

Anxiety to online learning: relationship with attitude, gender, environment, and mental health in university students

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Abstract

Introduction: The educational institution is one of the sectors that has suffered the most from the effects of the spread of Covid-19. **Objective:** This research aimed to characterize online learning anxiety through the eponymous dimension of the Online Learning Strategies Scale in a sample of university students (n = 192) and to examine its determinants. **Methods:** The study was quantitative, non-experimental and cross-sectional. **Results:** A regression model was used to explain 30% of the variability in online learning anxiety. Online learning anxiety was found to be negatively related to attitudes towards online classes, self-perceived mental health and quality of connectivity. Females reported higher anxiety than males. **Conclusion:** The article closes with recommendations for university policies and suggestions for further studies. **Keywords:** mental health; psychological effects; higher education; long distance education; learn online.

Ansiedad al aprendizaje en línea: relación con actitud, género, entorno y salud mental en universitarios

Resumen

Introducción: La institución educativa es uno de los sectores que más se ha resentido por los efectos de la propagación del Covid-19. **Objetivo:** Esta investigación se propuso caracterizar la ansiedad al aprendizaje en línea a través de la dimensión homónima del *Online Learning Strategies Scale* en una muestra de estudiantes universitarios (n = 192) y examinar sus

factores determinantes. **Método:** El estudio fue de carácter cuantitativo, no experimental y de corte transversal. **Resultados:** Mediante un modelo de regresión se logró explicar el 30% de la variabilidad en la ansiedad al aprendizaje en línea. Se encontró que la ansiedad al aprendizaje en línea se relaciona negativamente con las actitudes hacia a la modalidad de clases en línea, la salud mental autopercibida y la calidad de la conectividad. Las mujeres reportaron mayor ansiedad que los hombres. **Conclusión:** El artículo cierra con recomendaciones para las políticas universitarias y con sugerencias para nuevos estudios.

Palabras clave: salud mental; efectos psicológicos; enseñanza superior; educación a distancia; aprendizaje en línea.

Ansiedade ao aprendizado on-line: relação com atitude, gênero, meio ambiente e saúde mental em estudantes universitários.

Resumo

Introdução: A instituição educacional é um dos sectores que mais tem sofrido com os efeitos da propagação do Covid-19. Objectivo: Esta investigação visava caracterizar a ansiedade de aprendizagem em linha através da dimensão epónimo da *Online Learning Strategies Scale* numa amostra de estudantes universitários (n = 192) e examinar os seus determinantes. **Métodos:** O estudo foi quantitativo, não experimental e transversal. **Resultados:** Foi utilizado um modelo de regressão para explicar 30% da variabilidade da ansiedade de aprendizagem em linha. Verificou-se que a ansiedade da aprendizagem on-line estava negativamente relacionada com as atitudes em relação às aulas on-line, à saúde mental auto-percebida e à qualidade da conectividade. As mulheres relataram maior ansiedade do que os homens. **Conclusão:** O artigo encerra com recomendações para a política universitária e sugestões para mais investigação.

Palavras-chave: saúde mental; efeitos psicológicos; educação superior; educação à distância; estudante online.

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Introduction

The year 2020 has been particularly unusual due to the global spread of the SARS-CoV2 virus. Its impact did not only put the response capacity of health systems to the test, but also exerted great pressure on the educational field. In order to slow down the virus infection curve, institutions were forced to implement distance learning, having to adapt their services to new technical and pedagogical requirements. The implementation of this modality not only introduced the complications that technological inexperience entails, but also exposed the material and connectivity deficiencies that affect a vast number of students.

In order to face the crisis, the institutions arranged a series of support measures, including the grant of scholarships, the flexibilization of fees, and the provision of data plans and technological devices. These measures allowed students to have the minimum equipment necessary to take part in synchronous video classes, but didn't necessarily guarantee a high-quality connection and a real use of the benefits offered by these technologies. This problem is exacerbated when considering the unequal distribution of users' skills to operate these technologies (Rodríguez & Sandoval, 2017).

