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ABSTRACT

The aims of the study were to explore the associations between college students' perception of their overall physical and psychological health and four measures of academic performance. College students (N = 265) completed a 65-item Web-based survey in a university's student health services building during the spring 2015 semester. Poorer psychological health was associated with seriously considering dropping out of college and missing more classes during the current school year "due to physical or psychological health reasons." Poorer physical health was associated with enrollment in more credit hours. Students who reported a grade point average (GPA) below 2.0 missed more classes "because of physical or psychological reasons" during the current school year than those with a 2.0 or higher GPA. A longitudinal study is needed to clarify whether better health leads to more successful academic performance or vice versa and which specific health indicators play the largest role.
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BACKGROUND

College graduates tend to have higher salaries, lower unemployment rates, better health throughout life, and increased life expectancy when compared to their less educated counterparts (Hout, 2012; Kena et al., 2014; Madans, Molla, & Wagener, 2004). According to the spring 2015 American College Health Association (ACHA) survey (N = 25,841), within the previous 12 months, stress (30.0%), sleep difficulties (20.0%), and anxiety (21.9%) were reported as the top three health factors that have undesirably affected individual academic performance (i.e., receiving a lower grade on an exam or experiencing a significant disruption in dissertation work) (ACHA, 2015). Additional health factors that affected academic performance included depression (13.8%), cold/flu/sore throat (14.6%), and chronic health problem or serious illness (3.7%) (ACHA, 2015). Furthermore, many students reported being diagnosed or treated by a professional, within the last 12 months, for allergies (18.7%), sinus infection (16.1%), back pain (12.0%), and strep throat (10.2%) (ACHA, 2015).

Despite the fact that most of the literature linking health and academic performance has been conducted with primary and secondary school students, a few studies assessing health and academic performance in college students have indicated associations between the two (Chiang, Arendt, Zheng, & Hanisch, 2014; DeRoma, Leach, & Leverett, 2009; El Ansari & Stock, 2010; Odes & Locke, 2009). For example, DeRoma et al. (2009) found a significant negative correlation between Beck Depression Inventory II scores and grade point average (GPA) in a sample of college students. In another cross-sectional study, El Ansari and Stock (2010) determined a negative association between self-reported binge alcohol drinking and achieving good grades in college. They also found that students who reported better general health were more likely to rate their academic performance as being better relative to their fellow peers. In another study, Chiang et al. (2014) found a negative association between GPA and sleep latency (falling asleep between 2 a.m. and 6 a.m.) on weekdays. Although the aforementioned literature implies some associations between health and academic performance, all of the studies used just one or two measures of academic performance and focused on specific health indicators such as depression. No study has investigated the association between overall physical or psychological health and academic performance using a variety of academic performance indicators.

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In a large public university in Miami, Florida, which had more than 54,000 students enrolled during the spring 2014 semester, the Student Health Services (SHS) Center was marketed as a "medical home" that "empowers students to be advocates for their own medical and holistic wellness" (FIU SHS, 2013a; FIU SHS, 2013b; Florida International University, n.d.). The website describes how "Good health is essential to students' success while at the university and throughout their life." Importantly, however, no study has investigated whether there is any relationship between health and academic performance for the students who attend SHS. Therefore, the purpose of this cross-sectional exploratory study was to determine whether there is an association between students' perception of their own physical and psychological health and academic performance, as indicated by considering dropping out of college, GPA, number of credit hours, and number of classes missed due to health reasons.

METHODS

Survey

A 65-item survey was developed for SurveyMonkey by the seven investigators. After original creation, the survey was reviewed by four SHS employees who are most familiar with the patient characteristics and services offered at SHS at the university where the study was conducted, including the Director of SHS. Based on feedback obtained from these individuals, the survey was subsequently revised. The survey was then pre-tested with 20 undergraduate students from different universities and revised again based on participant feedback, investigators' experiences, and meetings between the investigators. The survey was comprised of the following sections: inclusion criteria (items 1 and 2), socio-demographics (items 3-8), basic college demographics and academic status (items 9-14), self-perceived health status (items 15-16), number of classes missed due to health reasons (item 17), considering dropping out of college (item 18), utilization and exposure to the university's SHS (items 19-51), perceptions about experience with the university's SHS and the impact/contribution of SHS on health and performance in college (items 52-59), intentions and confidence to persist and succeed in college and finish degree (items 60-63), and self-perceived academic success and importance of having good grades (items 64-65).

