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Math Anxiety in Primary Education during Covid-19 Confinement: Influence on Age and Gender

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ABSTRACT

Background: The closure of schools in Spain due to the Covid-19 pandemic confronted teachers, students, and families with a new reality. Previous studies have shown that anxiety levels increase during pandemic times. Therefore, it highlights the interest of the affective domain in primary education. **Objectives:** To analyse some general aspects of math anxiety, such as primary school students' fear, nervousness, and blockage before mathematics both at the educational centre and at home during the Covid-19 confinement. **Design:** Quantitative study using a closed questionnaire of seven questions with a Likert-type scale. **Settings and participants:** 496 Spanish primary school students. **Data collection:** Through the questionnaire hosted in Google Forms and provided by the teachers responsible for the students one month after the closure of all the educational centres and the confinement of all the participating children. **Results:** Fear of math increases during primary education, with the highest levels of fear and restlessness in the third and sixth grades; the girls presented the highest levels in all aspects, except for nervousness during classes. **Conclusions:** The general aspects of math anxiety are intimately linked and evolve increasingly throughout primary education. These facts are justified based on the proximity of the change in the educational stage and its influence on teaching, as well as the students' social conditions.

Keywords: Affection; Primary school; Distance learning; Age; Gender.

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Ansiedade matemática no ensino primário durante o confinamento da pandemia da Covid-19: influência na idade e no sexo

RESUMO

Antecedentes: O fechamento de escolas na Espanha devido à pandemia da Covid-19 colocou professores, estudantes e famílias frente a uma nova realidade. Estudos anteriores sobre pandemias têm demonstrado que os níveis de ansiedade aumentam. Destacamos, portanto, o interesse do domínio afetivo no ensino primário. **Objetivos:** Analisar alguns aspectos gerais da ansiedade matemática, tais como o medo, nervosismo e bloqueio por esquecimento apresentados por estudantes do ensino primário quando confrontados com a matemática tanto na escola como em casa durante o período de confinamento. **Desenho:** Estudo quantitativo a partir de um questionário fechado de sete perguntas com uma escala de tipo Likert. **Contexto e amostra:** 496 alunos da escola primária espanhola. **Coleta de dados:** Através do questionário hospedado no Google Forms e fornecido pelos professores responsáveis pelos estudantes após um mês do encerramento de todos os centros educativos e do confinamento de todas as crianças participantes. **Resultados:** O medo da matemática evolui durante o ensino primário de uma forma crescente, com destaque para os níveis mais elevados de medo e mal-estar no terceiro ano e no sexto ano do ensino primário; encontrando níveis mais elevados entre as meninas em todos os aspectos, exceto nervosismo durante as aulas. **Conclusões:** Os aspectos gerais da ansiedade matemática estão intimamente ligados e evoluem cada vez mais ao longo do ensino primário. Estes fatos justificam-se com base na proximidade da mudança da fase educacional e na sua influência no ensino, bem como nas condições sociais que rodeiam o aluno.

Palavras-chave: afetividade; escola primária; ensino a distância; idade; sexo.

Ansiedad matemática en educación primaria durante el confinamiento por el Covid-19: influencia en la edad y el género

RESUMEN

Antecedentes: El cierre de centros educativos en España motivado por el Covid-19 enfrentó a profesores, alumnos y familias a una nueva realidad. Estudios anteriores sobre pandemias demostraron que los niveles de ansiedad aumentan. Por ello, releva el interés del dominio afectivo en la educación primaria. **Objetivos:** Analizar algunos aspectos generales de la ansiedad matemática, como el miedo, el nerviosismo y el bloqueo por quedarse en blanco ante las matemáticas, que presentan los estudiantes de educación primaria, tanto en el centro educativo como en casa durante el periodo de confinamiento. **Diseño:** Estudio cuantitativo administrando un cuestionario cerrado de sete preguntas con una escala tipo Likert. **Contexto y muestra:**

496 estudiantes españoles de educación primaria. **Recogida de datos:** A través del cuestionario alojado en Google Forms y proporcionado por los maestros responsables de los alumnos después de un mes del cierre de todos los centros educativos y el confinamiento de todos los niños participantes. **Resultados:** El miedo hacia las matemáticas evoluciona durante la educación primaria de manera creciente, destacando los niveles más altos de miedo y de intranquilidad en tercero y sexto de educación primaria; encontrando niveles más altos entre las chicas en todos los aspectos salvo en el nerviosismo durante las clases. **Conclusiones:** Los aspectos generales de la ansiedad matemática están íntimamente ligados evolucionando de forma creciente a lo largo de la educación primaria. Estos hechos se justifican en base a la proximidad del cambio de etapa educativa y su influencia en la enseñanza, así como las condiciones sociales que rodean al alumno.

