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Mathematics Anxiety and Mathematics Self-Efficacy Among Senior High School Students in Public Secondary Schools in Botolan District

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Abstract

This study explored mathematics anxiety and mathematics self-efficacy of senior high school students in the Botolan District of Zambales during the academic year 2020-2021. The students are female, belong to young adults, and are Grade 11 senior high school students. Descriptive research was employed in the study, using ANOVA, T-test, and Pearson r to test the significant difference and relationship of variables. Findings revealed a high positive level of Mathematics anxiety and Mathematics self-efficacy in the students. Students stated that learning Mathematics made them feel nervous. Students acknowledged that Mathematics is a complex and challenging subject, and they lack the mathematical skills to solve complex problems. For Mathematics anxiety, students' perceptions according to age do not differ significantly.

When attributed to sex, perceptions differ significantly on Face Expression, while perceptions on the Appraisal, Arousal, and Action Tendencies are the same. Regarding the strand, perceptions differ significantly on the Arousal and Face Expression. Regarding school, the significant difference only matters on the Action Tendencies. For Mathematics self-efficacy, perceptions according to age on the Mastery Experience, Vicarious Learning, and Affective State aspect of Mathematics self-efficacy differ significantly, while perceptions on Social Persuasion are the same. When grouped according to sex, perceptions of Vicarious Learning and Affective states differ significantly. In terms of school, perceptions only differ significantly on the Physiological State.

Moreover, the perceived level of Mathematics anxiety and Mathematics self-efficacy differ significantly. The paper also concludes that Mathematics anxiety and mathematics self-efficacy influence students' academic performance. A follow-up study may be conducted on the difference in age and Mathematics self-efficacy to validate the result of the findings.

Keywords: *anxiety, mathematics, self-efficacy, students*

Introduction

Mathematics is an active part of the curriculum and is helpful in daily life and studying other subjects, yet students consider this a complex issue (Gafoor & Kurukkan, 2015). This is a significant concern about how it could be taught and understood in the education system since students differ in study orientations (Guinocor, Almerino, Mamites, Lumayag, Villaganas, & Capuyan, 2020). Students need help learning mathematical concepts. Because students differ in their abilities to acquire mathematics, one learns quicker than the other. Students are concerned and anxious about studying mathematics (Rameli & Kosnin, 2017).

Meanwhile, Filipino students need help to learn mathematical concepts. Furthermore, Paris (2019) reported on the Rappler website that the Philippines ranked in the low 70s in the 2018 Programme for International Student Assessment (PISA), a student assessment of 15-year-old learners conducted by the Organization for Economic Cooperation and Development (OECD) across 79 countries. Filipino students also performed poorly in mathematics, scoring 353 points compared to the OECD average of 489 points in both categories (Paris, 2019). According to Magsambol (2020) in Rappler, the Philippines scored 'significantly worse' than any other country participating in grade 4 math and science examinations in the Trends in International Mathematics and Science Study (TIMSS) 2019. According to the Trends in International Mathematics and Science Study 2019, Filipino students trailed behind other nations in the international evaluation for mathematics and science for grade 4. The country received the lowest score in both examinations out of the 58 countries participating. Only 19 percent of Filipino pupils met the Low standard in mathematics, which suggests they possessed "some fundamental mathematical understanding," while 81 percent did not achieve this level (Magsambol, 2020).

The above findings need to be addressed because this would significantly affect the future. Students and teachers must widen their perspectives on teaching and learning mathematics. When students need attention and focus in understanding mathematics as a subject and as a discipline, the researcher wants to seek the level of mathematics anxiety and self-efficacy of the students and if these affect the student's performance in mathematics. The study would also determine the sources of mathematics anxiety in today's learning modality. This study would enlighten every stakeholder, especially teachers, to be more aware of what and how the students feel learning mathematics and address the students' needs to improve their learning capability, especially in mathematics.

The study aimed to determine the level of mathematics anxiety and mathematics self-efficacy related to the mathematics performance of Grade 11 Senior High School students in Botolan District during AY. 2020-2021.

