they woke up with many worries, woke up in a bad mood, or woke up very tired.

One year later, another sample of introductory psychology students included 126 females and 62 males (Blankstein, Flett, Watson, & Koledin, 1990). Once again, test anxiety and sleep disturbance were consistently related. Test-anxious subjects reported feeling physically tense and that they frequently awakened during the previous night and were unable to obtain sufficient sleep. It should be noted that limitations in the study suggested the possibility of the test-anxious student using decreased sleep as an excuse for poor performance, and further research in the area was recommended.

A third variable included in the present study was the levels of stress that the college undergraduate experiences. Many students may become overwhelmed by all the chapters assigned, paper deadlines and lack of study time due to employment and extracurricular activities. There appears to be a particularly strong relationship between stress and academic performance. Sheridan and Smith (1987) assessed 250 students in a public high school located in a large, midwestern, metropolitan area.

Measures included scores for stressors, stress-related symptoms, and stress-resistant resources. Grade point averages were predicted from scores on the various scales. Higher grade point averages were negatively correlated with stressors and symptoms and positively correlated with resources. The study suggested that improved management of stress in adolescence might act as a preventive measure for poor academic achievement, as well as other prevalent social problems, such as drug use or teen suicide.

School, along with other activities connected to it, is one of the primary sources of stress for adolescents (Sarmany-Schuller, 1994). In this study, it was found that problems with students sleeping significantly less than their bodies actually required contributed to a more stressful school environment. A negative correlation between morning tiredness and grade point average was demonstrated. Farnill and Robertson (1990) also found that sleep disturbance was significantly related to stressful life experiences in their sample of first-year Australian college students. However, the direction of the relationship was unclear, and the authors stated that it was most likely reciprocal.

Because previous research has documented possible relationships between depression, stress, test anxiety, and school performance and/or sleep disturbance when each

factor is measured separately, the present study examined the role that sleep and school performance plays when the aforementioned three areas are all measured in the same sample. Depression, test anxiety, stress and daytime sleepiness were all assessed by various self-report questionnaires with a sample of university college students.

Predictions

Based on previous research, it was predicted that an inverse relationship would exist between daytime sleepiness and school performance. It was also believed that once the influence of depression, test anxiety and stress were each removed, the inverse relationship between school performance and daytime sleepiness would remain for the sample as a whole. It was expected that women would report more sleep disturbances than men. It was also predicted that women would report higher levels of depression than men, given past trends. If this were the case, the expected relationship between school performance and daytime sleepiness might disappear in women after controlling for depression.

Chapter 2

Method

Participants

Seventy-two undergraduate psychology students volunteered to participate. Eleven were eliminated because of age or not having a grade point average on record. This resulted in a final sample size of 61 (46 women and 15 men, mean age = 20.89 years, SD = 1.18).

Materials

Participants were given five questionnaires to complete. First, a demographic questionnaire (Appendix A) was used to gain information regarding age, gender and social security number of each student volunteer. Participants were asked various questions regarding sleep habits and alertness, such as the average number of hours sleep obtained per night and whether they tend to be more alert in the morning or the afternoon. In addition, information was gathered pertaining to potential confounding factors, such as the use of substances, including alcohol or over-the-counter medication to aid sleep, academic workload, school absences, work schedules, fraternity or sorority membership, smoking, and participation in athletics or other extracurricular activities.

The Epworth Sleepiness Scale (ESS) (Appendix B) is a relatively new scale designed to measure general levels of

daytime sleepiness (Johns, 1991). Previous sleep measures involved the participant's reports of feelings or symptoms of sleepiness only at a particular time. The ESS consists of eight items which result in an overall scaled score ranging from 0 to 24. Higher scores indicate greater levels of daytime sleepiness. Significant correlations were achieved when comparing the ESS to MSLT (r = -0.379) and polysomnography measures (r = -0.514) of patients previously diagnosed with sleep disorders such as narcolepsy or idiopathic hypersomnia. ESS scores for 30 controls were quite low, with a modal score of 6 for both men and women. The ESS is designed to distinguish among the whole range of daytime sleepiness.

Test-retest correlation was significant (r = 0.82) at five months for a sample of 87 healthy medical students (Johns, 1992). In addition, scores of 54 patients who were initially tested with the ESS while suffering from obstructive sleep apnea syndrome returned to normal levels once they were treated with nasal continuous positive airway pressure. Internal consistency, as measured by Cronbach's alpha, was .88. Factor analysis revealed only one factor in the scales. The ESS is a simple alternative to the more expensive and time-consuming laboratory measures, such as MSLT or overnight polysomnography.

