

## Mathematics Anxiety among Jordanian Pre-Service Elementary Teachers

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### Abstract

Mathematics is considered one of the most important topics people are interested in throughout the different learning stages. A lot of people all around the world face different types of difficulties such as anxiety of mathematics. The current study aimed at investigating mathematics anxiety among pre-service Jordanian elementary teachers. The sample consisted of 472 pre-service teachers who were studying in the College of Educational Sciences at Al al-Bayt University, Jordan. Those pre-service teachers were enrolled in three different majors: Elementary Teachers Program, Early Childhood Program, and Special Education Program. The researchers used the Mathematical Anxiety Scale- Short Version developed by Suinn and Winston (2003), which consisted of 29 items with 5-point Likert-type instrument. The results of the study revealed six themes where each included some of the 29 items of the scale. In general, the responses of the participants in the study showed mathematics anxiety in the following issues: [Anxiety](#) because of thinking about the exam, anxiety after taking the exam, anxiety in the form of patterns and life situations related to the four basic processes, anxiety from mathematics, concern in the form of questions on the four basic processes, concern in the form of models of life applications on the four basic operations (addition, subtraction, multiplication, division), and taking a math test or preparing for a math test or homework.

**Keywords:** Mathematics, Anxiety, Pre- Service Teachers, Basic Operations.

## قلق الرياضيات عند معلمي المرحلة الابتدائية ما قبل الخدمة

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### ملخص

تعتبر الرياضيات من أهم المواضيع التي يهتم بها الناس جميعهم في مراحل التعلم كافة. ويواجه العديد من الأشخاص حول العالم أنواعاً مختلفة من الصعوبات، مثل القلق من الرياضيات. وقد هدفت الدراسة الحالية إلى التعرف على قلق الرياضيات لدى معلمي المرحلة الابتدائية الأردنيين قبل الخدمة، وتكونت العينة من ٤٧٢ معلماً ومعلمة ما قبل الخدمة الذين يدرسون في كلية العلوم التربوية في جامعة آل البيت في الأردن. وقد تم تسجيل هؤلاء المعلمين قبل الخدمة في ثلاثة تخصصات مختلفة: برنامج معلمي المرحلة الابتدائية، وبرنامج الطفولة المبكرة، وبرنامج التربية الخاصة. وقد استخدم الباحثان مقياس القلق الرياضي - النسخة القصيرة التي طورها Winston و Suinn (٢٠٠٣). وقد تكونت تلك الأداة من ٢٩ فقرة من نوع ليكرت ذا ٥ نقاط. وكشفت نتائج الدراسة عن ستة محاور (مجالات). وشمل كل محور من هذه المحاور بعضاً من فقرات المقياس البالغ عددها ٢٩ فقرة. وبشكل عام أظهرت استجابات المشاركين في الدراسة قلق الرياضيات في المسائل التالية: القلق بسبب التفكير في الامتحان، القلق بعد أداء الامتحان، القلق على شكل أنماط ومواقف حياتية تتعلق بالعمليات الأساسية الأربع، القلق في الرياضيات. شكل أسئلة عن العمليات الأساسية الأربع، واهتمام على شكل نماذج تطبيقات حياتية على العمليات الأساسية الأربع (الجمع، الطرح، الضرب، القسمة)، وإجراء اختبار الرياضيات أو التحضير لاختبار الرياضيات أو الواجب المنزلي.

### Introduction:

Mathematics is one of the most important subjects or topics for all people in all learning stages. Many people around the world face different types of difficulties such as Mathematics Anxiety. Most of the students enter into the teacher education programs at universities and colleges with different beliefs, motivations, experiential backgrounds and concerns (Olson & Appleton, 2006; Riggs, 1995; Yılmaz-Tuzun, 2008). Their beliefs, backgrounds and concerns may have positive or negative impact on their behaviors and performance in teacher education programs and in their future classrooms (Brookhart & Freeman, 1992; Czerniak, 1989; Enochs & Riggs, 1990; Hollingsworth, 1989). One of these

attributes related to their affective state is their anxiety about teaching. Anxiety about teaching is an affective state which is expressed in unpleasant feelings, physical symptoms, and coping behaviors (Sinclair & Nicoll, 1980). Thomas (2006) defined teaching anxiety as the feelings, beliefs, or behaviors that interfere with a person's ability to start, continue, or finish teaching tasks

According to Tobia (1998), mathematics anxiety is a feeling of uncertainty if you do well or not in mathematics or with numbers. It is the case that students suffer from the fear of mathematics in which they cannot think or learn mathematics. Gresham, (2004) said that this fear might cause low self-esteem, frustration, and sometimes academic failure for some students. On the other hand, Suinn & Winston, (2003) defined Mathematics anxiety as the "feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations" (p.167). Mathematics anxiety has gained high awareness by educators as an important factor in the learning - teaching of mathematics (Sloan, T., Daane, C., & Geisen, J., 2002). Some studies reveal high levels of mathematics anxiety in elementary pre- service teachers (Zettle & Raines, 2002).

