

# **RESEARCH ARTICLE**

# MATHEMATICS ANXIETY AND CHOICE OF SUBJECT AMONG JUNIOR SECONDARY SCHOOL STUDENTS

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| Manuscript Info   | Abstract  |  |  |  |  |
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| Manuscrint History  | Mathematics anxiety has been found to negatively impact student's   |  |  |  |  |
| Received: 20 March 2021<br>Final Accepted: 24 April 2021<br>Published: May 2021 | academic performance, and the trend is pervasive in our society. The<br>purpose of this study was to determine whether math anxiety will  |  |  |  |  |
| Key words: -<br>Math Anxiety, Choice of Subject,                                | predict student's choice of subject. A total of one hundred and sixty-six<br>junior secondary school students participated in the study. The Math<br>Anxiety Scale (MAS) was used to measure the respondent's level of<br>math anxiety. Their subject choice was indicated in the demographic |  |  |  |  |
| Students, Junior Secondary School   | section. The linear regression analysis conducted in the demographic<br>that math anxiety positively and statistically predicted student's choice<br>of subject. The findings and practical implications of the study are<br>discussed  |  |  |  |  |

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#### **Introduction: -**

Currently, many societies worldwide are engaging in serious and promising educational reforms (Tajudin et al., 2018). Science, Technology, Engineering and Mathematics (STEM) Education is currently trending in the Global Educational System. Nigeria is not left out. STEM arose following the employment gap in STEM-related fields and meeting the current demand of 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).

Nigerian students are encouraged to embrace mathematic because it is the central intellectual discipline of any technological society (Sule et al., 2016). However, most students perceive mathematics as a frightening subject (Ifdil et al., 2019). Hence, most junior secondary school students prefer arts subjects to mathematics.

Mathematics is a ubiquitous part of education in Nigeria and all over the world. It is essential to the extent to which it contributes to general education purposes (Brkslich, 2020). Learning and passing mathematics have been a prerequisite for academic transition in all levels of academics. Competence in mathematics is vital in the preservation of society (The Education Committee, 2021). Mathematics teacher has an important job (Newman, 2020) because it needs to be taught to students from an early age because of its relevance in thinking skills (Murni & Ruqoyyah, 2020). However, teaching and learning mathematics are contingent on mental capabilities. The importance of mathematics is well documented (Akinoso, 2018; Andrews, 2007; Charles-Ogan, 2015; Kachapova, 2014; khasim, 2012; Kusmaryono, 2014; Lai et al., 2011; Obadare-Akpata, 2017). However, the present study is concerned with mathematics-related anxiety. However, most students perceive mathematics as a frightening subject (Ifdil et al., 2019), thus increasing math-related anxiety among secondary school students.

Mathematics anxiety has been well researched over the years (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). Math anxiety refers to the psychological state of tension and apprehension occasioned by mathematics-related events (Ashcraft, 2002; Bjälkebring, 2019). This phenomenon is implicated in severe psychological and psychosomatic symptoms ranging from loss of hope to total withdrawal. Mathematics anxiety negatively impacts learner's scholastic performance, mastery of learning competencies and skills, including career choice (Estonanto & Dio, 2019). Math anxiety is negatively related to mathematic outcomes(Szczygieł, 2019). The experiences by schoolchildren can lead to depression conditions in mathematics (Ifdil et al., 2019). Students with math anxiety may find it difficult opening a math textbook or even entering a math classroom (Maloney & Beilock, 2012).

#### The present study

Many studies have affirmed the prevalence of the trend among students in Nigeria(Agberotimi et al., 2015; Agnes & Mathew, 2019; Aremu & Taiwo, 2014; Garba et al., 2020; Idowu, 2018; Muhammad, 2017). The phenomenon poses a critical implication to student's educational advancement. Perhaps, at the junior secondary level, students have the opportunity to choose between arts and science subjects. The choice of subjects at the secondary school level remains an essential step in attaining the desired educational goal and a thriving destination (Javed, 2018). Conversely, the selection of subject area poses a challenge to the youngsters. Factors including social, familial, and personal factors have been implicated as the cause of the challenges (Zare-Ee & Shekarey, 2010).

Consequently, research suggests that math anxiety develops in junior high school (Maloney & Beilock, 2012). Consistent with this assertion, Idowu (2018) reported that junior secondary school (JSS3) students have the most math anxiety level. Thus, the purpose of the present study is to explore math anxiety as a factor that could predict junior secondary school student's choice of subject at the senior level. Perhaps, we hypothesized that math anxiety would significantly predict subject choice among junior secondary school students.