It is precisely students with mediocre digital skills who are more likely to experience technological immersion events negatively,

causing them to feel frustrated and worried, and even triggering symptoms of stress and anxiety.

Greater demand for technological appropriation can cause psychological and physiological imbalance among those who show negative attitudes and aversion towards the use of new digital systems (Brod, 1982). The transition to a virtual modality requires at least a cognitive effort to assimilate the functioning of the platforms. This, added to the unfulfillment of achievement expectations, as well as the failures and crashes that the system may experience, could end up exceeding the coping capacities to deal with online learning, affecting both the academic performance of students and their mental health (Castillo, in press).

Given the context in which the massification of distance learning has taken place, the threats that can compromise the attitude, satisfaction, and other affective reactions to the education received are multiple and not only attributable to the individual disposition of the students (Rosario-Rodríguez et al., 2020). E-learning externalizes some costs previously covered by the education institution itself, which leads to the absence of guarantees when studying from home. This implies that those exogenous determinants beyond the students' control remain heterogeneously distributed within the home (Rodríguez-Bailón, 2020).

In that sense, confinement at home exacerbates inequalities because the lower income sectors provide fewer material resources for study (Bol, 2020), and also because of the differential impact of family dynamics on the organization and management of learning. Students' interactions with their co-residents become more frequent and at the same time more intense, which in some cases may lead to a restructuring of family roles. Some students have taken on new responsibilities linked to household chores, as well as to the care of other family members, who have also been deprived of access to other in-person services. On the other hand, many of the household breadwinners lost their jobs and sources of income or at least faced a hostile and economically uncertain outlook, which only increases tensions within the family group, triggering a greater number of negative emotional responses (Piquero et al., 2020).

Involuntary staying for a prolonged period of time in someone else's company in a stressful situation can strain coexistence dynamics, exacerbating tensions that, in certain cases, could even escalate to domestic violence (Smyth et al., 2020). In this sense, home confinement measures have resulted in increased danger for those living with abusive companions (Kofman & Garfin, 2020), resulting in increased numbers of reports of domestic violence (Campbell, 2020). Under these circumstances, the assumptions underpinning the possibility of online education could easily be taken for granted (De la Cruz, 2020; Rogero-García, 2020).

Research works have taken into account the multiple challenges involved in transferring in-person encounters from a classroom to a virtual environment, since both students and faculty have to develop new roles within the teaching-learning process (Gillingham, 2009). Professors must adapt their didactic and evaluative methodologies, as well as readjust certain contents in the curriculum and weight them based on realistic expectations to ensure they are covered. For their part, students must move towards a more active role with a greater sense of responsibility and involvement in their own learning, even though this participation may remain invisible behind their screens.

In the university, the dilemmas related to the incorporation of technological platforms have triggered some additional reluctance to their implementation, especially in disciplines that conceive social interaction as a key component of their professional exercise (González & Maceiras, 2018). These cultural resistance is based on the perceived misalignment of technological innovation with respect to professional values and ideologies (Stackhouse et al., 2019). Likewise, the suppression of the physical space in a generation that by default already spends a significant portion of its time in front of a monitor (Randjelovic et al., 2021) could cripple the way university is experienced, understood as a process that goes beyond knowledge acquisition and that, in essence, represents a scaled model of coexistence in society (Nieves & Muñoz, 2021).

The configuration of an uncertain and impersonal academic scenario added to the

impact of the stressors inherent to the crisis may not only have exacerbated the systemic shortcomings of the Chilean education system, deteriorating the quality of learning and increasing the opportunity gap but may have also affected the emotional responses of students when interacting with online education. The pretense of normality within a context of crisis added to the inexperience of the institutions could end up suffocating the educational community, to the point of generating uneasiness and frustration due to unfulfilled expectations, as well as a lack of sensitivity to the reality of the most affected students.

