SIN-CHN SCIENTIFIC PRESS PTE.LTD.

Molecular & Cellular Biomechanics 2024, 21(2), 450.
https://doi.org/10.62617/mcb.v21i2.450

Article

Research on the relationship between college students' English learning anxiety and biomechanical factors

Xuemei Guo[1,2,*], Xin Gu[1]

[1] Department of Basic Education, Qingdao University of Technology, Linyi 276000, Shandong, China
[2] Faculty of Language Studies and Human Development, University Malaysia Kelantan, Kota Bharu Kelantan 16100, Malaysia
*** Corresponding author:** Xuemei Guo, guoxuemei@qut.edu.cn

CITATION

Guo X, Gu X. Research on the relationship between college students' English learning anxiety and biomechanical factors. Molecular & Cellular Biomechanics. 2024; 21(2): 450. https://doi.org/10.62617/mcb.v21i2.450

ARTICLE INFO

Received: 29 September 2024
Accepted: 18 October 2024
Available online: 6 November 2024

Abstract: English learning has become essential for higher education for students throughout the world, particularly in non-English-speaking nations where fluency in the language is frequently linked to success in the classroom, employment prospects, and international communication. Learning English is an emotional as well as a cognitive endeavor for many students. Anxiety related to language acquisition, including exam anxiety, fear of rejection, and fear of communication, is a common issue that can significantly impact how well students achieve. The goal of this research is to examine the connection among biomechanical characteristics and the anxiety that college students have while learning English. Participating in this study were 326 college students in total. Participants will also complete a structured questionnaire survey on biomechanical factors, as well as supposed muscle tension, posture habits, and physical discomfort throughout English learning sessions. The Foreign Language Classroom Anxiety Scale (FLCAS) is a validated instrument that will be used to measure English learning anxiety levels. The data was analyzed by statistical methods, including Regression analysis and Pearson correlation were utilized to ascertain the association between the English learning anxiety score and biomechanical factors. To evaluate students' anxiety and biomechanical reactions, an ANOVA will be used. The data was analyzed using SPSS v20 software. The result established the relationship between English learning anxiety and biomechanical factors is necessary for creating more supportive learning environments. Research demonstrates that the relationship between bodily reactions and anxiety, needs to address the mental and physical components of stress, and the significance of developing more effective methods of lowering anxiety, boosting student well-being, and raising academic achievement in English learning. This research suggests the relationship between college students' English learning anxiety and biomechanical characteristics, adding to a more complete understanding of how physical and psychological aspects impact English language learning outcomes.

Keywords: English learning anxiety; biomechanical factors; college student's; foreign language classroom anxiety scale (FLCAS)

1. Introduction

Worldwide employment in higher education by international students has augmented, with the health sciences rising as the most attractive sector. However, many have complexity studying due to linguistic and cultural difficulties, and their final year examines projects regularly because of stress and worry [1]. The mental health of college students is significantly impacted negatively by anxiety, impeding their future growth and increasing their risk of suicide and chronic illnesses. By determining the fundamental causes of these problems, mental health can be improved, allowing students to reach their full potential and adjust to society [2].

When young people feel too much pressure to perform academically and their adaptive resources are not being utilized, it can lead to unmanageable stress that affects their behavior, emotions, cognition, and physiology. This is known as academic stress [3]. An important area of study in foreign language studies is Foreign Language Anxiety (FLA), which is typified by negative behaviors including clammy hands, dry throats, fatigue, and avoiding contact with other students during class of contentious disputes [4]. Global population behaviors were altered by the new coronavirus pandemic (COVID-19). The lockdown measures set in place by nations all around the world are mostly to blame for the developments. Teachers and students must adapt to this shift, which might have a severe effect on health, especially musculoskeletal pain, which could lead to more stress and discomfort and could affect kids' academic performance [5]. Worldwide, the number of migrant students enrolling in higher education is continuously increasing. It includes both foreign and migrant students. Despite achieving the language standards, many people have difficulty speaking English as a second language (ESL) and interacting with others, which can cause anxiety connected to language, social rejection, and subpar performance in language activities [6]. **Figure 1** represents the Challenges in International Higher Education.

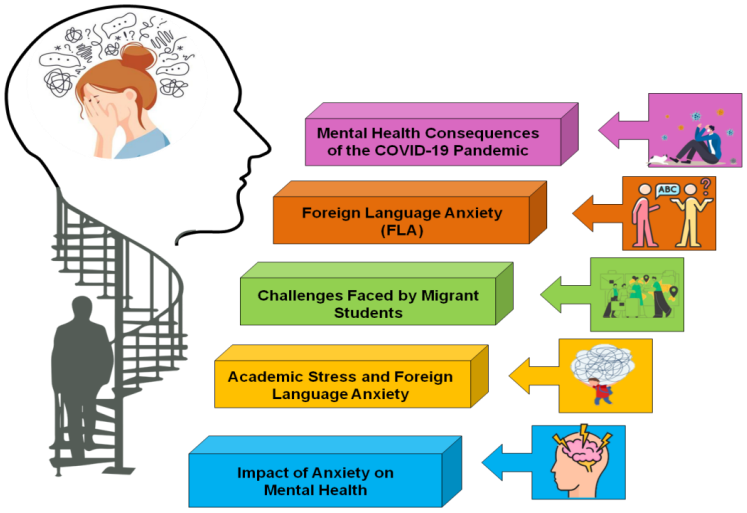

Figure 1. Challenges in international higher education.