### Method: -

A cross-sectional survey design was adopted for the study. The study population comprised junior secondary school students in the Kogi state of Nigeria. A total of one hundred and sixty-six (n=166) third-year junior secondary school students pooled from different public and private schools within the study parameter participated in the study. The respondents comprised males and females with an age range of 12-15 years and mean age of M = 13.04, SD = 0.98 years.

# 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 .90. However, in this study, a Cronbach alpha of r=.87 was recorded. Choice of subject was assessed by indication in the demographic section provided in the instrument.

# **Procedure: -**

Research assistants were employed, and they were instrumental to data collection. Permission was obtained from the relevant heads of the public and private schools selected for the study. Thereafter, students in their third year within the junior level were gathered and prepared for the study. Indeed, only the students who consented to the study were given the research instrument. In all, a total of one hundred and eighty questionnaires were distributed to the students. However, only one hundred and sixty-six of the scale was adequately filled and was subjected to statistical analysis.

#### **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 Subject      | 103 | 1.9515 | .21596 | 62  |   |
| Science Subject   | 63  | 1.3175 | .46923 | 38  |   |
| Total             | 166 | 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% of the respondents (M = 1.31, SD = 0.46) preferred sciences as their subject.

**Table 2:** -Table showing the result of the linear regression analysis conducted to determine the influence of math anxiety on subject choice.

|                   |       | 95% C | I for B |      |     |       |         |     |  |
|-------------------|-------|-------|---------|------|-----|-------|---------|-----|--|
|                   | В     | LL    | UL      | SEB  | β   | $R^2$ | t       | Sig |  |
| Constant          | 2.585 | 2.431 | 2.740   | .078 |     |       | 32.994  | 000 |  |
| Choice of Subject | 634   | 740   | 528     | .054 | 679 | .460  | -11.831 | 000 |  |

Note. B = Unstandardized regression coefficient; CI = Confident Interval; LL = Lower Limit; UL = Upper Limit; SEB = Standardized error of the coefficient;  $\beta$  = Standardized coefficient; R<sup>2</sup> = Coefficient of determination. \*P<.000.

A linear regression analysis was conducted to examine the predictive effect of mathematic anxiety on student's choice of subject. The analysis showed that mathematic anxiety statistically significantly predicted the respondent's choice of subject F (1,164), 139.984, P<.000. Thus, our expectation that mathematic anxiety will significantly predict student's choice of subject was affirmed.

# **Discussion: -**

The current study focused on exploring mathematic anxiety as a factor that could determine junior secondary school student's preference of subject. The linear regression analysis conducted on the data revealed that mathematic anxiety positively and statistically predicted the student's choice of subject. From the finding, it is possible that the students made their choice out of anxiousness and not really because they understand 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 right decisions. Furthermore, our study corroborates the report that students in junior high school with mathematics anxiety lose confidence in their ability to succeed in their academic mathematics courses (Gary, 2005).

#### Limitations, strengths, and future directions

Because of the small sample size used in the study, it becomes imperative to caution the current study's generalization. The study's data was also solely gathered through self-report, thus raising the issue of common method variance. Despite the practical limitations, the present study contributes to the mathematic anxiety literature by identifying math anxiety as a determinant of subject choice among junior secondary school students. Thus, the result broadens our knowledgeaboutthe negative impact of mathematic anxiety on junior secondary school students. Moreover, in our understanding, no study has attempted to investigate the predictive effect of math anxiety on student's subject choice at the junior level in the Nigerian context. Hence, justifying the current study. Future researchers should endeavor to utilize data from more inclusive sources and establish a cause-effect relationship.

#### Practical implication

The study provides insight into the relationship between math anxiety and subject choice at the junior secondary school level. Therefore, the finding can provide valuable data to the psychologists, career counselors, and educators in achieving their various purposes relating to choose of academic discipline, career choice, and general well-being. Also, the result provides parents and guardians the opportunity to filter the choices of their school children.

#### **Conclusion:-**

The result of the linear regression analysis conducted on the study data proved the critical effect of math anxiety in predicting student's choice of subject at the junior secondary school level. Indeed, the research hypothesis was supported by the result of the study. Therefore, it is concluded that mathematic anxiety is a critical predictive variable in the math anxiety-subject choice relations. Therefore, it is recommended that school administrators and counselors invest in a robust approach that will broaden the youngsters' cognitive processes. Also, interventions

aimed at curbing academic-related anxieties should be inculcated in the curriculum. Possibly, limiting the trend of math anxiety-avoidance link can increase interest and success in STEM education (Choe et al., 2019).

#### Ethical considerations

In other to abide by the research ethics in the process of the study. With the heads of the schools and teachers' aid, the participants were made to understand the study's purpose. They were told that the study is not a must and that they can withdraw anytime they want.

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