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**Physiological Responses to Anxiety and Gender Differences in  
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**RESUMEN**

Esta investigación indaga en la conceptualización de la ansiedad en una segunda lengua en el contexto de la producción oral, considerando las respuestas fisiológicas a la ansiedad y las diferencias derivadas del género en la ansiedad al hablar en una lengua extranjera. El estudio contó con 371 participantes, 185 mujeres y 186 hombres. Entre los participantes se encuentran 313 estudiantes de IFE (Inglés para Fines Específicos), de la Universidad de Córdoba (España), además de 23 profesores y 8 personas de administración y servicios de la misma Universidad que realizaban un curso de IFE. Se administró el Cuestionario de Ansiedad ante los Exámenes (CAEX) a los participantes. Los resultados de los datos cuantitativos de esta investigación muestran que las alumnas demostraron niveles más altos de ansiedad que los alumnos. Los resultados de este estudio pueden contribuir a ayudar al profesorado de todos los niveles educativos a seleccionar mejor sus estrategias de evaluación.

**PALABRAS CLAVE**

PRODUCCIÓN ORAL EN SEGUNDAS LENGUAS, ANSIEDAD, RESPUESTAS FISIOLÓGICAS, GÉNERO

**ABSTRACT**

his research project investigates the conceptualization of second language anxiety in the context of oral production, considering physiological responses to anxiety and differences derived from gender on foreign language speaking anxiety. There were 371 participants in the study, 185 female and 186 male participants. Among the participants there were 313 ESP (English for Specific Purposes) students at the University of Cordoba (Spain), plus 23 teachers from the same University taking an ESP course, and 8 administrative staff. A questionnaire (CAEX) was administered to participants. Results of the quantitative data in this research show that female learners demonstrated higher levels of anxiety than male learners. The results of this study help all-level teachers to select their testing and assessing strategies more effectively.

**KEYWORDS**

SECOND LANGUAGE ORAL PERFORMANCE, ANXIETY, PHYSIOLOGICAL RESPONSES, GENDER

## INTRODUCTION

Language learning is influenced by many factors, one of them being anxiety, which can impact not only on the learning process but also on foreign language oral performance. According to a variety of researchers (e.g., Arnáiz Castro & Guillén García, 2012; Elaldi, 2016; Horwitz et al., 1986; MacIntyre & Gardner, 1989), foreign language anxiety (FLA) can interfere with success in learning a foreign language.

FLA is ‘a distinct complex of self-perceptions, beliefs, feelings, and behaviours related to classroom language learning arising from the uniqueness of the language learning process’ (Horwitz & Cope, 1986, p. 128). Anxiety affects the oral performance and interaction of speakers of English as a second language, which can impact on both the results of oral tests and candidates’ level of anxiety. Results also may vary depending on the type of performance (individual oral performance and oral interaction).

The aim of this research will be to study the physiological responses to anxiety in oral tests, as well as to measure the difference between male and female learners studying English as a second language. Many learners express their inability to speak a second language; they may be good at other skills but when it comes to speaking, they claim to have a ‘mental block’ against it. Moreover, such ‘mental block’ seems to be different when they are speaking to peers (that is, another learner) and when they are speaking to their teachers/examiners, which may be caused by their level of anxiety (Liu, 2006).

## METHODOLOGY

To achieve the objective of this research, the following research question has been formulated: *Are there any significant differences between men and women as second language learners in terms of physiological responses to anxiety in oral exams?*

The main objective of this paper is to investigate how anxiety affects second language oral performance in English as foreign language (EFL) learners in the context of a specific Spanish university: the University of Cordoba. Secondly, it is also aimed to analyse whether the gender variable may affect the language learning process. There is not much research regarding this topic in the specific context of Spanish university EFL students, which leads us to consider studies of these characteristics necessary. In this line, Horwitz (2001) sustained that general FL anxiety might vary in different cultural groups. Arnáiz Castro & Guillén García (2012) also studied the variable of gender as a factor. The purpose of this study is then to analyse and measure the physiological responses to anxiety in a group of Spanish university subjects, and to find out whether their level of anxiety was similar to the level of other foreign language learners reported in former studies. Participants were randomly chosen. More specifically, this research was conducted in the context of the University of Cordoba, including four types of participants in the whole sample: i) students at English for Specific Purposes (ESP) courses; ii) ESP teachers; iii) administrative staff; and iv) others. The total number of participants in this study is 378 subjects. Group 1 were 313 university students from different degrees taking English as an