Computational literacy and proficiency with computer programming are essential for workers in a workplace that is changing quickly. The advantages to cognition and employment prospects are what drive learners to gain these abilities. Programming is hard, though, and dropout rates are greater because of things like motivation and topic difficulty [7]. Anxiety, sadness, and adverse effects on the musculoskeletal system were caused by the COVID-19 epidemic, which had a major influence on lives, especially those of college students. There is evidence to suggest that mental health issues among college students represent a significant public health risk appeared to be made worse by the COVID-19 epidemic, was provided in a recent meta-analysis, which also changed the way students learned by moving from on-campus to online formats and changing their daily routines [8]. The COVID-19 pandemic has significantly impacted education, prompting universities throughout

the globe to adjust to online instruction. Over 1.6 billion pupils worldwide have been impacted by this, with 94% of them experiencing school closures, particularly in low-and lower-middle-income nations. One important element affecting how well students achieve is motivation [9]. With over 1.6 billion children affected worldwide, the COVID-19 pandemic has significantly impacted education. Students' mental health issues have gotten worse as a result of the lockdown, which has also lowered drive, scholastic achievement, and mental activity. So, the majority of students and learners were impacted by the pandemic's significant changes. The worldwide pandemic had a negative impact on motivation, which is a key component that directly affects student performance. The sudden shift to virtual education has also resulted in technology failure, which has an impact on both professors and students [10]. A trait-level disposition known as math anxiety results in tension, worry, and uncertainty when performing activities involving numbers. It also negatively correlates with arithmetic proficiency and can lead to failure and bad attitudes [11]. Students that travel abroad to study in a non-home country with mutual benefits to both the host nation and the students themselves are known as international undergraduate students (IUSs). It does, however, have difficulties with socializing, mental health problems, and language impediments [12].

Objective of the study

This study's objective is to discover how psychological and physical variables affect language learning results and to investigate the connection between biomechanical characteristics and anxiety related to learning English among college students. The intention is to offer guidance on how to design encouraging learning settings that can lower anxiety and boost academic achievement.

The rest of the study has been divided into the following phases: Phase II evaluates the literature, Phase III provides the technique and materials, Phase IV covers the results and discussion, and Phase V ends with a conclusion.

2. Related works

The application of Mano Shakti Yoga (MSY) to identify and mitigate anxiety in college students was investigated. The research, which included a detection-estimation-reduction paradigm, exposed that MSY significantly decreased anxiety while boosting memory, intellect, and attention [13]. It examined the effects of being close to final examinations about 446 final-year medical students' mental wellness from six medical institutions. The findings indicated that both male and female students who were about to take tests had higher mean scores and higher occurrences of anxiety and depression, indicating the need for context-specific teaching and modified support in medical education [14]. The investigation's goal was to ascertain how the Class Point technology helps Saudi Arabian undergraduate female English as a Foreign Language (EFL) learner who were experiencing exam anxiety. The technology, when compared to traditional coaching, considerably lowers exam anxiety, according to the results [15]. Stress-related to school has a detrimental effect on students' academic performance it leads to fatigue, negative feedback, and theoretical inadequacy. It has an impact on the emotional and physical health of EFL

students, which can have detrimental effects like fatigue and sickness that eventually result in academic failure [16]. Using working memory as a mediator, examined the effects of L2 writing anxiety on the written texts produced by English language learners. The results illustrated the detrimental effects of high cognitive load tasks and demonstrated how high anxiety inhibits working memory, lowering syntactic complexity [17]. The most popular substances used by students, according to a survey including 2915 university students in the Western Cape, were ecstasy, cannabis, and alcohol, with a 62.7% prevalence rate. Students who used drugs had higher ratings for anxiety and depression, and it linked substance use to mental health. Lawmakers and intervention services might find a use for the results [18]. To enhance resilience and mental health, the study examined journal entries from 755 Q-Life users. To categorize diary entries, the study applied machine learning (ML) and sentiment analysis methods. The findings identified coping techniques along with 14 negative and 13 positive themes. Technology solutions that support resilience were suggested [19]. Using a galvanic skin reaction and an artificial electronic nose system, the pilot suggested a mechanism for identifying academic stress in University of Pamplona engineering students [20].