Data Collection

Everyone who entered the main entrance of the SHS building was invited to participate in the study. Inclusion criteria included being at least 18 years old, enrolled in at least one credit hour at the university during the spring 2015 semester, and attending SHS at the university. Investigators informed potential participants that the survey was anonymous and their participation was voluntary. No personal identification questions were used that could identify an individual. Data were collected during the spring 2015 semester at different time intervals between 9:00 AM and 5:00 PM by one of the five investigators on nine weekdays from March 30 2015 to April 9 2015. Investigators setup their personal laptops, tablets, and phones on a table in the entranceway of the main entrance to the SHS building and students completed the survey at the table or in the surrounding space using the devices. Participants were also provided a link to the survey so that it could be completed on their own personal devices at a more convenient time. If a student was not enrolled in at least one course at the university or under 18 years old, SurveyMonkey informed the potential participant that he/she was disqualified from participating in the study.

Upon completion of the survey, students were given a university promotional item that was donated by SHS and worth approximately $2-$10. The Institutional Review Board at Florida International University approved this study.

Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) Version 18. Descriptive statistics are presented as mean ± standard deviation for continuous variables and as frequencies or percentages for categorical data. Chi-square tests were used to analyze categorical data, and Fisher's exact test was used when chi-square assumptions were not met. One-way ANOVA was used to analyze results between Likert scale data and continuous variables. Significance of tests was ascertained using a criterion p-value < .05.

RESULTS

There were 291 surveys distributed; four were disqualified due to not being currently enrolled in any courses, and there were 22 breakoffs due to device failure or website problems. Remaining surveys from 265 students were incorporated into the analysis.

The majority of students were between 18 and 23 years old (69.5%), female (63.4%), single (88.7%), and Hispanic/Latino (46.0%). More than half (55.1%) of students reported being employed while attending classes. During the spring 2015 semester, participants were enrolled in an average of 12.3 ± 4.1 credits with the majority (79.2%) enrolled in a Bachelor's degree program.

Most students rated their physical health as "good" (57.7%) or "excellent" (23.0%); the remainder reported "fair" (17.0%), "poor" (1.5%), and "very poor" (0.8%) physical health. About half of the students rated their psychological health as "good" (50.2%) and approximately one-fourth as "excellent"

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(28.7%); the other students rated their psychological health as "fair" (14.7%), "poor" (4.9%), and "very poor" (1.5%). About one-fifth of the students (21.5%) answered "yes" when asked whether they "seriously considered dropping out of college or taking time off" during the 2014-2015 academic year. On average, students reported missing 2.7 ± 5.1 class sessions during the current academic year "because of physical or psychological health reasons." The majority of students reported their GPA was 3.0- 3.49 (34.7%) followed by 3.5-4.0 (30.9%).

Those who reported seriously considering dropping out of college during the current academic year rated their psychological health more poorly than those who denied considering dropping out ($p < .01$); there were no differences for physical health. Those who rated their physical health as "very poor" were enrolled in more credit hours than those who reported their physical health as "excellent," "good," "fair," or "poor" ($p < .05$); there were no differences for psychological health.

Students who rated their psychological health more poorly reported missing more classes during the current school year "due to physical or psychological health reasons" ($p < .05$); there were no differences for physical health ($p > .05$).

Students who reported a GPA below 2.0 missed more classes (10 ± 13.0) because of physical or psychological reasons during the 2014-2015 academic year than those with a GPA of 2.0 or higher (2.6 ± 4.8) ($p < .01$). Students who reported a GPA between 2.5 and 2.99 and 3.0 to 3.49 missed more days of class than those with a GPA between 3.5 and 4.0 ($p < .05$). GPA did not differ by rating of overall physical or psychological health ($p > .05$).