Conceptualization of Academic Anxiety

Academic anxiety emerges as a response to multiple stimuli or stressful situations in the academic environment (Hooda & Saini, 2017). From a broad view, anxiety, and by extension its situational expression in the academic setting, manifests itself on a continuum through which every student may transit, varying in intensity and persistence depending on the specific demands of the environment, as well as on the individual coping abilities of students (Siddaway et al., 2018).

Anxiety is the result of biased information processing, where the degree of danger in situations perceived as threatening is exaggerated, while the ability to cope with such situations is underestimated (Beck & Clark, 1988). In academic anxiety, threats correspond to the demands of the student environment, such as taking an evaluation, completing activities, or answering questions in class.

When students foresee that these situations are beyond their means, whether due to a general lack of preparation, low ability, or skewed perception of their academic self-concept, the negative thoughts about eventual failure can turn into a cloud of worries, generating at the same time a feeling of aversion and rejection towards learning.

Academic anxiety impairs the quality of learning because anxious students divide their attention between task-solving cognitions and irrelevant self-centered thoughts, leading to greater distraction and, consequently, to a loss of cognitive efficiency (Jadue, 2001). Academic anxiety may even be a relevant variable in

understanding university dropout rates and other educational problems (Duty et al., 2016; Pandita et al., 2021).

Empirical studies on academic anxiety have focused on the activation of aversive feelings towards specific subjects and pressure responses induced by evaluations (Pizzie & Kraemer, 2019). Namely, STEM courses (Science, Technology, Engineering, and Mathematics) are the most intimidating for students due to their complexity (Castillo-Riquelme, 2020). In courses such as Mathematics, higher levels of anxiety have been evidenced in comparison with other courses in both school and university settings, finding a close relationship with academic performance (Foley et al., 2017). Courses such as Statistics and Scientific Research Methods often represent great challenges for university students and are even perceived as obstacles that threaten the continuity of their academic journey (Bourne, 2018; Condron et al., 2018). This aversion brings with it a series of rejecting behaviors, such as skipping classes, paying little attention, showing a lack of enthusiasm, and, ultimately, low performance (Dominguez-Lara et al., 2017).

Likewise, anxious behavior has also been studied in contexts of evaluation and academic performance activities, as these are likely to have an impact on the future continuity of the student in the system and, to some extent, are responsible for modulating his or her expectations of achievement. Correlations have been found between test anxiety levels and performance on university admission tests, which often have a major impact on young people's life paths (Cassady & Johnson, 2002; Hannon & McNaughton-Cassill, 2011; Schachter, 2007), and it has been hypothesized that a significant number of gender differences on these tests is attributed to differences in test anxiety levels (Hannon, 2012). Even when taking tests with lower consequences, certain students experience greater anxiety due not only to the fear of a low score, but also to the exposure to peers and professors.

Anxiety disproportionately affects female students (Bhansali & Trivedi, 2008; Gao et al., 2020), particularly when faced with male-dominated university subjects, such as Science and Mathematics (Pelch, 2018). Regarding

psychological factors, academic anxiety has shown comorbidity with other mental health disorders, mainly stress and depression. The anxious student profile is characterized by a task-avoidant propensity (Krispenz et al., 2019), constant ruminations (Constantin et al., 2018), and a tendency toward external locus of control (Watson, 1967). Other factors that aid in explaining increased academic anxiety are lack of preparation, poor study time management, and family expectations (Duraku, 2017). Some contextual considerations of classroom climate and professor characteristics may also, albeit indirectly, influence academic anxiety (Downing et al., 2020), e.g., if aggressive verbal language is used (Lin et al., 2017) or if the instructor maintains an authoritarian and rigid teaching style (Hilton, 1980).