English for Specific Purposes (ESP) obligatory subject. The second group of participants, Group 2, was composed of 23 university teachers taking English for Specific Purposes courses. Group 3 were 8 people from the administrative staff at the University of Cordoba taking a General English course, and Group 4 were 8 ‘other’ participants (students who were also working at the moment of the study) taking General English courses.

**Table 1**  
*Occupation of participants - Percentages*

OCCUPATION	FREQUENCY	PERCENTAGE	VALID PERCENTAGE
<b>Students (Group 1)</b>	313	82.8%	<b>89.7%</b>
<b>University Teachers (Group 2)</b>	23	6.1%	<b>6.6%</b>
<b>Administration and Services Staff (Group 3)</b>	8	2.1%	<b>2.3%</b>
<b>Others</b>	5	1.3%	<b>1.4%</b>
<b>Total</b>	<b>349</b>	<b>92.3%</b>	<b>100%</b>

*Note.* Authors’ own elaboration

The number of men and women is almost the same. As we can see on Table 2, out of the 378 participants (N=378, 100% of the sample): 48.9% were women and 49.2% were men.

**Table 2**  
*Gender of participants – Percentages*

GENDER	FREQUENCY	PERCENTAGE	VALID PERCENTAGE
<b>MALE</b>	186	49.2%	50.1%
<b>FEMALE</b>	185	48.9%	49.9%
<b>LOST</b>	7	1.9%	
<b>TOTAL</b>	<b>378</b>	<b>100%</b>	

*Note.* Authors’ own elaboration

Ages range from 18 to 65 (M=22.24; SD=6.78). Most of the participants’ ages are between 18 and 30. 52% of the participants are less than 20 years old and 41% of them are between 21 and 30 years old as can be seen in the figure below.

Taking into consideration the language level established by the *Common European Framework of Reference for Languages* (CEFR) (Council of Europe, 2020): Learning, Teaching, Assessment, participants in this research range from A2 to C2 levels of the CEFR, as it can be seen from table 3.

**Table 3**  
*Participants' Level of English - Percentage*

CEFR LEVEL	FREQUENCY	PERCENTAGE	VALID PERCENTAGE
A2	46	12.2%	17.2%
B1	103	27.2%	38.4%
B2	91	24.1%	34%
C1	27	7.1%	10.1%
C2	1	0.3%	0.4%
<b>LOST</b>	109	28.8%	
<b>TOTAL</b>	<b>268</b>	<b>70.9%</b>	

*Note.* Authors' own elaboration

This research is a quantitative study. Participants were administered a questionnaire and then data were analyzed comparing variables in the questionnaire. In this research, anxiety will refer to the test context. When it comes to oral tests, candidates sometimes feel unable to speak and it may not only be a feeling that they have towards a second language test, but also towards tests in general. To measure this specific type of anxiety, Valero (1999) designed the CAEX (Cuestionario de Ansiedad ante los Exámenes). The CAEX was designed to gather a variety of motor, verbal, cognitive or physiologic responses linked to anxiety towards exams. The CAEX is a 50-item, 0-5 Likert scale questionnaire. The answers to each item range from 0- 5, and the participants had to express the subjective level of anxiety they undergo in some situations; 0 (no siento nada / I do not feel anything), 1 (ligera ansiedad / light anxiety), 2 (un poco intranquilo / a bit anxious), 3 (bastante nervioso / quite nervous), 4 (muy nervioso /very nervous) and 5 (completamente nervioso / absolutely nervous). Valero (1999) classified the items in the questionnaire according to four different behavioral factors:

- Factor 1 includes cognitive thoughts and worries about the test: 14 items are included in this factor (8, 13, 15, 16, 17, 19, 21, 24, 25, 30, 31, 37, 38 and 39).
- Factor 2 gathers physiological characteristics that appears as anxiety responses: 15 items are included in this factor (1, 2, 3, 6, 7, 9, 10, 11, 20, 26, 27, 28, 29, 33 and 34).