Mathematics anxiety has been defined by other researchers as an irrational dread of mathematics that interferes with manipulating numbers and solving mathematics problems within a variety of everyday life and academic situations (Battista, 1990; Gresham, 2009; Tobias, 1998). It is the helplessness and panic one experiences when asked to perform mathematical tasks (Bursal & Paznokas, 2006). Gresham (2007b) describes mathematics anxiety as feelings of helplessness, tension, or panic when performing mathematics operations or problems

Some studies reveal high levels of mathematics anxiety in elementary pre-service teachers (Zettle & Raines, 2002). Rayner et. Al. (2009) conducted a study to examine the relationship between mathematics anxiety and the procedural and conceptual knowledge of fractions in prospective teachers. Their sample consisted of 32 pre- service teachers who studies the elementary math methods course. They used Revised Mathematics Anxiety Rating Scale (RMARS, Baloglu, 2002)

as an instrument. Results showed that scores on the validated test of procedural knowledge of fractions declined as mathematics anxiety ratings increased. The results highlight the significance of fostering preservice teachers' skill in both mathematical processes and concepts by offering some insight into the cognitive and pedagogical aspects related with mathematics fear in this demographic.

Hakan et. Al. (2009) conducted a study to investigate the level of mathematics anxiety among pre-service elementary school teachers. They used a survey method in which the sample of their study was 207 pre-service elementary school teachers. The Mathematics Anxiety Scale consisted of 39 items developed by Üldaş (2005) was used. They concluded that the level of mathematics anxiety of pre-service elementary school teachers was low and the difference based on gender was not significant. In addition, they found that there were significant differences according to class, perceived ability and perceived success levels.

Gresham (2007a) and Geist (2010) believe that many teachers who have mathematics anxiety themselves not only influenced but inadvertently pass it on to their students. Beilock, Gunderson, Ramirez and Levine (2010) believe that their anxiety could negatively impact their students' mathematics achievements. Bursal and Paznokas (2006) found negative correlations between preservice teachers' mathematics anxiety and their confidence to teach elementary mathematics. Swetman, Munday, and Windham (1993) discovered that elementary school teachers with high levels of mathematics anxiety spend less time planning mathematics lessons and use mathematics instruction time for non-mathematics related activities.

Brady and Bowd (2005) also found that 39.3% of prospective elementary school teachers report that mathematics was their least liked subject and that many teachers uncomfortable teaching mathematics because they do not like mathematics themselves. (Geist, 2010). Hembre (1990) in a meta-analysis of 151 studies found that elementary education students exhibited the highest level of mathematics anxiety when compared to other undergraduate majors (e.g. humanities or social science). He also discovered that students enrolled in mathematics courses for elementary teachers revealed the highest level of mathematics anxiety, higher than

those students enrolled in courses such as “Remedial Algebra” or “Developmental Mathematics”. ReichweinZientek et al. (2010) found that early childhood teacher education majors exhibit anxiety levels somewhat comparable to those of community college remedial mathematics students.

This study aims to investigate Mathematics Anxiety among Pre- Service Jordanian Elementary Teachers and it is a qualitative study. The sample consisted of 472 pre-service teachers who were studying in the College of Educational Sciences at Al Albait University, Jordan. Those Pre- Service Teachers were enrolled in three different majors: Elementary Teachers Program, Early Childhood Program, and Special Education Program.

### **Method and Procedures:**

The researchers used the Mathematical Anxiety Scale- Short Version developed by Suinn and Winston (2003). This scale consists of 30-items, five-point, Likert-type instrument. It was developed to measure mathematics anxiety levels among pre-service teachers at colleges of education. The researchers deleted one item and used that scale of 29 items and these items refer to objects and experiences that may cause fear or anxiety. Each Pre- service teacher in the sample described the amount of fear associated with each item by choosing 1- “not at all”, 2- “a little”, 3- “reasonable”, 4- “a lot” and 5- “very much”. In addition to the Mathematical Anxiety Scale- Short Version, the researchers used a consent form to be completed by all the participants in the sample of the current study.