The Beck Depression Inventory (BDI) was used to assess levels of depressive symptomatology (Beck, 1993).

It is a widely used 21-item overall scale. Scores range
from 0 to 63, with higher scores indicating greater
depressive symptoms. Test-retest correlates ranged from
.64 to .90 for nonpatients. Test-retest correlates for
psychiatric patients ranged from .48 to .86. However, for
patients, test-retest may be less useful since patients
are expected to experience reductions in depressive
symptoms, due to both therapeutic intervention and the
passage of time. In an earlier study of 56 college
students, Bumberry, Oliver & McClure (1978) concluded that
the BDI was a valid instrument for measuring depressive
symptomology within a university setting. Correlation
between the primary psychiatrist's ratings of depth of
depression and scores on the BDI was .77. Concurrent
validity has been adequately demonstrated through
comparisons to the MMPI-D scale, Zung Self-Rating
Depression Scale and the Hamilton Rating Scale for
Depression.

The Test Attitude Inventory (TAI) (Appendix C) is a
20-item self-report scale developed to measure individual
differences in anxiety proneness in test situations
(Spielberger, Gonzalez, Taylor, Ross & Anton, 1977). The
TAI also results in an overall score ranging from 20 to
80, with higher scores representing greater levels of test
anxiety. The development of the TAI was based on the two
major components of test anxiety, worry and emotionality.

Worry is the cognitive thoughts one has about the consequences of failing. Emotionality is the physiological reaction evoked by stress. Subscales, each containing eight items, measure worry and emotionality, with subscale scores ranging from 8 to 32. Low negative correlations were obtained between the TAI scale and measures of study skills, intelligence, ability and academic achievement in a demonstration of divergent validity.

Test-retest correlates for the TAI were .80 at two weeks on a sample of graduate students, .80 at three weeks for a sample of undergraduate college students, and .62 at six months for a sample of high school students. Concurrent validity has also been demonstrated through comparison to the WEQ Worry and Emotionality Scales (.58 to .85) and to the Test Anxiety Scale (.69 to .83).

The Perceived Stress Scale (PSS) (Appendix D) was the fifth measure given (Cohen, Kamarck & Mermelstein, 1983). The PSS measures the degree to which life situations are appraised as stressful. It contains 10 items measured on a scale of 0 (never) to 4 (very often). Questions were developed to be general in nature to avoid content specific to subgroups of the population.

Coefficient alpha reliability for the PSS ranged from .84 to .86 in each of three samples. Two-day test-retest correlation for a sample of 82 college students was .85.

The PSS has also been shown to be an adequate predictor of health and health-related outcomes. The PSS, therefore, is a brief, easy-to-administer scale which assesses the extent of stressful life events having occurred within the past month.

Procedure

At time of testing, questionnaires were distributed to each participant. The order of the instruments was counterbalanced. Participants completed the questionnaires in group, classroom settings. They were given brief verbal instructions and encouraged to complete all items. Before they left, each participant was given information concerning possible resources for sleep or mood disorders. Responses to the ESS, BDI, TAI and PSS were scored based on the standard instructions for each instrument. An overall score was calculated for each instrument.

Chapter 3

Results

On the average, participants were enrolled in 15.11 credit hours (SD = 2.05) of college coursework. Participants normally averaged about 7.16 hours of sleep per night (SD = 1.0), but averaged only 6.9 hours (SD = 1.38) on the night prior to completing the questionnaires in this study.

Results showed that 26% of respondents consider themselves to be more alert in the morning, while 61% are more alert in the afternoon. The remainder either indicated that they were alert all during the day or sleepy all during the day. Thirty-nine percent of participants reported that they sleep less on weekends. Less than 2% of respondents smoked or used alcohol to aid sleep. Three percent had been retained a grade in the past and 16% reported the use of over-the-counter sleep aids.

Grade Point Average

A Pearson product-moment correlation matrix (see Table 1) was generated to characterize the relationship between grade point average and each factor while ignoring the other factors in the data set. While the association between daytime sleepiness and grade point average was found to be inverse as predicted, it was not significant.

No other factor measured was related significantly to grade point average for the sample as a whole.

Overall Sample

Significant correlations were found to exist between daytime sleepiness and test anxiety, daytime sleepiness and stress and daytime sleepiness and depression for the overall sample (see Table 1). The relationships between stress and test anxiety, stress and depression and depression and test anxiety also reached significance. Upon further assessment, partial correlations pairing grade point average with daytime sleepiness, stress, test anxiety or depression while controlling for each third variable revealed no significant relationships.