- Factor 3 includes different situations and test proposed as anxiety provoking ones: 14 items are included in this factor (5, 32, 36, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49 and 50).
- Factor 4, which gathers avoidance behaviors, is characteristic of any anxiety problem: 7 items are included within this factor (4, 12, 13, 14, 18, 22 and 23)

CAEX was administered in Spanish as it is the original version (we found no need for translation, as candidates were Spanish native speakers). Some items in the CAEX, however, have been modified to adapt to oral performance as some of them referred to written test. The adaptations of this questionnaire have been validated by experts using the Delphi method. We presented each item to the expert panel members in the form of a six-point Likert scale to be analyzed according to a double parameter: accuracy and adequacy, and a section for additional comments was also included. Then, each expert panel member chose their level of agreement with each statement and suggested all their proposals to improve the item by using free text feedback. After the validation round, we removed some proposed items which did not meet the final requirements of the questionnaire, and those that were not accurate enough were reformulated to meet the expert panel members' requirements. These experts' responses allowed us to refine and adapt CAEX to the final purpose of the research and enable us to have a high reliability on the questionnaire after calculating the Cronbach's alpha.

Furthermore, a background questionnaire which included information about participants' language level, gender, age, and occupation was used.

The questionnaire was administered in the first semester in three different Faculties at the University of Cordoba by three different instructors. Participants were informed about the purpose of the study and were asked to sign a consent and to complete the background questionnaire. In this research we studied Factor 2; the physiological characteristics that appear as responses to anxiety and we compared the results between male and female participants. We have studied and analyzed the answers to the 15 items which correspond to the physiological aspects. SPSS v. version 24 for MacOS was used to conduct the analyses discussed below. The mean and standard deviations were computed for the entire group and then divided by gender.

## RESULTS

After administering the CAEX to our group of participants, the resulting data revealed interesting information about participants' anxiety. Cronbach's alpha coefficient indicates the degree to which the items in a scale measure similar characteristics. This revised version of the CAEX had an internal consistency of 0.898. This shows high internal reliability, similar to that obtained by Valero (1999), which was 0.923.

Table 4 shows the mean and standard deviation for answers to the scale for the whole sample. The highest score is in item 10 ( $M=3.25$ ), while the lowest score is in item 6 ( $M=1.74$ ). Those figures are different when we compare male and female results. As

it can be seen in table 5, item 10, male participants' mean is 3.12, whereas for female ones it is 3.44. As for item 6, male participants' mean is 1.81 and female one is 1.69.

**Table 4**  
*Whole sample mean and standard deviation*

<b>ITEM</b>	<b>GENERAL MEAN (N= 371)</b>	<b>STANDARD DEVIATION</b>
1. My hands sweat during exams.	2.85	0.076
2. When I have been doing the exam for a while, I feel discomfort in my stomach and the need to defecate.	1.99	0.063
5. When I finish the exam, I have got a headache.	2.89	0.088
6. When I've been doing the test for a while, I feel short of breath, very hot and I feel like I'm going to faint.	1.74	0.056
8. I get nervous when I see the teacher with the exams before going in.	2.83	0.078
9. In the exam I feel rigidity all over my body.	2.30	0.072
10. Before entering the exam I feel a "knot" in my stomach, which disappears when I start to speak.	3.25	0.081
18. I really want to go to the bathroom during the exam.	2.42	0.079
24. I cannot fall asleep the night before the exam.	2.73	0.082
25. It makes me nervous that the exam is multitudinous.	2.88	0.090
26. I felt dizzy and nausea during an exam.	2.49	0.087
27. Moments before doing an exam I have a dry mouth and it's hard to swallow.	2.72	0.086
30. When I'm doing an exam my heart beats very fast.	3.02	0.087
31. My legs tremble when I enter the exam room.	2.36	0.080