DISCUSSION

This is the first study to explore the association between health and academic performance in a group of college students using four indicators of academic performance. In contrast to previous studies that typically looked at only one indicator of health such as depression or sleep problems, we assessed overall (self-perceived) psychological and physical health and demonstrated four significant findings, suggesting an association between health and academic performance.

In our sample, we found that students who have considered dropping out of college during the current academic year rated their psychological health more poorly than those who denied considering dropping out. This supports the findings of a qualitative analysis of a retrospective study by Maher et al. (2013) that revealed that psychological ill health was a major reason for dropping out of medical school. However, in a separate study, Tamin (2013) found that a history of mental health problems at the time of college enrollment did not predict whether healthcare

and social work university students subsequently dropped out from their courses. In the future, investigators should explore which specific psychological health problems may be associated with dropping out of college. In turn, attrition prevention efforts by universities could be geared toward helping students with particular psychological problems. In addition, policy changes which increase the availability of psychological services could result in lower college attrition rates. It would also be of interest to know what proportion of those who reported considering dropping out of college in fact do so, so that this question could be used as a predictor for college dropouts. Our finding of no differences in self-perceived physical health between those who affirmed versus denied considering dropping out is not surprising, because more than three-quarters of the students rated their physical health as "good" or "excellent"; hence, the distribution of the sample may have been inadequate to detect differences. It is also possible that students have misconceptions about physical health. Future studies should consider asking more specific health questions and obtaining medical records to assess health status.

Second, we demonstrated that students who rated their physical health as very poor were enrolled in more credit hours than those who reported their physical health as excellent, good, fair or poor. Students who take on more classes per semester may become physically ill due to the added stress, or students who are in poor physical health perhaps enroll in more credit hours because they do not set aside time for physical activity. There were no differences in credit hours for psychological health. Whereas it is possible that students in poorer psychological health enroll in less credit hours, students enrolled in a large amount of credit hours could also feel stressed and report poor psychological health, despite no differences being detected in the analysis. Future studies should further investigate more specific health problems and their association with number of credit hours so that college policies targeting graduation rates and time to graduation can include a health promotion component, if appropriate.

Third, the students who reported a GPA below 2.0 also reported that they missed more classes during the current school year "because of physical or psychological health reasons," which could suggest that being sick to the point of missing class sessions has a negative effect on GPA. However, interestingly, GPA was similar between those who rated their overall physical or psychological health as good or excellent. This may represent inflated perceptions of personal health in college students, once again emphasizing the need for a study with more objective measures of health. Alternatively, this

Table 1. Socio-demographic characteristics of study participants (n = 265)

	Frequency (%)
Age (years)	
18-23	184 (69.5)
24-29	63 (23.7)
≥ 30	18 (6.8)
Sex	
Female	168 (63.4)
Male	97 (36.6)
Race	
Hispanic/Latino	122 (46.0)
African American/Non-Hispanic	42 (15.8)
White/Non-Hispanic	55 (20.8)
Other	46 (17.4)
Employment status	
Employed	146 (55.1)
Unemployed	119 (44.9)
Marital status	
Single	235 (88.7)
Married	12 (4.5)
Other	18 (7.8)
School classification	
Florida resident	208 (78.5)
Out of state	24 (9.1)
International	33 (12.4)
Degree program	
Undergraduate	210 (79.2)
Graduate	43 (16.2)
Professional or other	12 (4.6)
GPA	
3.5-4.0	82 (30.9)
3.0-3.49	92 (34.7)
2.5-2.99	66 (24.9)
2.0-2.49	20 (7.5)
<2.0	5 (1.9)
Number of credits enrolled	
<9	32 (12.1)
9-11	43 (16.2)
12-14	117 (44.2)
≥15	73 (27.5)
Housing status	
On-campus	84 (31.7)
Off-campus	181 (68.3)

