

# Does Eating Breakfast Affect the Performance of College Students on Biology Exams?

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**Abstract.** This study examined the breakfast eating habits of 1,259 college students over an eleven year period to determine if eating breakfast had an impact upon their grade on a General Biology exam. The study determined that there was a significant difference in the performance on the exam with a higher percent of the participants, who had eaten breakfast passing the exam. The study found that only 65.6 percent of the students participating in the study had eaten breakfast. This finding supports the results of several other studies that people of college age show an increase in the percent skipping breakfast over individual of a younger age.

**Keywords:** general biology, exam performance, standardized tests, breakfast

## INTRODUCTION

Many studies have examined the link between eating breakfast and performance in school (Gagnard, 1986; Mathews, 1996; Pollitt, Leibel, & Greenfield, 1981; Pollitt, Lewis, Garza, & Shulman, 1982; Simeon & Grantham-McGregor, 1989; Worobey & Worobey 1999). These studies have consistently pointed toward the importance of eating breakfast and doing well in school. Several researchers (Cantore, 1999; Given, 1998; Kleinman, 1998; and Pollitt, 1995) further suggest that breakfast can have a significant impact upon the grade obtained in a standardized test. Staub (2000) pointed out that this type of research has played an important role in providing evidence that supports the need for school lunch and breakfast programs. Morse and Pollack (1988) recognized that the importance of eating a good breakfast does not end after adolescence, but is an essential part of a healthy life style.

However, much of the research has been focused on public school students, ranging from pre-K up to high school. Fewer studies have focused on college students and the effect breakfast may have had on their performance. Some of the studies that have examined this segment of the population have measured glucose levels and performance of college students on memory

tests or minimal skills tests (Gagnard, 1986; Deije, Heemstra, & Orlebeke, 1989; Benton & Parker, 1998; and Benton & Sargent, 1992). Their research has consistently agreed with earlier research that breakfast does play a crucial role in performance. This longitudinal study intends to add to the body of knowledge on the relationship between academic performance and eating habits by examining the performance of college students who ate breakfast on the day of major Biology exams.

## PROBLEM STATEMENT

The fundamental question that drove this study was to determine if there were a significant difference in the performance on Biology exams of college students who had eaten breakfast and those who had not eaten breakfast.

## SAMPLE

The study involved 1,259 community college students who were enrolled in General Biology I classes. The classes involved in the study began at 8, 9, or 10 am. The study extended from spring 1993 through fall 2004.

The study was conducted on the Brenham campus of Blinn College, a residential community college in Brenham, Texas. The students at Blinn College are

predominantly freshmen, 80.4 percent. Males comprise 50.2 percent of the Brenham campus population and females comprise the remaining 49.8 percent (Blinn College, 2003). Most of the students on the Brenham campus are traditional students who are between 18-21 years of age, with an average age of 20.6 (Blinn College, 2003). The majority of students, 87.1 percent, on the Brenham campus are full time students, taking at least 12 credit hours. The ethnic breakdown of the Brenham campus students are as follows: Caucasian 74.8 percent, African-American 16.3 percent, Hispanic 7.8 percent, Asian 0.5 percent, American Indian 0.2 percent, and foreign students comprise 0.4 percent of the population (Blinn College, 2003). While the study did not track ethnicity or gender, the General Biology classes are freshman level courses with no prerequisites and, as such, contained comparable demographics to the campus as a whole.

### METHODOLOGY

The second major exam was selected for determining the effect of breakfast on test results. I chose to use the second major exam as a focal point for the study in an attempt to minimize the effects of students adjusting to a new class and professor. A single survey question was placed at the top of the exam that asked, "Did you or did you not eat breakfast

this morning?" Following the premise of the American Dietetic Association (1996) that breakfast is when you eat, not what you eat, the administrator of the exam explained that breakfast could be a Pop Tart, a bowl of cereal, piece of cold pizza, piece of fruit, or a full blown traditional breakfast. It was further explained that a cup of coffee alone was not considered breakfast. The students were then asked to indicate if they had breakfast or not by checking the appropriate box. A limiting factor in this study is that the students were not asked for details concerning what they ate for breakfast or when they had last eaten. Another limiting factor to this study was that it was only conducted in General Biology classes at a single community college.