Specifically, it sought to answer the following questions:

1. What is the profile of the student-respondents with regards to age, sex, strand, and school?
2. What is the level of academic performance of the student-respondents in General Mathematics?
3. How can the student-respondents describe mathematics anxiety in terms of Appraisal, Arousal, Face Expressions, and Action Tendencies?
4. How can the student-respondents describe mathematics self-efficacy in terms of Mastery Experience, Vicarious Learning, Social Persuasion, and Affective State?
5. Is there a significant difference in the perception of the students-respondents towards mathematics anxiety when grouped according to profile?
6. Is there a significant difference in the perception of the student-respondents towards mathematic self-efficacy when grouped according to profile?

7. Is there a significant difference between mathematics anxiety and mathematics self-efficacy of the student-respondents?
8. Is there a significant relationship between mathematics anxiety and the academic performance of the student-respondents?
9. Is there a significant relationship between mathematics self-efficacy and academic performance of the student-respondents?
10. What are the sources of mathematics anxiety and mathematics self-efficacy of the students?

The following null hypotheses below were tested:

1. There is no significant difference in the perception of the students-respondents towards mathematics anxiety when grouped according to profile.
2. There is no significant difference in the perception of the student-respondents towards mathematic self-efficacy when grouped according to profile.
3. There is no significant difference between mathematics anxiety and mathematics self-efficacy of the student-respondents.
4. There is no significant relationship between mathematics anxiety and the academic performance of the student-respondents.
5. There is no significant relationship between mathematics self-efficacy and the academic performance of the student-respondents.

The study utilized the IV-DV model of framework or known as the Independent-Dependent Variable frame. Figure 1 below is the conceptual paradigm of the study showing the relationship of the variables used in the study.

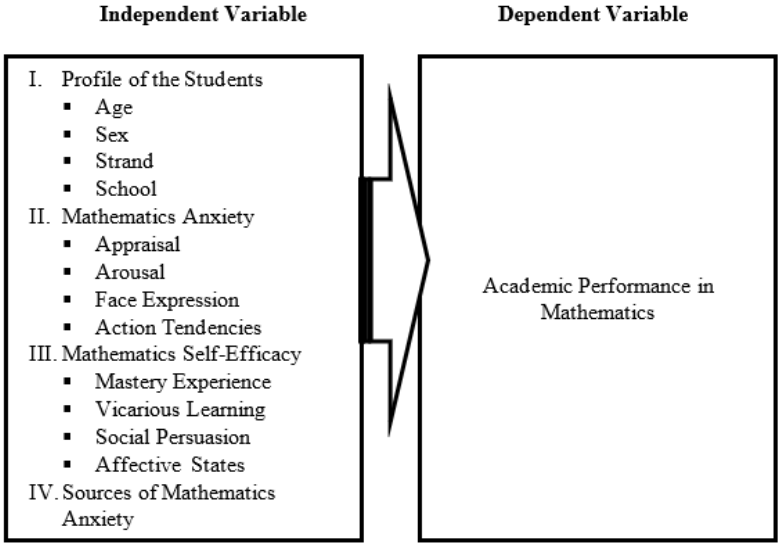

Figure 1. Paradigm of the Study

The Independent Variable frame, known as the cause variable, deals with the profile of the student-respondents regarding age, sex, strand, and school as the first part. The second part deals with how the respondents describe mathematics anxiety in terms of (1) Appraisal; (2) Arousal; (3) Face Expression; and (4) Action Tendencies. The third part deals with the perception of the respondents towards mathematics self-efficacy in terms of (1) Mastery Experience; (2) Vicarious Learning; (3) Social Persuasion: and (4) Affective State. For the Dependent Variable frame or known as the effect variable, the academic performance of the student-respondents in Mathematics was gathered.

Methods

A descriptive research design and quantitative analysis were employed in the present study. Descriptive research aims to correctly and thoroughly characterize a population, situation, or phenomenon. A descriptive study design might employ various research methodologies to explore one or more variables (Mc Combes, 2019). A survey questionnaire was used to collect data, supplemented by open-ended questions. The study targeted Grade 11 senior high school students as the respondents conducted in Botolan District, Division of Zambales, during Academic Year 2020-2021. Five hundred fifteen (515) were officially enrolled Grade 11 students of Botolan District. From the total population of five hundred fifteen (515), a sample of two hundred twenty-five (225) was utilized. The sample size was computed using Sloven's formula with a 0.5 margin of error and applied stratified random sampling to select the respondents.