*Note.* Authors' own elaboration

After analyzing the mean and standard deviation of both groups, we applied Student's *t*-test to assess if there are significant differences between group 1 (male participants) and group 2 (female participants). The Student's *t*-test is a parametric test used when two groups are being compared. This test uses sample means and standard deviations to calculate the probability or likelihood that the groups are different. More specifically, in this case Student's *t*-test for independent samples was used to analyze if there were significant differences ( $p < 0.05$ ) between the means of the two groups of participants: male and female students. We found no significant differences



between both groups, except for items 1, 18, 25, 30 and 31, being the results of the Student's *t*-test  $p < 0.05$ . At table 5, significant differences appear in bold. Differences between male and female participants also exist in the rest of items though they are not significant. Only in two of the items, item 2 (2.01-2.00) and item 5 (2.90) both male and female participants show equal or almost equal results.

**Table 5**  
*Male and female participants' mean - Student's t-test*

ITEM	GENDER	N	Mean	t	P
1. My hands sweat during exams.	Male	186	3.05	2.597	<b>.010</b>
	Female	185	2.66		
2. When I have been doing the exam for a while, I feel discomfort in my stomach and the need to defecate.	Male	186	2.01	.042	.967
	Female	184	2.00		
5. When I finish the exam, I have got a headache.	Male	185	2.90	-.030	.976
	Female	185	2.90		
6. When I've been doing the test for a while, I feel short of breath, very hot and I feel like I'm going to faint.	Male	186	1.81	.982	.327
	Female	183	1.69		
8. I get nervous when I see the teacher with the exams before going in.	Male	186	2.76	-1.024	.306
	Female	185	2.92		
9. In the exam I feel rigidity all over my body.	Male	186	2.34	.396	.692
	Female	185	2.28		
10. Before entering the exam I feel a "knot" in my stomach, which	Male	186	3.12	-1.963	.050
	Female	185	3.44		



disappears when I start to speak.					
18. I really want to go to the bathroom during the exam.	Male	186	2.76	4.263	<b>.000</b>
	Female	183	2.10		
24. I cannot fall asleep the night before the exam.	Male	180	2.64	-1.059	.290
	Female	178	2.82		
25. It makes me nervous that the exam is multitudinous.	Male	179	2.66	-2.547	<b>.011</b>
	Female	177	3.12		
26. I felt dizzy and nausea during an exam.	Male	181	2.43	-.965	.335
	Female	176	2.60		
27. Moments before doing an exam I have a dry mouth and it's hard to swallow.	Male	181	2.68	-.707	.480
	Female	177	2.80		
30. When I'm doing an exam my heart beats very fast.	Male	181	2.79	-2.815	<b>.005</b>
	Female	178	3.28		
31. My legs tremble when I enter the exam room.	Male	180	2.20	-2.044	<b>.042</b>
	Female	178	2.53		

*Note.* Authors' own elaboration

## DISCUSSION

Anxiety has long been studied as an influential factor in the process of learning a second language. The conclusive results from different studies on how it impacts on students' attitudes show that it should not be taken for granted. How anxiety affects foreign language learning has long been studied since the 1970s (Scovel, 1978), but a general theory about foreign language classroom anxiety was not presented until 1980s by Horwitz (Horwitz, 1995, 2000, 2001; Horwitz et al., 1986; Horwitz & Young, 1991). The main contribution of this research is to underline the physiological responses to anxiety in oral test and performance in the context of the University of Cordoba. It also clarifies the function of gender as an affecting factor in the second language oral production.

The results of the present study show that a high number of ESL learners have average anxiety levels. It can be concluded from the figures showed before that female learners tend to be more anxious than their male counterparts. These results resonate with Torrano-Martínez et al.'s (2017) study among secondary education students. Female Second Language learners showed higher level of anxiety related to physiological responses than male learners. Out of the 14 items, female participants show higher level of anxiety in 8 of them.

As it can be seen from the descriptive statistics and *t*-test results, although both genders have a moderate level of exams anxiety, the anxiety level of female learners has been found to be significantly different between male and female participants. In items 1 and 18, male participants show higher level of anxiety, whereas in items 25, 30 and 31 female participants' level is higher. This study supports the finding of previous studies carried out in the university context and considering the variable of gender (Arnáiz Castro & Guillén García, 2012). In the university context, this study also supports the findings with students who had French as a foreign language (MacIntyre, 2002). Nevertheless, the results of our study contrast with reports submitted by Aida (1994), in which no significant connection between language anxiety and gender was observed.