The population of the study was all Pre-service teachers in all Jordanian Colleges of Education. The researchers selected 472 Preservice teachers as the sample of the study from the College of Educational Sciences at Al al-Bayt University. The reason that the researchers selected the sample from a specific university in Jordan is that they both work at that university. All participants of the study sample completed the instrument of the study, Mathematical Anxiety Scale- Short Version. The researchers used Google Forms to collect the data from the participants and then analyzed it in this qualitative research study.

**Limitations of the study:**

There were some limitations of this study such as: All participants in the study were females. The reason behind this thing is that all college students in Jordan who study to be teachers are females, and all teachers in both Kindergarten or Elementary schools are females. Another limitation of the current study. The researchers selected the sample from only one Jordanian University, Al al-Bayt University. A Third limitation of the study is that it is only a qualitative type and there is no quantitative data in it. In addition, the Cronbach alpha of .96 indicated high internal consistency, while the test-retest reliability for the MARS 29-item was .90 ( $p < .001$ ). The validity data confirm that this 29- item scale is comparable to the original MARS 30-item scale.

**Results and Discussion:**

The researchers in this study used the Mathematical Anxiety Scale- Short Version to collect the data. The scale itself was translated by the researchers themselves and another professional translator.to Arabic language from the original one that was in English. In addition, the researchers used a Consent Form that was completed by all participants in the study. The Mathematical Anxiety Scale- Short Version consisted of 29 items with 5- point Likert-type instrument. These items were categorized in some areas (themes) and each of these themes include some of the 29 items of the scale. Table (1) summarized the areas (themes) and the items of each theme of the scale.

**Table (1): The Themes and the items of the Mathematical Anxiety Scale- Short Version**

| # of Area (Theme) | The Area (Themes)   | Items                  |
|-------------------|---|------------------------|
| The First area    | anxiety because of thinking about the exam  | 1, 2, 3, 4, 5          |
| The Second area   | anxiety after taking the exam   | 6, 7, 8                |
| The Third area    | anxiety in the form of patterns and life situations related to the four basic processes | 21, 22, 23, 24, 25, 26 |
| The Fourth area   | concern in the form of questions on the four basic processes                            | 15, 16, 20, 27, 28, 29 |
| The Fifth area    | concern in the form of models of life applications                                      | 17, 18, 19             |

| # of Area (Theme) | The Area (Themes)  | Items                 |
|-------------------|--|-----------------------|
|                   | on the four basic operations (addition, subtraction, multiplication, division) |                       |
| The Sixth area    | taking a math test or preparing for a math test or homework                    | 9, 10, 11, 12, 13, 14 |

**EXPLORATORY FACTOR ANALYSIS (EFA):**

Data for the 29 items were entered into a principal axis factoring (PAF) analysis, we performed the Kaiser–Meyer–Olkin (KMO) test (Kaiser, 1958) to measure the sampling adequacy and the Bartlett’s test of sphericity (Bartlet, 1954) to Investigate the factorability of the data. As depicted in Table 1, KMO results of high value (almost .922), which is higher than the minimum requirement of 0.7 (Lloret et al., 2017) implied the suitability of the data for exploratory factor analysis and a significant test statistic was indicated by Bartlett’s test of sphericity ( $p < 0.001$ ), The Bartlett’s test of Sphericity is highly significant at  $p < 0.001$  which shows that the correlation matrix has significant correlations among at least some of the variables. Here, test value is 6792.321 and an associated degree of significance is less than 0.0001. Hence, the hypothesis that the correlation matrix is an identity matrix is rejected. To be specific, the variables are not orthogonal. The significant value  $< 0.05$  indicates that a factor analysis may be worthwhile for the data set. Table

**Table 2. Kaiser–Meyer–Olkin (KMO) sample adequacy test.**

| KMO and Bartlett's Test                          |                    |          |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | .922     |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 6792.321 |
|  | df                 | 406      |
|  | Sig.               | .000     |

In the EFA, all 29 items were subjected to principal component analysis (PCA) Rotation Method: Varimax. To determine the number of initial unrotated

factors to be extracted, Kaiser's criterion and the Scree test are used. The eigenvalues associated with each factor is represented the variance explained by those specific linear components. The coefficient value less than 0.30 is suppressed that will suppress the presentation of any factor loadings with values less than 0.30 (Watson et al., 1995). The final six -factor model with eigenvalue over 1, however, as depicted in the scree plot in Figure 1, there is a break after the six components, and several items showed small variances and close to each other.