The influence of a psychology course on their opinions and academic English performance was assessed. Task completion, organization, language proficiency, and source material utilization were all enhanced by the psychology major-focused course [21]. There was not a significant shift in the student's anxiety or sense of self-efficacy. Three categories of students were found in the investigation, and every had significant gains in composition scores in anxiety and self-confidence. The degree of foreign language (FL) anxiety among elementary school students and its correlation with FL proficiency are examined in the investigation. The Foreign Language Classroom Anxiety Scale (FLCAS) participated, according to the findings, FL anxiety was on level with that of adults [22]. Four elements of FL anxiety were found: an adverse perspective toward the classroom, test anxiety, fear of a poor assessment, and communication apprehension. According to the study, FL anxiety and FL accomplishments were negatively connected, with the associations being larger for formal exams and higher educational degrees. They investigated the effects of foreign language listening anxiety (FLLA) on assessment of listening proficiency. FLLA is a representation of general listening anxiety in the classroom, daily use, and media learning, according to the results. There is a negative correlation between self-perceived performance and listening test anxiety, there is no correlation between performance and general listening anxiety. Compared to English majors, non-majors have more general listening anxiety [23]. The research to FLLA research grounded on complicated dynamical systems and has useful educational ramifications for further research. Social cognition was used in the research to investigate the factors influencing the analytical abilities of English as a Foreign Language (EFL) readers. Through the use of structural equation modeling, data from Chinese EFL learners was examined [24]. Critical thinking was found to be positively impacted by metacognitive learning techniques, it severely impacted by learner anxiety, self-efficacy, and self-oriented learning perfectionism. According to the research should adopt measures to promote critical thinking abilities in EFL instruction and stress the value of encouraging metacognitive techniques. The examined Chinese

undergraduate EFL learners' task values affect their English language acquisition. There are four aspects to task values, and there is a high correlation between ELSA and expectation [25]. Expectation has a stronger influence than value in predicting learning accomplishment, according to the research. The results, teachers have to encourage their students to set high goals and provide them additional chances to practice speaking English.

3. Methodology

To investigate the connection between college students' anxiety related to learning English and biomechanical characteristics, this study used a mixed-method approach. The subsequent crucial stages include the methodology:

3.1. Research design

The collection of data includes 326 college students and focuses on biomechanical aspects of English language instruction. It records sitting patterns, extended sitting, and perceived muscular strain in the neck, shoulders, or back, as well as physical discomfort such as headaches, stiffness in the muscles, and exhaustion. To ensure uniformity, the data was gathered using a standardized questionnaire. Further measuring students' concerns about studying English was conducted with the Foreign Language Classroom Concerns Scale (FLCAS). Regression analysis, which predicts anxiety from physical strain, ANOVA, which evaluates group differences, and Pearson correlation, which looks at relationships between anxiety and physical discomfort, were used in this study to investigate the link between anxiety and body reactions. The findings provide light on how physical and mental difficulties interact when learning a language. **Table 1** and **Figure 2** demonstrate the demographic table for the anxiety and biomechanical factors.

Table 1. Demographic information about English learning.

Variables	Category	Frequency (n)	Percentage (%)
Gender	Male	162	49.7
	Female	164	50.3
Age	18–20 years	105	32.2
	21–23 years	165	50.6
	24–26 years	56	17.2
Academic year	Freshman	83	25.5
	Sophomore	92	28.2
	Junior	95	29.1
	Senior	56	17.2
English proficiency level	Beginner	45	13.8
	Intermediate	172	52.8
	Advanced	109	33.4

Table 1. (*Continued*).

Variables	Category	Frequency (n)	Percentage (%)
Learning hours per week	1–5 h	78	23.9
	6–10 h	134	41.1
	11–15 h	73	22.4
	16+ h	41	12.6
Physical activity level	Low (0–2 times/ week)	145	44.5
	Moderate (3–4 times/ week)	111	34.0
	High (5+ times/ week)	70	21.5

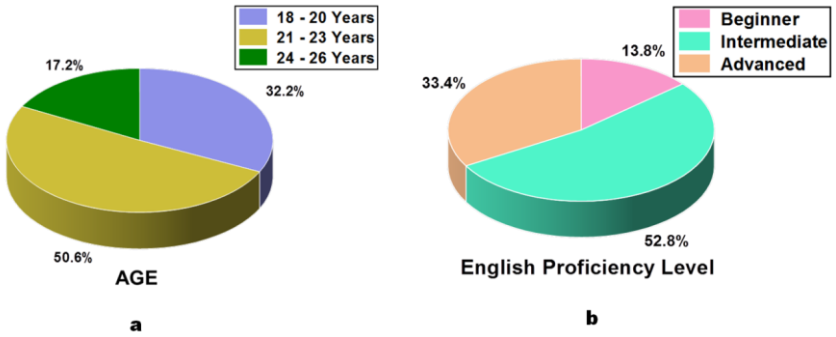

Figure 2. Demographic information about **(a)** age and **(b)** English proficiency level.

3.2. Survey instruments

The purpose of the survey questionnaire used to assess the connection between anxiety related to learning English and biomechanical parameters. It responded to an investigation on the physical pain student's skilled through English language courses, as well as their perceptions of muscular tension and postural habits. The occurrence of tense muscles, the need to correct posture, and the intensity of physical discomfort were all scored by the participants. Also assessed, were the belongings of posture on focus and the frequency of somatic complaints such as tiredness or headaches. The gathered information aided in the conception of helpful learning settings by providing information on how these physiological indicators can increase anxiety related to learning English. **Table 2** shows the survey questionnaires below.

Table 2. Survey questions about anxiety and biomechanical factors.

S.No.	Questions
Anxiety	
1	How nervous before or during an English exam, on a scale of 1 to 5?
2	How often do avoid using the English language in class because are afraid of making a mistake?
3	How much do fear that when talk in English, peers will criticize or reject?
4	How anxious when requested to take part in activities involving the English language, including group discussions and presentations?
5	How certain that can speak English in class and engage with the other students?

