

# Multinomial Logistic Modelling of Socio-Economic Factors Influencing Spending Behavior of University Students

Gogo Jacqueline Akelo<sup>1\*</sup>, Stephen Muteti Mbunzi<sup>1</sup> and Cyrus Gitonga Ngari<sup>1</sup>

<sup>1</sup>Department of Mathematics, Computing and Information Technology, University of Embu, P.O.Box 6-6100, Embu, Kenya.

## Authors' contributions

This work was carried out in collaboration among all authors. Author GJA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SMM and CGN managed the analyses of the study and managed the literature searches. All authors read and approved the final manuscript.

## Article Information

DOI: 10.9734/AJPAS/2019/v3i430102

### Editor(s):

(1) Dr. Ali Akgül, Professor, Department of Mathematics, Siirt University, Turkey.

### Reviewers:

(1) Atul Anand, Anna University, India.

(2) Kunio Takezawa, Institute for Agro-Environmental Sciences, NARO (NIAES), Japan.

Complete Peer review History: <http://www.sdiarticle3.com/review-history/48195>

Received: 10 January 2019

Accepted: 25 March 2019

Published: 04 June 2019

Original Research Article

## Abstract

This study aims at determining the use of Multinomial Logistic Regression (MLR) model which is one of the important methods for categorical data analysis. This model particularly deals with one nominal or ordinal response variable that has more than two categories. Despite the fact that many researchers have applied this model in data analysis in many areas, for instance behavioral, social, health, and educational, a study on spending habits of University students have never been done. To identify the model by practical way, we conducted a survey research among students from University of Embu. Segment of the population of students in undergraduate level, a sample of 376 was selected. We employed the use stratified random sampling and simple random sampling without replacement in each stratum. The response variable consisted of five categories. Four of explanatory variables were used for building the primary (MLR) model. The model was tested through a set of statistical tests to ensure its appropriateness for the data. From the results, the study reveals that year of study, family financial level, gender and school are significant factors in explaining spending habits of students. Despite the fact that gender is one of the deterministic factors of financial behavior of student, this model identified family level of income as a major deterministic factor.

\*Corresponding author: E-mail: [gogoakelo@gmail.com](mailto:gogoakelo@gmail.com);

Conclusively, using MLR model accurately defines the relationship between the group of explanatory variables and the response variable. It also identifies the effect of each of the variables, and we can predict the classification of any individual case. The researchers recommend that, the Universities peer counselling department, should hold trainings on the basis of major determinant of financial spending behavior i.e. family financial level.

*Keywords: Multinomial logistic regression model; categorical data; Undergraduate University students; spending behavior.*

## 1 Introduction

University or college students are in a distinct period of their lives where they start to manage their money independently without their parent's supervision [1]. Most of them start to deal with monetary challenges such as paying bills, keeping a budget, or having bank account bearing their own names for the first time. Thus due to this reason many students find themselves unable to manage their finances well hence ending up being so much broke that they are unable to meet their financial obligations towards the end of the semester as compared to the start of the semester, where they spend their finances extravagantly. This is a problem which most of the students are facing throughout their campus life. Very little studies have been done among Kenyan Universities and none in University of Embu to explain the above observed behavior. Therefore, there is a need of drawing a satisfactory statistical model of personal finances among university students to explain the observed behavior of financial hiccups. Consequently, providing solution to issues that may arise thus identifying the difference in spending habits of students of different gender, years of study, family financial background and school which this study will address.

With a specific end goal to analyze the trend of the relationship between the impact of social factors and average amount spend by students, historical perspectives were explored. Lyons [2], investigated Credit Practices and Financial Education Needs of Midwest College Students. The researcher used simple random sampling to obtain a sample of 835 college students. The study found that gender, ethnicity, financial independence, total amount of debt and credit card acquisition prior to the college were significant predictors of risky financial behaviors. Some of these factors are among what we consider studying. With the below studies it is apparent that none of them was conducted in Kenya, also very little has been done in Africa. Therefore, it was worth to establish the social-economic factors influencing the spending habits in Kenyan universities. The findings of this study can help students to know the factors which affect their habits of spending and take correct measures. For instance, to learn how they should spend their finance based on the findings of this study, so that, towards the end of semester they will still have some amount to cover for their needs. These findings can be used to create awareness among parents so that they could understand the rate at which they will be providing financial support to their children It can also help the university counseling department to point out the key factors to consider when solving cases where students find themselves straining to meet their basic needs as a result of poor finance management at the beginning of the semester. Furthermore, the department can also utilize these findings to organize training on financial awareness.

### 1.1 Gender versus spending habits

Consider a research on the saving and spending habits of young people [3]. This was among British adolescents in London It is important to note the findings of such a study, as not many researchers have attempted to investigate the financial habits of children. Insights on reasons as to why college students have adopted different spending habits may be provided by focusing on a younger age bracket [3], is able to suggest why an individual may be more susceptible to spending, as early exposure to certain attitudes and parental treatment can largely factor into the development of spending habits. The study on British children asks participants to complete a questionnaire which asks about sources of income, how much money is generally put into savings, where it is stored and the purpose it is intended for Furnham [3]. The main demographics [3] focuses on are gender, age and class, with the first two proving to be highly significant. This research conclude that age is the most powerful predictor of saving [3]. The older a child is, the more money he or she will receive and save. However, this could be due to differences in socialization, as it is found that at a younger age, boys are receiving more

pocket money and are allowed to take on part-time jobs before girls [3]. This finding by Furnham [3] may explain what gender differences cause on financial attitudes that appear within multiple studies. The socialization and upbringing of boys in comparison to girls builds a separate framework for handling money issues. Finally, social class differences appear to be a difficult demographic to measure. It is foreseen that higher socioeconomic status implies huge savings. However, the sample turned out to be a homogenous population of children from middle class backgrounds [3]. The challenges faced during the study did not give room for full investigation of the range of demographics that were initially intended for study. According to most of the studies, gender has been identified as a deterministic factor of spending habits. For instance, we considered a research on Attitudes toward Credit and Finances among College Students in Brazil and the United States. In this study participants were recruited from several departments and classes all over the campuses, comprising of core courses. In this study, the researcher employed the use of simple regression analysis. The study reveals that women have a more frequent participative budget than men [4]. According to the research conducted by Roberts [5] on Consuming in a Consumer Culture: College Students, Materialism, Status Consumption and Compulsive Buying is a contradiction to [4]. A study by [5], found that women have been brought up and enculturated to obtain satisfaction from shopping. Therefore, there is a manifestation of spending behaviors among them, particularly compulsive buying compared to men.

Villanueva [6], had interest on factors affecting spending and saving habits of college students. In the study the gender tests for differences in spending that may arise was treated depending on if either the participant was male or female. The study spliced data for gender into 25 male participants and 30 female participants. The numbers for the gender variable were thus aggregated across all class years and ethnicities. Between males and females, data supports the idea that males are more likely to spend more in a given month than females. More precisely, results reveal that females are 4.1% less likely to spend than the average male student, a finding that was expected. Again, the sample population, consisting of 54.5% female and 45.5% male, is representative of the more populous female demographic of Skidmore College [6]. From this we can see that none of them fitted MLR model to assess whether gender is significant. They just gave descriptive statistics on the effect of gender on spending habit and did not develop a statistical model, particularly MLR model to express the extent to which gender affect spending habit.

## **1.2 Family financial background versus spending habits**

To validate the fact that the financial behaviors and attitudes of college students are an international focus, [7] analyzes the relationship of savings behavior and financial issues among college students in Malaysia. From their results, financial experience prior to college often fosters poor habits. Majority of students first experience financial self-reliance at the university level. There is overall low financial literacy among young people. The sample consists of both private school and public school students, which later proves to be a significant factor in the study [7]. Participants that come from private schools are more likely to come from wealthier backgrounds. They accounted for the high volume of spending among these students [7]. Generally, respondents in this sample are more prone to spending than saving. More than half of the respondents choose to spend money that they receive from scholarships or education loans [7]. Often, this money is spent on personal shopping, most of which is consumed before the end of one semester [7]. This highlight that the students who are from richer background tend to spend more than the other students since they have enough money to use unlike the other students from lower class background who try to spend carefully their resources thus it is believed that the financial status of a student have influence on the amount of money which he/she spends.