The researchers used the Statistical Package for Social Sciences v.26 (SPSS) software to analyze the gathered data. The statistical tools used are frequency, percentage, weighted mean, F-test, T-test, and Pearson r.

Results and Discussion

1. Profile of the Student-Respondents

Age. As for the age, 74 or 32.9% are 18 years old; 71 or 31.6% are 17 years old; 41 or 18.2% are 20 years old, and 39 or 17.3% are 19 years old. The mean age of the student-respondents was 18.22 years old. The student of the present study belongs to the age range from 18 – 25 years old, which according to Prajapati, Patel, and Raninga (2014), is considered young adults. In the study of Lopez and Malay (2019), it also appears that most of their respondents are senior high school students aged 18 – 19 years old. Young adulthood is a period of development and change, but the magnitude of change may appear less dramatic than during childhood and adolescence (Bonnie, 2015).

Sex. Of the two hundred twenty-five (225) student-respondents, 136 or 60.4% are female respondents, and 89 or 36.6% are male respondents. The findings are also confirmed by Jabor, Machtmes, Kungu, Buntat, and Nordin (2011), which reveals that the majority of the respondents are female. In Buctot, Kim, and Kim's (2020) study, more than half of their respondents are female junior and senior high school students.

Strand. Of the two hundred twenty-five (225) student-respondents, 103 or 45.8% are enrolled in Humanities and Social Sciences (HUMSS) Strand; 43 or 19.1% belong to Science, Technology, Engineering and Mathematics (STEM) Strand; 34 or 15.1% are students from General Academic (GAS) Strand; 24 or 10.7% are enrolled from Accounting and Business Management Strand; and 21 or 9.3% are students from Technical, Vocational and Livelihood Strand. With a large population of students, the majority of the respondents were from the HUMSS strand. It has been reported that 49% of the students want to enroll in the academic track and technical vocational and livelihood track (Ibañez & Mangunay, 2016).

School. As for the school, most of the students (93 or 41.33%) are respondents from Botolan National High School since they have the highest number of enrolled senior high school followed by New Taugtog National High School with 38 or 16.90% of student-respondents. 29 or 12.89% are student-respondents from Panan National High School, while 19 or 8.44% respondents are from San Juan Integrated School. Senior high school students from Loob-Bunga High School and Bancal Integrated school are comprised of 18 or 8.00% of the respondents, and 10 or 4.44% are student-respondents from Beneg National High School. Maglipot (2020) reported that the Department of Education Region III has one of the highest enrollees for Academic Year 2020-2021.

2. Academic Performance of the Student – Respondents

The data revealed that out of two hundred twenty-five student-respondents, the most significant number of students, comprising 101 or 44.89% of the students, belong to the group with a proficient grade; 69 or 30.67% of the students belong to the grade bracket of 80 – 84; 45 or 20% of the students experience a grade of 90 and above, and 10 or 4.44% of the students got a grade of 75 – 79. No student got failing marks. The mean grade of the student-respondents in General Mathematics is 86.62. The students show proficient levels in General Mathematics as based on the k-12 Curriculum Guidelines. The results show that students possess good problem-solving skills and answer questions and facts in Mathematics. The findings are similar to the study of Tus (2020), which revealed that most respondents (54.62%) got satisfactory grades with a range of 85 – 89. A comparable conclusion also showed that 46.32% of students' academic achievement was satisfactory (Tus, 2019).

3. Mathematics Anxiety

Appraisal. For Appraisal, ranked 1st was Indicator 3, I feel anxious once I see the examination question is different from what is regularly asked (WM = 3.01) perceived as Agree. Students feel anxious once they see that the examination questions are different from what they regularly answer. They are also worrying when they do not have enough skills to learn mathematics lessons involving complex formulas. The finding signifies that students become apprehensive during exams when they lack sufficient abilities to learn mathematics lessons and are not familiar with examination questions. The increase in tension and worry about the exam were identified by Paechter, Macher, Martskvishvili, Wimmer, and Papousek (2017) as the causes of negative contribution in the performance of the students. Some students feel anxious when taking a test. This makes them stressed. Students were worried by the term test itself (Prodromou & Frederiksen, 2018). Students reported to have

experienced problems related to understanding or comprehending mathematics questions and explaining the solution or answer (Iglesia, Dundain, Miñoza, & Casimiro, 2021).