### FINDINGS

The data revealed that 65.5 percent self identified they had eaten some type of breakfast. Of those that had eaten breakfast, 72.7 received a "C" or better on the test. The data showing the number of students who had eaten breakfast and those that had not eaten breakfast along with the corresponding letter grade they received on the exam are shown as a bar graph in Figure 1. The data show the actual number of students out of 825 who ate breakfast and out of the 434 who did not eat breakfast.

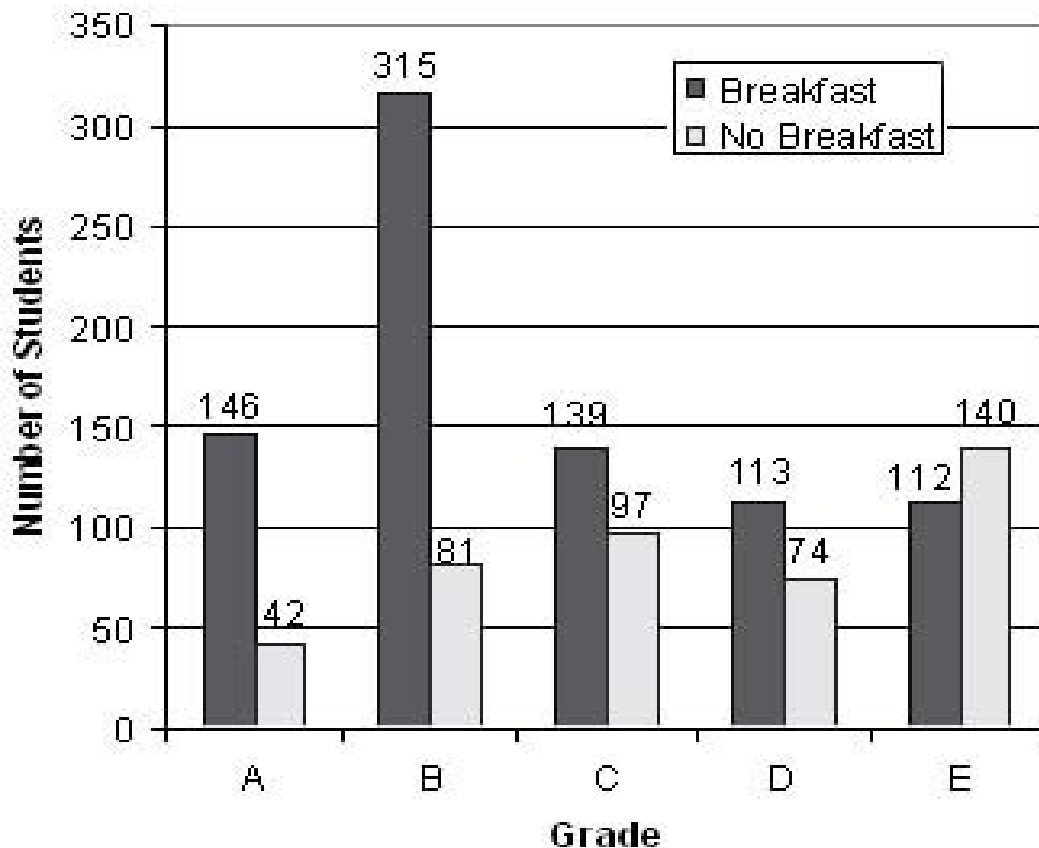
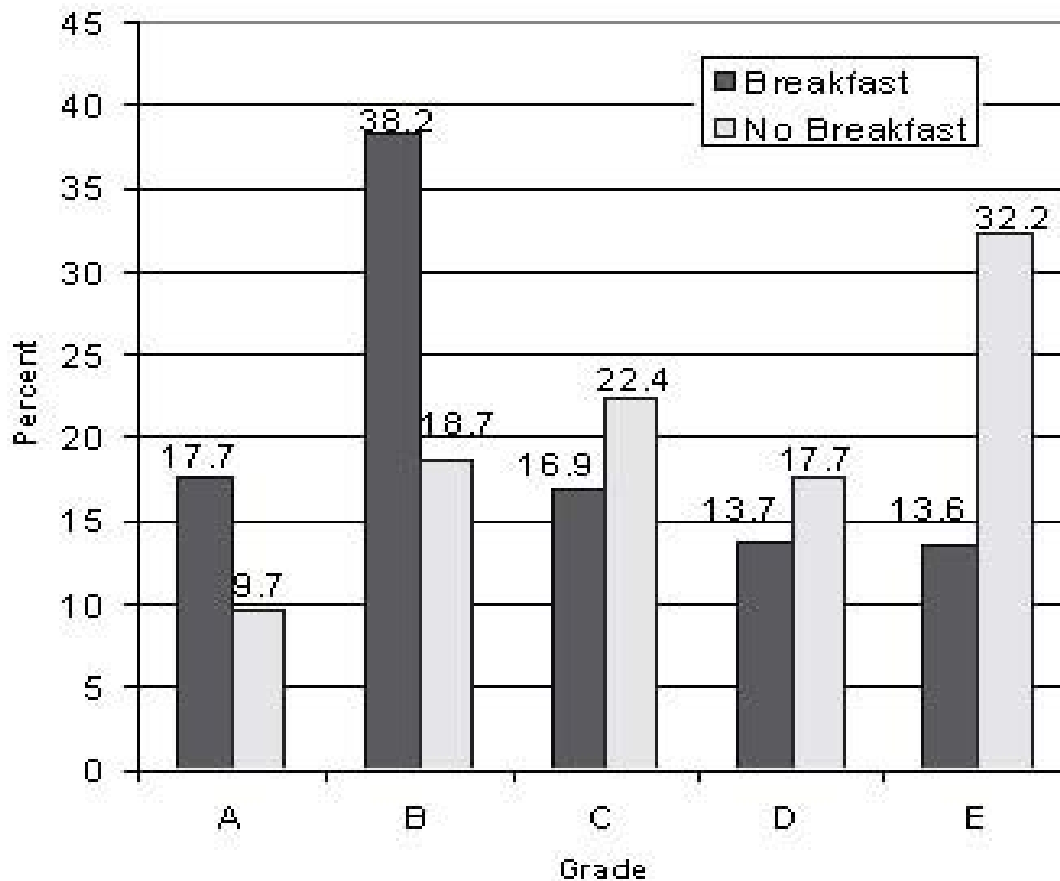