Finally, this 29 item structure was found to explain 61.927% of the variance in the pattern of relationships among the items as shown in Table 2. This initial solution suggests that the final solution will extract not more than six factors. The first component has explained 14.316% of the total variance with eigenvalue 9.437. The second component has explained 12.526% variance with eigenvalue 3.467. The third component has explained 12.400% variance with eigenvalue 1.545. The fourth component has explained 9.149% variance with eigenvalue 1.395. The fifth component has explained 6.646% variance with eigenvalue 1.092. Finally, the sixth component has explained 6.324% variance with eigenvalue 1.023.

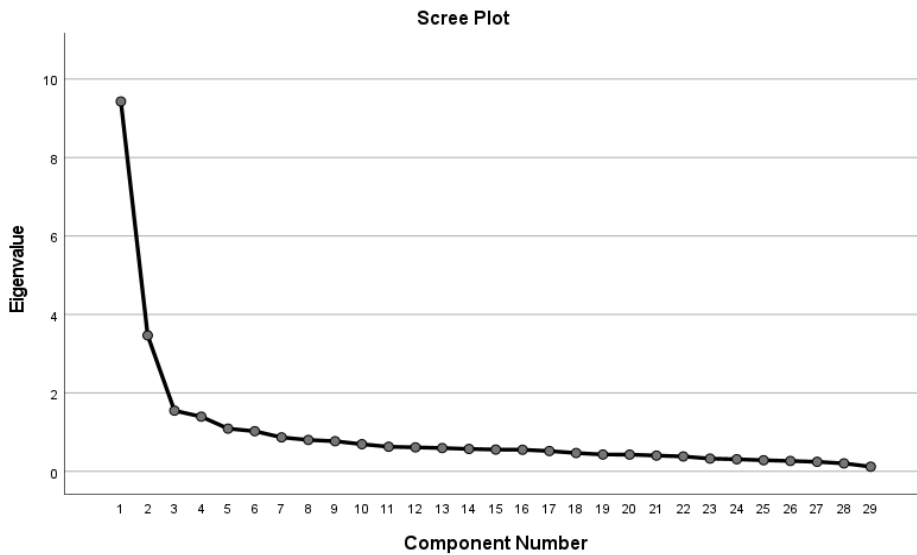


Figure 1. Scree plot output indicating that the data have six factors



Table 3 below, presents the item wordings, factor loadings, Eigen Value and variance explained for each factor. As depicted, the factor loadings ranged from 0.364 to 0.919, meaning that all items were good measures of their respective factors(Hair et al., 2010).

**Table 3 Results of exploratory factor analysis (EFA) on the 29-item**

| Factor/Item 1  | Factor Loading | Eigen Value | Variance Explained |
|--|----------------|-------------|--------------------|
| <b>anxiety after taking the exam</b>   |                |             |                    |
| a6   | 0.772          | 9.437       | 14.883             |
| a7   | 0.654          |             |                    |
| a2   | 0.368          |             |                    |
| a1   | 0.546          |             |                    |
| <b>anxiety because of thinking about the exam</b>  |                |             |                    |
| a3   | 0.845          | 3.467       | 12.526             |
| a4   | 0.919          |             |                    |
| a5   | 0.901          |             |                    |
| <b>taking a math test or preparing for a math test or homework</b>                             |                |             |                    |
| a8   | 0.649          | 1.545       | 12.400             |
| a9   | 0.591          |             |                    |
| a10  | 0.770          |             |                    |
| a12  | 0.511          |             |                    |
| a14  | 0.739          |             |                    |
| a16  | 0.390          |             |                    |
| <b>anxiety in the form of patterns and life situations related to the four basic processes</b> |                |             |                    |
| a11  | 0.690          | 1.395       | 9.149              |
| a15  | 0.410          |             |                    |
| a13  | 0.623          |             |                    |
| a21  | 0.372          |             |                    |
|  |                |             |                    |

| Factor/Item 1  | Factor Loading | Eigen Value | Variance Explained |
|--|----------------|-------------|--------------------|
| a27  | 0.364          |             |                    |
| <b>concern in the form of models of life applications on the four basic operations (addition, subtraction, multiplication, division)</b> |                |             |                    |
| a18  | 0.613          |             |                    |
| a19  | 0.514          | 1.092       | 6.646              |
| a22  | 0.631          |             |                    |
| a23  | 0.672          |             |                    |
| a24  | 0.636          |             |                    |
| a25  | 0.686          |             |                    |
| <b>concern in the form of questions on the four basic processes</b>  |                |             |                    |
| a17  | 0.504          |             |                    |
| a20  | 0.638          |             |                    |
| a26  | 0.635          | 1.023       | 6.324              |
| a28  | 0.812          |             |                    |
| a29  | 0.805          |             |                    |

