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THE ROLE OF MATHEMATICS ANXIETY IN COURSE PREFERENCE: A QUANTITATIVE STUDY OF PROSPECTIVE UNDERGRADUATES IN ENUGU STATE, NIGERIA

By
Ndubuisi U. Okon*
Department of Mathematics
Federal College of Education, Eha Amufu

Corresponding Author: -

Abstract

The present study examined course preference among prospective undergraduates based on mathematics anxiety. One hundred and thirty-eight post-secondary school students participated in the study. The Maths Anxiety Scale (MAS) was used to measure the respondent's level of math anxiety. Their subject choice was indicated in the demographic section. A linear regression analysis was conducted to examine the predictive effect of mathematic anxiety on the prospective student's course preference. The study showed that mathematic anxiety statistically significantly predicted the respondent's course preference F (1,136), 128.97, P<.000. Notably, the finding revealed that mathematics anxiety contributed to about 16.1% of the prospective undergraduate's course preference variation. Thus, the assumption that mathematic anxiety will significantly predict course preference among the prospective undergraduates was true. The findings and practical implications of the study are discussed.

Keywords: *Math anxiety, prospectives, course preference, students*

BACKGROUND

The choice of course of study at the undergraduate level is likely to be one of the first significant life decisions post-secondary school students take. Understanding the relevant variables that affect this decision is essential in helping to provide more efficient career advice and support to tailor educational programs to prospective undergraduate's expectations. Indeed, when a prospective undergraduate is challenged with choosing intrinsically rewarding courses, career specialists, school counselors, and other experts may help recommend degree types that may satisfy that need. This might secure a better match between degree types and students and reduce drop-out rates. However, there are indications that the choice of a university degree is influenced by numerous socio-psychological variables, including personal motivations to become educated and what is expected in the end.

There is an age-long tradition in the educational discourse that seems almost natural to believe in the dichotomy between science and art and labeling a student as belonging to a science or arts discipline. In particular, young learners at the junior secondary school level can choose between arts and sciences in their future academic endeavors. However, several factors offer different opportunities to fulfill this choice, and that, in part, defines the choices the youngsters make towards their educational journey. For example, those exposed to sciences are potentially more likely to choose a science-related course with clear career prospects. In contrast, others might be motivated primarily by unspecified phenomena, whether or not it has clear career prospects or earning potential. Wide intimations suggest that science-related courses have more career prospects than arts and humanities. This assertion seems valid in contemporary society, given the attention to science-related classes in developed and developing countries.

Consequently, science subjects are mostly regarded as complex among beginners. Most students at the secondary school level perceive science as tasking in that mathematics is known to be the chief subject in the science stream. Indeed, the contemporary education ecosystem is headed toward educational reforms promoting science, technology, engineering, and mathematics (STEM) (Tajudin et al., 2018). STEM education is currently trending in the global educational system of every society, including Nigeria. STEM is rooted in the observed gap in STEM-related fields and meeting the current demand for technological development (Fomunyam, 2019). Knowledge and understanding of the subjects involved in STEM are vital for all young people in an increasing science and technology-driven society (Banks & Barlex, 2020).

Mathematics is an essential component of STEM and a vital subject in the Nigerian education curriculum. Indeed, regardless of science or art, students attend mandatory math classes as a prerequisite for graduation and transition to future academic progress. Also, students are encouraged to acquire basic mathematical knowledge because it is the central intellectual discipline of any technological society (Sule et al., 2016). It is essential to the extent to which it contributes to general education purposes (Brkslich, 2020). Accordingly, mathematical knowledge has been linked to preserving societal values (The Education Committee, 2021). Moreso, Newman (2020) applauded mathematics teachers given their role in imparting mathematical knowledge to students and its relevance to thinking skills (Murni & Ruqoyyah, 2020).

Although mathematical processes are contingent on mental capabilities, numerous literature abounds that underscores the importance of mathematics to the society (Akinoso, 2018; Andrews, 2007; Charles-Ogan, 2015; Kachapova, 2014; Khasim, 2012; Kusmaryono, 2014; Lai et al., 2011; Obadare-Akpata, 2017). However, there are growing insinuations linking mathematics to an increased emotional state of anxiousness among students (Fernández-Alonso et al., 2019; Hill et al., 2016; Kucian et al., 2018; Luttenberger et al., 2021; Ramirez et al., 2018; Rozgonjuk et al., 2020; Skagerlund et al., 2019). The concept of mathematics anxiety describes a psychological state of tension and apprehension, instigated mainly by mathematics awareness (Ashcraft, 2002; (Bjälkebring, 2019)). This occurrence has been linked to a variety of severe psychological and psychosomatic symptoms, including hopelessness and utter retreat. Mathematics anxiety negatively impacts learners' scholastic performance, mastery of learning competencies and skills, and career choice and influences outcome (Estonanto & Dio, 2019; Szczygieł, 2019). The experience by young learners can lead to depressive conditions in mathematics (Ifdil et al., 2019). Students with math anxiety may find it difficult to open a math textbook or even enter a math classroom (Maloney & Beilock, 2012) and, most importantly, avoid math-related activities. The present paper examined mathematics anxiety as a scarcely explored variable that could explain the variations in prospective undergraduate's choice of course.

