

# Relationship between Students' Achievement in Statistics I and Mathematics Grade, English Grade and Whether They Are Living with Their Family or Living Independently

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## ABSTRACT

There are many key factors contributing to a success in a course at university. This paper will examine the relationship between first year students' achievement in statistics and quantitative mathematics and English language grades they earned in grade-12 national exam. The effect of how they live (whether students live with their family or not with their family (independently)) on the achievement in statistics is also investigated. Pearson correlation coefficient and t-test comparing two means were employed. The findings suggest that mathematics grade and English language grade statistically correlate with statistics score but the difference in statistics score for the students living with their family and those not living with their family is not statistically significant, that is, whether the students live with their family or living independently does not affect their achievement in statistics I.

**Keywords:** statistics score, relationship, correlation, mathematics grade, English language grade, t-test

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## Introduction

CamEd Business School is the dominant institution in Cambodia to provide higher education in accounting and finance field with high quality. The school offers a variety of programs such as BA, CAT, ACCA as well as some diplomas. Undergraduate students pursuing BA program, in their first year, are required to take two statistics courses, one in the first semester and another in the second semester. Students' learning is taken care seriously. Some research studies concerning students' learning have been conducted, to say a few, Uy (2017) studied the correlation between 3rd-year students' F1 CBE achievement and other variables such as Aptis score, math score, midterm score, and whether or not the students joined the extended review classes of F1. Siphath(2017) conducted a study on the behavior of CamEd students in his economics classes and in the study, a significant relationship between the mathematics knowledge and understanding level of macroeconomics subject is suggested.

The strong knowledge in statistics helps students to be well prepared in accounting, finance and banking-related subjects in their higher academic years. Hamada et al. (1988) discussed the important role of statistics in accounting, marketing, finance, and production. Learning statistics seems to be challenging. English proficiency of non-native English-speaking students is found to be in the correlation with academic performance in other college courses. To be successful in a subject there may be many relating factors. Prerequisites for the subject are very important.

The purpose of this study is to examine the relationship between academic achievement in statistics I for first-year BA students and some other factors: whether the students are living with their family or living independently and quantitative grade-12 national exam achievement in mathematics and English. This study is important for students to be well prepared for the success in that subject.

The study will seek to answer the following questions:

- 1) Is there a significant difference between mean statistics scores for the students who live with the family and those who live independently?
- 2) Is there a significant relationship between statistics scores and mathematics scores?
- 3) Is there a significant relationship between statistics scores and English language scores?

## Methods

The analyses in this paper are based on the data collected from first-year CamEd students in the first semester of the academic year 2018. The questionnaire including how they are living in Phnom Penh (with their family or not with their family), their grade-12 national exam letter grades in mathematics and English, and statistics midterm exam scores (in percent) was dropped in google class rooms in JJ2018 and 311 students responded. IBM SPSS 21 for window was used to perform the data analysis including descriptive analysis, independent sample t-test, and Pearson correlation.

The variables in this study are:

- 1). Students' midterm exam score (statscore).
- 2). How the students are living (living), which assumes the value of 1 for those who are living with their family and 0 for those who are NOT is a factor.

- 3). Mathematics score (mathgrade) achieved in grade-12 national exam is independent variable.
- 4). English score (enggrade) achieved in grade-12 national exam is independent variable.

A scale ranging from 1 to 6 was used to code “mathgrade” and “enggrade” as 1 = F; 2 = E; 3 = D; 4 = C; 5 = B and 6 = A.

## Results

Of a total of 311 respondents, 88% which corresponds to 274 respondents are living with their family and 12% are living independently (*Figure 1*).