Arousal. In terms of Arousal, Indicator 2, My heart beat fast when a teacher asked me how to solve math problems. (WM = 2.80), ranked 1st with a qualitative rating of Agree. The students agreed that their heartbeats fast when their teacher asks how to solve mathematics problems and that they feel their head aching when facing a tricky question in mathematics. The lack of confidence of a student to answer or solve mathematics problems when called upon by the teacher, as well as the shaking of voices and sweating of palms when asked by the teacher to explain a mathematical concept, are some of the reasons why students feel worried or anxious, according to Estonanto (2017), although these are senior high school students. Reyes (2019) stated that doing calculations in front of the class makes them anxious and that they have stage fright when discussing the results of the Mathematics lesson.

Face Expression. For Face Expression, Indicator 1, I will frown my forehead when I cannot answer math questions asked by the teacher. (WM = 2.76) interpreted as Agree ranked first. The students agreed that they would frown on their foreheads when they could not answer mathematics questions asked by the teacher. They also snap their lips because they are worried that they cannot understand the mathematics lesson taught by the teacher. Students who felt terrible when solving mathematics questions indicated more concern and, in particular, perceived stress than those who felt positively about mathematics examinations (Lu, Li, Patrick, & Mantzicopoulos, 2021). Classroom activities requiring exercises on boards, oral recitation, feeling uncomfortable, and the presence of teachers might all contribute to their nervousness (Reyes, 2019).

Action Tendencies. As for Action Tendencies, Indicator 1, I keep silent during math class because I am afraid to be asked by my teacher (WM = 2.67) ranked 1st interpreted as Agree. Students agree that they keep silent during math class because they are afraid to ask their teacher. They also agree that they tend to play with their pen or other objects when they cannot answer mathematics questions during examination. Students avoid recitations during math class because they feel uneasy performing mathematics calculations (Nyakudya & Nyakudya, 2020). When students get worried about answering difficult questions, they avoid mathematics in their modules at the earliest (Nyakudya & Nyakudya, 2020).

4. Mathematics Self-Efficacy

Mastery Experience. Indicator 5, If I study hard, I do well in mathematics. (WM = 3.35), ranked first interpreted as Strongly Agree. Students strongly agreed that they do well in mathematics if they study hard. The result is also confirmed by Norbu and Dukpa (2021). This signifies that students' performance in mathematics depends on their exerted effort. Students gain self-confidence and feel good when they understand and learn mathematics lessons (Reyes, 2019). Those who were confident in their mathematical ability in learning mathematics performed better in the tasks than those who were not as confident in their ability (Tossavainen, Rensaa, & Johansson, 2021). Estonanto and Dio

(2019) mentioned that performing better in mathematics requires analytics and mathematical comprehension skills.

Vicarious Learning. Indicator 1, Seeing adults and kids do well in math pushes me to do better (WM = 3.23), interpreted as Agree ranked first. Students agree that seeing adults and kids do well in mathematics pushes them to improve. Norbu and Dukpa (2021) also revealed that students could be motivated to perform well in math when they see others do well. This signifies that a good role model motivates them to strive in mathematics class. Mukuka, Mutarutinya, and Balimuttajjo (2021) also found that students exposed to cooperative learning possess a strong relationship between self-efficacy belief and mathematical reasoning ability.

Social Persuasion. Indicator 2, My teacher appreciates me if I solve math problems correctly (WM= 3.10) ranked first. Students agreed that their teacher appreciates them if they solve mathematics problems correctly. Students received appreciative words because of their ability to solve in Mathematics, thus developing more self-efficacy in Mathematics (Norbu & Dukpa, 2021). Words of encouragement teacher gives help the student do a lot better (Nipaz, Belecina, & Garvida, 2016). According to Slade (2011 in Nipaz et al., 2016), the language of encouragement used in the classroom can affect students' feelings of belonging and connectivity. A teacher's support can have an impact on how pupils perceive themselves. Furthermore, encouraging comments impact the quality of classroom education, causing students to delve deeper and create connections.