Seen from a general perspective, anxiety finds a key place for its existence in modernity, and functions as a response to certain cultural values, such as the obsession with success and the cult of efficiency (Sacristán, 1990). On the other hand, the new insecurities that the free-market model is generating, given that it fosters principles such as consumption, individualism, distrust, and competition, implies a shift opposed to the one required to face mental health demands (United Nations Development Program [UNDP], 1998). It is no coincidence that, in Chile, economic growth correlates positively with suicide rates and other emotional disorders (Moyano & Barría, 2006), which tend to be particularly high in relation to other countries, as almost one third of the Chilean population suffers or has suffered from some psychiatric disorder (Vicente et al., 2016). The atomistic conception of society subordinates people to the values of the economy, at the personal cost of assuming greater vulnerability to symptoms of emotional stress (Jadue, 2001).

At certain stages in life, students may be more vulnerable, as illustrated by the high prevalence rates of mental health disorders in university students (Micin & Bagladi, 2011). During periods of adaptation to change, it is common for anxiety levels to be higher, as the demands of the environment create new tensions and require new responses. Access to and permanence in the university is in its own right a complex and

stressful process, capable of altering the stability of students, generating greater uncertainty about the consolidation of their life projects (Barrera & Vinet, 2017). The onslaught of the socio-health crisis only exacerbates the vulnerability of students in the face of an uncertain outlook that they face without prior preparation. Although some studies have already analyzed the impact of the COVID-19 pandemic on the mental health of university students (Cobo et al., 2020; Pérez et al., 2020), little is known about the specific anxiety responses to the distance learning modality and its determinants. This research has set out to correlate online learning anxiety with some relevant variables, such as gender, attitude towards online classes, mental health, and assessment of the environment as a space for study. In addition to testing for gender differences, it is hypothesized that a favorable attitude to the virtual environment, positive mental health, and an appropriate assessment of the environment can decrease online learning anxiety scores.

Method

Design

Quantitative research was conducted based on the use of statistical procedures of regression, correlation, and group comparisons. Within the classification proposed by Ato et al. (2013), the study followed a predictive design based on a cross-sectional associative strategy, which focuses on the functional relationship between two or more variables, with data collection taking place during the months of June and July 2020.

Participants

A priori, based on a statistical power of 80%, a significance level of 5%, and an expected correlation effect of 0.2, a total of 194 participants was estimated as the optimal sample size (Hulley et al., 2013). A total of 192 university students from three different programs (62% Psychology; 22% Social Work; 16% Occupational Therapy) participated and were selected on the basis of a purposive cluster sampling. The courses chosen for recruiting the participants were those framed

within the scientific-quantitative methodological line: Parametric and Nonparametric Statistics; Statistics for Health Sciences; Inferential Statistics; Construction of Psychological Tests, and Methodology of Quantitative Research. The average age of the participants was 21.88 years (SD 3.38); and the distribution by gender showed a higher frequency of female students (74%). All participants reported studying in the Bio-Bío region of Chile, and 80.7% reported living in urban areas.

Instruments

Sociodemographic questionnaire: A group of single-choice questions was designed ad hoc to inquire about the socio-demographic characteristics of the participants, as well as about some general attributes related to accessibility to online classes and self-perception of mental health. In this section, unidimensional questions were used because they are oriented to capture general assessments, emphasize group representation and not individual effects, and play a complementary role to other more elaborate instruments (Morales, 2011). This type of questions were validated by means of experts' resolutions considering criteria of clarity and relevance, both in the formulation of the items and in their response categories.

Online Learning Strategies Scale (OLSS): The OLSS is a multidimensional scale developed and validated by Tsai (2007) under the model of strategic online learning. The purpose of this scale is to examine learning strategies in web environments across seven dimensions: Anxiety, Attitude, Time Management, Study Aids, Self-Awareness, Web Literacy, and Concentration. For our research, only the subscales corresponding to the Anxiety and Attitude dimensions were used, variables that according to the model proposed can be considered conceptually independent of each other, since Attitude belongs to the affective domain, while Anxiety belongs to the Self-regulation domain (Tsai, 2009).