## **1.3 Year of study versus spending habits**

In the study by about financial literacy [8], the findings shows that younger people do not know how to handle their finances well and moreover, there is a learning curve that exists when making the transition from being completely financially dependent to slowly becoming financially independent where students from their first years were considered as financially dependent and fourth years were considered almost financially independent [8]. The researcher also believed that people with less work experience which comprise of young people are more likely to have less knowledge on managing their finances. Villanueva [6], in her study where she took class year as one her factors influencing spending habits of students. The regression results of class year from her study found that freshman and senior students exhibit higher spending behaviors while sophomores and

juniors exhibit less spending. However, their findings indicate that fourth years also tends to spend more on average. Thus arguing that transition from college to post graduation may also probe more spending in preparation and anticipation of a higher income [6]. Also in their findings show the signs of the coefficients were as expected, where freshman students were positively correlated and sophomore and juniors were negatively correlated with average spending [6]. From this literature we can see that since most of them was done outside our continent there is need to study for us to research on this and determine whether the findings will be the same.

## **1.4 Research gap**

After analyzing most of the researches done in this field, majority have used descriptive statistics analysis. None of them has used MLR model to draw conclusions over socioeconomic factors on spending behavior of university students. Despite the fact that many researchers have several case study, University of Embu has never been used as a case of study. The researchers were interested in knowing whether there was a difference in the pattern of spending behavior of University students with reference to different times in a semester. Further, this study sought to demonstrate the application of MLR model to examine the factors associated with the spending behavior of University students in high income families, low and middle income families. Finally, determine the significance of the explanatory variable.

## **2 Research Methodology**

### **2.1 Definition of variables**

There were two categories of variables in the study. First was the dependent variable which analyzed the average spending habit of an individual per month and was measured through a multi-choice question that asked students to estimate their average spending. It was categorized into five sub-divisions. The second category was independent variables which include; year of study which is quantitative i.e. it take values 1, 2, 3 & 4, gender which had two sub-divisions. These included family financial status which was further categorized into three categories depending on income of the parents and school of the respondent which was also categorize depending on each one's school where we had five categories representing each school.

### **2.2 Target population**

The targeted population was University of Embu undergraduate students. This was because the study was about the spending behavior of undergraduate students in Kenya.

### **2.3 Scope of the study**

The study area was University of Embu which was partitioned into five strata which were the schools of study of respective students. These included: School of Pure and Applied Sciences (SPAS), School of agriculture (SOA), School of Education and Social Sciences (SESS), School of Nursing (SON) and School of Business (SOB). It's a public university which is fully chartered with an approximate population of 6200 students [9].

### **2.4 Sample size and sampling technique**

#### **2.4.1 Sampling size**

The researchers obtained representative sample for the population as follows; [10], states that a sample size needs to be adequately and accurately selected so as to make sure the sample is indeed a representative of the whole population under study in order to provide reliable and accurate information needed.

The targeted population was all the undergraduate students in University of Embu taking various courses. The sample was arrived using Yamane's formula

$$n = \frac{N}{1 + Ne^2} = \frac{6200}{1 + 6200(0.05)^2} = 375.75 \approx 376$$

See [11].

Where  $n$  – sample size,  $N$  – the size of the population and  $e$  – the error of 5% points.

Proportional allocation was then used to distribute the sample among the five strata which were the five schools and the sample per school was as follows

- School of pure and applied sciences
- School of Agriculture
- School of Nursing
- School of Education and Social Sciences
- School of Business

#### 2.4.2 Sampling technique

The researchers used stratified sampling technique. The entire population was classified into five strata in which each stratum represented each school in University of Embu. The strata were of unequal sizes and therefore the researchers employed the use of proportional allocation to eliminate sampling error (lack or representativeness of the exact population). And therefore, the sample was large to represent the whole population. Simple random sampling without replacement technique was employed within each stratum to obtain stratum sample. This was because each element of the population had equal probability of participating in the study. Mark et al. [12], argues that this technique involves one selecting the sample at random from the sample frame. This methodology was considered to be very good for the study. The following are the results from proportional allocation.

Strata	No. of students
School of pure and applied sciences	125
School of Agriculture	62
School of Nursing	34
School of Education and Social Sciences	73
School of Business	86

#### 2.4.3 Data sources and instruments

In order to acquire accurate information, the study relied mainly on primary sources of data. This type of data was collected using structured questionnaires which was formulated by the researchers on the basis of research objectives. The questionnaires were structured with both closed ended and open ended type of questions. [13], claims that a questionnaire is considered to be the best tool for collecting data in a descriptive design. The questionnaire was divided into two main section, the first section is made up of questions seeking background information of the respondent. The second part of the questionnaire had questions regarding to the above objectives.

#### 2.4.4 Reliability

It was concerned with the extent to which instruments yield the same results on repeated trials. Even though unreliability was unavoidable to a certain extent, there exist a good deal of consistency in the results from a quality instrument gathered at different times. The tendency toward consistency found in repeated measurements is referred to as reliability [14]. This makes it very important that the researcher in social sciences and humanities determine the reliability of data gathering instrument to be used [15]. The reliability of the instrument was tested using SPSS, by computing Cronbach’s alpha coefficients. I had desired a higher values of alpha and this showed that items had relatively high internal consistency (measure how well the items on the same test measure the same idea). A score of 0.75 will be deemed sufficient for the study. The manual formula is as follows;

$$\alpha = \left( \left[ \frac{k}{k-1} \right] \left[ 1 - \frac{\sum \text{var}(x_i)}{\text{var}(t)} \right] \right)$$

Where

$\alpha$  – reliability

$k$  – number of questionnaires (total number of the sampling elements i. e. sample size)

$\text{var}(x_i)$  – variance associated with each item

$\text{Var}(test)$  – variance associated with test scores.

After performing the analysis using Cronbach's in SPSS we generated the output below which shows that the questionnaire was reliable and questions had high internal consistency  $\alpha=0.86$ .

### 2.4.5 Validity

By definition, validity of a measuring tool was the degree to which a test measure the topic and characteristic of interest. To check validity of the instrument used in this study, the content validity method as suggested by [16] where, the researchers subjected questionnaires to three experts including our supervisor.

## 2.6 Data analysis

### 2.6.1 Model specification

Suppose we obtained a sample of  $(n)$  independent observations of the pair  $(X_i, Y_i)$

$$i = 1, 2, \dots, k$$

Where  $(Y_i)$  denoted the value of a dichotomous outcome variable with  $j^{th}$  categories  $j = 1, 2, 3, 4, 5$  and  $(X_i)$  was the value of a single independent variable for the  $j^{th}$  subject. Define,  $\pi_{ij} = \Pr(Y_i = j)$  the probability of the  $i^{th}$  average amount spent whose outcome fall in the  $j$  category. To model the probabilities  $\pi_{ij}$  ( $i = 1 \dots n$  and  $j = 1 \dots J$ ) we allow these probabilities to depend on a vector  $x_i = (x_{i1}, x_{i2}, \dots, x_{ip})$  of the covariate associated with the  $i^{th}$  average amount spend.

### 2.6.2 Multinomial logistic model

The analysis adopted was multinomial logistic regression since our response variable was measured in terms of five categories which each category was compared to an arbitrary providing  $j-1$  logistic regression models which were fitted. The following were the categories used.

- Less than 2500 category  $j = 1$*
- 2501 – 3750 category  $j = 2$*
- 3751 – 4500 category  $j = 3$*
- 4501 – 5500 category  $j = 4$*
- Above 5500 category  $j = 5$*

This model was used to test the effects of the independent variable on the average amount spent per month in a semester. The model was as follows;

Let probabilities associated with the response category for the  $i$ th average, amount spend will be  $\pi_{i1}, \pi_{i2}, \pi_{i3}, \dots, \pi_{ij}$ . The probabilities of the response  $Y_i = 1, 2, \dots, J$  were expressed probability of a response of  $j^{th}$  category. The probabilities are given as

$$P(Y_i = j) = \pi_{i1} + \pi_{i2} + \pi_{i3} + \dots + \pi_{ij}, \quad j = 1, 2, 3, \dots, J$$

Where

$$\pi(x_i) = \frac{e^{\beta_0 + \beta_1 + \beta_2 + \dots + \beta_n}}{1 + e^{\beta_0 + \beta_1 + \dots + \beta_n}}$$

See [17].

Where

- $x_1$  represent gender as a factor
- $x_2$  represent year of study
- $x_3$  represent the family financial status
- $x_4$  represent the school
- $\epsilon$  is the error component
- $\pi(x_i)$  is the probability of an event belong to an  $j^{th}$  category

Further, independent variables correspond to each specific factor being tested in relation to the individual spending mechanism.