Table 2. (*Continued*).

S.No.	Questions
Biomechanical	
6	How frequently, on a measure of 1 to 5, do feel tense in neck, shoulders, or back when learning English?
7	How do find that during English language study sessions have to correct posture (e.g., sit up, lean forward, or slouch)?
8	How much physical discomfort (such as backache, stiff neck, or eye strain) do experience during lengthy English study sessions?
9	How much is the ability to focus during English learning exercises affected by the way sit?
10	How frequently do physical symptoms like headaches, exhaustion, or eye strain occur when studying English?

3.3. Research instruments

The survey uses a FLCAS is a validated instrument of Likert scale to evaluate the impact of different factors on the anxiety college students have when learning English. Questions include learning experiences, interactions with language learning resources, and the impact of biomechanical or physical factors (like posture or screen time) during study sessions. Five elements are used in the Likert scale, with Strongly Disagree to Strongly Agree as its extremes. The impact of outside influences such as peer pressure or teacher comments, the experience with English language skills, and the way that biomechanical elements (such as extended sitting or using digital devices) affect an individual's anxiety are all rated by the respondents. They are also asked to assess how these elements influence their confidence in their ability to learn English as well as how they perform overall.

3.4. Data analysis

Descriptive Analysis: With an importance on students' physical responses throughout English language learning sessions, this study examined biomechanical variables and anxiety ratings associated with English learning. English learning anxiety was examined by the FLCA Scale, which confidential into low, reasonable, and high levels. Biomechanical components incorporated subjective muscle tension and postural patterns.

Pearson Correlation Analysis: The relationship between biomechanical variables including muscular tension, postural habits and English learning anxiety ratings was examined by using Pearson correlation analysis. Significant correlations were found by the study, with stronger relations indicated by values closer to +1 or −1.

Regression Analysis: In the study, regression analysis was used to search at how biomechanical individuality affected anxiety related to learning English. With coefficients (β) indicating their strength and direction, the model determined that the most important determinants were biomechanical character including muscle tension and postural patterns.

ANOVA: Using ANOVA, this study compared students' anxiety levels related to learning English based on their biomechanical reactions, result changes in anxiety

levels amongst learners who have statistically important knowledge of various degrees of physical pain.

SPSS Software: The statistical studies were performed by SPSS v20 software, which yielded quantifiable proof of the relationship between biomechanical characteristics and anxiety related to learning English.

4. Experimental result

The study focuses on how college students' anxiety correlated to studying English and how biomechanical characteristics relate to one another. Significant relationships were exposed using ANOVA, regression analysis, descriptive analysis, and Pearson correlation, underscoring the influence of psychological and physical factors on anxiety levels. The consequences underscore how critical it is to concentrate on these elements to improve learning outcomes.

4.1. Descriptive analysis

A statistical method called descriptive analysis is used to compress and clarify data, giving a concise depiction of a dataset's properties. This study uses descriptive analysis to examine the relationship between anxiety and biomechanical elements in college students studying English. Descriptive analysis helps expose trends and patterns in students' experiences with anxiety and physical pain during English learning sessions by employing metrics similar to means, standard deviations, and the percentage of high replies. **Table 3** and **Figure 3** represent the outcomes of the descriptive analysis using anxiety and biomechanical factors below.

Table 3. Descriptive analysis test results.

S. No	Factor category	Mean (M)	Standard Deviation (SD)	Minimum	Maximum	Percentage of high response
Anxiety						
1	Exam anxiety	3.8	0.92	1	5	56
2	Language acquisition	3.5	1.05	1	5	48
3	Fear of rejection	3.7	1.12	1	5	52
4	Fear of communication	3.6	1.00	1	5	50
Biomechanical						
5	Perceived muscle tension	3.9	0.90	1	5	58
6	Posture habits	4.1	0.85	1	5	65
7	Physical discomfort	3.7	1.02	1	5	65

The descriptive analysis's results offer significant new in sequence on the anxiety levels and biomechanical aspects influencing English language gaining in college students. According to the survey, 56% of students reported having Exam anxiety reactions, indicating that pupils had moderate levels of worry. Anxiety related to language acquisition is significant, 48% of students express concern about their language learning. Peer rejection anxiety is considerable, 52% of them report having significant anxiety. There is a great deal of fear of communicating, as reported by 50% of those surveyed. Perceived muscular strain mean of 3.9 (SD = 0.90), with 58% of students experiencing notable tension in their muscles during

English learning sessions., posture habits scored the highest mean at 4.1 (SD = 0.85), with 65% of students acknowledging poor posture while learning, which could affect their overall learning experience, and physical pain mean score of 3.7 (SD = 1.02), with 65% reporting significant discomfort. These results underscore the intricate connection between anxiety and physiological variables, highlighting the necessity of developing methods to enhance the learning environment and promote the well-being of students.