Keywords: afectividad; escuela primaria; enseñanza a distancia; edad; género.

INTRODUCTION

In Spain, through Royal Decree 463/2020 of March 14, 2020, educational activity was suspended at all levels and stages at the national level. In addition, at the end of April 2020, more than one hundred countries worldwide closed their schools due to the Covid-19 pandemic (Unesco, 2020), confronting teachers, students, and families with a new reality.

This pandemic situation posed unprecedented challenges that required teachers to adapt to online teaching (König et al., 2020), forcing them to use various digital tools and resources to solve problems and implement new teaching and learning approaches. Before this pandemic began, the Spanish Ministry of Education already had the resources to facilitate distance primary education through the Centre for Innovation and Development of Distance Education (CIDEAD, in the Spanish acronym); however, this type of teaching was only for exceptional cases.

Some authors, including Hodges et al. (2020), pointed out that it is important to differentiate online learning from distance learning motivated by the Covid-19 health emergency. There is planning, strategies, and approaches based on the learning environment in the first case. In contrast, in the second case, the teaching's planning and design had to be carried out in a hurry, resulting in an emergency and improvisation situation (García-Aretio, 2021). Also, relying on this solution, which aims to guarantee the continuity of learning, can be excessively optimistic in those places where a more conservative approach is adopted, and online connection is difficult (Vlachopoulos, 2020). On the other hand, besides the organisational and technological problems described, studies of previous epidemics and

pandemics (Taylor, 2019) have shown that anxiety levels increase; specifically, a large part of the students developed anxiety during the lockdown period (Baloran, 2020). However, when this school closure occurs without a home lockdown, as it happened during the influenza A pandemic, the anxiety levels described are low or average in general (Effler et al., 2010). In this sense, other studies (Jackson et al., 2013) on influenza A do not consider anxiety among students as an actor when school closure is decided; on the other hand, they do propose considering economic and ethical aspects.

Krathwohl et al. (1956) describe the affective domain in the educational sphere as the result of learning related to beliefs, feelings, attitudes, enthusiasm, interests, motivation, and curiosity. Pulido and Herrera (2017) affirm that emotions influence academic performance, acting directly on learning. In addition, the relationship between the learning process and a negative emotional state is considered to precede a major problem (Filella-Guiu et al., 2014).

In mathematics education, there are differences about what is or is not considered affection. Some researchers study the distinction between cognitive and affective analysis, while others focus on the socio-constructivist vision of affective relationships (Pérez-Tyteca et al., 2011).

Therefore, the general objective of the study is to analyse some aspects of the primary school students' math anxiety, specifically fear, nervousness, and blockage when dealing with mathematics tasks during confinement.

Moreover, the specific objectives are:

- Study the differences per cycle, course, and gender of the primary school students' fear, nervousness, and blockage.
- Compare the nervousness perceived in primary education students during classes and assessments according to whether they were carried out at the educational centre or home during the Covid-19 lockdown period.

THEORETICAL FRAMEWORK

The theoretical framework is based on two fundamental pillars: anxiety in primary education and math anxiety.

Anxiety in primary education

Bertoglia (1982) defines anxiety as fear of failure, punishment, or ridicule that people experience in a very particular way when facing a situation that they consider important, interferes with their performance, or makes them worry for their self-esteem.

In the educational field, Hembree (1990) defines anxiety as a state of mind related to fear and terror, causing insecurity and impotence. Following the same line, and based on motivational principles, Klausmeier (1977) states that being under pressure or feeling anguish causes low performance, wrong procedures, and alterations in the personality, interfering in creative learning, especially in students of average school competence. Anxiety can come from different situations: fear of failure, school punishment, aggression, or a social or school appraisal (García-Fernández et al., 2011).

The assessment is another factor that can increase anxiety, although not many studies focus that aspect on the primary education stage. However, Freire et al. (2019) affirm that the mathematics, natural sciences, and social sciences assessments generate the most anxiety.

Regarding gender, Gómez-Núñez et al. (2017) highlight that school anxiety is much higher in female than in male students. Concerning the grade, in their study on anxiety between the third and sixth grades, the authors also affirm to have found the highest anxiety levels in the sixth grade, coinciding with the end of primary education, and the lowest levels in the third grade. Likewise, Freire et al. (2019) also state that the higher the grade, the higher the anxiety, although it does not show differences in gender. None of these authors considers the students of the first and second grades of primary education in their studies.