The Attitude subscale measures, through a score ranging from 4 to 20 points, the students' perceptions towards online learning and their willingness to use web resources in their learning process. It is composed of four items of graduated response in Likert format, whose categories

range from Strongly Disagree (1) to Strongly Agree (5). A representative item of this scale is: "I believe that online learning is an effective way to learn." For its part, the Anxiety subscale measures, through a score ranging from 4 to 20 points, the maladaptive responses that students report from their learning experiences in a virtual environment. In operational terms, this subscale includes four items related to nervousness, concern about informatics skills, feelings of frustration, and concern about performance.

The items include five response options ranging from Strongly Disagree (1) to Strongly Agree (5). A representative item on this scale is "I am concerned about my computer skills for online learning." Scores for both the Attitude and Anxiety subscales were obtained by adding the corresponding items once corrected for polarity.

A free translation of the original version was made for the application of the OLSS subscales. The translation sought to respect the meaning of each sentence, maintaining its simplicity and ensuring the non-interference of idiosyncratic or colloquial expressions that would affect its cultural equivalence, an aspect that was contrasted through a reverse translation into English.

While primary studies identified high reliability for all subscales of the OLSS, obtaining for Anxiety an $\alpha = .84$ and for Attitude an $\alpha = .85$ (Tsai, 2009), in our study, we obtained indicators of internal consistency with more moderate values for both the Anxiety dimension ($\alpha = .76$) and the Attitude dimension ($\alpha = .66$).

Procedures

Participants were invited to take a CSAQ (Computer Self-Administered Questionnaire) survey created with the Google Forms platform and disseminated in university classes in the scientific-quantitative methodological line. All participants approved the informed consent through the Google Forms platform. The Scientific Ethics Committee of Universidad Santo Tomás, corresponding to the Central-South macro-zone of Chile, approved the study under internal code 8-20.

Data analysis

Measures of central tendency, dispersion, and frequency distribution tables were calculated. Bivariate analyses included the following

hypothesis tests: Pearson product-moment correlation (r), Student's t for independent samples (t), Student's t for one sample (t), and Pearson's Chi-square (χ^2). Correlation, regression, and t -tests were not substituted with nonparametric tests because simulation studies have demonstrated their robustness against small deviations from normality (McDonald, 2014). Effect sizes were estimated using Cohen's d and Cramer's V following the valuation rules presented by Fritz et al. (2012).

The final analysis included a multiple linear regression model considering Online Learning Anxiety as the predicted variable and Gender, Attitude toward Online Classes, Self-perceived Mental Health, and Environmental Conditions as predictors. The Gender and Environmental Conditions variables were coded in binary format for applicability as dummy variables. The variables were entered into the equation through the Stepwise method. Efforts were made to satisfy the assumptions of linearity, homoscedasticity, and non-multicollinearity. All analyses were performed using SPSS version 21.0.

Results

The results are presented under the following structure. First, we report the descriptive analysis of the variables and the correlations found between them. Second, the descriptive and inferential analysis of online learning anxiety is presented, breaking down the results into the

four indicators (items) that make up the scale: nervousness, concern about computer skills, frustration, and concern about performance. Additionally, a comparative analysis is presented according to students' gender. Finally, the study reports the results of the multiple regression model, in which the following predictors for online learning anxiety were incorporated: gender, attitude towards online classes, self-perceived mental health, and perception of the environment.

According to Table 1, online learning anxiety presented central tendency measures of 15.23 ($SD=3.56$) and 16 points for the mean and median, respectively. On the other hand, the frequencies of the scores reached their highest peak around the value of 17 points, and 8.9% of the participants even reached the maximum 20-point score contemplated by the scale.

In the attitudes toward learning, a certain tendency was observed for the data to be grouped within the range of lower scores, the effect of manifesting an unfavorable attitude toward the online teaching process. Thus, for example, only 6.8% of the students considered e-learning to be efficient. These values are centered around a mean of 10.15 points ($SD = 2.99$) and a median of 10 points.

For both Self-perceived Mental Health and Quality of Connectivity, scores were relatively distributed in a symmetrical way around their respective averages. Self-perceived Mental Health had a mean of 4.63 points ($SD = 1.21$) along with a median of 5 points, while the Quality of Connectivity variable also had a mean of 4.59 points ($SD = 1.25$) and a median of 5 points.