## CONCLUSIONS

As research confirms, anxiety is a factor affecting second language oral skills, which can even hinder second language learning. All level teachers should consider this affecting factor when teaching. As Díaz Negrín (2014) stated, teacher training is essential to pursue the expected results in learners. It is an aspect which is present all along the second language learning process whatever the learners' variables can be. A major finding of this study is that significant differences between male and female learners exist when dealing with physiological responses to anxiety. The variable of gender should be further researched as the literature has proven to be of great importance in the second language learning process. Sairitupac Santana et al. (2020), demonstrate that female learners show higher percentage of anxiety than male ones. Future research should be taken to find ways to decrease anxiety in the university context and thus create a comfortable learning environment for learners.

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**ANNEX I. Modified and translated version of CAEX - Cuestionario de ansiedad ante los exámenes (Valero, 1999) (Test Anxiety Questionnaire)**

Instructions: In each of the items or situations described, indicate with a score of 0 to 5 the degree of anxiety or discomfort you feel in those situations. Use the following criteria:

- 1 I don't feel anything
- 2 Slight anxiety
- 3 A little uneasy
- 4 Quite nervous
- 5 Very nervous
- 6 Completely nervous

ITEMS	1	2	3	4	5	6
1. My hands sweat during exams.						
2. When I have been doing the exam for a while, I feel discomfort in my stomach and the need to defecate.						
3. If I'm 5 minutes late for an exam, I don't go in.						
4. The conditions where an exam is performed (e.g. too much noise, cold, heat, sun, etc.) influence me by increasing my nervousness.						
5. When I finish the exam, I have got a headache.						
6. When I've been doing the test for a while, I feel short of breath, very hot and I feel like I'm going to faint.						
7. I feel nervous if the teacher stares at me and I can no longer answer.						
8. I get nervous when I see the teacher with the exams before going in.						
9. In the exam I feel rigidity all over my body.						
10. Before entering the exam I feel a "knot" in my stomach, which disappears when I start to speak.						
11. At the beginning of the test, just reading or listening to the questions I get paralyzed and I can't speak.						
12. After the test I cry easily (thinking how badly I did it) even if I don't know the result.						
13. I usually give it a lot of thought before deciding to take the test.						
14. While I'm taking the test, I think I'm doing it very badly.						
15. I feel nervous if my partner speaks more than I do on the test.						
16. I have a strong urge to smoke during the test.						
17. I usually bite my nails or anything on my hands during exams.						
18. I really want to go to the bathroom during the exam.						
19. I get ill and make excuses not to take an exam.						

20. I cannot sit still during the exam (I move my feet, the pen, look around, look at the time, etc.).						
21. For me, it is reassuring or comforting when, for whatever reason, an exam is postponed.						
22. I think I won't be able to pass an exam, even if I've studied.						
23. Before taking the exam, I think that I don't remember anything and that I'm going to fail it.						
24. I cannot fall asleep the night before the exam.						
25. It makes me nervous that the exam is multitudinous.						
26. I felt dizzy and nausea during an exam.						
27. Moments before doing an exam I have a dry mouth and it's hard to swallow.						
28. If the test has a fixed time to be performed, my nervousness increases, and I do it worse.						
29. I feel nervous in very large auditoriums.						
30. When I'm doing an exam my heart beats very fast.						
31. My legs tremble when I enter the exam room.						
32. I feel nervous in classes that are too small.						
33. Groups commenting on the test before it starts make me nervous.						
34. When I leave, I have the feeling that I have done the exam very badly.						
35. I think I'm going to get nervous and forget everything.						
36. I doubt very much when it comes to answering most of the questions.						

Rate with the same scale (1-6) the degree of anxiety or nervousness that you would feel if you had to take any of the following types of tests:

37. A personal interview exam.	
38. An oral exam in public.	
39. An exposition of a work in class.	
40. A standard examination in front of a court.	