Mathematics anxiety

We focus our study on the level of math anxiety. We agreed on qualifying it as a feeling - or set of feelings - with negative connotations resulting in a specific behaviour toward mathematics tasks. Specifically, fear (Fennema & Sherman, 1976; Hembree, 1990) and nervousness (Fennema & Sherman, 1976) are two of the most relevant feelings in the definitions of mathematics anxiety. As specific behaviours or consequences associated with what students feel when doing mathematics, the authors cite, among others, blockages before the tasks (Richardson & Suinn, 1972). Hembree (1990)

distinguishes two aspects: anxiety towards mathematics and assessments. The two constructs are related to general anxiety. And for mathematics as well as assessments, there are analogous differences according to gender and level: female students show higher levels of anxiety than male students, increasing throughout secondary school until it stabilises at the end of this stage. Female students are less prone to experiencing positive emotions during mathematics learning in primary education (Ayuso et al., 2020), which agrees with Hembree's (1990) appreciation, which indicates that for later stages, females tend to increasingly admit their anxiety and deal better with it, thus reducing its effects. However, Sorvo et al. (2017) find no difference in terms of gender at the beginning of schooling. They state that anxiety appears later.

In the same sense, Yüksel-Şahin (2008) say that girls show higher levels of anxiety than boys. Students who liked math or the math teacher showed lower anxiety levels, as did those who performed well in math. In addition, the author establishes differences in the anxiety level between fourth and fifth-graders, according to their performance and their fondness of mathematics and the teacher.

As seen, there are not very many studies carried out on mathematics anxiety in primary education in Spain, especially in the first grades. In the international context, they are somewhat more frequent (Krinzinger, Kaufmann, & Willmes, 2009; Newstead, 1998; Sorvo et al., 2017; Yüksel-Şahin, 2008). From them, we can extract some knowledge of mathematics anxiety considering gender, performance, and the different types of tasks in mathematics classes.

Some studies establish relationships between anxiety and performance. In their study with students between the sixth grade of primary school and the second grade of high school, Hidalgo et al. (2005) consider that via low performance, mathematical difficulty triggers anxiety. Notwithstanding, most studies conclude that math anxiety partially determines math performance in one way or another (Ramírez et al., 2018). However, Krinzinger et al. (2009) establish that in the first grades of primary education, anxiety does not seem to influence performance or vice versa, relating anxiety to factors such as family's or teacher's stances. What they did find in their study was that anxiety and mathematics skill influence the opinion about mathematics in the first grades of primary school.

The study by Newstead (1998) sheds light on an aspect that may be of interest in our work, the social origin of mathematics anxiety in primary education. Students in the last years of primary school showed high levels of

mathematics anxiety related to social aspects of mathematics, such as the public explanation of their math tasks rather than their accomplishment.

Sorvo et al. (2017) carried out a study with second to fifth-graders in Finland in which, agreeing with Hembree (1990), they suggested separating the study of anxiety related to mathematical situations from the study of anxiety related to academic failure, issues that are related but separable, and related to academic performance. Regarding gender, they did not find differences in terms of anxiety related to academic failure, but they did find differences in terms of anxiety related to mathematical situations (e.g. answering teacher's questions), which was higher among girls. Regarding the course, anxiety related to academic failure increases up to the fourth grade of primary school to decrease in the fifth; however, anxiety related to mathematical situations decreases from the second up to the fifth grade.

As with school anxiety in general, mathematics anxiety occurs to a greater extent with students who are afraid of failure and punishment and those who have a high performance in mathematics, and also with those who are anxious toward aggression, and those who have behavioural anxiety toward low performance in mathematics (García-Fernández et al., 2013).

METHOD

Participants

The study was carried out with 496 primary education students aged between 6 and 12, from different public and concerted Spanish educational centres. The data was collected one month after the closure of all the educational centres in Spain and the children's mandatory confinement. Through a convenience sample, in the centres we accessed, we chose those students who were having non-presential classes and whose percentage of answers of the group to which they belonged exceeded 85%.

The personal information collected from each student[1] was degree and gender. The students' anonymity was preserved at all times (Table 1).