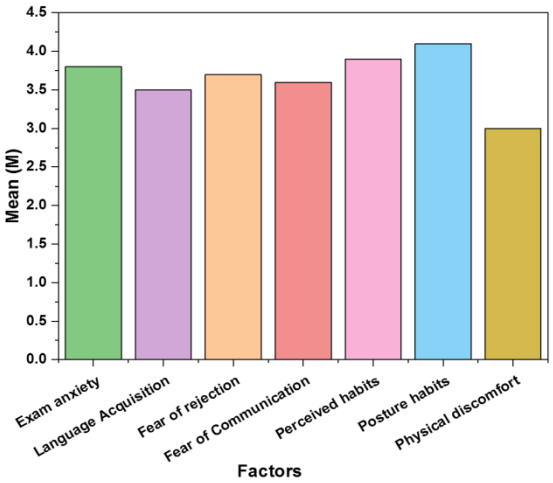

Figure 3. Descriptive analysis test results.

4.2. Pearson correlation analysis

Using Pearson Correlation Analysis, this study investigates the relationship between biomechanical traits and the anxiety experienced by college students when learning English. Between −1 and +1, which represent perfect positive or negative correlation, are the values that indicate the linear relationship between the variables as found by the investigation, including its direction and intensity. **Table 4** and **Figure 4**, display the findings of the Pearson correlation study.

Table 4. Pearson correlation analysis test results.

Factors	Exam anxiety	Language acquisition	Fear of rejection	Fear of communication	Perceived muscle tension	Posture habits	Physical discomfort
Exam anxiety	1.00	0.62	0.55	0.60	0.50	0.45	0.48
Language acquisition	0.62	1.00	0.58	0.65	0.54	0.40	0.52
Fear of rejection	0.55	0.58	1.00	0.59	0.48	0.41	0.46
Fear of communication	0.60	0.65	0.59	1.00	0.53	0.44	0.50
Perceived muscle tension	0.50	0.54	0.48	0.53	1.00	0.46	0.55
Posture habits	0.45	0.40	0.41	0.44	0.46	1.00	0.42
Physical discomfort	0.48	0.52	0.46	0.50	0.55	0.42	1.00

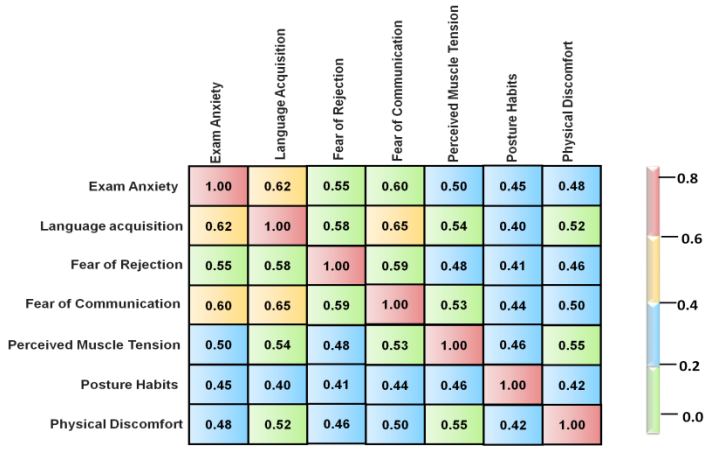

Figure 4. Pearson correlation analysis test results.

The findings of the Pearson correlation analysis (r) show an assortment of significant correlations between the variables linked to anxiety and the biomechanical aspects of English learning sessions. Exam anxiety has modest connections with fear of rejection (r = 0.55), fear of communication (r = 0.60), and physical discomfort (r = 0.48). Exam anxiety also has a substantial positive link with language acquisition (r = 0.62). This shows that in physical pain, greater levels of test anxiety are linked to difficulties in language learning, as well as higher degrees of communication and rejection anxieties. Fear of Communication has a substantial positive association (r = 0.65) with Language Acquisition. Fear of Rejection (r = 0.58) and Physical Discomfort (r = 0.52) have modest relationships. This suggests that students who are more nervous about learning a language also frequently have higher physical pain and communicative anxieties. Fear of Rejection and anxiety of Communication show a positive correlation (r = 0.59), suggesting that students who experience fear of rejection also experience increased fear of communicating with others**.** Exam anxiety (r = 0.50), language acquisition (r = 0.54), and physical discomfort (r = 0.55) all have positive correlations with perceived muscle tension, indicating that higher degrees of anxiety and pain are linked to higher levels of muscle tension. The strongest connection (r = 0.42) between Posture Habits and Physical pain indicates a moderate association wherein students' physical pain during English language learning sessions can be attributed to their bad posture. Other correlations are fewer. Overall, these findings highlight how it is essential to address both physical and psychological disorders to improve students' academic success when learning English and their overall well-being.

4.3. Regression analysis

Study using regression analysis aimed at the link between language acquisition anxiety and biomechanical behavior and college students' anxiety connected to learning English. This study attempts to determine areas for intervention to build more supportive learning settings by quantifying these associations; which can also assist in understanding the relative contributions of each aspect to English learning anxiety. **Table 5** demonstrates the results of the regression analysis.

Table 5. Regression analysis test analysis.