Figure 1. Raw Data Showing Student Performance and Breakfast Consumption

As one examines the letter grade categories, the data clearly show significant difference in the performance of those who had eaten breakfast and those that did not have breakfast. During the course of the study 188 students made an “A” on the second exam, this includes 17.7% of the students who had eaten breakfast and 9.7% of those who had not eaten breakfast. Similarly, the results show that 38.2% of the students eating breakfast received a “B”; whereas, only 18.7% of the students not eating breakfast received a “B”. At the “C” grade level, we see a reversal of the

trend as only 16.9% of the ones eating breakfast and 22.4% of those not eating breakfast receive a “C”. In the case of a “D” grade, the percents are 13.7 for students who had eaten breakfast and 17.1 for those who had not. A large difference occurs at the “F” level with only 13.6 percent in the case of the students having eaten breakfast, but 32.3 percent for those who hadn’t receiving an “F”. Figure 2 graphically illustrates the data presenting an obvious disparity in performance between those students who ate breakfast and those that did not.



*Figure 2. Percent Performance of Those Student who had Eaten Breakfast and Those that did not have Breakfast*

## RESULTS AND DISCUSSION

This study showed that students who ate breakfast had a higher success rate on General Biology exams than those students who did not eat breakfast. This finding supports earlier research, which indicated that eating breakfast affects student performance. It also provides a platform from which to strongly encourage college students to eat breakfast as a method of augmenting their study strategies and maintaining a healthy positive life style.

It is equally important to point out that 72.7 percent of the participants who passed the test (C or better) had eaten breakfast. In contrast, 50.8 percent of

the students who had not eaten breakfast passed the test (C or better). While eating breakfast does not insure that students will pass the exam or replaces the need to study, this research does suggest that eating breakfast provides students with an advantage on major Biology exams.