Table 1

Descriptive Statistics and Correlations Between Online Learning Anxiety, Online Learning Attitude, Self-perceived Mental Health, and Connectivity Quality

	M	SD	1	2	3	4
1. Anxiety	15.23	3.56	1			
2. Attitude	10.15	2.99	-.32***	1		
3. Mental health	4.63	1.21	-.35***	.24***	1	
4. Connectivity	4.59	1.25	-.28***	.20**	.27***	1

Note. M = Mean; SD = Standard Deviation.

Because, culturally, in Chile, it is usually considered that on a scale of 1 to 7, the value 4 represents the minimum passing score, t-tests were carried out to compare whether these measures were sufficiently high in relation to the midpoint of the scale. In the case of Self-perceived Mental Health, the difference was statistically significant [$t(191)=7.29$, $p < .001$], and only 17.1% of the students gave their mental health a score lower than 4. For its part, the mean score for Quality of Connectivity was also significantly higher than the benchmark [$t(191)=6.66$, $p < .001$], and 18.8% of the students rated the quality of their internet connection with a score lower than 4.

All bivariate correlations between Anxiety to Online Learning, Attitude toward Online Classes, Self-perceived Mental Health, and Quality of Connectivity were statistically significant, although with relatively low effect sizes.

For Online Learning Anxiety, inverse correlations were observed with the rest of the variables, the most notable being its relationship with Self-perceived Mental Health [$r=-.35$ (190), $p < .001$], with which it shares 12% of its variability. It is followed in magnitude by a negative correlation with Attitude toward Online Classes [$r=-.32$ (190), $p < .001$] and finally an equally inverse correlation with Quality of

Connectivity [$r=-.28$ (190), $p < .001$]. These results suggest that high anxiety responses to virtual learning experiences, at least within the context of the COVID-19 pandemic, are often associated with negative perceptions of one's mental health, as well as with the presence of greater barriers to connect to classes. Similarly, higher online learning anxiety scores tend to be mobilized together with an attitude of disapproval towards the way distance learning modality works.

On the other hand, positive correlations were also found between Self-perceived Mental Health and Quality of Connectivity [$r=-.27$ (190), $p < .001$], between Attitude towards Online Classes and Self-perceived Mental Health [$r=-.24$ (190), $p < .001$], and between Quality of Connectivity and Attitude towards Online Classes [$r=-.20$ (190), $p < .01$].

Table 2 shows the differences in the anxiety indicators according to the gender of the student. The female group obtained a higher average on the Online Learning Anxiety scale, showing a mean difference of 3.05 points over the male group. This difference is statistically significant and of great magnitude [$t(191)=5.07$, $p < .01$, $d=0.87$], which is best illustrated when considering that 85.2% of the women obtained a higher score for this scale than the mean of the men's group.

Table 2
Indicators of Anxiety toward Online Learning According to Gender in University Students

Indicators	Male	Female	Total	t / χ^2
	(n=50)	(n=142)	(n=192)	
	M / %	M / %	M / %	
Total score (x)	12.98	16.03	15.23	5.07**
Online learning makes me very nervous.				
• (% Agree and Strongly Agree)	40.0	64.8	58.3	12.46**
• I am concerned about my computer skills for online learning.	26.0	64.1	54.2	28.16***
• (% Agree and Strongly Agree)				
• Online learning systems always make me feel frustrated.	48.0	66.9	62.0	6.96*
• (% Agree and Strongly Agree)				
• I am concerned about my performance in online learning.	76.0	90.1	86.5	14.10**
• (% Agree and Strongly Agree)				

Note. * $p < .05$ ** $p < .01$ *** $p < 0.001$. For analysis purposes, each item of the OLSS Anxiety scale represents an empirical indicator that provides disaggregated information of the general construct. These indicators constitute categorical variables, while the total score corresponds to a quantitative summary measure.