Gender

Women reported more daytime sleepiness (M = 7.96, SD = 3.78) than men (M = 6.27, SD = 2.88). The average score for women on the Beck Depression Inventory was 9.35 (SD = 8.6), while the average score for men was 7.47 (SD = 3.45). Computed values of t tests for both sleepiness and depression scores, however, revealed that these differences were not statistically significant. Zero order and first order correlations for women yielded results similar to the overall sample.

Extracurricular Activities

Separate analysis of those respondents working or participating in athletic, fraternity/sorority or other

extracurricular activities 12 or more hours per week revealed similar results to the overall sample and the sample of women, with one exception. The relationship between daytime sleepiness and test anxiety was not found to be significant (r = -.075).

An analysis of those participants engaging in less than 12 hours per week of additional activities (see Table 2) yielded quite different results. Significant relationships between test anxiety and depression, stress and depression, stress and test anxiety and grade point average and test anxiety (inverse) were found. The relationship between grade point average and test anxiety increased slightly when sleepiness was controlled (r = -.4539, p < .01). Additional partial correlations revealed no other notable pairings.

Skip Class

Seventy-seven percent of respondents surveyed skip one or more classes on a regular basis. Results of these separately analyzed scores revealed the same six significant relationships as did the overall sample and the subgroup of women (see Table 3). In addition, a significant inverse relationship between grade point average and test anxiety was revealed, which increased slightly when sleep was controlled (r = -.3989, p < .01). Once again, partial correlations yielded no further significant findings.

Chapter 4

Discussion

The results of the study indicated that although an inverse relationship exists between daytime sleepiness and grade point average, it did not reach significance for the overall sample or any subset of the sample. Those who are sleepy may be so because of increased study time or commitment to academics or other activities, but perform well in spite of increased sleepiness. Also, an increase in sleepiness levels may often come and go, rather than being stable over time; therefore, occasional fluctuations may not adversely affect overall performance. It may be that while sleepiness plays a minor role in how well or how poorly a student performs, sleepiness is primarily mediated by additional factors, several of which were examined in this sample.

Daytime sleepiness did correlate significantly with test anxiety, stress and depression for the overall sample. In addition, stress, depression and test anxiety were all found to be interrelated. For women and those who skip class, similar significant correlations were found. The similar results for these groups may be due to the fact that women and those who skip class were overrepresented in the sample as a whole.

Previous research has found that women are more likely to experience sleep problems (Hill, 1994). This

finding was not confirmed in the present study. Although overall women scored higher than men, this difference was not statistically significant. This lack of significance is possibly due to fewer men being represented in the present study, which may have led to insufficient statistical power.

On the average, women in the study also scored higher on the depression scale than men, but the difference was not statistically significant. One possible reason for this lack of significance was that the women's scores on the BDI were highly variable.

A separate analysis was conducted specifically to see if the relationship between daytime sleepiness and grade point average would disappear after removing the influence of depression. Conversely, the relationship between daytime sleepiness and grade point average actually increased after controlling for depression, although it did not reach significance. Further study would be required to assess any possible hidden relationship among these variables. Partial correlations among the same variables did decrease, but did not reach significance for those participants with less than 12 hours of work or activities per week and those who skip class, indicating that the original correlation was influenced by depression.

For those students engaging in work or extracurricular activities 12 hours or more weekly, the same areas of significance were demonstrated as in the overall sample, with the exception of daytime sleepiness and test anxiety. However, the latter pairing did approach significance. The sleepy student may experience more adverse symptoms in relation to school functioning. On the other hand, the additional worry and rumination connected with stress, depression and/or test anxiety may alter the normal sleeping patterns of college students, producing a larger score on the sleepiness scale.

For students with less than 12 weekly hours of work or extracurricular activities, there were no significant correlations found among daytime sleepiness and any of the variables. Perhaps these students get plenty of sleep due to less commitments during the week. They may experience less negative symptoms due to having more time for sleep, study or relaxation. For these students, grade point average and test anxiety were closely related, as well as test anxiety and depression and stress and depression. Although sleepiness did not appear to be problematic for this group, test anxiety was, with greater levels resulting in lower grades. Perhaps they know their grades are lower and become anxious during testing. On the other hand, they may become so anxious about tests that it results in lower grades.

Depression also played a significant role for these students. It could be that having less contact outside of the classroom contributes to stress and depression in a similar fashion as having many activities and responsibilities and trying to juggle them all. It may also be that they are unable to handle additional responsibilities because they feel overwhelmed by stress and/or depression.