[1]There was no Informed Consent Form. The research project does not have an ethics committee. Moreover, the researchers did not have the students' personal information, only their ages, scores, and sex, always preserving their anonymity. This work proceeds and explicitly assumes and exempts Acta Scientiae from any consequences arising therefrom, including full assistance and possible compensation for any damage

Table 1

Sample description per course and gender.

Grade	Male	Female	Total
1st	28 (5.6 %)	31 (6.3 %)	59 (11.9 %)
2nd	50 (10.1 %)	41 (8.2 %)	91 (18.3 %)
3rd	44 (8.9 %)	48 (9.7 %)	92 (18.6 %)
4th	36 (7.3 %)	54 (10.8 %)	90 (18.1 %)
5th	24 (4.8 %)	40 (8.1 %)	64 (12.9 %)
6th	45 (9.1 %)	55 (11.1 %)	100 (20.2 %)
Total	227 (45.8%)	269 (54.2%)	496

Procedure

We collected the data according to a quantitative methodology through a questionnaire hosted in GoogleForms. This questionnaire was composed of seven items, with five response options: "Never", "Seldom", "Sometimes", "Often", and "Always". Subsequently, these options were numerically encoded on a Likert scale, taking the values from 1 to 5.

Instrument

The questions that constituted the items were:

- Q1: Are you afraid of mathematics?
- Q2: At school, did you feel restless during math classes?
- Q3: At home, do you feel restless during math classes?
- Q4: At school, do you feel restless during a math assessment?
- Q5: At home, do you or would you feel restless during a math assessment?
- Q6: Does mathematics make you nervous?
- Q7: Do you go blank, or can't you think when doing math assignments?

This questionnaire was adapted from the Fennema-Sherman Mathematics Anxiety Scale (1976) and the Pérez-Tyteca et al. (2011) questionnaire to measure mathematics anxiety in university students. This

resulting from any of the research participants, in accordance with Resolution No. 510, of April 7, 2016, of the National Health Council of Brazil.

adaptation is justified by the level of linguistic understanding of students aged 6-12.

Given the double adaptation for the instrument construction, we used Cronbach's alpha to prove its reliability, which was possible because, in our questionnaire, each question is measured on a Likert scale with seven items, covering a sample of more than 400 individuals (n=496) (Sánchez & Gómez, 1998). The reliability index was .87, considered a good indicator and a reasonable goal.

Data analysis

The statistical data analysis was carried out with the *IBM SPSS Statistics 25* program.

RESULTS

We verified the normality of the seven variables associated with the questionnaire items through a Kolmogorov-Smirnov goodness-of-fit test. The significance was .00 for all of them, which means that the variables do not follow a normal distribution. For this reason, the statistical analysis carried out in the study will be non-parametric.

Overall results

First, we present the data collected through the questionnaire considering each question individually (Table 2). No differences are yet established in these data per course, cycle, or gender.

More than half (69.5%) of primary school students never or seldom feel fear of mathematics, being almost an anecdotal percentage (2%) of those who always suffer from it. Regarding restlessness during classes at these ages, the students show they rarely feel restless, which is similar to what happens when the lessons are imparted at school or at home during the pandemic. Peace of mind in the face of an examination varies greatly depending on where it is carried out. They feel restless on fewer occasions at home, .35 points less than at school in average. Only 6.2% of students are always or often afraid of mathematics, although a higher percentage (15%) frequently feels nervousness. A low percentage (9.9%) goes blank when faced with a math task.

Table 2

Data collected for each of the questions.

Question	1	2	3	4	5	Med	Typical dev.
Q1	53.8 %	15.7 %	24.4 %	4.2 %	2.0 %	1.85	1.05
Q2	46.6 %	28.0 %	18.8 %	5.6 %	1.0 %	1.86	.98
Q3	46.2 %	25.4 %	22.2 %	3.8 %	2.4 %	1.91	1.02
Q4	29.8 %	27.2 %	24.4 %	7.9 %	10.7 %	2.42	1.28
Q5	41.5 %	26.6 %	19.8 %	7.5 %	4.6 %	2.07	1.15
Q6	37.3 %	20.2 %	27.6 %	6.5 %	8.5 %	2.29	1.26
Q7	28.6 %	23.0 %	36.7 %	7.5 %	2.4 %	2.36	1.10

Reviewing the questions that affect general aspects of mathematics anxiety, we find a considerable positive correlation (between .50 and .75) between the levels of fear, nervousness, and going blank in primary school students after we obtained Spearman's Rho statistical correlation (Table 3). Questions that address specific aspects of nervousness during confinement are discussed later.