Affective State. Indicator 2, Just being in Mathematics class makes me feel calm and relaxed (WM = 2.80), interpreted as Agree ranked 1st. Students agreed that being in Mathematics class makes them feel calm and relaxed. They also agreed that they get many ideas and can think when doing Mathematics work clearly. This signifies that students are in a conducive learning environment. The finding was congruent to the study of Norbu and Dukpa (2021), in which they stated that a conducive, friendly, secured, and stress-free learning environment encourages students to participate and learn better, thus gaining more self-efficacy. In a conducive learning environment, learning experiences via problems may help students solve mathematical problems well, either individually or collectively. This may be an asset to solve mathematical problems in their learning activities (In'am & Sutrismo, 2021).

5. Analysis of Variance on the Difference in the Perception on Mathematics Anxiety When Grouped According to Profile of the Student – Respondents

Appraisal. The significant values for age (0.336), sex (0.710), strand (0.343), and school (0.826) were higher than the 0.05 alpha level of significance. Therefore, the null hypothesis is accepted. There is no significant difference in the perceived Mathematics Anxiety in terms of Appraisal when grouped according to age, sex, strand, and school. Student-respondents believed that they have the same understanding of Mathematics Anxiety with regards to Appraisal.

Arousal. The significant value for age (0.168), sex (0.470), and school (0.154) were higher than the 0.05 alpha level of significance. Therefore, the null hypothesis is accepted. There is no significant

difference in the perceived level of Mathematics anxiety in terms of Arousal when grouped according to age, sex, and school. Student-respondents' beliefs and understanding of Mathematics Anxiety in terms of Arousal are the same. The significant value for strand (0.048) was lower than the 0.05 alpha level of significant value. Therefore, the null hypothesis was rejected. There is a significant difference in the perceived Mathematics Anxiety in Arousal when grouped according to strand. Student-respondents differ significantly in their perceived level of Mathematics Anxiety regarding Arousal when attributed to respondents' strand. Students choose a career path that only requires a lesser mathematics subject (Espinosa et al., 2017). Lee (2009 in Rameli, 2016) reported that students from Asia, such as Korea, Japan, and Thailand, regarded Mathematics Anxiety to be considerably greater than students from Europe or the West.

Face Expression. The significant values for age (0.074) and school (0.502) were higher than the 0.05 alpha level of significance. Therefore, the null hypothesis is accepted. There is no significant difference in perceived Mathematics anxiety regarding face expression when grouped according to age and school. Student-respondents' beliefs and understanding of Mathematics Anxiety in terms of Face Expression are the same. The significant values for sex (0.018) and strand (0.000) were lower than the 0.05 alpha level of significance. Therefore, the null hypothesis is rejected. There is a significant difference in the perceived Mathematics Anxiety regarding Face Expression when grouped according to sex and strand. Student-respondents differ significantly in their perceived level of Mathematics Anxiety in terms of Face Expression when attributed to respondents' age and strand, which contradicts the claims of Iglesia et al. (2021); Odumodu and Unachukwa (2021); and Delgado and Kassim (2019), however, it must be emphasized that significance noted is statistically significant which corroborates with the findings of Asikhia (2021); and Lacia, Ben and Elizar (2020). Gire (1988 in Asikhia, 2021) stated that the difference in the perceived level of mathematics anxiety could explain how the students perceived mathematics as either male or female domains. Alico, Maraorao, and Maraorao (2017); and Erdem (2017) also mentioned that among gender, female students have a higher level of mathematics anxiety. Lacia, Ben, and Elizar (2020) found that the mathematics anxiety levels between males and females significantly differ. On the other hand, students with a high level of mathematics anxiety tend to choose tracks with lesser mathematics courses required. This is why most students choose HUMSS as their career path (Espino et al., 2017).

Action Tendencies. The significant values for age (0.437), sex (0.305), and strand (0.354) were higher than the 0.05 alpha level of significance. Therefore, the null hypothesis is accepted. There is no significant difference in the perceived level of Mathematics Anxiety in terms of Action Tendencies when attributed to age, sex, and strand. Students' beliefs and understanding of Mathematics Anxiety in terms of Action Tendencies are the same. The significant value for school (0.036) is lower than the 0.05 alpha level of significance. Therefore, the null hypothesis is rejected. There is a significant difference in the perceived level of Mathematics Anxiety in terms of Action Tendencies when grouped according to school. Student-respondents differ significantly in their perceived level of Mathematics anxiety regarding Acton tendencies when attributed according to school. The findings support the claims of Lacia, Ben, and Elizar (2020); and Winarso and Haqq (2019). Lee (2009 in Rameli, 2016)

reported that students from Asia, such as Korea, Japan, and Thailand, regarded Mathematics Anxiety to be considerably greater than students from Europe or the West. Lacia, Ben, and Elizar (2020) revealed that students from elementary schools developed a higher significant level of mathematics anxiety than students from secondary schools. In contrast, Winarso and Haqq's (2019) study indicates that senior high students possess a high level of mathematics anxiety compared to the lower level of education.