Predictor Variables	Unstandardized Coefficients	Standardized Coefficients (β)	*t*-value	*p*-value
Constant	2.50	-	10.50	<0.001
Perceived Muscle Tension	0.30	0.25	3.80	<0.001
Posture Habits	0.20	0.15	2.50	0.012
Physical Discomfort	0.25	0.22	3.00	0.003
Exam Anxiety	0.40	0.35	5.00	<0.001
Fear of Rejection	0.35	0.30	4.50	<0.001
Fear of Communication	0.28	0.24	3.70	<0.001
Language Acquisition	0.32	0.28	4.00	<0.001

The dependent variable, English learning anxiety ratings, and the independent factors had many significant connections, as demonstrated by the regression analysis. Exam anxiety had the largest effect, according to the data, with an unstandardized coefficient of 0.40 and a *p*-value of less than 0.001, indicating that it contributed significantly to total anxiety. Following that, anxiety levels were considerably impacted by language Acquisition of unstandardized Coefficients is 0.32, $p < 0.001$, and fear of rejection of unstandardized Coefficients is 0.35, $p < 0.001$. Biomechanical individuality that was shown to significantly contribute to anxiety associated with learning English integrated subjective muscular tension unstandardized Coefficients is 0.30, $p < 0.001$, physical discomfort of unstandardized Coefficients is 0.25, $p = 0.003$, and postural habits of unstandardized Coefficients is 0.20, $p = 0.012$, all of which had an authority on the anxiety. Reducing anxiety and improving college students' English learning outcomes requires addressing psychological as well as substantial aspects, as the information makes apparent. The model provides thorough data on how different variables involve anxiety and, the importance of the requirement of included methods to get better students' academic performance and overall well-being.

4.4. ANOVA

Study examines the relationship between biomechanical characters well as muscular tension and postural patterns among college students and anxiety associated with learning English by ANOVA. Significant disparities are recognized with the assistance of this study, which also provides in sequence on how psychological and physiological aspects influence learning outcome. **Table 6** represents the outcomes of ANOVA.

Table 6. ANOVA test outcomes.

Origin of Variation	Sum of square	Degrees of freedom	Mean Square	*F*-value	*p*-value
Between Groups	120.56	3	40.19	5.67	0.001
Within Groups	590.25	322	1.83	-	-
Total	710.81	325	-	-	-

Significant variations in participant groups' anxiety levels and biomechanical reactions are shown by the ANOVA analysis. The distinction to anxiety levels is

indicated by the sum of squares, which is 120.56. With a mean square of 40.19 and an *F*-value of 5.67, group differences have a significant impact on anxiety. The null hypothesis, according to which there are no differences in the group means, is rejected by the *p*-value of 0.001. The variance within each group is highlighted by the Within Groups sum of squares, which is 590.25. 710.81 is the total sum of squares, which highlights the data's overall variability. These consequences point to more studies on the connection between biomechanical traits and anxiety correlated to learning English.

4.5. Likert scale on students English learning

Table 7 and **Figure 5** provide information on a variety of factors that affect college students' anxiety levels while studying English, as measured by a Likert scale. With 40% of respondents agreeing and 25% strongly agreeing that exam anxiety affects their performance, exam anxiety seems to be a major worry. Similarly, 45% of students experience anxiety related to language acquisition, demonstrating how common it is. Students' anxiety is also influenced by their fear of rejection and their dread of communicating, with 38% and 37% of respondents agreeing, respectively, suggesting a significant emotional barrier to language acquisition. In terms of the physical, participants recognize felt tenseness in their muscles and habits of posture, with 39% indicating a correlation with their anxiety levels. Lastly, 42% of participants identified physical pain during study sessions as a factor influencing their ability to learn. All things considered, these results highlight the complex interplay between emotional and physical aspects of anxiety in language acquisition that could affect students' progress.

Table 7. Likert scale on impacts.

Factors	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Exam Anxiety	5%	12%	18%	40%	25%
Language Acquisition	7%	10%	20%	45%	18%
Fear of Rejection	6%	11%	22%	38%	23%
Fear of Communication	8%	14%	20%	37%	21%
Perceived Muscle Tension	9%	13%	19%	39%	20%
Posture Habits	4%	10%	24%	43%	19%
Physical Discomfort	5%	13%	22%	42%	18%

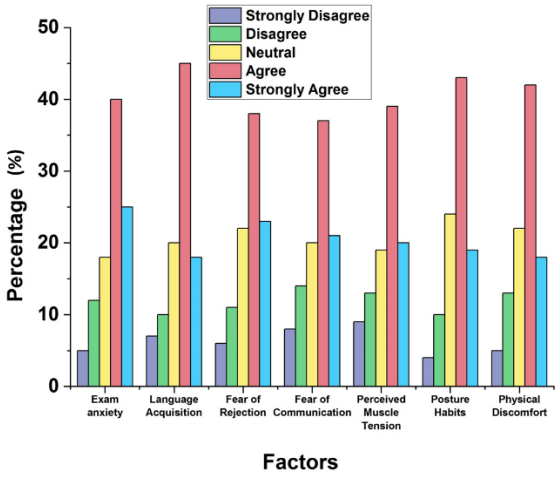

Figure 5. Outcomes of likert scale impacts.