Table 2. Self-perceived psychological health, physical health, and number of classes missed due to physical or psychological health reasons (mean ± SD)

| In general, how would you rate your overall psychological health status? (frequency)	Missed classes (mean ± SD)	In general, how would you rate your overall physical health? (frequency)	Missed classes (mean ± SD)
Excellent (76)	1.4 ± 3.1	Excellent (61)	1.9 ± 3.9
Good (133)	2.2 ± 3.2	Good (153)	2.8 ± 5.3
Fair (39)	4.6 ± 8.2	Fair (45)	3.5 ± 6.0
Poor (13)	8.9 ± 9.5	Poor (4)	5.8 ± 2.1
Very poor (4)	8.8 ± 10.3	Very poor (2)	0 ± 0

Figure 1. Association between psychological health and considering dropping out of college during the 2014-2015 academic year
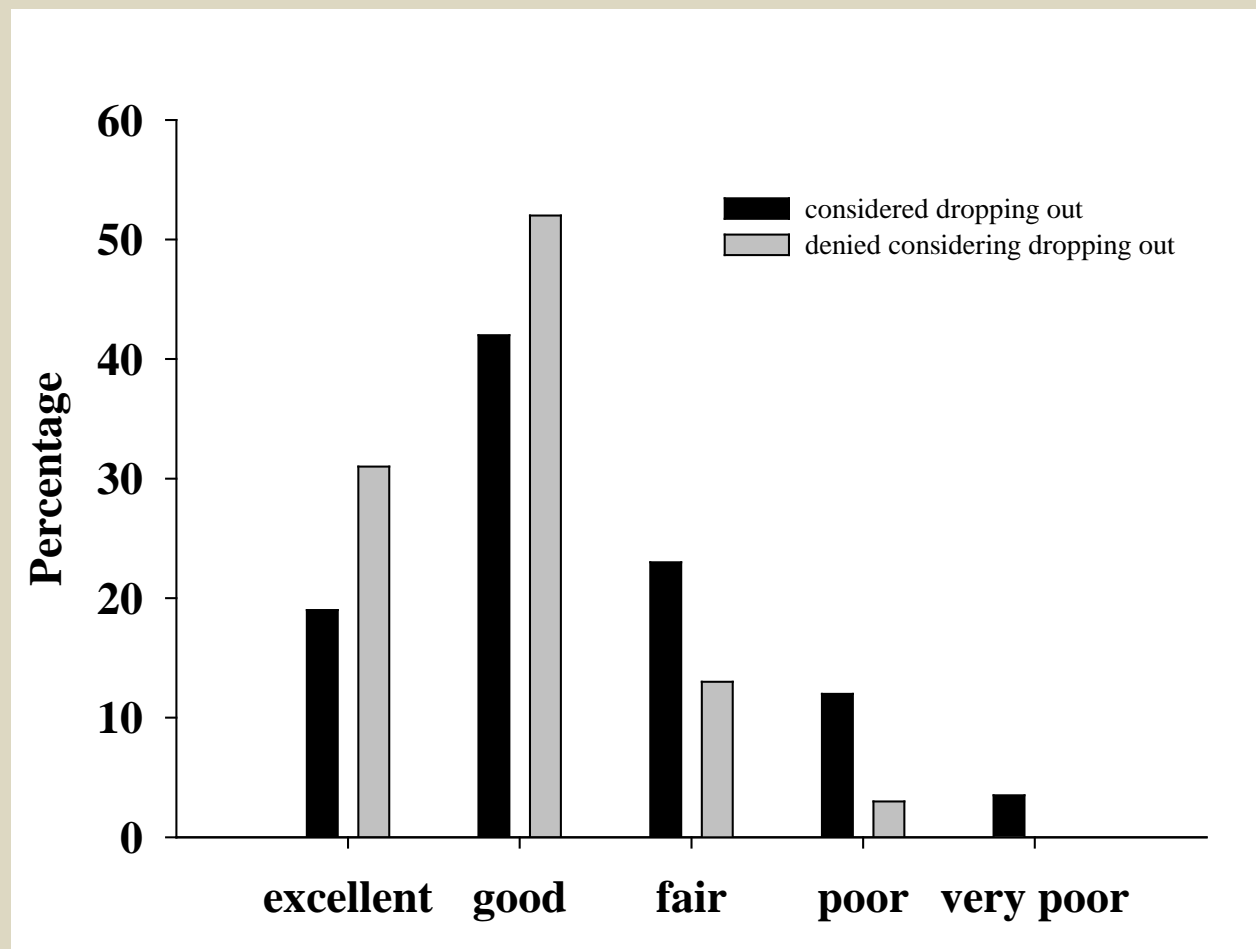
Those who reported seriously considering dropping out of college during the current academic year rated their psychological health more poorly than those who denied considering dropping out (p < .01); there were no differences for self-perceived physical health.