Another finding in this study is the overall percent of students, 65.6, who self identified as having had breakfast. According to the United States Department of Agriculture (1998) and a study conducted by Haines, Guilkey, and Popkin (1996) the percentage of people who eat breakfast decreases with age. The USDA study claimed that 92 percent of

children ages 6-11 eat breakfast, while only 75-78 percent of adolescents ages 12-19 are reported as eating breakfast. According to a report in the American Heart Association Journal (Kartashov, et al., 2003) only 47 percent of Caucasians and 22 percent of African Americans reported daily breakfast consumption. In another recent survey conducted by Harris Interactive (2003) consisting of 3,925 American adults, only 38 percent eat breakfast every day. These studies indicate a general trend that adults skip breakfast more frequently as they age. The average age for the participants in this study is 20.6 (Blinn College, 2003). The data from this study correlate with the pattern of decline in eating breakfast as determined by the prior research (Figure 3).

It must be recognized that this preliminary study constitutes a correlation between breakfast and exam scores, not a regression. Other factors such as when

the student arose, when he/she went to bed, the amount of time spent studying for the exam, etc. must be considered to help determine if the results are a correlation rather than a cause and effect.

### CONCLUSION

Although this study was only conducted in General Biology classes at Blinn, it may suggest a trend at colleges in general. Research mentioned earlier in this paper and similar unreferenced studies have provided ample evidence that school children's mood and performance levels are affected by eating breakfast. Still other research has investigated the levels of blood glucose in affecting performance of college students. The results from this study support the general conclusion that eating breakfast has an effect on test results.

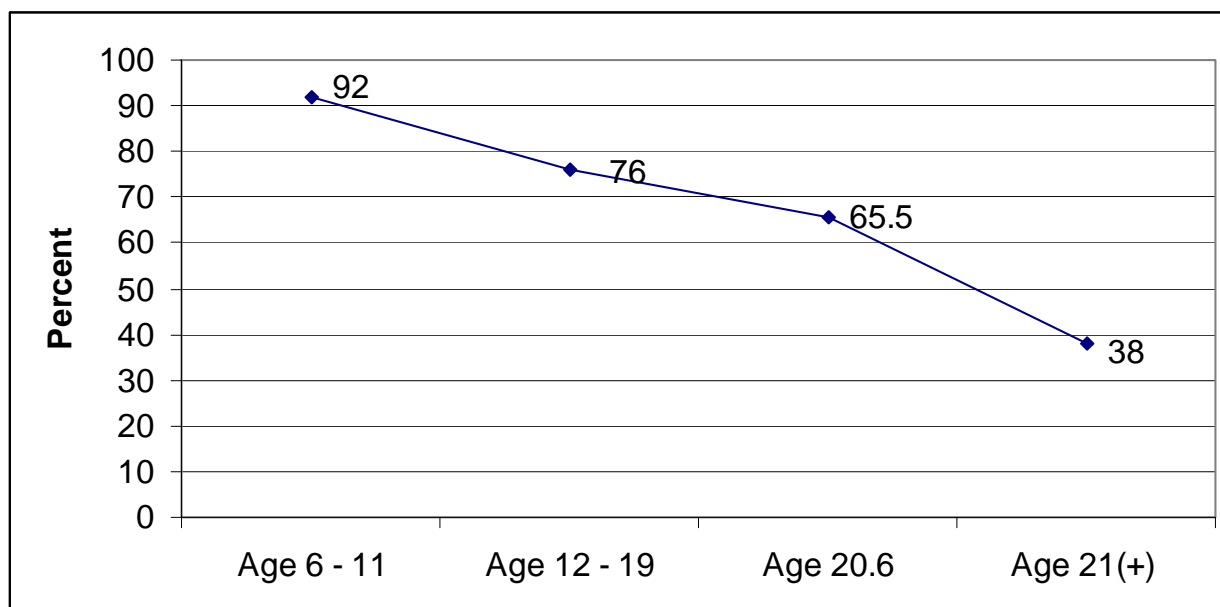


Figure 3. Decline in Breakfast Consumption with Age

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