<sup>1</sup> All the items are measured on a 5-point Likert scale (1: strongly disagree to 5: strongly agree)

### Conclusion:

One of the most crucial disciplines or themes for learners at all levels is mathematics. Numerous people worldwide struggle with various issues, including mathematics anxiety. The current study used a qualitative methodology to examine mathematics anxiety among Jordanian elementary school teacher candidates. 472 aspiring teachers who were enrolled in Al al-Bayt University's College of Educational Sciences in Jordan made up the sample. The Elementary Teachers Program, Early Childhood Program, and Special Education Program were the three majors in which those pre-service teachers were enrolled. The study employed Suinn and Winston's (2003) short version of the Mathematical Anxiety Scale. There were 29 items total on this 5-point Likert-type instrument.

The study's findings identified six themes, each of which contained a few of

the scale's 29 components. The study's participants generally expressed fear about the following issues in their responses: anxiety from worrying about the test, anxiety from taking the test, anxiety from patterns and real-world situations related to the four fundamental processes, anxiety from questions about the four fundamental processes, anxiety from models of real-world applications of the four fundamental operations (addition, subtraction, multiplication, and division), and anxiety from doing math tests or studying for math tests. Finally, the researchers recommended that future studies might explore studies that might use both males and females in the sample. The future studies might investigate Math Anxiety for students in other majors.

### References:

- Bartlett, M. (1954). A note on multiplying factors for various chi-squared approximations. *Journal of the Royal Statistical Society*, 16, 296–298.
- Battista, M. (1990). The relationship of mathematics anxiety and mathematical knowledge to the learning of mathematical pedagogy by preservice elementary teachers. *School Science and Mathematics*, 86, 10-19.
- Beilock, S. L., Gunderson, E. A., Ramirez, G & Levine, S. C. (2010), *Female teachers' math anxiety affects girls' math achievement*, Proceedings of the National Academy of Sciences of the United States of America (PNAS), 107 (5), 1860-1863.
- Brady, P. & Bowd, A. (2005). Mathematics anxiety, prior experience and confidence to teach mathematics among pre-service education students. *Teachers and Teaching: theory and practice*, 11(1), 37–46.
- Bursal M., & Paznokas, L. (2006). Mathematics anxiety and preservice elementary teachers' confidence to teach mathematics and science. *School Science and Mathematics*, 106 (4) 173-179.
- Enochs, L. G., & Riggs, I. M. (1990). Further Development of an Elementary Science Teaching Efficacy Belief Instrument: A Preservice Elementary Scale. *School Science & Mathematics*, 90, 694-706.

- Kaiser, H. F. (1958). The varimax criterion for analytic rotation in factor analysis. *Psychometrika*, 23(3), 187–200.
- Lloret, S., Ferreres, A., Hernández, A., & Tomás, I. (2017). The exploratory factor analysis of items: guided analysis based on empirical data and software. *Anales de Psicología*, 33(2), 417–432.
- Olson, J. K. & Appleton, K. (2006). Considering curriculum for elementary science methods courses. In K. Appleton (Ed.), *Elementary science teacher education: International perspectives on contemporary issues and practice* (pp. 127–151). New Jersey: Lawrence Erlbaum in association with ASTE.
- Bartlett, M. (1954). A note on multiplying factors for various chi-squared approximations. *Journal of the Royal Statistical Society*, 16, 296–298.
- Hair, J. F., Anderson, R. E., Babin, B. J., & Black, W. C. (2010). *Multivariate data analysis: A global perspective (Vol. 7)*. Upper Saddle River, NJ: Pearson.
- Watson, D., Clark, L. A., Weber, K., Assenheimer, J. S., Strauss, M. E., & McCormick, R. A. (1995). Testing a tripartite model: II. Exploring the symptom structure of anxiety and depression in student, adult, and patient samples. *Journal of Abnormal Psychology*, 104(1), 15.
- Battista, M. (1990). The relationship of mathematics anxiety and mathematical knowledge to the learning of mathematical pedagogy by preservice elementary teachers. *School Science and Mathematics*, 86, 10-19.
- Beilock, S. L., Gunderson, E. A., Ramirez, G & Levine, S. C. (2010), Female teachers' math anxiety affects girls' math achievement, *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, 107 (5), 1860-1863.
- Brady, P. & Bowd, A. (2005). Mathematics anxiety, prior experience and confidence to teach mathematics among pre-service education students. *Teachers and Teaching: theory and practice*, 11(1), 37–46.
- Bursal M., & Paznokas, L. (2006). Mathematics anxiety and preservice elementary teachers' confidence to teach mathematics and science. *School Science and Mathematics*, 106 (4) 173-179.
- Geist, E. (2010). The Anti-Anxiety Curriculum: Combating Math Anxiety in the Classroom. *Journal of Instructional Psychology*, 37(1), 24-31