may be because students were rating their health status based on how they felt when they participated in the study, whereas GPA is representative of academic performance throughout, for some participants, the past four or more years. Colleges should invest in studies to determine which specific health variables, if any, are associated with GPA, and appropriate health services should be enhanced on campus. For example, if back pain and depression are associated with lower GPAs, it may be financially worthwhile for universities to invest in better psychological and chiropractic health services.

Fourth, students who rated their psychological health more poorly also reported missing more classes during the current school year "because of physical or psychological health reasons." This finding provides evidence of internal consistency and reliability of our instrument. However, since the same was not found for overall physical health, it is possible that for the students who missed classes "because of physical or psychological health reasons," most cases were due to psychological reasons more so than physical health reasons.

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Figure 2. Credit hours enrolled during spring 2015 semester and self-perceived physical and psychological health
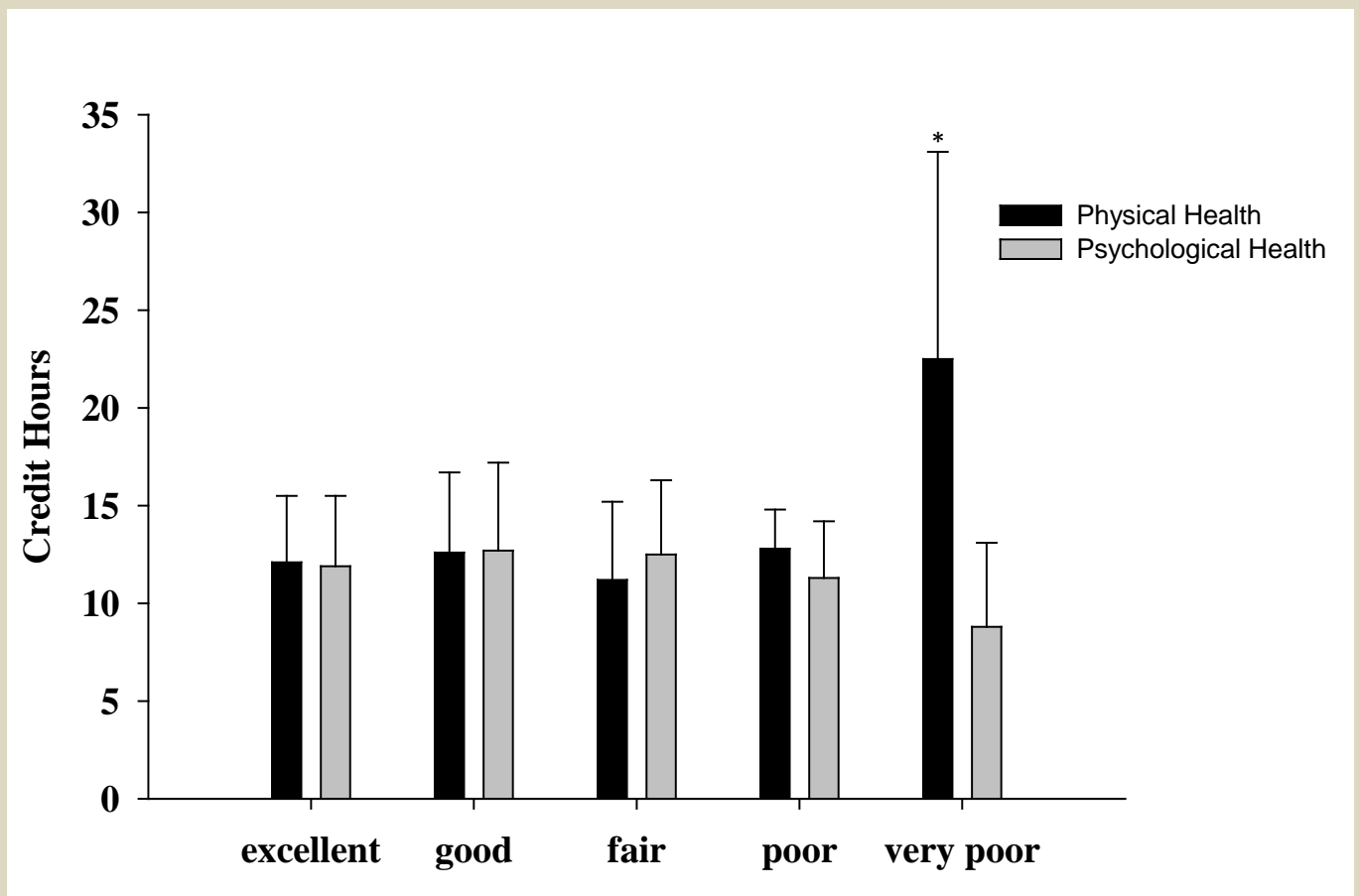
* Those who rated their physical health as very poor were enrolled in more credit hours than those who reported their physical health as excellent, good, fair, or poor ($p < .05$); there were no differences for psychological health.