Hypothesis: *Mathematics anxiety would significantly predict the choice of course among the prospective undergraduates.*

Prospective undergraduates encompass post-secondary school students that have completed their senior secondary school certificate examination and are awaiting enrollment into higher education. These individuals, mostly in their adolescence, are more prone to poor decision-making as they strive for independence. Thus, they are likely to be influenced by their thoughts and feelings without regard to parental and expert advice. Course preference is a hard decision that requires careful assessment. However, the present paper assumes that mathematics-related anxiousness could explain the student's choice of the course they intend to study. Course preference is operationalized in relation to science and art-oriented disciplines. Particularly, course preference was distinguished between sciences courses and art (including humanities and management-related fields).

Method

A cross-sectional survey design was adopted for the study. The study population comprised post-secondary school students in the Enugu state of Nigeria. A total of one hundred and thirty-eight (n=138) prospective undergraduates awaiting their senior secondary school certificate exam pooled from different locations within the study parameter participated in the study. The respondents comprised males and females aged 16-20 years with a mean age of ($M = 13.04$) ($SD = 0.98$).

Measures

For the current study's purpose, mathematic anxiety was measured using the Math Anxiety Scale (MAS) developed by Zakariya (2018). The 20-item scale comprised two subsections (learning mathematics anxiety and perception of difficulty and motivation). The scale is scored on a five-point Likert-type format with response options ranging from (5) Strongly agree to (1) Strongly disagree. The original reliability coefficient of the instrument was .91. However, in this study, a Cronbach alpha of r=.88 was recorded. Course preference was determined by indication in the demographic section provided in the instrument.

Result

Table 1:
Table showing the mean, standard deviation, and percentage of the respondent's choice of subject

Choice of Subject	N	Mean	SD	%
Arts preference	70	1.9515	.21596	62
Science preference	63	1.3175	.46923	38
Total	138	1.7108	.45474	100

The above table shows that 62% of the respondents with (*M= 1.95, SD= 0.21*) selected arts as their preferred subject, while 33% (*M = 1.31, SD = 0.46*) chosed sciences as preferred course of study.

Table 2:
Table showing the result of the linear regression analysis conducted to determine the influence of math anxiety on course preference.

	B	SEB	β	R^2	t	Sig
Constant	2.59	.078			32.994	000
Math anxiety	-.64	.054	-.679	.161	-11.831	000

Note. B = Unstandardized regression coefficient; SEB = Standardized error of the coefficient; β = Standardized coefficient; R^2 = Coefficient of determination. *P<.000.

A linear regression analysis was performed to determine the predictive effect of mathematic anxiety on the prospective student's course preference. The study showed that mathematic anxiety statistically significantly predicted the respondent's course preference F (1,136), 128.97, P<.000. Notably, the finding revealed that mathematics anxiety contributed to about 16.1% of prospective undergraduate course preference variation. Thus, the assumption that mathematic anxiety will significantly predict course preference among the prospective undergraduates was true.

Discussion

The current study focused on exploring mathematic anxiety as a factor that could determine course preference among the prospective undergraduates in Enugu state. One hundred and thirty-eight participants responded to the questionnaire. The linear regression model performed on the data showed that mathematic anxiety positively and statistically predicted the prospective undergraduate's course preference. From the finding, it is possible that the students made their choice out of anxiousness and not really because they understood their preference. This assertion is consistent with Choe et al. (2019), who found that math anxiety was associated with the tendency to select easier, low-reward problems. Similarly, the result agreed with Morsanyi and Busdraghi (n.d.), who reported that mathematical anxiety negatively impacts individuals' ability to make good choices and the right decisions. Furthermore, the study backs up reports that children with mathematics anxiety in junior high school lose faith in their capacity to perform in their mathematics courses (Gary Scarpello, 2005).

Limitations, strengths, and future directions

The present study is challenged given the sample size in the study. It becomes imperative to caution against the generalization of the finding. The study's data was also solely gathered through self-report, thus raising the issue of common method variance. Thus, future research should utilize data from more inclusive sources and establish utilize multiple data collection methods. Despite the practical limitations, the present study contributes to the mathematic literature by identifying math anxiety as determining course preference among prospective undergraduates. Thus, the result broadens our knowledge about the negative impact of mathematic anxiety on higher education-bound students. Furthermore, observation suggests that studies attempting to investigate math anxiety's predictive effect on students' course preference at the post-secondary level in the Nigerian context remain scarce. Hence, justifying the present study.

Practical implication

The study provides insight into the relationship between math anxiety and course preference at the post-secondary school level. Therefore, the finding can provide valuable data to psychologists, career counselors, and educators in achieving their various purposes relating to educational and career choices, including well-being. Also, the result provides parents and guardians the opportunity to be conscious of the variables influencing their ward's course preference.

Conclusion

The linear regression analysis conducted on the study data proved the critical effect of math anxiety in predicting post-secondary school students' course preferences. Indeed, the research finding affirmed the study's hypothesis. Therefore, it is concluded that mathematic anxiety is a critical predictive variable in the math anxiety and course preference relationship. Consequently, it is recommended that school administrators and counselors invest in a robust approach that will broaden the youngsters' cognitive processes to allow them to consult widely before making decisions related to their academic journey. Also, interventions to curb academic-related anxieties should be taught in the curriculum. Limiting the trend of math anxiety-avoidance link can increase interest and success in STEM education (Choe et al., 2019).

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