6. Analysis of Variance on the Difference in the Perception on Mathematics Self-Efficacy When Grouped According to Profile of the Student – Respondents

Mastery Experience. The significant values for sex (0.916), strand (0.687), and school (0.232) were higher than the 0.05 alpha level of significance. Therefore, the null hypothesis is accepted. There is no significant difference in the perceived level of mathematics self-efficacy in terms of mastery experience when attributed to sex, strand, and school. Students' beliefs and understanding of mathematics self-efficacy in terms of mastery learning are the same. The significant value for age (0.007) is lower than the 0.05 alpha level of significance. Therefore, the null hypothesis is rejected. There is a significant difference in the perceived level of mathematics self-efficacy when grouped according to age. Student-respondents differ significantly in their perceived level of mathematics self-efficacy regarding mastery experience when attributed to age. It is possible to conclude that age might be a predictor of mathematics self-efficacy of students. There is a lack of studies regarding age and mathematics self-efficacy. However, some studies suggest that younger students perform better in mathematics than older students (Jabor et al., 2011; Pellizzari & Billari, 2012).

Vicarious Learning. The significant values for strand (0.687) and school (0.281) were higher than the 0.05 alpha level of significance. Therefore, the null hypothesis is accepted. There is no significant difference in the level of mathematics self-efficacy in terms of vicarious learning when attributed according to strand and school. Students' belief and understanding of mathematics self-efficacy in vicarious learning is the same when attributed to strand and school. The significant values for age (0.024) and sex (0.021) were lower than the 0.05 alpha level of significance. Therefore, the null hypothesis is rejected. There is a significant difference in the perceived level of mathematics self-efficacy in terms of vicarious learning when grouped according to age and sex. Student-respondents differ significantly on their perceived level of mathematics self-efficacy regarding vicarious learning when attributed to age and sex. The result contradicts the findings of Ducay and Alave (2021); Cuevas and Berou (2016); and Probst (2019), where there was no significant difference between mathematics self-efficacy of male and female students. On the other hand, the significant difference in mathematics self-efficacy regarding vicarious learning and age cannot be verified by other findings since there is a lack of research. However, some studies suggest that younger students have a higher mathematics performance than older students (Jabor et al.,2011; Pellizzari & Billari, 2012).

Social Persuasion. The significant values for age (0.177), sex (0.333), strand (0.177), and school (0.597) were higher than the 0.05 alpha level of significance. Therefore, the null hypothesis is accepted. There is no significant difference in perceived Mathematics Self-Efficacy in terms of Social Persuasion

when grouped according to age, sex, strand, and school. Students believed that they have the same understanding of Mathematics Self-Efficacy with regards to social persuasion.

Affective State. that the significant values for strand (0.366) were higher than the 0.05 alpha significance level. Therefore, the null hypothesis is accepted. There is no significant difference in the level of mathematics self-efficacy regarding Affective states when grouped according to strand. Students' belief and understanding of Mathematics self-efficacy in terms of physiological state are the same when attributed to strand. The significant values for age (0.004), sex (0.036), and school (0.049) were lower than the 0.05 alpha level of significance. Therefore, the null hypothesis is rejected. There is a significant difference in the perceived level of Mathematics self-efficacy regarding physiological state when attributed to age, sex, and school. Students' beliefs and understanding differ significantly in terms of age, sex, and school. The result contradicts the findings of Ducay and Alave (2021), where there was no significant difference between the self-efficacy of males and females. On the other hand, the finding was similar to the study of Ozdemir, Karasan, & Sahal (2020), where students' attitudes towards mathematics differ significantly according to the school where they enroll. Cayubit et al. (2020) observed that school type could account for the variation of mathematics motivation. Moreover, the significant difference in mathematics self-efficacy regarding vicarious learning and age cannot be verified by other findings since there is a lack of research about it. Nevertheless, some studies suggest that younger students have a higher mathematics performance than older students (Jabor et al.,2011; Pellizzari & Billari, 2012).