Of note is that most students rated their physical and psychological health as "good" or "excellent." Although this is an optimistic finding, it is possible, as previously mentioned, that students have an inflated perception of their personal health. In addition, 21.5% of students reported they "seriously considered dropping out of college or taking time off" during the current academic year. Since individuals with a college degree tend to have higher median salary earnings, lower unemployment rates, better health throughout life, and higher life expectancy than their less educated counterparts (Hout 2012; Kena et al., 2014; Madans et al., 2004), future studies should further explore the reasons students consider dropping out of college.

This exploratory cross-sectional study has several limitations. Due to the combination of heavy traffic

flow in conjunction with the relatively small data collection team, we were unable to invite every person who entered the SHS building to participate in the study. However, because this was unintentional and it was at random that students were approached, this likely had little effect on the results. Although the survey did not undergo rigorous validity and reliability testing, it was reviewed, revised, and pilot tested. Nonetheless, we suggest measuring test-retest reliability of the survey in order to establish the survey as a reliable tool that can be used by other investigators. Typical distractions that may have decreased the accuracy of participant responses included cell phone calls and texts and friends walking by to socialize. Because the survey was anonymous, it is possible that participants filled it out more than once. However, because data collection

was conducted over a two-week period and the incentive was modest, it is doubtful that many students visited SHS more than once to participate in the study. Additionally, because all data were self-reported, recall bias and social desirability response bias may have played a role; however, we attempted to reduce these biases by emphasizing the anonymity of the survey and having participants fill out online surveys on the researchers' devices. Lastly, because the survey was conducted at only one university, results may not be representative of all universities in the U.S. Finally, we were unable to control for the following confounding factors – psychological counseling experience, amount of time spent studying, social support, income, and financial aid.

In conclusion, the four major findings of this study reveal that there may be some associations between health and academic performance in this sample of college students. We recommend future studies build upon this exploratory study in order to more clearly depict the associations between health academic performance, so that ultimately colleges can appropriately tailor dropout prevention efforts and future studies can investigate dropout prevention intervention programs. A longitudinal study of health and academic performance in college students will help clarify whether better health leads to more successful academic performance or better academic performance results in better health.