### 2.6.3 Model diagnostic and building

Goal of model building was to develop a model with the best set of independent variables. In statistical inference situations, [18], suggest the use of entropy  $B[\bullet]$  which is expressed by

$$B[f; g] = \int \log \left\{ \frac{g(z, x)}{f(z)} \right\} f(z) dz \quad \text{where } f(z) \text{ and } g(z, x) \text{ are density functions of the true and}$$

fitted model while  $X$  is the vector of observations. Further, according to Akaike [18], on entropy maximization principle, estimate of  $f(z)$  should be obtained from the data  $X$  using the object of statistical inference. And obtain  $g(z, x)$  which minimizes the expected entropy.

$E[B[f; g]] = \int B[g(z, x)] / f(z) dz$  Which is our expectation operator. Given that the sample size used in this study is too large i.e.  $n \geq 30$ , according to Barnett and Lewis [19],

$$-2n = \{B[f; g]\} \cong \eta + 2k - L \quad \text{Where } \eta \text{ is the log-likelihood ratio test given by}$$

$$\eta = -2 \sum \log \left\{ \frac{g(x_i | \hat{\beta}_k)}{g(x_i | \hat{\beta}_L)} \right\} \text{ for } \hat{\beta}_L \text{ and } \hat{\beta}_k \text{ are the estimated parameters of the fitted and true model. AIC}$$

(Akaike Information Criterion) measures the goodness of fit and the complexity of the model. This was further summarized as

$$AIC = -2 \ln(L) + 2k, \text{ See [20].}$$

Where

$L$  – Maximum likelihood value

$k$  – Number of free parameters in the model

$2k$  – Represents the penalty of increasing function of the number of estimated parameters in the model

The researchers used Wald test to test the significance of individual coefficients comparing the Chi-square  $P$  – value with our level of significance.

#### 2.6.4 Model assumptions

The distribution of response variable  $Y_i$  was multinomial  $(n_i, p_i)$ , thus the model assumes a distribution. Errors are independent but not normally distributed and therefore normality does not hold. The variances of the errors are not constant, that is to say, no homogeneity of the variance. Further, the independent variables are not linear combinations of each other. Perfect multicollinearity makes estimation impossible, while strong multicollinearity makes estimates imprecise [21].

#### 2.6.5 There is no multi-collinearity

The reciprocal of the tolerance is known as the Variance Inflation Factor (VIF). The VIF shows us how much the variance of the coefficient estimate is being inflated by multicollinearity. Normally, multi-collinearity occurs under cases where the independent variables are highly correlated with each other. Thus checked this by running VIFs where values higher than 10 indicates that multi-collinearity was a problem otherwise it was not. As from the table below, there was no multicollinearity. On the other hand, a tolerance close to 1 means there is little multicollinearity, whereas a value close to 0 suggests that multicollinearity may be a threat [22].

#### 2.6.6 Estimation and interpretation of coefficients

The researchers preferred using maximum likelihood estimation (MLE) rather than ordinary least squares (OLS) to estimate parameters of the model. The impact of predictor variables is best explained in terms of odds ratios. According to El-Habil [23]. MLR model applies maximum likelihood estimation after transforming the dependent into a logit variable (the natural log of the odds of the dependent occurring or not). Logistic regression calculates changes in the log of odds of the dependent, not changes in the dependent itself as ordinary least square (OLS) regression does. (Exponentiation of  $\beta_i$ 's) represented the odds increased (or decreased) for category  $j$  compared to reference category for each unit increased in  $X$  that is;

If  $\beta_i > 0$ :  $e^{\beta_i}$  then odds and probabilities of being in the  $j^{th}$  category increased as  $x_i$  increased reference to the baseline category



If  $\beta_i < 0$ :  $e^{\beta_i}$  then the odds and probabilities of being in the  $j^{th}$  category decreased as  $x_i$  increased reference to the baseline category

If  $\beta = 0$ :  $e^{\beta_i}$  then the odds and probabilities of being in the  $j^{th}$  category remained constant as  $x_i$  increased reference to the baseline category.

## 2.7 Data analysis and presentation

Data was coded and cleaned in Excel sheet then exported to SPSS for correlations and cross tabulation and consequently to STATA to generate the MLR model. It was presented using tables, charts, bar graphs and any other appropriate presentation method as well as data collected. This formed a suitable basis for arriving at important findings and conclusion

## 3 Results and Discussion

### 3.1 Introduction

This chapter describes the output that was generated from both the STATA and SPSS and interpretation of results.

### 3.2 Demographic summary of the respondent

#### 3.2.1 Gender of the respondent

According to this study, the valid respondents were students from University of Embu undergraduate level. From the study, majority of the respondents were male (52%) which represented 197 male students of the total sample. On the other hand, 179 female students participated in the study which was (48%) of the students. See (Fig. 1).

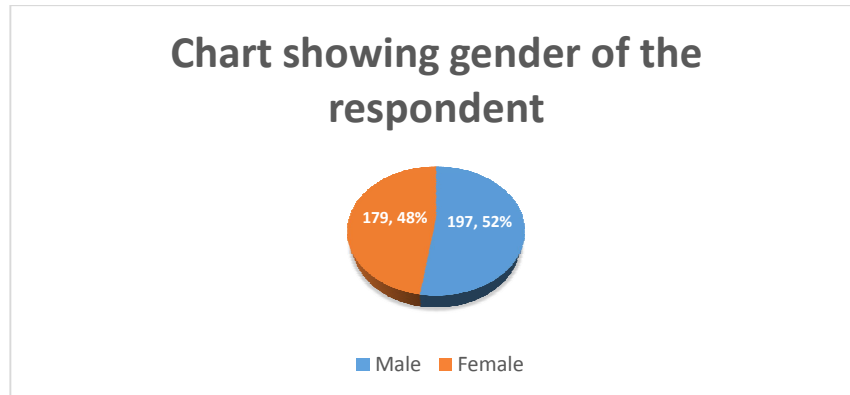


Fig. 1.

#### 3.2.2 Year of study of the respondent

From this study, most of the respondents were third years (30%), followed by second years (27%), then fourth years (22%) and finally first years (21%). See (Fig. 2).

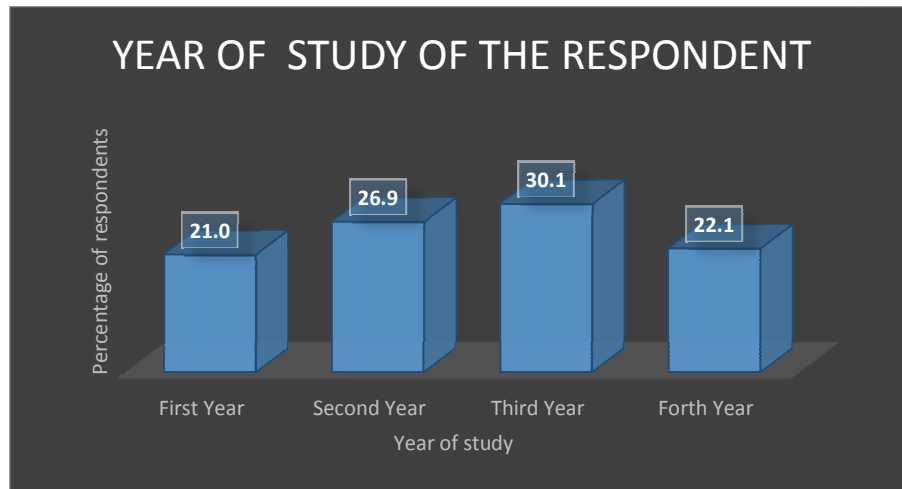


Fig. 2.

### 3.2.3 School of study of the respondent

According to the anticipation of the researchers before this study was conducted, as compared to the weighted means calculations of the sample in the methodology section of this paper. It is clear that majority of the respondents (34%) were in the school of pure and applied sciences (SPAS). Only (8%) of the respondents are in the school of nursing (SON). See (Fig. 3).