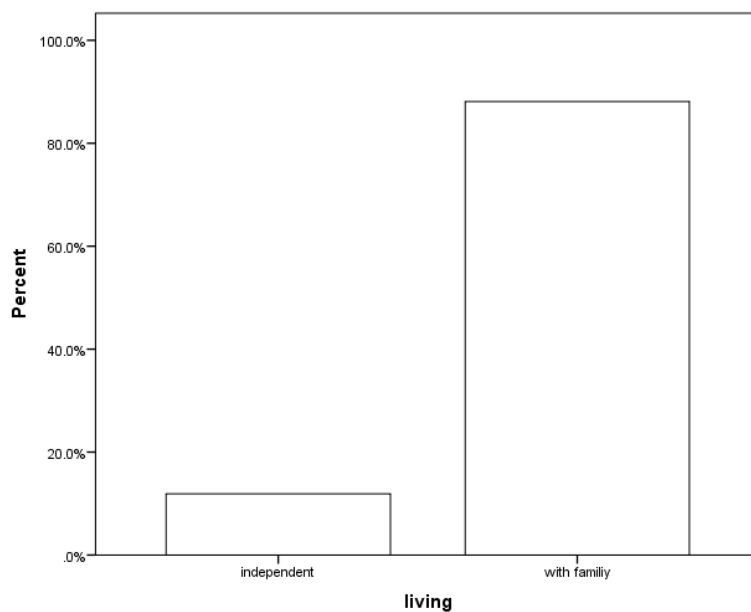
The descriptive statistics, the mean and standard deviation of statistics midterm exam score, mathematics score and English score were shown in Table 1.

Table 1

### *Descriptive Statistics Summary*

| variable          | <i>M</i> | <i>SD</i> |
|-------------------|----------|-----------|
| Mathematics score | 3.58     | 1.56      |
| English score     | 3.78     | 1.37      |
| Statistics score  | 72.28    | 18.25     |

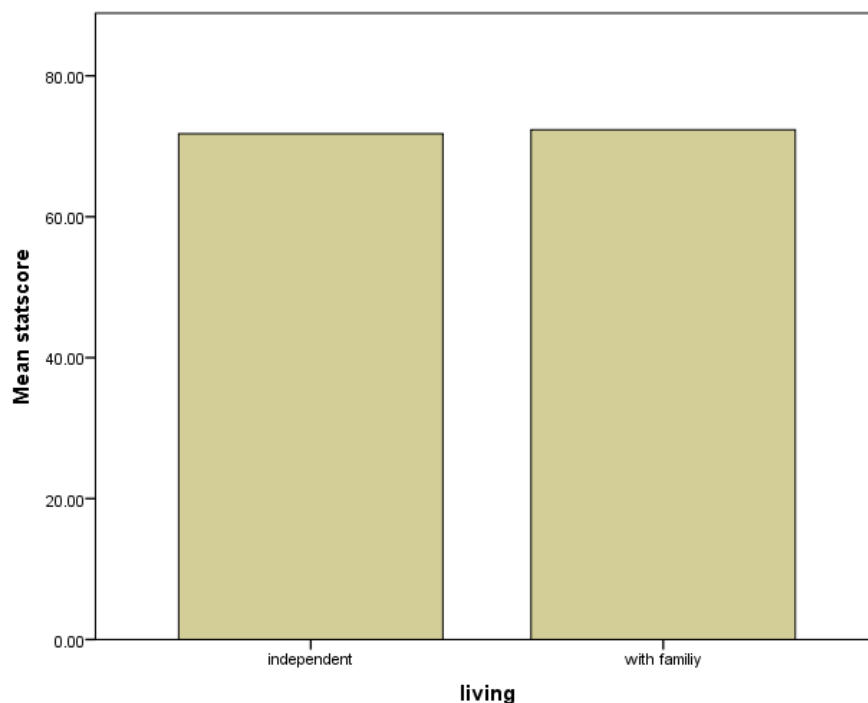
*Note.* Total number of respondents (sample size) is  $N = 311$



*Figure 1.* Percentage of the respondents living independently or with family

The independent-sample t-test was conducted to compare the means of statistics midterm score for the students who are staying in Phnom Penh with their family and those who are not living with their family. Inspection revealed that there was homogeneity of variance as assessed by Levene's Test for Equality of Variances. Therefore, an independent t-test was run on the data with a 95% confidence interval (CI) for the mean difference. It was found that there was not a significant difference between statistics midterm score for the students who are staying with the family ( $M = 72.34$ ,  $SD = 18.41$ ) and those who are living independently (*Figure 2*) ( $M = 71.78$ ,  $SD = 17.22$ ),  $t(309) = -.175$ ,  $p = .86$ , with a difference of  $-.559$ , 95%CI  $[-6.851, 5.139]$ .