4.6. Discussion

The results of this study demonstrate the strong correlation that exists between anxiety and biomechanical elements in English language acquisition among college students. Using statistical techniques such as ANOVA, regression, descriptive statistics, and Pearson correlation, the results show substantial relationships. A descriptive study finds modest levels of exam anxiety as well as worries over communication and language learning. Higher levels of anxiety are correlated with more muscular tension and pain, with exam anxiety having the greatest influence, according to regression and Pearson correlation studies. Further demonstrating the connection between anxiety and biomechanical characteristics, the Pearson correlation analysis shows that elevated anxiety is associated with worse posture and more physical discomfort. These factors' effects on anxiety related to learning English are further supported by regression analysis, which reveals that exam anxiety has the most influence. Significant differences in anxiety across groups are shown by the ANOVA findings, indicating the necessity for specialized therapies. The findings of the ANOVA show that biomechanical reactions have a substantial impact on group differences in anxiety levels. Furthermore, the Likert scale results highlight the need for complete support techniques by demonstrating how emotional and physical obstacles, such as fear of rejection and muscular tension, impact students' learning experiences. To improve learning results and advance students' well-being, these findings ultimately highlight the need to address both psychological and physical aspects in educational environments. Thorough approaches that concentrate on these elements have the potential to greatly enhance college students' educational experiences.

5. Conclusion

English learning anxiety in college students is the fear and tension that occurs when learning the language, which can impair their motivation as well as their achievement. Students' convenience, concentration, and general involvement throughout the process of education can be influenced by biomechanical elements,

which include physical characteristics like posture and bodily motion. The effectiveness of incorporating physical tactics into language acquisition was further demonstrated by the fact that the intervention led to an average rise in exam scores. When compared two factors Language acquisition has the highest degree of agreement among the categories (45%), whereas fear of communication has the lowest (37%). These results together indicate to a close connection across improved learning experiences and biomechanical treatments. Concentrating on the biomechanics and anxiety aspects of college students' English language acquisition could simplify intricate psychological and cognitive processes, ignore additional psychological or environmental impacts, and make it difficult to meaningful connections. Future studies should examine the interactions across certain biomechanical treatments and how these affect college students' anxiety levels related to learning English. The long-term effects of consistent biomechanical training on language learning and emotional health can also be evaluated through longitudinal research.

Limitations and future scope

Study dependence on self-reported measurements is one of its limitations it might lead to bias in the evaluation of anxiety and biomechanical aspects. To further understand the interaction between physical and psychological factors in language learning, future research might investigate longitudinal designs and include varied groups, hence improving generalizability.

Author contributions: Conceptualization, XG (Xuemei Guo) and XG (Xin Gu); writing—original draft preparation, XG (Xuemei Guo) and XG (Xin Gu); writing—review and editing, XG (Xuemei Guo) and XG (Xin Gu). All authors have read and agreed to the published version of the manuscript.

Ethical approval: Not applicable.

Conflict of interest: The authors declare no conflict of interest.

References

1. Ramírez-Adrados; A.; Beltrán-Velasco; A.I.; Gonzalez-de-Ramos; C.; Fernández-Martínez; S.; Martinez-Pascual; B.; Fernández-Elías; V.E. and Clemente-Suárez; V.J.; 2020. The effect of final dissertation defense language; native vs. non-native; in the psychophysiological stress response of university students. Physiology & Behavior; 224; p.113043.https://doi.org/10.1016/j.physbeh.2020.113043
2. Meng; X. and Zhang; J.; 2020. Anxiety recognition of college students using a Takagi-Sugeno-Kang fuzzy system modeling method and deep features. IEEE Access; 8; pp.159897-159905.10.1109/ACCESS.2020.3021092
3. Rodríguez-Arce; J.; Lara-Flores; L.; Portillo-Rodríguez; O. and Martínez-Méndez; R.; 2020. Towards an anxiety and stress recognition system for academic environments based on physiological features. Computer methods and programs in biomedicine; 190; p.105408.https://doi.org/10.1016/j.cmpb.2020.105408
4. Ran; C.; Wang; Y. and Zhu; W.; 2022. Comparison of foreign language anxiety based on four language skills in Chinese college students. BMC Psychiatry; 22(1); p.558.https://doi.org/10.1186/s12888-022-04201-w
5. Harithasan; D.; Singh; D.K.A.; Abd Razak; N.A.B. and Baharom; N.B.; 2022. Personal; academic stressors and environmental factors contributing to musculoskeletal pain among undergraduates due to online learning: a mixed method study with data integration. International journal of environmental research and public health; 19(21); p.14513.https://doi.org/10.3390/ijerph192114513