- Gresham, G. (2007a). An Invitation into the Investigation of the Relationship between Mathematics Anxiety and Learning Styles in Elementary Preservice Teachers. *Journal of Invitational Theory and Practice*, 13, 24-33.
- Gresham, G. (2007b) A study of mathematics anxiety in pre-service teachers. *Early Childhood Education Journal*, 35, 181-188.
- Gresham, G. (2009). Examining the relationship between pre-service elementary teachers' experience of mathematics anxiety and their efficacy for teaching mathematics. (44) 2, 22-38.
- Hakan, C.; Osman, B.; Serkan, C.; & Ramazan, G. (2009). The Level of Mathematics Anxiety among Pre-Service elementary School Teachers. *Procedia- Social and Behavioral Sciences*, 1 (1), 1578- 1581.
- Rayner, V., Pitsolantis, N. &Osana, H. Mathematics anxiety in preservice teachers: Its relationship to their conceptual and procedural knowledge of fractions. *Mathematics Education Research Journal*, 21, 60–85 (2009). <https://doi.org/10.1007/BF03217553>
- Sloan, T., Daane, C., &Geisen, J. (2002). Mathematics anxiety and learning styles: What is the relationship in elementary preservice teachers? *School Science and Mathematics*, 102, 84-87.
- Suinn R. M., & Winston, E. H. (2003). The Mathematics Anxiety Rating Scale A Brief Version: Psychometric Data. *Psychological Reports*, 92, 167-173.
- Swetman, B., Munday, R. & Windham, R. (1993) Math anxious teachers: breaking the cycle. *College Student Journal*, 22(4), 421–427.
- Tobias, S. (1998). Anxiety and mathematics. *Harvard Education Review*, 50, 63-70.
- Turkish Language Association. (2020). (updated 2020 Oct 11; cited 2020 Oct 11). Available from: <http://www.tdk.gov.tr>
- Watson, D., Clark, L. A., Weber, K., Assenheimer, J. S., Strauss, M. E., & McCormick, R. A. (1995). Testing a tripartite model: II. Exploring the symptom structure of anxiety and depression in student, adult, and patient samples. *Journal of Abnormal Psychology*, 104(1), 15.

- Yilmaz-Tuzun, O. (2008). Preservice Elementary Teachers' Beliefs About Science Teaching. *Journal of Science Teacher Education*, 19 (2), 183-204.
- Zettle, R., & Raines, S. (2002). The relationship of trait and test anxiety with mathematics anxiety. *College Student Journal*, 34, 246-258.

## Appendix A: The survey questions (English)

### MATHEMATICS ANXIETY RATING SCALE: SHORT FORM (MKDÖ-KF)<sup>1</sup>

Explanation: In this scale, questions refer to things and experiences that may cause fear or apprehension. Please describe how much fear is associated with each item by choosing 1-“Not at all,” 2-“A little”, 3-“A fair amount,” 4-“Much” and 5-“Very much”. Please work quickly but to consider each item carefully.

|    | Reason for fear and apprehension...  | Not at all | A little | A fair Amount | Much | Very Much. |
|----|--|------------|----------|---------------|------|------------|
| 1. | Taking an examination (final) in a math course   | 1          | 2        | 3             | 4    | 5          |
| 2. | Thinking about an upcoming math test 1 week before   | 1          | 2        | 3             | 4    | 5          |
| 3. | Thinking about an upcoming math test 1 day before  | 1          | 2        | 3             | 4    | 5          |
| 4. | Thinking about an upcoming math test 1 hour before   | 1          | 2        | 3             | 4    | 5          |
| 5. | Thinking about an upcoming math test 5 minutes before  | 1          | 2        | 3             | 4    | 5          |
| 6. | Waiting to get a math test returned in which you expected to do well.  | 1          | 2        | 3             | 4    | 5          |
| 7. | Receiving your final math grade in the mail (report)   | 1          | 2        | 3             | 4    | 5          |
| 8. | Realizing that you have to take a certain number of math classes to fulfil the requirements for graduations. | 1          | 2        | 3             | 4    | 5          |