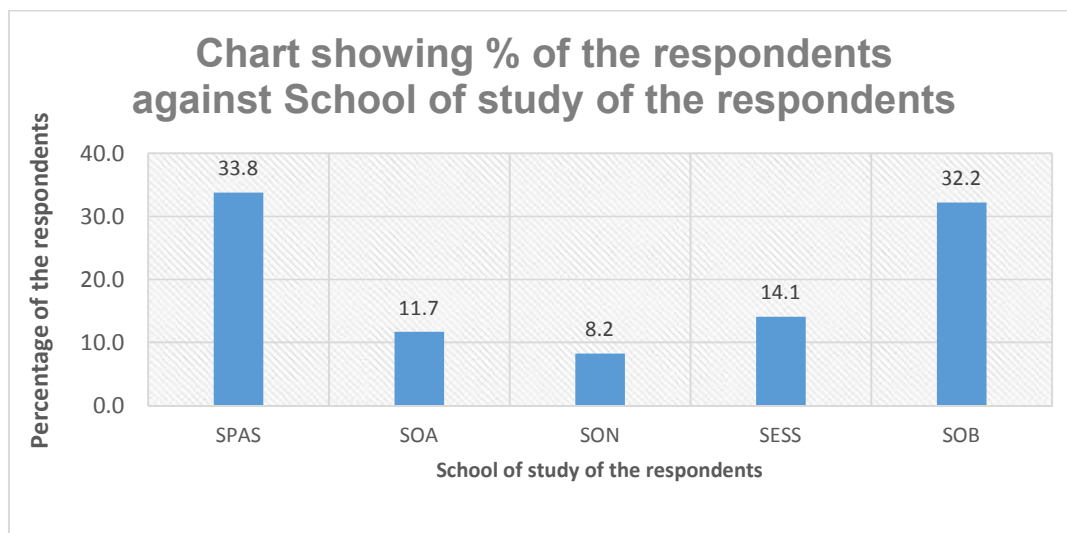


Fig. 3.

### 3.3 Family level of income

From this study, it is believed that different students have different family level of income. Majority of the respondents has claimed to have between Sh. (20,000-50,000) which was (55%) of the respondents. See (Fig. 4)

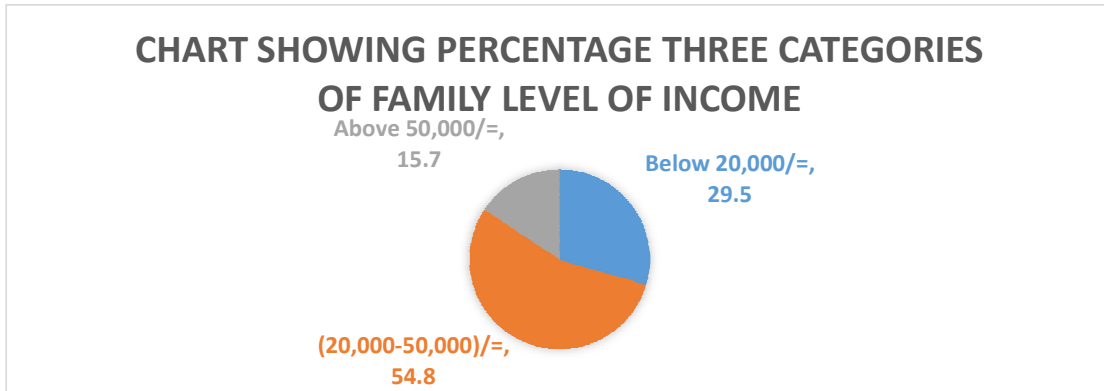


Fig. 4.

### 3.4 Financial management

Majority of the students sometimes do budgeting. See (Fig. 5).

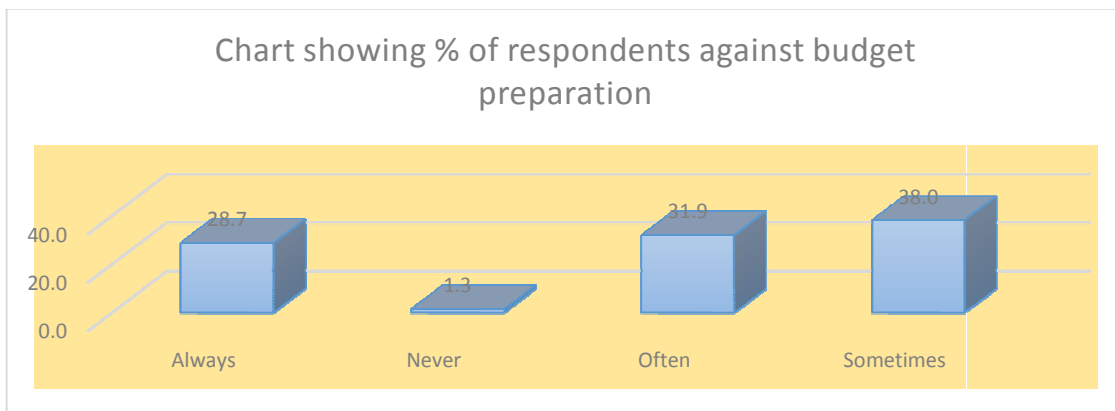


Fig. 5.

### 3.5 Average daily spending

The average amount spent throughout the semester is decreasing as the semester ends. This indicates that during the start of the semester students tend to have a lot of cash to spend and they spend them extravagantly without planning for them as evident in the financial preference awareness. Towards the end they are remaining with only a small amount of cash in their hands so they are forced to adjust to this amount hence ending up spending less in order to succumb to them. This scenario happens because of failing to plan their finances well as they start the semester hence there is a need to create awareness on good financial practices See (Fig. 6).

### 3.6 Testing overall relationship

Before conducting any analysis as far as Multinomial Logistic Regression model is concerned, the first thing any analyst must put into consideration is to test the overall relationship between dependent variable and independent variables [20]. It is evident that there is a relationship between dependent variable and combination of independent variables on the basis of statistical significance on the Chi-square model which is our model fitting information. According to this analysis, the below model fitting information reveals that the probability of likelihood ratio test Chi-square (680.927) was (0.000) which is less than level of significance 0.05 i.e. ( $p < 0.05$ ). See (Table 1).

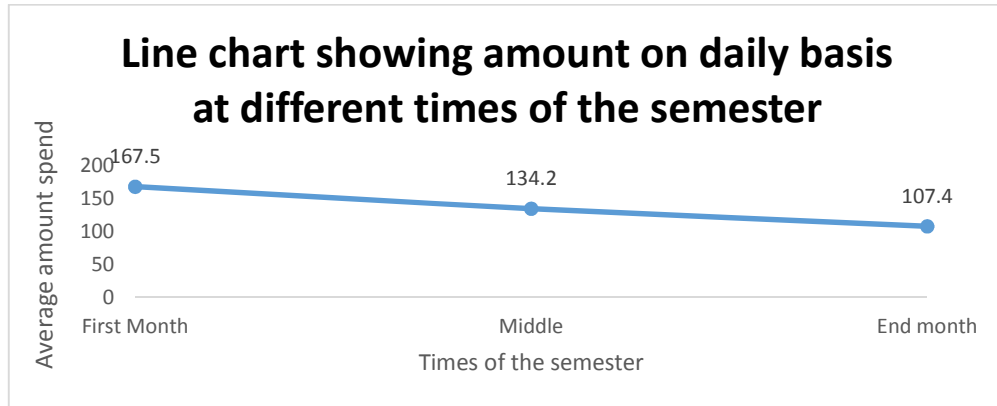


Fig. 6.

Table 1.

Model	Model fitting information			
	model fitting criteria		Likelihood ratio tests	
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1152.907			
Final	471.981	680.927	88	0

### 3.7 Cross tabulation

As per the objective of this study, various categories of spenders were correlated by use of Chi-square tests. This test was carried out to check if there was significant relationship between the independent variable and dependent variables. From the study, majority of students who spend very less amount (less than 2,500) are male (68%). This is a similar case in the second and third categories with (88.4 %), (75%) respectively. This is a total contradiction in category of Sh. (4501-5000) and (Above KSh.5000) where female tends to spend more than male (77%) and (83%). See (Fig. 7). According to the analysis, this relationship was considered statistically significant (p-value=0.00) which was less than our default value.