Table 3

Correlation between fear, nervousness, and going blank.

	Fear	Anxiety	Blank
Fear	1.00	.67	.53
Anxiety		1.00	.54
Blank			1.00

Results per cycle

Clustering students per cycle, we observe that fear of mathematics, restlessness in the face of mathematics assessments at the educational centre, and nervousness toward mathematics increase during the entire primary education stage (Table 4). Despite having an upward trend, the greatest change occurs between the first and second cycles in all three cases. The possibility of going blank or not being able to think also evolves upwards, although not as accentuated as in the previous cases. Restlessness during math classes at the educational centre and home and when taking a math test at home barely

changes during this whole school stage. Moreover, only restlessness during math classes at home is higher in students of the first cycle than in the rest of their higher cycle classmates.

Table 4

Average per cycle.

Question	1st	2nd	3rd	Sig. asin.
Q1	1.61	1.94	1.97	.00
Q2	1.85	1.88	1.86	.75
Q3	1.98	1.87	1.88	.42
Q4	2.14	2.53	2.56	.00
Q5	2.07	2.04	2.11	.74
Q6	2.05	2.32	2.47	.02
Q7	2.28	2.37	2.41	.68

To study the differences perceived between the averages of each of the questions grouped per cycle, we used the Kruskal-Wallis statistical test (see the last column of Table 4), which can allow us to affirm that fear of mathematics, restlessness when taking a math test at the educational centre, and nervousness toward mathematics in general differ according to the students' cycle, with a significance level of 5%. Despite the differences and evolutions described above, the rest of the questions associated with restlessness during mathematics classes at the educational centre and at home, restlessness in the face of a mathematics assessment at the educational centre, and going blank when dealing with a mathematics assignment do not differ statistically according to the students' cycle, with a significance level of 5%.

Table 5

Comparison per cycles, with difference between averages.

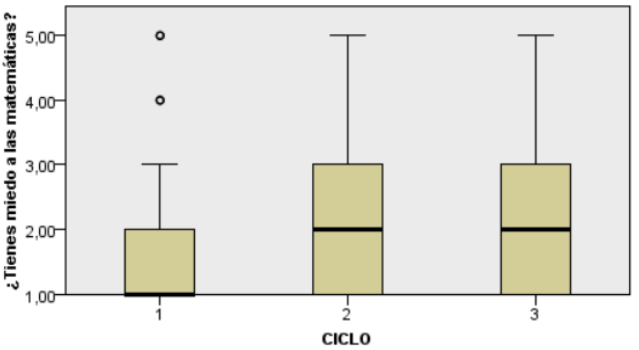
Question	1st vs. 2nd	1st vs. 3rd	2nd vs. 3rd
Q1	.00	.00	.95
Q4	.01	.00	1.00
Q6	.32	.02	.62

Focusing on the comparison between the cycles of those questions that present statistical differences among their averages, we used the Dunn-Bonferroni approach (Table 5), with a significance level of 5%.

Fear of math differs from all others among first-cycle students (Figure 1).

Figure 1

Question "Are you afraid of mathematics?" Per cycle.



It also happens with restlessness in the face of a mathematics assessment at school. However, nervousness before mathematics only differs between first-cycle and third-cycle students. Furthermore, there are no significant differences between the second and third-cycle students for any of the questions raised in the questionnaire.

Results per course

Clustering students by their grades (Table 6), fear of mathematics increases during primary education, making the average .65 points more at the end of this school stage. Also, restlessness during mathematics class at the educational centre and at home oscillates, peaking at the educational centre in the third cycle, and at home, in the second cycle. Except for the third grade, the students are more restless in a class held at home by videoconference. On the other hand, restlessness in a mathematics assessment also oscillates, but in this case, it tops in the sixth grade. Contrary to what happened in the classes, this

time the students are more restless in an assessment at the educational centre, in all grades. Likewise, nervousness before mathematics grows throughout this educational stage. Reviewing the evolution of questionnaire answers beginning with the first grades, it is interesting to note that in the first three grades, the percentage of students that feel nervous about mathematics is practically the same, around 10%; however, in higher grades, this percentage is around 20% (see appendix). Finally, the feeling of going blank or not being able to think oscillates throughout primary education, although with slight changes, just a difference in means of .27 between the minimum and the maximum value.

Table 6

Average per degree.