(1) Matematik Kaygısını Derecelendirme Ölçeği Türkçe formu Prof. Dr. Richard Suinn'in 'Mathematics Anxiety Rating Scale: Short Version (MARS-SV) adlı ölçeğinin orijinal formundandır ve geliştirilmiştir. Orijinal form hakkında Prof. Dr. Richard Suinn 808 Cheyenne Drive, Ft. Collins, CO 80525 USA adresinden bilgi alınabilir.

|     | Reason for fear and apprehension...   | Not at all | A little | A fair Amount | Much | Very Much. |
|-----|---|------------|----------|---------------|------|------------|
| 9.  | Being given a “pop” quiz in a math class.   | 1          | 2        | 3             | 4    | 5          |
| 10. | Studying for a math test  | 1          | 2        | 3             | 4    | 5          |
| 11. | Taking the math section of a college entrance exam like LGS-LYS   | 1          | 2        | 3             | 4    | 5          |
| 12. | Picking up a math textbook to begin working on a homework assignment.   | 1          | 2        | 3             | 4    | 5          |
| 13. | Being given a homework assignment of many difficult problems which is due to next class meeting.  | 1          | 2        | 3             | 4    | 5          |
| 14. | Getting ready to study for a math test.   | 1          | 2        | 3             | 4    | 5          |
| 15. | Dividing a five digit number by a two digit number in private with pencil and paper   | 1          | 2        | 3             | 4    | 5          |
| 16. | Adding up 976+777 on paper  | 1          | 2        | 3             | 4    | 5          |
| 17. | Reading a cash register receipt after you purchase.   | 1          | 2        | 3             | 4    | 5          |
| 18. | Figuring the sales tax (KDV) on a purchase that costs more than 1 Turkish Lira  | 1          | 2        | 3             | 4    | 5          |
| 19. | Figuring out your monthly budget  | 1          | 2        | 3             | 4    | 5          |
| 20. | Being given a set of numerical problems involving addition to solve on paper  | 1          | 2        | 3             | 4    | 5          |
| 21. | Having someone watch you as you total up a column of figures  | 1          | 2        | 3             | 4    | 5          |
| 22. | Totaling up a dinner that you think overcharged you.  | 1          | 2        | 3             | 4    | 5          |
| 23. | Being responsible for collecting dues for an organization and keeping track of the amount   | 1          | 2        | 3             | 4    | 5          |
| 24. | Studying for a driver’s license test and memorizing the figures involved such as the distances it takes to stop a car going at different speeds | 1          | 2        | 3             | 4    | 5          |
| 25. | Totaling up the dues received and the expenses of a club you belong to  | 1          | 2        | 3             | 4    | 5          |
| 26. | Watching someone work with a calculator   | 1          | 2        | 3             | 4    | 5          |
| 27. | Being given a set of division problems to solve on paper  | 1          | 2        | 3             | 4    | 5          |
| 28. | Being given a set of subtraction problems to solve on paper   | 1          | 2        | 3             | 4    | 5          |
| 29. | Being given a set of multiplication problems to solve on paper  | 1          | 2        | 3             | 4    | 5          |



## Appendix B: The survey questions (Arabic)

## MATHEMATICS ANXIETY RATING SCALE- SHORT FORM- - Arabic Version

## مقياس تقييم القلق في الرياضيات - الشكل القصير

في هذا المقياس ، تشير الأسئلة إلى الأشياء والتجارب التي قد تسبب الخوف أو القلق. يرجى وصف مقدار الخوف المرتبط بكل عنصر عن طريق اختيار ١- "لا على الإطلاق" ، ٢- "قليل" ، ٣- "معقول" ، ٤- "كثير" و ٥- "كثير جدا". الرجاء العمل بسرعة ومراعاة النظر في كل فقرة بعناية.