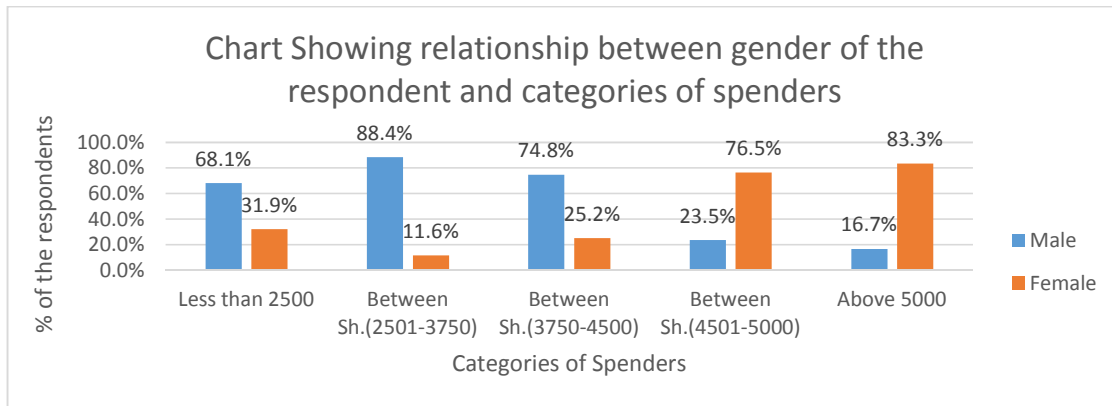


Fig. 7.

The study confirms that there was statistically significant relationship between amount spent by students and year of study (P-value= .001). Second years and third years takes lead in spending above Ksh.5000 monthly (40%) and (33.3%). Very few fourth years spend cash that is above KSh.5000 (3.3%). From the table below, Majority of the students who spend less than Ksh. 2500 are fourth years (34.7%) See (Fig. 7).

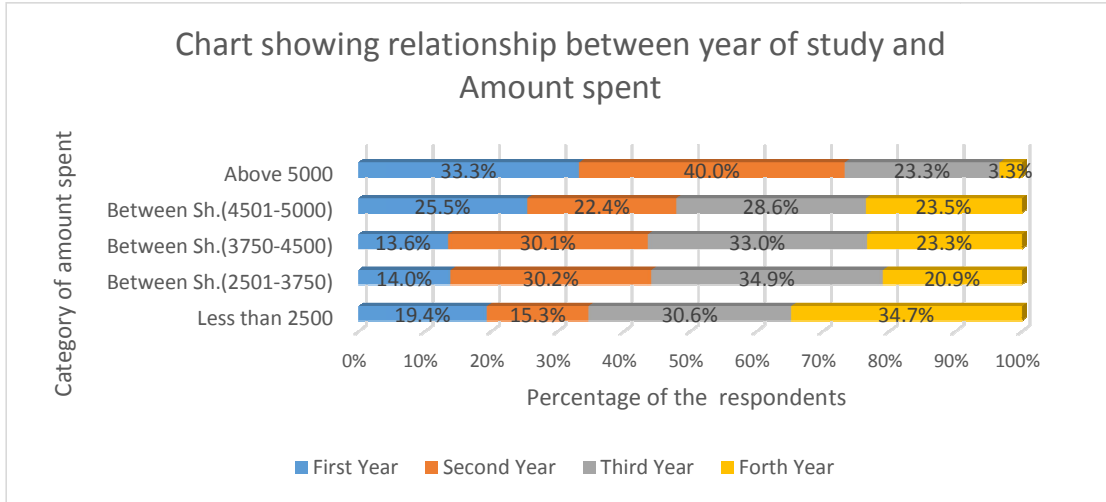


Fig. 8.

In Fig. 8, most of the students who spend less than KSh.2500 are from the school of business (SOB) (28.80%). Majority of the business students spend amount in the category  $j=3$  i.e.KSh. (3750-4500). Similarly, School of business takes the lead in category  $j=2$ . We can as well see that most of the students in the school of nursing (SON) spend more than KSh.5000 per month in a semester (38.70%). Very few students in the School of business spent amount of money more than Ksh. 5000 (1.76%). From the Chi-square test, we observed that, the researcher found out that the amount spend by the university students is significantly related to the school of study ( $p=0.000$ ).

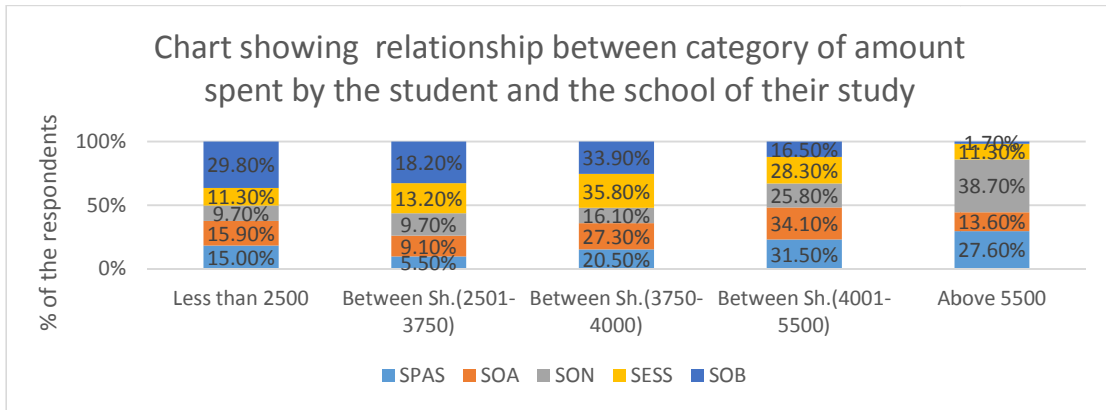


Fig. 9.

There was a significant relationship between the category of amount spent and the family level of income. This was from the Chi-Square test where the Asymptotic Significance (2-sided) of Pearson Chi-Square ( $p=0.000$ ). This was less than the default value 0.05. Majority of students who spend less than Ksh.2500 per month (91.70%) have their family income level below Ksh.20, 000. None of the students who spend less than Ksh. 2500 per month of the semester have their family level of income above Ksh (50,000). We can also see that, students whose family level of income is above Ksh.50, 000, have their spending levels increasing. Most of these students spend more than Ksh.5500. We can also see that amount spent by students from low level of income decreases from the left hand side. The distribution of amount spent by students from a low level family income is skewed to the left, while the distribution of amount spent by students from high level of family income is skewed to the right. Students from a moderate family level of income has a normal distribution. See (Fig. 9).

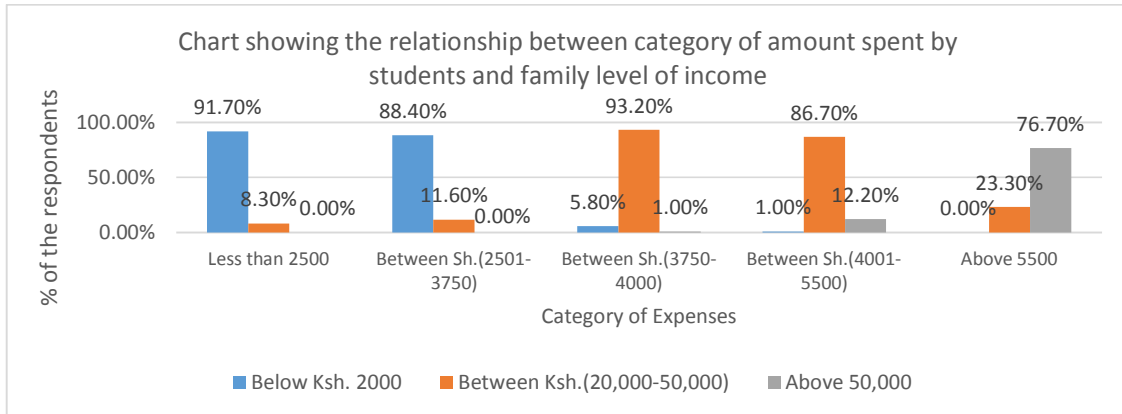


Fig. 10.

### 3.8 There is no Multi-collinearity

Normally, multi-collinearity occurs under cases where the independent variables are highly correlated with each other. The variance inflation factors (VIFs) indicated the degrees that variances in the regression estimates were increased due to multi-collinearity. Thus checked this by running VIFs where values higher than 10 indicates that multi-collinearity was a problem otherwise it was not. As from the Table 2, there was no multicollinearity.

Table 2.