Question	1st	2nd	3rd	4th	5th	6th	As. sig.
Q1	1.36	1.77	1.97	1.91	1.91	2.01	.00
Q2	1.83	1.87	2.03	1.72	1.83	1.88	.41
Q3	1.92	2.02	1.91	1.83	1.88	1.89	.79
Q4	2.08	2.18	2.60	2.47	2.33	2.71	.00
Q5	2.00	2.11	1.90	2.18	1.84	2.28	.10
Q6	2.00	2.08	2.27	2.37	2.36	2.54	.12
Q7	2.22	2.32	2.39	2.36	2.28	2.49	. 83

There are significant differences between the averages of the different grades for the questions associated with fear of mathematics and restlessness during mathematics assessments at school, with an asymptotic significance of .00 y .00 respectively, by the Kruskal-Wallis test.

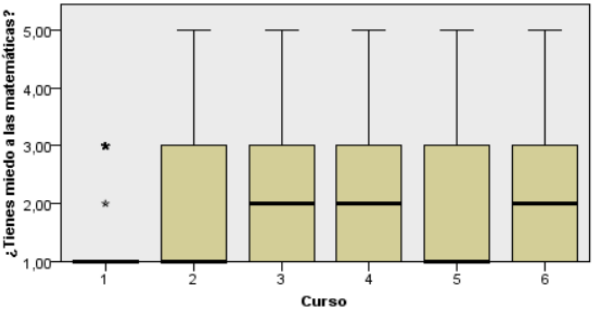
Just as for the clustering per cycle, we used the Dunn-Bonferroni approach and the asymptotic meanings for each pair. For the question about fear, there are significant differences between the 1st and 3rd, 1st and 4th, 1st and 5th, and 1st and 6th grades. For the rest of the pairs, the asymptotic significance is greater than .05. Thus, we can affirm that there is a change in the perception of fear among first-graders with respect to students in the other cycles, with a lower perception of fear for the first cycle (Figure 2).

Regarding restlessness toward mathematics assessment at school, there are significant differences between the 1st and 6th, and the 2nd and 6th grades. For the rest of the pairs, the asymptotic significance is greater than .05. In this case, the change in students' restlessness during assessments occurs between

the students of the first cycle and those attending the last grade of primary education.

Figure 2

Question "Are you afraid of mathematics?" Per grade.



Results per gender

For the study per gender, we applied the Mann-Whitney U test. Consequently, we obtained the data of the seven questions and, as a group, the gender (Table 7). Fear of mathematics, restlessness in the face of a mathematics assessment at home and the educational centre, nervousness toward mathematics, and the belief of not being able to think when facing a mathematical task differ between students. Also, students' restlessness during mathematics classes, both at the educational centre and at home, does not vary. All tests showed a significance level of 5%. Note that in those questions with a difference between male and female students, the latter suffers the most significant mathematics anxiety.

Moreover, we applied the Mann-Whitney U test, considering the differences between the two sexes for all cycles (Table 8). In the first cycle, there are significant differences between the results of the male and female students for the questions associated with fear, restlessness, nervousness, and going blank during classes at home. In the second cycle, gender differences are associated with fear, restlessness in the face of an assessment, nervousness, and going blank at school and at home. However, gender differences in the third cycle occur only in terms of nervousness and going blank. Of all the questions raised in the

questionnaire, nervousness, and going blank stand out since there are statistical differences between the two genders for the three cycles.

Table 7

Average per gender.

Question	Male	Female	Asymptotic sign.
Q1	1.68	1.99	.00
Q2	1.78	1.93	.10
Q3	1.81	2.00	.10
Q4	2.20	2.61	.00
Q5	1.96	2.17	.02
Q6	2.01	2.52	.00
Q7	2.10	2,58	.00

Table 8.

U-Mann Whitney test clustering per gender and cycle.

Question	1st	2nd	3rd
Q1	.114	.025	.21
Q2	.581	.239	.28
Q3	.016	.268	.59
Q4	.053	.013	.16
Q5	.099	.045	.81
Q6	.034	.006	.01
Q7	.010	.002	.02

Comparison of activities at school and at home

Next, we compare the results of the questions associated with the classes and assessments at school and home when the students were in confinement. By reviewing the correlations obtained between these variables (Table 9), we verify a considerable positive correlation between restlessness during classes and restlessness during assessments at school. For the rest of the relationships, only an average positive correlation is reached (between .10 and .50).