7. T-test on the Difference in the Perception Between Mathematics Anxiety and Mathematics Self-Efficacy by the Student-Respondents

The significant value (0.000) on the difference between perceived mathematics anxiety and mathematics self-efficacy was lower than 0.05 alpha level of significance. Therefore, the null hypothesis is rejected. There is a significant difference in the perceived mathematics anxiety and mathematics self-efficacy of the student-respondents. The findings of Rozgonjuk, Kraav, Mikkor, Orav-Puurand, and That (2020) indicated that mathematics self-efficacy significantly influences mathematics anxiety. As a result, one potential lesson from the current study's findings is that increasing students' mathematical self-efficacy may also be beneficial in lowering mathematics fear. It is possible that lowering students' mathematics anxiety may be beneficial in increasing their mathematics self-efficacy. Students who were more anxious about mathematics tended to have lesser cognitive reflection and, as a result, more inflexible persistence (Jiang, et al., 2021). Findings also revealed a strong interaction between perceived mathematics anxiety and mathematics self-efficacy (Hiller et al., 2020; and Cuevas & Berou, 2016).

8. Pearson Correlation on the Relationship Between the Level of Mathematics Anxiety and Academic Performance of the Student-Respondents

Table 8 shows that the significant value (0.003) is lower than the 0.05 alpha significance level. Therefore, the null hypothesis is rejected. There is a significant negligible relationship between perceived Mathematics Anxiety and academic performance in General Mathematics of the students.

The inverse connection indicates that as students' anxiety levels in General Mathematics rise, so does their performance. Based on this finding, it is possible to conclude that the mathematics anxiety level of senior high school students is substantially connected to their performance level in General Mathematics. As a result, their degree of math anxiety is negatively related to their academic performance in General Mathematics. The result is also verified by Hiller et al. (2020) and Ducay and Alave (2021) that mathematics anxiety affects students' academic performance. Furthermore, Estonanto (2017) found out that there is a link between mathematics anxiety and student performance in Pre-calculus. Furthermore, findings were also revealed in Mukaka, Mutarutinya, and Balimuttajjo's (2021) study, where students' self-confidence significantly impacts students' understanding of specific mathematical concepts.

9. Pearson Correlation on the Relationship Between the Level of Mathematics Anxiety and Academic Performance of the Student-Respondents

The significant value (0.016) was lower than the 0.05 alpha significance level. Therefore, the null hypothesis is rejected. There is a significant negligible relationship between perceived Mathematics self-efficacy and academic performance of students in General Mathematics. The positive relationship signifies that the increase in Mathematics self-efficacy of the students will improve the students' performance in Mathematics. The result was also verified by Hiller et al. (2020), Ducay and Alave (2021), and Mariera, Murugami, and Muthee (2021), where mathematics self-efficacy is a predictor of academic performance. Students that have a firm conviction in their abilities and capabilities will eventually do well (Nipaz, Belecina, & Garvida, 2016). The ability to achieve well in mathematics, do well in completing the task and adapt to the learning environment possess a high level of self-efficacy (Negara, Nurlaelah, Wahyudin, Hernan, & Tamur, 2021).

10. Sources of Mathematics Anxiety and Mathematics Self-Efficacy

Student respondents were asked what they felt about learning Mathematics. Responses were categorized into subthemes: positive emotion and negative emotion. Positive and negative emotions are linked with the achievement of the students in Mathematics (Van der Beek, Van der Ven, Kroesbergen, & Leseman, 2017). Reyes (2019) stated that Mathematics anxiety is based on physical and emotional feelings, while mathematics self-efficacy is about the student's effort and the teachers' coping techniques. Based on the result of the study, for positive emotion, sixteen (16) students said they feel happy about learning Mathematics; fifteen (15) said learning Mathematics is good; fourteen (14) students mentioned that Mathematics made them feel challenged; and lastly, seven (7) said they feel better.