Further analyses of each data set was performed through the use of partial correlations. For each group, grade point average was paired with sleep while controlling for stress, depression or test anxiety. Grade point average was also paired, in turn, to stress, depression and to test anxiety while controlling for sleep. Results for one of these correlations was discussed previously. Partial correlations pairing grade point average and test anxiety while controlling for sleep for those who work or participate in extracurricular activities less than 12 hours per week and for those who skip class did reach significance; however, these correlations merely increased slightly from the already significant bivariate relationships and, therefore, are considered inconsequential. The remainder of partial correlations produced no noteworthy results for the overall sample or any subset.

The use of sleep aids was much higher than that reported by Levy, Gray-Donald, Leech, Zvagulis, & Pless (1986) in a survey of high school students. The use of sleep aids would be a useful area to explore in future, concentrating more specifically on what type of medication is used, how often it is taken, and what side effects are involved.

In conclusion, it appears that a great deal of symptomology is present in the lives of many college students. While some may learn to compensate for their difficulties and still manage to achieve, there are others who may continually struggle. The variables in the present study were all interrelated. Other measures of sleep problems, depression, stress and test anxiety might produce different results and yield more independent relationships. Samples taken at various times during the school year might also yield different results. For instance, one might expect to find less stress in the first week of school than after the first test or during finals week. Also, for this study, current levels of depression, stress, and daytime sleepiness were compared with previously earned grade point averages. Perhaps this is one factor restricting the association between school performance and depression, stress or sleepiness. The present results suggest a framework for future research in order to better understand the needs of college students

and determine how those needs can best be served.
Improving school performance is important to promote
greater success not only in the college years, but also
later in life.

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Table 1

Correlation Coefficients Among All Variables (N = 61)

	1	2	3	4	5
1. Grade Point Average	-----	-.0774	-.2140	.208	.1650
2. Daytime Sleepiness		-----	.3299**	.321*	.3613**
3. Test Anxiety			-----	.395**	.4834**
4. Stress				-----	.5360**
5. Depression					-----

Note.   *p < .05. **p < .01.

Table 2

Correlation Coefficients Among All Variables for

Respondents with Work or Extracurricular Activities Less

than 12 Hours Weekly   (N = 32)

	1	2	3	4	5
1. Grade Point Average	-----	-.0482	-.4500**	.110	-.0444
2. Daytime Sleepiness		-----	.2640	.132	.1741
3. Test Anxiety			-----	.384*	.3767*
4. Stress				-----	.5109**
5. Depression					-----

Note. *p < .05. **p < .01.

Table 3

Correlation Coefficients Among All Variables for

Respondents who Skip Class (N = 46)

	1	2	3	4	5
1. Grade Point Average	-----	-.020	-.384**	.108	-.019
2. Daytime Sleepiness		-----	.318*	.453**	.534**
3. Test Anxiety			-----	.442**	.461**
4. Stress				-----	.592**
5. Depression					-----

Note. *p < .05. **p < .01.

Appendix A

DEMOGRAPHIC QUESTIONNAIRE

Name _____   Age _____

Class Rank _____   Major _____

Social Security Number _____

		Yes	No

1. Do you ever drink alcohol for the
    purpose of aiding sleep?   _____   _____

If so, how many nights per week? _____

2. Do you participate in college athletics? _____   _____

    If so, how many hours per week are spent
    for practice and games? _____

3. Were you ever told that you walked in
    your sleep as a child?   _____   _____

4. Do you have a job?   _____   _____

    If so, how many hours per week do
    you work? _____

5. Are you more alert in the morning?   _____   _____

6. Do you tend to be more alert in the
    afternoon?   _____   _____

7. Do you ever skip classes?   _____   _____

    If so, how many class periods per week
    do you skip? _____

8. Were you ever retained a grade in
    school?   _____   _____

9. Do you ever take drugs (prescription
    or over-the-counter) for the purpose
    of aiding sleep?   _____   _____

10. Do you sleep less on weekends?   _____   _____

Yes   No

11. Do you participate in extracurricular
    activities other than athletics?   _____   _____

    If so, how many hours per week? _____

12. Have you ever been diagnosed with a
    sleep disorder?   _____   _____

    If so, what was the diagnosis?
    _____

13. Do you ever smoke for the purpose
    of aiding sleep?   _____   _____

    If so, how many nights per week? _____

14. How many credit hours are you enrolled
    in this semester?   _____

15. How many hours did you sleep last
    night?   _____

16. Do you belong to a fraternity or
    a sorority?   _____   _____

    If so, how many hours per week do
    you spend on activities related to
    your membership?   _____