According to the data in Table 2, we can see that there are significant differences in the proportions of the indicators for nervousness [$\chi^2(2, n=192)=12.46, p<.01, V=.26$], computer skills concern [$\chi^2(2, n=192)=28.16, p<.001, V=.38$], frustration [$\chi^2(2, n=192)=6.96, p=.03, V=.19$], and performance concern [$\chi^2(2, n=192)=14.10, p<.01, V=.27$]. While 40% of men reported feeling nervous about online learning, in women, this figure rose to 64.8%, a value that represents a difference of 25 percentage points. The most striking difference between men and women was found in the indicator of concern about computer Skills, since the latter (64.1%) outnumber men (26.0%) in the percentage that considers if they agree or strongly agree with the statement of the item. As for the indicator of frustration, although with insignificant differences, it is also women who present a higher percentage (66.9%) statistically different from men (48.0%). Finally, in the indicator of concern for performance, 90.1% of the women indicated that they agreed or disagreed with the statement of the item, reaching a difference of 14 percentage points over the group of men.

Therefore, although it is not unusual to find that students experience frustration (62.0%) and nervousness (58.3%) when interacting with the technologies required by the distance education modality and, in turn, express concern about their computer skills (54.2%) and their academic performance (86.5%), these figures tend to

present relevant variations when the results are disaggregated by gender, leaving the female group at a greater disadvantage when faced with the online learning experience.

Table 3 presents a multiple linear regression model to explain anxiety to online learning based on four predictor variables: Gender, Attitude towards Online Classes, Self-perceived Mental Health, and Suitable Environment. As a whole, the model manages to explain 30% of the variability in anxiety scores ($F=20.99, p <.001$), with significant effects for each independent variable. In order of impact, it is observed that Gender obtains the highest standardized coefficient $\beta=-0.30, (t(191)=-4.78 \text{ CI } [-3.40, -1.41])$, followed by Attitude towards Online Classes $\beta=-0.23, (t(190)=-3.63 \text{ CI } [-0.42, -0.12])$, Self-perceived Mental Health $\beta=-0.22, (t(190)=-3.53 \text{ CI } [-1.03, -0.29])$, and finally, the Environment Perception $\beta=-0.17, (t(191)=-2.81 \text{ CI } [-2.11, -0.37])$. Consequently, being male, having a positive attitude to online classes, self-reporting good mental health, and declaring to have an environment suitable for study would contribute to a decrease in the total anxiety score. Although the bivariate analysis also found a significant relationship between the scores for *Online Learning Anxiety and Quality of Connectivity*, the effect of the latter was absorbed by including the question about the conditions of the study environment (suitable/unsuitable), finding, naturally, that anxiety decreased when a suitable environment was available.

Table 3

Multiple Linear Regression Model for Online Learning Anxiety in University Students

	B	β	t	IC 95%		R^2_a	F
				Li	Ls		
Model						0.30	20.99***
Intercept	22.29	0	21.83***	20.28	24.31		
Gender (male)	-2.40	-0.30	-4.78***	-3.40	-1.41		
Attitude towards online classes	-0.27	-0.23	-3.63***	-0.42	-0.12		
Self-perceived mental health	-0.66	-0.22	-3.53***	-1.03	-0.29		
Perception of the environment (suitable)	-1.24	-0.17	-2.81***	-2.11	-0.37		

Note. *** $p<0.001$.

Discusión

Although given the limitations of a cross-sectional study, it is not possible to affirm that an increase in student anxiety has occurred, it is unusual for such high proportions of negative feelings to exist within the context of distance learning. Moreover, it is difficult to assess the magnitude of these levels of anxiety to online learning, since the studies that have previously measured this construct have done so in circumstances and populations that are difficult to compare with this research. Until recently, distance learning was a disruptive experience to the academic norm, so studying online learning anxiety only made sense under certain conditions, such as MOOCs (Massive Online Open Courses) or special teaching programs.