Model	Collinearity statistics	
	Tolerance	VIF
1 Gender of the respondent	.941	1.062
Year of study of the respondent	.995	1.005
School of study of the respondent	.945	1.058

### 3.9 The Strength of Multinomial Logistic Regression Relationship

In the statistical world, to measure the strength of a multinomial logistic regression (MLR), we shall consider Pseudo R<sup>2</sup>. According to Borooah [24], Pseudo Random square is defined as  $1 - LL_{R+F} / LL_R$  and is bounded from below by 0 and from below by 1. Here we can say that  $LL_{R+F}$  is the value of log-likelihood function when the explanatory variable is a constant term. On the other hand,  $LL_R$  is the value of the log-likelihood function when all the explanatory variables are included. MLR normally computes the correlation measures to estimate the strength of the relationship (Pseudo Random square). This study will make use of the three commonly used R<sup>2</sup> statistics. These are Cox and Snell, Nagelkerke and McFadden to measure the strength of the relationship between the dependent variable and the concomitant variables. From the analysis of this study, Cox and Snell, Nagelkerke and McFadden R squares, are 0.809, 0.846 and 0.529 respectively. This suggest that 80%, 84% and 52% variability is explained by the variables in this model.

Table 3.

Pseudo R-square	
Cox and Snell	0.809
Nagelkerke	0.846
McFadden	0.529

### 3.10 Evaluating the Usefulness of Logistic Model

It is of great importance to evaluate the usefulness of MLR. The model is useful if and only if, the overall classification accuracy in the predictive table is noted. From Table 4, the overall predictive accuracy for the present model is 68.9%, suggesting that the model was useful. Predictive accuracy refers to how accurate the model predicts the study of interest.

**Table 4.**

Observed	Classification					
	Predicted					
	Less than 2500	Between Sh.(2501-3750)	Between Sh.(3750-4000)	Between Sh.(4001-5500)	Above 5500	Percent Correct
Less than 2500	58	7	5	2	0	80.60%
Between Sh.(2501-3750)	22	16	4	1	0	37.20%
Between Sh.(3750-4000)	1	5	72	25	0	69.90%
Between Sh.(4001-5500)	1	0	21	70	6	71.40%
Above 5500	0	0	3	14	43	71.70%
Overall %	21.80%	7.40%	27.90%	29.80%	13.00%	68.90%

**Table 5.**

Effect	Likelihood ratio tests					
	Model fitting criteria			Likelihood ratio tests		
	AIC of reduced model	BIC of reduced model	-2 log likelihood of reduced model	Chi-square	df	Sig.
Intercept	351.380	524.282	263.380 <sup>a</sup>	.000	0	.
Gender	411.751	568.935	331.751	68.372	4	.032
SOS	366.424	476.453	310.424	47.045	16	.000
YOS	378.149	503.895	314.149	50.769	12	.010
Family level of income	741.674	883.140	669.674	406.295	8	.002

*The Chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0 a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom*

### 3.11 How does the explanatory variable relate with the independent variable?

After ascertaining how much the model is useful, we further subject this study to higher analysis to spot out the relationship of individual independent variable to my dependent variable. Much of my interest was in two types of tests. We used the likelihood ratio test to evaluate the relationship between individual independent variable and dependent variable (gender and category of amount spent, SOS and category of amount spent, YOS and category of amount spent and finally, family level of income and category of amount spent). For sure, likelihood ratio test presents the contribution of each independent variable to the model. From (Table 5) we can conclude that the independent variables like gender, School of study, year of study and family level of income are significant independent variables related to the amount spend for students who spent low, moderately and extravagantly high amount.

From the table, the AIC of the final generated model was statistically significant  $p\text{-value} = .000$ . The researchers considered the fitted model below to be good for the study

**Table 6.**

Model	Model fitting information					
	Model fitting criteria			Likelihood ratio testS		
	AIC	BIC	-2 Log likelihood	Chi-square	df	Sig.
Intercept Only	892.974	908.693	884.974			
Final	351.380	524.282	263.380	621.594	40	.000

Secondly, we further employed the use of Wald test to evaluate whether the independent variable is statistically related to differentiate between categories in each embedded binary logistic comparison. From the Table 5, the (Ksh. 2500) represents category  $j=1$ . It describes the risk factors associated with the spending behavior of students. Female university students had an Odd Ratio (OR) =19.785(95%CI 3.213to 121.846),  $p=0.001$ . SPAS had an (OR) =0.052(95%CI 0.004 to 0.695),  $p=0.025$ . SOA had an (OR) =0.007(95%CI 0to0.216),  $p=0.005$ . SON had an (OR) =0.003(95%CI 8.38E-0.5 to0.089),  $p=0.001$ . See (Table 8 from the Appendices).

### 3.12 Model building

In order to obtain final model fit for the data, the researchers decided to adopt forward elimination method where we began by entering all terms specified on the stepwise list into the model. At each step, the least significant stepwise term was removed from the model until all of the remaining stepwise terms have a statistically significant contribution to the model. In this study all factors were significant thus the final model was generated having all the variables.

From table below, we can see that all the four factors under study are significant in explaining variation in the response variable (average amount spent). These factors are school, year of study, family financial level and gender at 5% level of significance ( $0.00 < 0.05$ ). Therefore, we can conclude that gender, school, year of study and family level of income are the factors contributing to variation in average amount spent by student. See (Table 6)

#### Model 1

This model takes probability of success as spending an amount in less than Kh.2000 category relative to spending an amount in above 3750 category;

$$\log it(\pi) = 6.619915 + 0.8811861 \text{ Year} - 6.191551 \text{ Familylevel}$$

From this model it can be seen that, having all other factors constant the odds of a student spending an amount in less than 2500 category relative to the above 3750-4500 category increases by 6.619915 times. The odds of a student spending an amount in less than 2500 category relative to the above 3750 category increases by 0.8811861 times for every unit change in year of study of a student. Lastly, in terms of family level of income, the odds of a student spending an amount in less than 2500 category relative to the above 3750-4500 category decreases by 6.199551 times for every unit change in family level of income of a student. Gender and School of study were excluded from this model because they are not statistically significant. See (Table 7). Family level of income has a stronger magnitude of effect on the spending behavior of students in this model.

#### Model 2

This model takes probability of success as spending an amount in 2501-3750 relative to spending an amount in above 3750-4500 category;

$$\log it(\pi) = 5.761189 + 0.6468959 \text{ Year} - 5.393299 \text{ Familylevel}$$

From the above model 2, we can see that gender and school of study had no significant effect on the spending behavior of the students. From this model it can be seen that, having all other factors constant the odds of a student spending an amount in (2501-3750) category relative to the above 3750-4500 category increases by 5.761189 times. In terms of family level of income, the odds of a student spending an amount in (2501-3750) category relative to the above (3750-4500) category decreases by 5.393299 times for every unit change in family level of income of a student. This is a big effect to the spending behavior of the students. From the magnitude of coefficients family level of income has greatest influence on spending habit of an individual. In terms of year of study, the odds of a student spending an amount in (2501-3750) category relative to the above (3750-4500) category increases by 0.6468959 times for every change in year of study of a student. Gender and School of study was not significant in this model that's why we have excluded it in the model.



**Table 7.**

Multinomial logistic regression		Number of obs =		376		
Log likelihood = 326.7064		LR chi2(16) =		521.61		
		Prob > chi2 =		0.0000		
		Pseudo R2 =		0.4439		
Category of expending		Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
1						
	Gender	.736188	.5406756	1.36	0.173	-.3235167 1.795893
	YOS	.8811861	.3082256	2.86	0.004	.277075 1.485297
	SOS	-.3367515	.1732175	-1.94	0.052	-.6762516 .0027486
	FAMILYLEVELOFINCOME	-6.191551	.8002493	-7.74	0.000	-7.760011 -4.623091
	_cons	6.619915	1.434239	4.62	0.000	3.808858 9.430972
2						
	Gender	.3908365	.553455	0.71	0.480	-.6939155 1.475588
	YOS	.6468959	.3112867	2.08	0.038	.0367853 1.257007
	SOS	-.1593144	.1767973	-0.90	0.368	-.5058307 .1872019
	FAMILYLEVELOFINCOME	-5.393299	.7700515	-7.00	0.000	-6.902572 -3.884026
	_cons	5.761189	1.461533	3.94	0.000	2.896638 8.62574
3		(base outcome)				
4						
	Gender	.3902355	.2913569	1.34	0.180	.1808135 .9612844
	YOS	.2770881	.1487196	1.86	0.062	.5685732 .014397
	SOS	.3137886	.0909232	3.45	0.001	.4919947 .1355825
	FAMILYLEVELOFINCOME	2.522597	.7772832	3.25	0.001	.9991498 4.046044
	_cons	-4.110492	1.679848	-2.45	0.014	-7.402934 -.8180499
5						
	Gender	1.139214	.4882091	2.33	0.020	.1821461 2.096282
	YOS	-.9013189	.2573913	-3.50	0.000	-1.405797 -.3969412
	SOS	-.8936748	.1922993	-4.65	0.000	-1.270575 -.516775
	FAMILYLEVELOFINCOME	6.165209	.9007092	6.84	0.000	4.399851 7.930566
	_cons	-11.88556	2.145768	-5.54	0.000	-16.09119 -7.679931