Table 9

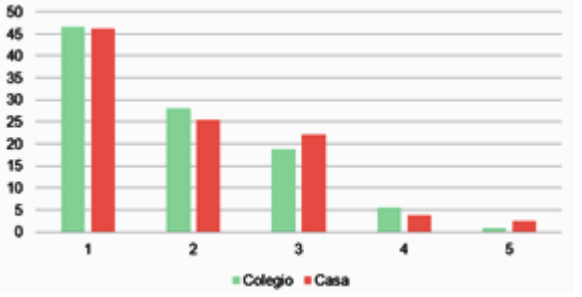
Statistics correlation between restlessness at different times.

	school classes	home classes	school assessment	home assessment
school classes	1.00	.39	.51	.35
home classes		1.00	.26	.44
school assessment			1.00	.47
home assessment				1.00

To compare the questions that include restlessness in mathematics classes at school and at home (Figure 3), the Wilcoxon test has been applied. From this test, we obtained an asymptotic significance of .25, with an error of 5%, so the null hypothesis is accepted. Therefore, we can conclude that there is insufficient evidence to affirm that changing places for the classes changes the students' restlessness feelings in general, without considering their grade or gender.

Figure 3

Answers to the question "Are you or would you feel restless in math class?"



Next, the students are grouped per cycle and gender for us to analyse their restlessness at school and at home (Table 10).

Table 10

Average restlessness in one class per gender and cycle.

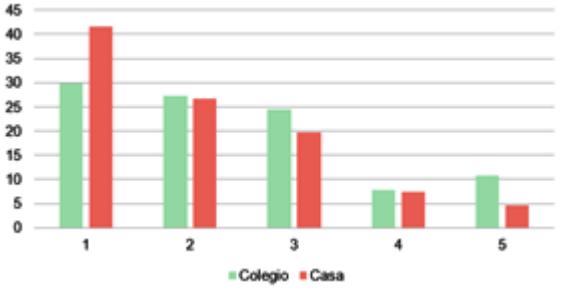
		1st	2nd	3rd
School	Male	1.82	1.75	1.78
	Female	1.89	1.98	1.92
Home	Male	1.79	1.74	1.90
	Female	2.18	1.98	1.87

Students' restlessness in a class varies at school and at home, decreasing between the first and second cycle and growing in the passage to the third cycle. On the other hand, the students' restlessness presents differences between school and home classes. In the case of the school, it varies inversely to the students: between the first and second cycles, it grows, and in the passage to the third cycle, it decreases. At home, restlessness decreases throughout primary education.

Similarly, we analyse the questions about restlessness during a mathematics assessment (Figure 4). Again, the Wilcoxon test is applied, with which, in this case, there is an asymptotic significance of 0.00, with an error of 5%, so the null hypothesis is rejected. Therefore, we can conclude that there is sufficient evidence to affirm that changing the assessment places alters the students' restlessness. Primary school students are less restless when they take their assessments at home.

Figure 4

Answers to the question "Are you or would you feel restless in a math assessment?"



We grouped the students per cycle and gender to analyse restlessness during an assessment at school and at home (Table 11).

Table 11

Average per gender and cycle on restlessness in an assessment.

		1	2	3
School	Boy	1.97	2.25	2.39
	Girl	2.32	2.75	2.68
Home	Boy	1.94	1.84	2.12
	Girl	2.21	2.20	2.11

The students' restlessness in a class at school grows throughout primary education. However, it varies at home, decreasing between the first and second cycles and increasing in the third. On the other hand, the female students' restlessness oscillates at school since it grows between the first and second cycles and decreases in the third, while at home, it decreases throughout primary education. In addition, the female students' restlessness in the face of an assessment is greater than the restlessness of the male students during the entire primary education, except for the third cycle at home; then, it is practically the same, although slightly higher for the male students.

DISCUSSION AND CONCLUSIONS

In this work, we study some aspects of primary education students' mathematics anxiety. We covered fear, nervousness, and blockage for going blank before mathematics and restlessness toward classes and assessments taken at school or at home during the unusual situation of confinement.

The results show a considerable positive correlation between students' fear, nervousness, and going blank when performing mathematical activities, which raises the specific influence of each of these aspects with that performance, since, as stated by Sorvo et al. (2017), mathematics anxiety is related to academic performance.

Clustering students per cycles, we find some differences between the averages in fear and nervousness in the face of mathematics and restlessness at

school during a math test. Fear and restlessness at school during an assessment are statistically different between the first-cycle students and those of the other cycles, while nervousness toward mathematics differs only between the first and third-cycle students. This conclusion is in line with the studies of Newstead (1998), who stated that students in the final grades had higher levels of mathematics anxiety. However, these results do not fully coincide with those of Freire et al. (2019), who found differences between the second and third cycles in the levels of school anxiety, attributed to the increase in academic demand, although these authors studied assessments of several scientific disciplines simultaneously, which could mask what happened with the mathematics assessments.