17. What is your favorite leisure
    activity?   _____

18. How many times per week do you eat
    at a fast food restaurant?   _____

19. How many hours do you sleep on an
    average night?   _____

Appendix B

THE EPWORTH SLEEPINESS SCALE

Name: _____ Age: _____ Gender: _____

Social security number: _____

How likely are you to doze off or fall asleep in the following situations, in contrast to feeling just tired? This refers to your usual way of life in recent times. Even if you have not done some of these things recently, try to work out how they would have affected you. Use the following scale to choose the **most appropriate number** for each situation:

0 = would **never** doze 1 = **slight** chance of dozing 2 = **moderate** chance of dozing 3 = **high** chance of dozing

Situation	Chance of dozing
Sitting and reading	_____
Watching TV	_____
Sitting, inactive in a public place (e.g. a theater or a meeting)	_____
As a passenger in a car for an hour without a break	_____
Lying down to rest in the afternoon when circumstances permit	_____
Sitting and talking to someone	_____
Sitting quietly after a lunch without alcohol	_____
In a car, while stopped for a few minutes in the traffic	_____

Thank you for your cooperation

Appendix C

TEST ATTITUDE INVENTORY

NAME _____DATE _____ SEX   M   F

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and circle the appropriate answer according to the key below to indicate how you <u>generally</u> feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

1 = almost never 2 = sometimes 3 = often
4 = almost always

1. I feel confident and relaxed while taking tests.
       1   2   3   4

2. While taking examinations I have an uneasy, upset feeling.
       1   2   3   4

3. Thinking about my grade in a course interferes with my work on tests.
       1   2   3   4

4. I freeze up on important exams.
       1   2   3   4

5. During exams I find myself thinking about whether I'll ever get through school.
       1   2   3   4

6. The harder I work at taking a test, the more confused I get.
       1   2   3   4

7. Thoughts of doing poorly interfere with my concentration on tests.
       1   2   3   4

8. I feel very jittery when taking an important test.
       1   2   3   4

9. Even when I'm well prepared for a test, I feel very nervous about it.
       1   2   3   4

10. I start feeling very uneasy just before getting a
    paper back.
        1   2   3   4

11. During tests I feel very tense.
        1   2   3   4

12. I wish examinations did not bother me so much.
        1   2   3   4

13. During important tests I am so tense that my stomach
    gets upset.
        1   2   3   4

14. I seem to defeat myself while working on important
    tests.
        1   2   3   4

15. I feel very panicky when I take an important test.
        1   2   3   4

16. I worry a great deal before taking an important
    examination.
        1   2   3   4

17. During tests I find myself thinking about the
    consequences of failing.
        1   2   3   4

18. I feel my heart beating very fast during important
    tests.
        1   2   3   4

19. After an exam is over I try to stop worrying about it,
    but I just can't.
        1   2   3   4

20. During examinations I get so nervous that I forget
    facts I really know.
        1   2   3   4

Appendix D

PERCEIVED STRESS SCALE

The questions in this scale ask you about your feelings and thoughts during <u>the</u> <u>last</u> <u>month</u>. In each case, please indicate with a check <u>how</u> <u>often</u> you felt or thought a certain way.

0 = NEVER   1 = ALMOST NEVER   2 = SOMETIMES
    3= FAIRLY OFTEN   4 = VERY OFTEN

1. In the last month, how often have you been upset because of something that happened unexpectedly?

____0   ____1   ____2   ____3   ____4

2. In the last month, how often have you felt that you were unable to control the important things in your life?

____0   ____1   ____2   ____3   ____4

3. In the last month, how often have you felt nervous and "stressed"?

____0   ____1   ____2   ____3   ____4

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

____0   ____1   ____2   ____3   ____4

5. In the last month, how often have you felt that things were going your way?

____0   ____1   ____2   ____3   ____4

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

____0   ____1   ____2   ____3   ____4

7. In the last month, how often have you been able to control irritations in your life?

____0   ____1   ____2   ____3   ____4

8. In the last month, how often have you felt that you
    were on top of things?

    _____0   _____1   _____2   _____3   _____4

9. In the last month, how often have you been angered
    because of things that were outside of your control?

    _____0   _____1   _____2   _____3   _____4

10. In the last month, how often have you felt
    difficulties were piling up so high that you could not
    overcome them?

    _____0   _____1   _____2   _____3   _____4