| #  | سبب الخوف والتوجس ...   | لا على الإطلاق | قليل | معقول | كثير | كثير جدا |
|----|---|----------------|------|-------|------|----------|
| ١  | إجراء امتحان نهائي في مادة الرياضيات  |                |      |       |      |          |
| ٢  | التفكير في اختبار الرياضيات القادم قبل أسبوع واحد   |                |      |       |      |          |
| ٣  | التفكير في اختبار الرياضيات القادم قبل يوم واحد   |                |      |       |      |          |
| ٤  | التفكير في اختبار الرياضيات القادم قبل ساعة واحدة   |                |      |       |      |          |
| ٥  | التفكير في اختبار الرياضيات القادم قبل ٥ دقائق  |                |      |       |      |          |
| ٦  | في انتظار إعادة اختبار الرياضيات الذي كنت تتوقع أن تؤدي فيه بشكل جيد.   |                |      |       |      |          |
| ٧  | استلام الدرجة النهائية في الرياضيات   |                |      |       |      |          |
| ٨  | إدراك أنه يتعين عليك حضور عدد معين من حصص الرياضيات المطلوبة  |                |      |       |      |          |
| ٩  | الحصول على اختبار قصير في مادة الرياضيات  |                |      |       |      |          |
| ١٠ | الدراسة والاستعداد لامتحان الرياضيات  |                |      |       |      |          |
| ١١ | أخذ امتحان في مادة الرياضيات كإمتحان القبول بالجامعة  |                |      |       |      |          |
| ١٢ | الحصول على كتاب رياضيات لبدء العمل على حل واجب منزلي  |                |      |       |      |          |
| ١٣ | أن يتم تكليفي بأحد الواجبات المنزلية والذي يحتوي على العيد من المشكلات الصعبة والمطلوب الانتهاء منه في الحصة التالية. |                |      |       |      |          |

|  |  |  |  |  |   |
|--|--|--|--|--|---|
|  |  |  |  |  | ١٤ الاستعداد للدراسة لاختبار الرياضيات.   |
|  |  |  |  |  | ١٥ قسمة عدد مكون من خمسة أرقام على رقم مكون من رقمين على انفراد بالقلم الرصاص والورقة |
|  |  |  |  |  | ١٦ جمع العددين $976 + 777$ على الورق  |
|  |  |  |  |  | ١٧ قراءة إيصال قيمة الفاتورة بعد الشراء   |
|  |  |  |  |  | ١٨ حساب ضريبة المبيعات على مشتريات تزيد تكلفتها عن دينار أردني واحد                   |
|  |  |  |  |  | ١٩ معرفة ميزانيتك الشهرية   |
|  |  |  |  |  | ٢٠ إعطاؤك مجموعة من المسائل العددية التي تتضمن الجمع لحلها على الورق                  |
|  |  |  |  |  | ٢١ وجود شخص يرافقك وأنت تجمع عمودا من الأرقام   |
|  |  |  |  |  | ٢٢ إجمالا اعتقد أن تكلفة العشاء عالية   |
|  |  |  |  |  | ٢٣ أن تكون مسؤولاً عن تحصيل مستحقات مركز عملك وتتبع ذلك المبلغ                        |
|  |  |  |  |  | ٢٤ الدراسة لاختبار رخصة القيادة وحفظ بعض الأرقام مثل المسافات                         |
|  |  |  |  |  | ٢٥ حصر إجمالي المستحقات المستلمة ونفقات مركز العمل الذي تنتمي إليه                    |
|  |  |  |  |  | ٢٦ مشاهدة شخص ما يعمل مع آلة حاسبة  |
|  |  |  |  |  | ٢٧ إعطاؤك مجموع من مسائل القسمة لحلها على الورق                                       |
|  |  |  |  |  | ٢٨ إعطاؤك مجموع من مسائل الطرح لحلها على الورق  |
|  |  |  |  |  | ٢٩ إعطاؤك مجموع من مسائل الضرب لحلها على الورق  |

## **Appendix C: A Letter to Pre-Service Teachers- Participants in the Study**

### **Mathematics Anxiety Rating Scale- Letter to Pre-Service Teachers- Participants in the Study**

Dear Student- Teacher... This scale is a tool for collecting data in a scientific research that will benefit the educational field in Jordan and abroad. On this scale, questions refer to objects and experiences that may cause fear or anxiety. Please describe the amount of fear associated with each paragraph by choosing 1- “not at all”, 2- “a little”, 3- “reasonable”, 4- “a lot” and 5- “very much”. Please work quickly and carefully consider each paragraph. Thank you for your valuable time and interest in scientific research.