Further investigation on correlations found that mathematics score ( $M = 3.58$ ,  $SD = 1.56$ ) has a significant relationship with statistics score ( $M = 72.28$ ,  $SD = 18.25$ ),  $r(309) = .46$ ,  $p < .001$  (*Figure 3*) while English score ( $M = 3.78$ ,  $SD = 1.37$ ) statistically correlates with statistics score significantly,  $r(309) = .306$ ,  $p < .001$  (*Figure 4*).



*Figure 2.* Means of midterm statistics scores for the students living with their family and the students living independently (not with their family)

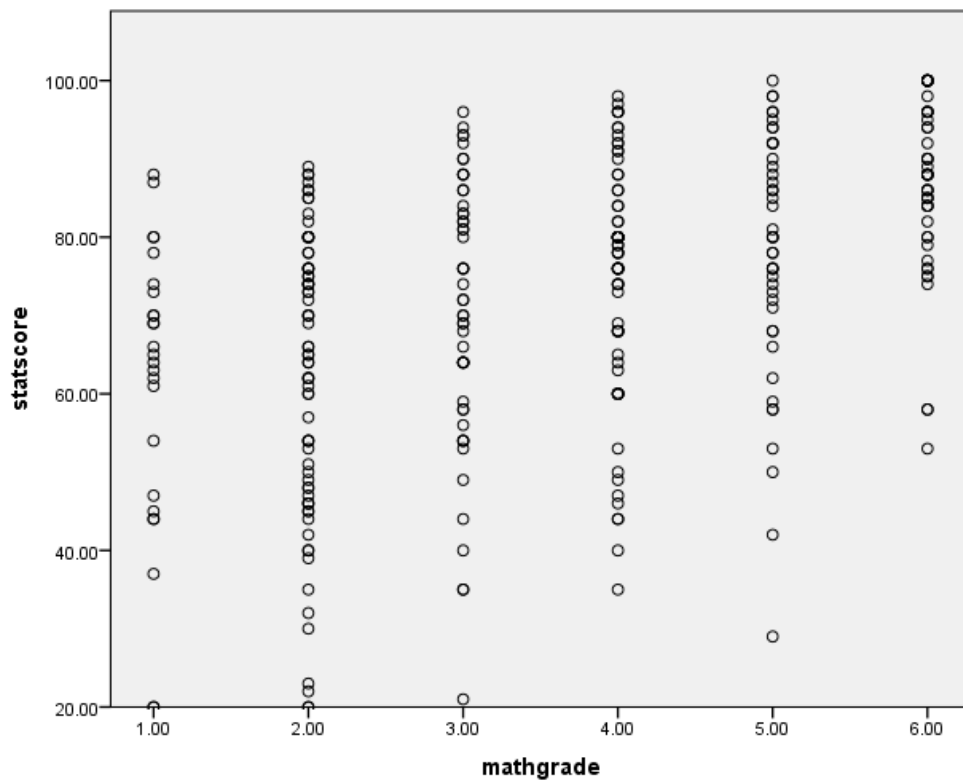


Figure 3. Statistics scores vs. mathematics scores

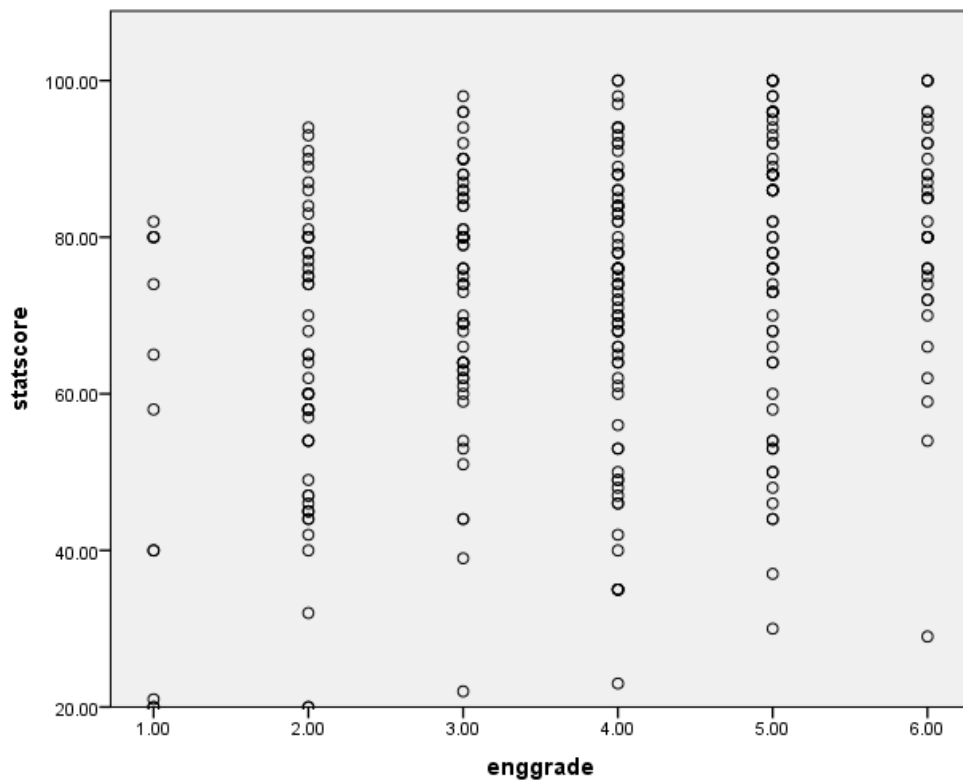


Figure 4. Statistics scores vs. English scores

## Discussion

The results of the study suggest that whether the students are living with their family or living independently does not affect the academic performance in Statistics I. The study also found that mathematics score in national grade-12 exam statistically correlates in a positive manner with achievement in Statistics I. English score is also found to positively statistically associates with Statistics I achievement based on the results of the study. The strength of correlation between mathematics score with the score in Statistics I is higher than the strength of correlation between English score with the score in Statistics I.

The findings of the study are aligned with Uy (2017) in fact that mathematics and English language proficiency has a significant positive relationship students' achievement in F1 CBE. The results are also aligned Siphath (2017) who found the significant correlation between the knowledge of mathematics and students' achievement in macroeconomics. The results of the study are also in line with Lai, Tanner, & Stevens (2011); Lunsford & Poplin (2011); Johnson & Kuennen (2006) that mathematics skill is one of the factors in association with introductory college statistics performance. The findings that English proficiency is positively related with the scores in Statistics I are not far away from the many others correlation study results, which found that high English competence correlates with high level academic performance in other subjects. Wong & Chia (1996) found among the first-year accounting-major students with higher competency in English, there is a significant association between mathematics proficiency and academic performance in financial accounting courses. Hence, there are many evidences that mathematics and English Language are linked to the success in many college courses.

It is worth restating that this study is limited to the fact that the participants are voluntary CamEd students and that mathematics and English exam scores are converted from letter grades received in grade-12 national exam.

## Conclusion

The analysis lead to the following conclusions. How the students are living (whether they are living with their family or living independently) does not significantly affect their academic achievement in Statistics I. There is a significant positive relationship between academic achievement in Statistics I and mathematics and English language grades in grade-12 nation exam. Therefore, mathematics and English language proficiency is very important for accounting and finance students.

Future research should be done using the real exam mathematics and English language scores, not the ones scaled from letter grades. Also, further study should examine the effect of whether the students are living with family or living independently during university life and the effect of student gender on overall GPA.

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