6. Lou; N.M. and Noels; K.A.; 2020. Breaking the vicious cycle of language anxiety: Growth language mindsets improve lower-competence ESL students' intercultural interactions. Contemporary Educational Psychology; 61; p.101847.https://doi.org/10.1016/j.cedpsych.2020.101847
7. Dirzyte; A.; Vijaikis; A.; Perminas; A. and Rimasiute-Knabikiene; R.; 2021. Associations between depression; anxiety; fatigue; and learning motivating factors in e-learning-based computer programming education. International Journal of Environmental Research and Public Health; 18(17); p.9158. https://doi.org/10.3390/ijerph18179158
8. Daher; A. and Halperin; O.; 2021; November. Association between psychological stress and neck pain among college students during the coronavirus disease of 2019 pandemic: a questionnaire-based cross-sectional study. In Healthcare (Vol. 9; No. 11; p. 1526). MDPI.https://doi.org/10.3390/healthcare9111526
9. Papageorgi; I.; 2022. Prevalence and predictors of music performance anxiety in adolescent learners: contributions of individual; task-related and environmental factors. Musicae Scientiae; 26(1); pp.101-122.https://doi.org/10.1177/1029864920923128
10. Gumasing; M.J.J. and Castro; F.M.F.; 2023. Determining ergonomic appraisal factors affecting the learning motivation and academic performance of students during online classes. Sustainability; 15(3); p.1970.https://doi.org/10.3390/su15031970
11. Qu; Z.; Chen; J.; Li; B.; Tan; J.; Zhang; D.; and Zhang; Y.; 2020. Measurement of high-school students' trait math anxiety using neurophysiological recordings during math exam. IEEE Access; 8; pp.57460-57471.10.1109/ACCESS.2020.2982198
12. Kabir; R.; Isha; S.N.; Chowdhury; M.T.H.; Siddika; N.; Jahan; S.S.; Saha; A.K.; Nath; S.K.; Jahan; M.S.; Sivasubramanian; M.; Mahmud; I. and Hoque Apu; E.; 2021. Depression among the non-native international undergraduate students studying Dentistry in Bangladesh. International Journal of Environmental Research and Public Health; 18(11); p.5802.https://doi.org/10.3390/ijerph18115802
13. Pal; R.; Adhikari; D.; Heyat; M.B.B.; Guragai; B.; Lipari; V.; Brito Ballester; J.; De la Torre Díez; I.; Abbas; Z. and Lai; D.; 2022. A novel smart belt for anxiety detection; classification; and reduction using IIoMT on students' cardiac signal and MSY. Bioengineering; 9(12); p.793.https://doi.org/10.3390/bioengineering9120793
14. Thiemann; P.; Brimicombe; J.; Benson; J. and Quince; T.; 2020. When investigating depression and anxiety in undergraduate medical students timing of assessment is an important factor-a multicentre cross-sectional study. BMC Medical Education; 20; pp.1-8.https://doi.org/10.1186/s12909-020-02029-0
15. Akram; H. and Abdelrady; A.H.; 2023. Application of ClassPoint tool in reducing EFL learners' test anxiety: empirical evidence from Saudi Arabia. Journal of Computers in Education; 10(3); pp.529-547.https://doi.org/10.1007/s40692-023-00265-z
16. Jahara; S.F.; Hussain; M.; Kumar; T.; Goodarzi; A. and Assefa; Y.; 2022. The core of self-assessment and academic stress among EFL learners: The mediating role of coping styles. Language Testing in Asia; 12(1); p.21.https://doi.org/10.1186/s40468-022-00170-9
17. Güvendir; E. and Uzun; K.; 2023. L2 writing anxiety; working memory; and task complexity in L2 written performance. Journal of Second Language Writing; 60; p.101016.https://doi.org/10.1016/j.jslw.2023.101016
18. Blows; S. and Isaacs; S.; 2022. Prevalence and factors associated with substance use among university students in South Africa: implications for prevention. BMC Psychology; 10(1); p.309.https://doi.org/10.1186/s40359-022-00987-2
19. Oduntan; A.; Oyebode; O.; Beltran; A.H.; Fowles; J.; Steeves; D. and Orji; R.; 2022. "I Let Depression and Anxiety Drown Me…": Identifying Factors Associated With Resilience Based on Journaling Using Machine Learning and Thematic Analysis. IEEE Journal of biomedical and Health Informatics; 26(7); pp.3397-3408.10.1109/JBHI.2022.3149862
20. Acevedo; C.M.D.; Gómez; J.K.C. and Rojas; C.A.A.; 2021. Academic stress detection on university students during the COVID-19 outbreak by using an electronic nose and the galvanic skin response. Biomedical Signal Processing and Control; 68; p.102756.
21. Sun; Q.; Yang; Z. and Jiang; L.; 2024. Effect of an EAP Course on Students' Writing Performance; Anxiety and Self-Efficacy: A Latent Profile Analysis. The Asia-Pacific Education Researcher; pp.1-16.10.1007/s40299-024-00909-3
22. Hu; X.; Zhang; X. and McGeown; S.; 2024. Foreign language anxiety and achievement: A study of primary school students learning English in China. Language teaching research; 28(4); pp.1594-1615.10.1177/13621688211032332
23. Li; K.; Qin; X.; Ji; S. and Zou; L.; 2023. The Effects of General Listening Anxiety and Listening Test Anxiety on Self-Perceived Listening Performance Among Chinese English Learners. Psychology Research and Behavior Management; pp.3541-3560.

24. Fu; J.; Ding; Y.; Nie; K. and Zaigham; G.H.K.; 2023. How does self-efficacy; learner personality; and learner anxiety affect critical thinking of students. Frontiers in Psychology; 14; p.1289594.10.3389/fpsyg.2023.1289594
25. Chen; Z.; 2024. A Study of Chinese Undergraduate Students' English Language Speaking Anxiety; Expectancy-Value Beliefs and Spoken English Proficiency. SAGE Open; 14(1); p.21582440231219312.10.1177/21582440231219312