Within the bivariate space, it was possible to find significant correlations between all the variables reported, which were in the direction expected by this research. Anxiety to online learning is not a variable alien to the general behavior of students' mental health, because even when it is not addressed as a pathology, it represents a potentially maladaptive emotion loaded with unpleasant thoughts. The attitude by which online classes are faced could play a key role in reducing induced anxiety, since, unlike the contextual factors, the attitude would be within a margin that could be modified and could be promoted by professors and university policies. One option would be to capitalize on the positive aspects and opportunities opened up by the online class modality. However, the excessive concerns do not only respond to the attitudinal disposition of the students but may also be due to objectively adverse factors that justify the feeling of uneasiness and uncertainty about the future. Not knowing what to expect from the university system and the impossibility of foreseeing the direction that the current crisis will take, including its impact on all aspects of the social system, may be the main catalyst for this new expression of academic anxiety.

By disaggregating online learning anxiety scores by gender, we found differences in the same direction suggested by some studies on general anxiety (Özdin & Bayrak, 2020), leaving

females in a condition of greater fragility in the face of the indirect effects of the pandemic. This finding is also consistent with higher rates of post-traumatic stress experienced by women compared to men (Liu et al., 2020) and with a more intense manifestation of fear of COVID-19 by women (Broche et al., 2020; Fitzpatrick et al., 2020). However, some previous studies have compared online learning anxiety by gender without finding significant differences (Marimuthu et al., 2013; Yukselturk et al., 2016), a situation that suggests a possible interaction with the socio-health context, which requires further attention in future research. On the other hand, gender differences in online learning anxiety can also be interpreted as a natural consequence of pre-existing technology achievement gaps, as it has been found that men are more attracted to interacting with technology than women (Cai et al., 2017), perceive themselves as more capable of solving technological problems (Huffman et al., 2013), and are vocationally oriented toward technology-related career paths at a higher rate than their female peers (Rodríguez & Castillo, 2015).

The multiple linear regression model allowed to jointly associate anxiety to online classes with other factors that were considered relevant for its understanding. The results of this analysis were aligned with the main hypotheses of this study, showing that anxiety to online learning tends to be higher when there is a negative attitudinal disposition towards learning on digital platforms, a perception of impaired mental health, and an inadequate environment to participate in the educational process from home. Although the model integrates a limited number of variables, and these were operationalized with coarse measurements, it manages to satisfactorily explain 30% of the variability of anxiety to online learning, and improvements in its goodness of fit could be projected if measurements more sensitive to the variables were added, capable of finding nuances in individual student differences within a broader spectrum. The environment perception variable could be broken down into multiple indicators to capture the specific way in which it impacts students' affective reactions, being the material conditions for study (connectivity, noise, space) and the family environment the

main candidates to explain this effect since these variables constitute an extension of the social inequalities with which the main educational gaps are associated (Lloyd, 2020). Another element to consider in the analysis is the role played by Mental Health since it is difficult to theoretically defend that this is associated in a unidirectional way with anxiety to online classes. It is likely that the connection between the two responds to continuous feedback of their effects, reaffirming the complex and multicausal nature of the phenomenon of anxiety. It can be hypothesized that people with more impaired mental health may be particularly vulnerable to experiencing feelings of anxiety when faced with the online classroom modality, while this aversion may further intensify students' distress and stress.

The education sector is one of the most affected by the propagation of COVID-19. Both professors and students have had to face new demands to deal with technology and assimilate it into the teaching-learning process, while, at the same time, they have received the negative effects of the uncertain outlook that the pandemic has introduced into daily life. Anxiety has been one of the most typical reactions that students have experienced in the new academic scenario and, of course, constitutes a niche that will require greater attention from the scientific community.

Although academic anxiety has been a widely addressed concept, its re-signification in the light of a new reality brought about by the access to and quality of technologies is now of major importance. Understanding this phenomenon can contribute to the early detection of psychological adjustment problems and their correlates with university performance, and would also allow education institutions to develop strategies to protect the mental health of students in order to optimize the efficiency of the teaching system.

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