The result suggests that positive experiences and reinforcements aid the students in becoming good at Mathematics. Students are motivated to learn and better connect with their teachers when given sufficient attention and commendations (Salazar & Basierto, 2021). Students who are appraised and given encouraging words also support their academic growth (Nipaz, Belecina, & Garvida, 2016). It is also conclusive in the study of Delima, Rahmah, and Akbar (2018) that students with positive self-concepts in mathematics possessed higher mathematical skills. (Delima, Rahmah, & Akbar, 2018).

For the negative emotion, twenty-six (26) mentioned that they feel nervous when learning Mathematics; eighteen (18) responded that Mathematics is complicated; nine (9) said that they feel anxious and worried; and lastly, three (3) respondents said they are pressured in learning Mathematics. The dominant remarks of the student-respondents are the feeling of nervousness, especially during solving problems and checking whether the answer is correct. They mentioned that Mathematics is challenging to learn without a teacher's aide. Based on the findings, students acknowledged that Mathematics is a complex subject, making them feel nervous, especially during exams, activities, and recitations. Students feel nervous, worried, and anxious once they hear mathematical terms that seem very hard (Estonanto & Dio, 2019). This could be possible when students do not master the concept and lack conceptual, computational, and manipulative skills in solving mathematical problems. It is also possible that teaching styles cause major anxiety, as stated by Finlayson (2014 in Estonanto & Dio, 2019).

Student-respondents were asked about their experiences that made them feel anxious in learning Mathematics. Based on the result, twenty-nine (29) said they were not able to solve mathematics problems, and they lacked in skill or knowledge to solve; twenty-three (23) said answering in front of the class made them feel anxious; eight (8) said they got worried during examination day; and lastly, six (6) mentioned experiences related to teachers' behavior, attitude and teaching style. The dominant remarks of the student-respondents are solving Math problems that involve many variables and different formulas. They get worried when they do not have enough mathematical skills to understand and solve math problems which are evident in their responses: Based on the findings, students acknowledged that lacking mathematical skills to solve Math problems is the main reason for their anxiety. Gafoor and Kurukkan (2015) mentioned that students detest Math as a subject because it is not easy to understand. There is poor instruction, and it demands more time to comprehend (Gafoor & Kurukkan, 2015). Strictness in any means may also affect the students' performance (Jameel & Ali, 2016). Students also noticed their teacher is either unprepared or does not have mastery of the topic (Jameel & Ali, 2016; and Estonanto & Dio, 2019). It could also be possible when students know the basic skills, yet they do not understand the proper application of the concept itself. That is why students are afraid to answer in front of the class (Reyes, 2019).

Conclusions

Based on the findings, the researcher concluded that:

1. Female students who belong to young adults are enrolled in Grade 11 in a public Senior High School in the Botolan district.
2. The students demonstrate a proficiency level in General Mathematics.
3. The students' perceived level of Mathematics Anxiety is highly positive.
4. The students' perceived level of Mathematics Self-Efficacy is highly positive.
5. Students stated that they feel nervous when learning mathematics. They acknowledged their lack of skills and knowledge in solving Mathematics problems.
6. When grouped according to age, the students' perceptions of the Appraisal, Arousal, Face Expression, and Action Tendencies aspects of Mathematics Anxiety do not differ significantly.

When grouped according to sex, perceptions differ significantly on Face Expression, while perceptions on the Appraisal, Arousal, and Action Tendencies are the same. Regarding the strand, perceptions differ significantly on the Arousal and Face Expression, while perceptions on the Appraisal and Action Tendencies are the same. Regarding school, the significant difference only matters on the Action Tendencies, while perceptions of Appraisal, Arousal, and Face Expression are the same.

7. When attributed to age, perceptions of the Mastery Experience, Vicarious Learning, and Physiological State aspect of Mathematics self-efficacy differ significantly, while perceptions of Social Persuasion are the same. When grouped according to sex, perceptions of Vicarious Learning and the Affective States differ significantly, while perceptions of Mastery Experience and Social Persuasion are the same. In terms of the strand, perceptions of all the aspects of Mathematics self-efficacy are the same. In terms of school, perceptions only differ significantly on the Physiological State.
8. The level of Mathematics anxiety and Mathematics self-efficacy differ significantly.
9. There is a significant yet negative relationship between the level of Mathematics anxiety and students' academic performance in General Mathematics.
10. There is a significant positive relationship between the level of Mathematics self-efficacy and students' academic performance in General Mathematics.

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