**Model 3**

This model takes probability of success as spending an amount in 2001-3750 category relative to spending an amount in above 3750 category;

$$\log it(\pi) = -4.110492 - 0.3137886 \text{ School} + 2.52259 \text{ Familyleve } l$$

From this model, it can be seen that, having all other factors constant the odds of a student spending an amount in 4501-5500 category relative to the 3750-4500 category decreases by 4.110492 times. The odds of a student spending an amount in 4501-5500 category relative to the 3750-4500 category decreases by 0.3137886 times for every unit change in School of study of a student. Lastly, in terms of family level of income, the odds of a student spending an amount in 4501-5500 category relative to 3750-4500 category increases by 2.52259 times per unit change in family level of income. It was also clear in this model that family level of income was the major effect to the spending behavior of university undergraduate students. Since gender of the students and the year of their study were not statistically significant, we excluded them from this model.

**Model 4**

This model takes probability of success as spending an amount in 2001-3750 category relative to spending an amount in above 3750 category;

$$\log it(\pi) = -11.88556 + 1.139214 \text{ Gender} - 0.9013189 \text{ Year} - 0.8936748 \text{ Shool} + 6.165209 \text{ Familyleve } l$$

All the variable under study were statistically significant. This means that these factor had a considerable effect on the spending behavior of students. Having all other factors constant the odds of a student spending an amount in above 5500 category relative to the 3750-4500 category decreases by 11.88556 times. The odds of a student

spending an amount in above 5500 category relative to the in 3750-4500 category decreases by 0.901389 times for every unit change in year of study of a student. In terms of gender, the odds of a student spending an amount in above 5500 category relative to the above 3750-4500 category increase by 1.139214 times for every unit in gender. In terms of school, the odds of a student spending an amount in above 5500 category relative to the above 3750-4500 category decreases by 0.8916748 times for every change in school of a student. Lastly, in terms of family level of income, the odds of a student spending an amount in above 5500 category relative to the above 3750-4500 category increases by 6.165209 times for every unit change in family level of income of a student.

### **3.13 Conclusion**

For sure, findings in this study are in line with the findings of other researchers in which their work have been cited. This study reveals that year of study, family financial level, gender and school are significant factors in explaining spending habits of students. Given that from this study, students tend to spent more resources during the start of the semester and continue decreasing towards the end of the semester shown by the trend line fitted in chapter four, we agree by the Sabri and MacDonald [8]. Further, from this study different University students from different financial background have different spending behavior. As we can see from the generated multinomial models, family level of income has been identified to be the major determinant of students spending behavior. Even though year of study, school and gender is a contributing factor to different spending behaviors, family level of income takes the lead with largest coefficient and appearing in all the above models. Despite the fact that gender is one of the deterministic factors of financial behavior of students, this study contradicts a research conducted by Furnham [3] who claims that gender is the major determinant of spending behavior. Students from higher financial background tends to spend more as compared to students from a poor background. This is because these students receive a lot of cash from their guardians or parents more than enough thus spending extravagantly. This is in agreement with my fellow researchers [8].

## **4 Conclusion and Recommendations**

### **4.1 Conclusion**

The spending habits of college students help in providing insights on the mechanisms used by young adults. The results of this study show that there are clear patterns that have arose, which are in line with the findings indicated by other researchers on this subject. Conclusive evidence presents the fact that family financial background is a strong determinant of certain spending patterns. As highlighted by other researchers, [8], students who come from wealthier background tend to spend more money as compared to those from humble background. Not only is this further indicated in our study but it was also found that there is a larger difference between their spending habits.

In addition, in this study it was found that school of study of student was also a determinant of how students spend their resources. In school where financial courses are offered like school of business, tend to spent less amount than students pursuing other courses. This is an insight in which no researcher has ever established. This call for more studies to be done over this factor since this study only established its influence on spending habit. Furthermore, students in their first year of study were spending more compared to other students, followed by those in their final year. This can be due to the fact that first years have just entered stage of financial independence while fourth years have different sources of finances which can serve as a supplement to the money given by their parents. The results of this study provide various inferences and policy suggestions that can contribute to the literature of the spending habit of college students.

### **4.2 Recommendation and limitations**

Biasedness is inevitable in the study design. Participants were carefully selected via stratified sampling. However, students were asked to participate in the study based on demographic factors under study. Since demographic characteristics are at large focus in this study, it was crucial that those who participated in the survey came from a variety of combinations in school, gender, year of study and family financial level. As such, students were first asked their school prior to recruiting them to participate in the proposed study. Although

simple random sampling without replacement was used within the strata (school), selection bias was inevitable. These intrinsic limitations can be addressed in future studies.

This study fitted a multinomial logistic models some other models may be fitted and compare the results with the results obtain from this study. Fitting a different model might change significance of factors included in the model.

On the other hand, there is an issue on how the study was conducted. It cannot be completely assessed whether the explanatory variables are the factors with the confounding effects on the dependent variable. The issue, also known as reverse interconnection, indicates that there is a continual response loop to show if the explanatory variable has an impact on the response variable, or if this association exists in the contrasting direction as well. For instance, there is no way to completely determine whether the association exactly exists in the sense that average spending is affected by year of study, gender, school, family level of income, or if the opposite could happen. The study only considers the above factors there might be other factors which may be affecting average spending of students. Therefore future studies should focus on other factors believed to also influence spending habits. The scope of this study fails to take into consideration habitual spenders and how individuals of this kind may affect the results. Future studies on this subject should take into consideration types of spenders in order to compare findings and draw meaningful conclusions about financial practices these spenders exhibit. As more attention is being drawn towards studying this subject of spending habits of young adults, there is an increasing desire to understand the issue and the main reason contributing to development of financial habits. It will be of great importance to study the impact of formal education on spending habits of students in institution of higher learning. A little research has been done in this branch of a topic especially in African continent. Kenya is not exceptional and doing so could shed some light on methods that allow students to develop good financial habits. Most of the young people realized financial independence during their college years, therefore having no prior knowledge of experience may make them face a lot of difficulties in future. The scope and depth of studies can be extended to further analyze other variables that may have significant effects on the financial habits of college students. Demographic factors such as age, gender and family financial seem to be most commonly studied. Student spending habits should be studied before joining college in order to establish the trend in order to provide more insights since it will have be a reference for other studies on the same subject.

## Competing Interests

The authors declared no potential conflicts of interest with respect to the research, authorship or publication of this article.

## References

- [1] Gutter MS, Garrison S, Capur Z. Social learning opportunities and the financial behaviors of college students. *Family and Consumer Sciences Research Journal*. 2010;38(4):387-404.
- [2] Lyons AC. The credit practices and financial education needs of community college students. *Journal of Financial Counselling and Planning*. 2004;14(2).
- [3] Furnham A. The savings and spending habits of young people. *Journal of Economic Psychology*. 1999; 20(6):677-697.
- [4] Norvitis J. Personality factors, money attitudes, financial knowledge and credit card debt in college students. *Applied Social Psychology*. 2006;36:1395-1413.
- [5] Roberts JA, Jones. Consuming in a consumer culture: College students, materialism, status consumption and compulsive buying. *The Marketing Management Journal*. 2000;76-91.
- [6] Villanueva S. An analysis of the factors affecting the spending and saving habits of college students. *Skidmore College Creative Matter*; 2017.