Figure 3. Association between GPA and number of classes missed due to physical or psychological reasons
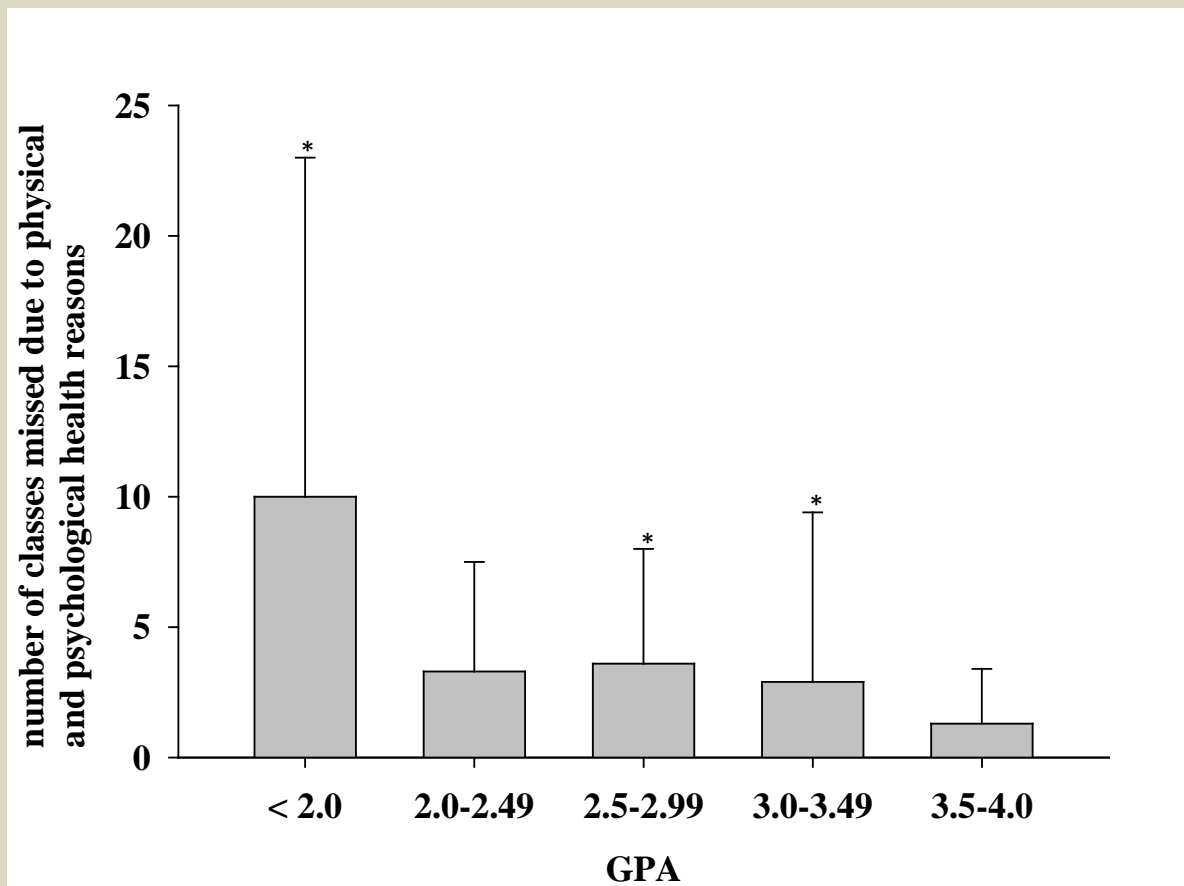
* Students who reported a GPA below 2.0 missed more classes during the current school year due to physical or psychological reasons than those with a GPA of 2.0 or higher. (p < .01); and those who reported a GPA between 2.5 and 2.99 and 3.0 and 3.49 missed more days of class than those with a GPA between 3.5 and 4.0 (p < .05).

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