We emphasise that the third and sixth grades are the ones that manifest the greatest fear of mathematics, which happens especially in the sixth grade, when the highest averages are obtained in all questions, except for class restlessness. However, restlessness during classes grows in the final grades at school and at home, being higher at home, an aspect that could be justified by the emotional support of the classmates at this age during the classes (Gallardo, 2006). The above reaffirms the results of Gómez-Núñez et al. (2017), who relate the increase in educational anxiety with the transition to a new stage. They could also look for explanations of this increase in the social conditions that surround the student (Newstead, 1998), for example, how the sixth-graders perceive their participation in mathematics class.

Regarding gender, there is a significant difference in fear, nervousness, and going blank between male and female students, which was already pointed out by Ayuso et al. (2020), who suggested that female students feel less positive emotions during mathematics learning in primary education.

During this study, no sufficient evidence was found to affirm that there are differences in restlessness during a mathematics class at the educational centre and home during confinement, at least from the perspective of the primary education student, in contrast to what was stated by Vivanco-Vidal et al. (2020), who determined that difficulties could arise during classes through online learning.

There are differences between restlessness during a mathematics assessment at the educational centre and at home during confinement, being lower at home, despite the fact that epidemics and pandemics have shown that anxiety influences people (Taylor, 2019). Particularly, in the first and second grades, they have similar opinions of the assessments at home and at school, which can be related to the lower importance given to assessments in the first

cycle compared to the end of the stage (Freire et al., 2019). It is even possible that some of these students had not even been assessed when we did this research. However, we can state that, in higher education, there is usually a much higher percentage of less anxious students taking the assessment at home than at school.

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AUTHORSHIP CONTRIBUTION STATEMENT

MA-P and CB discussed the instrument and data collection together. MA-P, AA-B, and CB discussed the methodology and theoretical basis. MA-P and AA-B analysed the data and the results.

DATA AVAILABILITY STATEMENT

The data supporting the results of this study will be provided by the corresponding author, MA-P, upon reasonable request.

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Appendix

Question		1st	2nd	3rd	4th	5th	6th
Are you afraid of mathematics?	1 2	83.1%	71.4%	66.3%	67.8%	68.8%	65.0%
	3	16.9%	22.0%	26.1%	27.8%	23.4%	26.0%
	4 5	0.0%	6.6%	7.6%	4.4%	7.8%	9.0%
Did you feel restless during math classes at school?	1 2	76.3%	71.4%	65.2%	81.1%	78.1%	77.0%
	3	18.6%	20.9%	23.9%	11.1%	18.8%	19.0%
	4 5	5.1%	7.7%	10.9%	7.8%	3.1%	4.0%
Do you feel restless during math classes at home?	1 2	67.8%	63.7%	71.7%	71.1%	79.7%	76.0%
	3	28.8%	31.9%	21.7%	23.3%	10.9%	16.0%
	4 5	3.4%	4.4%	6.5%	5.6%	9.4%	8.0%
Do you feel nervous during a math assessment at school?	1 2	66.1%	61.5%	52.2%	60.0%	59.4%	48.0%
	3	23.7%	23.1%	23.9%	21.1%	26.6%	28.0%
	4 5	10.2%	15.4%	23.9%	18.9%	14.1%	24.0%
Do you or would you feel nervous during a math assessment at home?	1 2	67.8%	61.5%	78.3%	64.4%	78.1%	62.0%
	3	22.0%	27.5%	12.0%	20.0%	14.1%	22.0%
	4 5	10.2%	11.0%	9.8%	15.6%	7.8%	16.0%
Does mathematics make you nervous?	1 2	62.7%	61.5%	54.3%	60.0%	56.3%	52.0%
	3	27.1%	30.8%	34.8%	16.7%	29.7%	27.0%
	4 5	10.2%	7.7%	10.9%	23.3%	14.1%	21.0%
Do you go blank or cannot think when you do your math assignments?	1 2	50.8%	51.6%	52.2%	48.9%	56.3%	51.0%
	3	40.7%	37.4%	32.6%	42.2%	32.8%	35.0%
	4 5	8.5%	11.0%	15.2%	8.9%	10.9%	14.0%