- [7] Haiyang Chen R. An analysis of financial literacy among college students. *Financial Service Review*; 2008.
- [8] Sabri MF, MacDonald M. Saving behavior and financial problems among college students. *Cross-Cultural Communication*. 2010;6(3):103-110.
- [9] University of Embu. The Flashlight Magazine. September. Retrieved from University of Embu; 2018. Available:<https://www.embuni.ac.ke/images/Flashlight/Issue5FlashlightSep2018.pdf>
- [10] Xiangqin Cui, Gary A. Churchill. Statistical test for differential expressions in DNA. *Genome Biology*. 2003;1-10.
- [11] Yamane T. *Statistics: An introductory analysis*. New York: Harper and Row; 1967.
- [12] Mark Saunders, Philip Lewis, Adrian Thornhill. *Research methods for business students (Illustrated Ed.)*. Financial Times/Prentice Hall; 2003.
- [13] McNabb DE. *Research methods in public administration and nonprofit management: Qualitative and quantitative approaches*. (Ed.) USA: Sharpe ME, Incorporated; 2008.
- [14] Edward G. Carmines, Richard A. Zeller. *Reliability and validity assessment: Volume 17 of quantitative applications in the social sciences*. SAGE Publications. 1979;17.
- [15] Allan S. Willmott, Desmond L. Nuttal. *The reliability of examination 16+: Schools council of research studies: Research studies, Schools Council (Great Britain)*. Macmillan; 1975.
- [16] Emanuel J. Mason, William J. Bramble. *Understanding and conducting research: Application in education and the behavioral sciences (2, Illustrated Ed.)*. McGraw-Hill Book Company; 1989.
- [17] Bartlett P, Mendelson S. Rademacher and gaussian complexities: Risk bounds and structural results. *J. Machine Learning Research*. 2002;3:463-482.
- [18] Akaike H. On entropy maximization principle. In: *Proc. Symp. On Applications of Statistics*. The Netherland. 1997;27-47.
- [19] Barnett V, Lewis T. *Outliers in statistical data*. New York, USA: John Willey; 1978.
- [20] Madhu B, Ashok NC, Balasubramanian S. A multinomial logistic regression analysis to study the influence of residence and socio-economic status on breast cancer incidences in Southern Karnataka. *International Journal of Mathematics and Statistics Invention (IJMSI)*. 2014;2(5):01-08.
- [21] O'Halloran PS. *Logistic regression ii: Multinomial data*. New York: Colombia University; 2005.
- [22] Williams R. *Multicollinearity*. University of Notre Dame: [Retrieved from online]; 2015.
- [23] El-Habil AM. An application on multinomial logistic regression model. *Pak. J. Stat. Oper. Res*. 2012; 271-291.
- [24] Borooah VK. *Logit and probit order and multinomial models*. London New Delhi: International, professional and Educational Publisher; 2012.

## APPENDICES

Table 8.

Parameter estimates		B	Std. Error	Wald	df	Sig.	Exp(B)	95% confidence interval for exp(B)	
Category of amount spent (Ksh)	Lower bound							Upper bound	
<b>Less than 2500</b>	<b>Intercept</b>	-15.944	1.74	84.014	1	0			
	[GENDER=1(female)]	2.985	0.927	10.357	1	0.001	19.785	3.213	121.846
	[GENDER=2(male)]	0b	.	.	0	.	.	.	.
	[SOS=1(SPAS)]	-2.948	1.319	4.998	1	0.025	0.052	0.004	0.695
	[SOS=2(SOA)]	-4.998	1.769	7.982	1	0.005	0.007	0	0.216
	[SOS=3(SON)]	-5.901	1.779	11.008	1	0.001	0.003	8.38E-05	0.089
	[SOS=4(SESS)]	-4.332	1.667	6.751	1	0.009	0.013	0.001	0.345
	[SOS=5(SOB)]	0b	.	.	0	.	.	.	.
	[YOS=1]	-6.954	1.562	19.83	1	0	0.001	4.48E-05	0.02
	[YOS=2]	-8.47	1.59	28.37	1	0	0	9.29E-06	0.005
	[YOS=3]	-3.717	1.302	8.154	1	0.004	0.024	0.002	0.312
	[YOS=4]	0b	.	.	0	.	.	.	.
	[FAMILYLEVELOFINCOME=1]	44.938	1719.588	0.001	1	0.979	3.28303E+19	0	.c
	[FAMILYLEVELOFINCOME=2]	21.075	0	.	1	.	1421833823	1421833823	1421833823
	[FAMILYLEVELOFINCOME=3]	0b	.	.	0	.	.	.	.
<b>Between Sh.(2501-3750)</b>	<b>Intercept</b>	-17.252	1.826	89.244	1	0			
	[GENDER=1]	4.391	0.997	19.409	1	0	80.72	11.444	569.335
	[GENDER=2]	0b	.	.	0	.	.	.	.
	[SOS=1]	-3.456	1.323	6.829	1	0.009	0.032	0.002	0.422
	[SOS=2]	-4.811	1.752	7.543	1	0.006	0.008	0	0.252
	[SOS=3]	-5.679	1.785	10.123	1	0.001	0.003	0	0.113
	[SOS=4]	-3.777	1.653	5.22	1	0.022	0.023	0.001	0.585
	[SOS=5]	0b	.	.	0	.	.	.	.

	[YOS=1]	-5.952	1.559	14.568	1	0	0.003	0	0.055
	[YOS=2]	-7.06	1.575	20.096	1	0	0.001	3.92E-05	0.019
	[YOS=3]	-3	1.315	5.201	1	0.023	0.05	0.004	0.656
	[YOS=4]	0b	.	.	0	.	.	.	.
	[FAMILYLEVELOFINCOME=1]	43.785	1719.588	0.001	1	0.98	1.03687E+19	0	.c
	[FAMILYLEVELOFINCOME=2]	21.123	0	.	1	.	1491630778	1491630778	1491630778
	[FAMILYLEVELOFINCOME=3]	0b	.	.	0	.	.	.	.
<b>Between Sh.(3750-4000)</b>	Intercept	0.933	1.741	0.287	1	0.592			
	[GENDER=1]	3.185	0.701	20.637	1	0	24.178	6.117	95.562
	[GENDER=2]	0b	.	.	0	.	.	.	.
	[SOS=1]	-4.387	1.106	15.738	1	0	0.012	0.001	0.109
	[SOS=2]	-3.948	1.296	9.274	1	0.002	0.019	0.002	0.245
	[SOS=3]	-3.585	1.372	6.826	1	0.009	0.028	0.002	0.408
	[SOS=4]	-1.918	1.268	2.29	1	0.13	0.147	0.012	1.762
	[SOS=5]	0b	.	.	0	.	.	.	.
	[YOS=1]	-4.651	1.196	15.115	1	0	0.01	0.001	0.1
	[YOS=2]	-4.846	1.203	16.214	1	0	0.008	0.001	0.083
	[YOS=3]	-2.642	1.12	5.566	1	0.018	0.071	0.008	0.639
	[YOS=4]	0b	.	.	0	.	.	.	.
	[FAMILYLEVELOFINCOME=1]	22.27	1719.588	0	1	0.99	4697123407	0	.c
	[FAMILYLEVELOFINCOME=2]	6.355	1.356	21.973	1	0	575.479	40.365	8204.52
	[FAMILYLEVELOFINCOME=3]	0b	.	.	0	.	.	.	.
<b>Between Sh.(4001-5500)</b>	Intercept	3.329	1.284	6.719	1	0.01			
	[GENDER=1]	0.602	0.626	0.924	1	0.336	1.826	0.535	6.231
	[GENDER=2]	0b	.	.	0	.	.	.	.
	[SOS=1]	-3.139	1.033	9.226	1	0.002	0.043	0.006	0.328
	[SOS=2]	-2.633	1.201	4.809	1	0.028	0.072	0.007	0.756
	[SOS=3]	-1.908	1.112	2.946	1	0.086	0.148	0.017	1.311

[SOS=4]	-1.657	1.179	1.975	1	0.16	0.191	0.019	1.923
[SOS=5]	0b	.	.	0	.	.	.	.
[YOS=1]	-2.983	1.073	7.726	1	0.005	0.051	0.006	0.415
[YOS=2]	-3.759	1.102	11.634	1	0.001	0.023	0.003	0.202
[YOS=3]	-2.321	1.039	4.996	1	0.025	0.098	0.013	0.751
[YOS=4]	0b	.	.	0	.	.	.	.
[FAMILYLEVELOFINCOME=1]	16.768	1719.588	0	1	0.992	19157423.92	0	.c
[FAMILYLEVELOFINCOME=2]	3.662	0.591	38.382	1	0	38.954	12.228	124.093
[FAMILYLEVELOFINCOME=3]	0b	.	.	0	.	.	.	.

*a The reference category is: Above 5500*

*b This parameter is set to zero because it is redundant*

*c Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing*

© 2019 Akelo et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Peer-review history:**

The peer review history for this paper can be accessed here (Please copy paste the total link in your browser address bar)

<http://www.sdiarticle3.com/review-history/48195>