EMOTIONAL ANXIETY, FRUSTRATION OF FAILURE AND THE CHAIN MEDIATING EFFECT OF PROJECT-BASED LEARNING PERFORMANCE

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SUMMARY

Background: Anxiety is one of the greatest emotional obstacles in language learning. College English teaching has shifted from focusing on external factors such as the improvement of teaching hardware facilities to focusing on learners' language learning awareness, language psychological changes, language cognitive ability, and language emotional performance.

Subjects and methods: This study was carried out on a sample of 318 Chinese undergraduates. This paper suggests that emotional anxiety is a key factor leading to low language learning efficiency and has a negative impact on project-based learning performance. Then two variables: frustration of failure and learning satisfaction, are introduced, and a multi-chain mediating model is established to explore the transmission mechanism of emotional anxiety and learning performance.

Results: With the increase of emotional anxiety, students' learning performance will be significantly affected in the process of project-based learning, and the results verify the negative relationship between anxiety and learning acquisition. Three paths that affect emotional anxiety on learning performance are identified, namely, "Emotional Anxiety -- Frustration of Failure -- Learning Satisfaction -- Learning Performance", "Emotional Anxiety -- Frustration of Failure -- Learning Performance" and "Emotional Anxiety -- Learning Satisfaction -- Learning Performance".

Conclusions: English learning is not only a process of language cognition, but also a process of psychological changes in learners. The achievement of learning performance is not only affected by language characteristics, students' cognitive ability, and learning environments, but also by non-intellectual factors such as learning attitude, learning motivation and emotions.

Key words: emotional anxiety - english learning - psychological changes - learning performance

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INTRODUCTION

With the development of modern teaching techniques, teaching models have been greatly enriched. Students, teachers and teaching tools have merged into a new teaching community, which has certain advantages in the output of learning performance. Students may obtain better results in the dimensions of competence, behavior and knowledge structure through adapting and self-driving to the new teaching environment (Bai et al. 2018). However, the new teaching model also imposes certain requirements on learners, which are usually considered to be affected by learning ability and learning motivation.

At the same time, in the learning process under the new teaching model, learners may have a certain degree of learning emotional anxiety due to changes in the learning environment such as different materials, tools, and learning progresses, which will also directly affect learners' learning performance. Once learners fail to adapt to the new teaching model in time, they will have a sense of the frustration of failure, which will further affect the learning effect. Project-based learning, which integrates flipped learning, innovative environment learning, and the application of new technology, is a new teaching model that has gradually emerged and gained popularity in recent years. It is considered to be an effective way to improve learning performance.

However, in project-based learning, learners will also face certain environmental challenges, resulting in learning anxiety. From the perspective of environmental psychology, when the perception between individual and environment is compatible, that is, when the components of the environment meet individual needs, it is beneficial to the individual's physical and mental health and, consequently, learning of knowledge perception can be promoted. On the contrary, when the perception is not compatible, individuals will suffer from psychological and physical tension and their health will be damaged (Barkanyi et al. 2021), thus causing anxiety and frustration of failure, which has an inhibitory effect on the learning of knowledge perception. Then it is necessary to make changes in the individual itself or in the environment to adjust and improve the mental state so as to avoid anxiety. What's more, the frustration of failure in learning, i.e. emotional disorder deviation, is a psychological and behavioral learning problem, which has a huge negative impact on the acquisition of learning performance (Buratta et al. 2019).

There is a mutual pulling force between human beings and environment. At present, researches usually focus on the positive effects of project-based teaching model on learning performance, while to a certain extent ignore the environmental challenges of innovative teaching models to learners, which in turn affects learning performance. This is the main standpoint of this research.

In the 1960s, humanistic psychology gradually sprouted up. It is believed that people's cognitive pathways are closely related to emotional factors. Knowledge learning is a process of combining a person's cognition and emotion, emphasizing the influence of emotional factors (Baron et al. 1986). Psychologist Krashen (1983) deconstructed the influence mechanism of affective factors. He believed that in language learning, learners' motivation, anxiety and self-confidence/frustration were the main emotional elements that affected learning effects, and proposes the Affective Filter Hypothesis. Based on this hypothesis, when learners have high motivation, sufficient self-confidence and low anxiety, less input will be blocked, and then more comprehensible input is obtained, resulting in better learning effect (Blumenfeld et al. 1991). Existing theories and researches support that learning anxiety and frustration of failure are important factors influencing learning performance.

Performance, a concept originally comes from management, is an integration of achievement and effectiveness. It is the work behavior, mode, result and its objective influence in a certain period of time. Learning performance not only refers to the achievement of learning, but also to the universal acquisition of learning. The acquisition of learning refers to the degree to which students acquire professional knowledge, skills and understanding, correct attitudes and values, as well as good individual behaviors in the process of completing various learning activities (Ching et al. 2019).

The level of satisfaction, which intuitively reflects students' overall evaluation of their own learning process and learning outcomes, is a key indicator for evaluating the success of teaching from the perspective of students (Dewaele et al. 2017, Horwitz et al. 1986). Compared with other traditional teaching models, project-based Learning (PBL) has many advantages. It can effectively improve learners' learning motivation and learning outcomes (Jahangiri et al. 2011). It is proved in many researches that the application of PBL in university language teaching, especially in teaching that involves real life scenarios such as business English teaching, is conducive to promoting learners' satisfaction and meeting their needs and desires (Jin et al. 2017).

Anxiety is a person's subjective emotions including worry, tension, and fear (Ding & Yao 2020). It is an emotional state triggered by external unspecified risks. In the learning process, learners, subject to factors such as teaching environment, individual differences and curriculum heterogeneity, may experience learning anxiety, which affects their learning effect. In the 1980s, American psychologist Horwitz. et al pioneered the study of foreign language learning anxiety as an independent phenomenon in the process of language learning (Krashen et al. 1983). Horwitz et al held that the foreign language anxiety arouse when communication difficulties were caused by learners' inability to fully grasp a foreign language, which, consequently, threatened learners' self-awareness. In addition, they also believed that foreign language anxiety mainly included communication anxiety, test anxiety and negative evaluation anxiety. Among them, negative evaluation anxiety was an important factor that caused learners' frustration of failure (Krashen et al. 1981).

Macher et al. (2012) considered that trait anxiety was related positively to statistics anxiety and, counterintuitively, to academic performance. Park & French pointed out that foreign language anxiety had aroused great research interest in the field of second language acquisition and teaching and they examined gender differences in language anxiety (Li et al. 2021). Barkanyi & Zsuzsanna testified that learners with intrinsic motivation were more likely to fulfil language learning, but anxiety prevented learners from fully participating in language learning activities (Macher et al. 2012). Cheng, Ching-Hsue, Chen, & Chung-Hsi studied the scenario of mobile-assisted English learning system and pointed out that mobile-assisted English learning system was beneficial to students' overall academic performance, though students with lower levels of anxiety have better academic performance than those with higher levels of anxiety (Park et al. 2013). However, Jahangiri et al held different views on anxiety, believing that the question of anxiety had too often been discussed in absolute rather than relative terms. Anxiety does not necessarily create negative effects (Podsakoff et al. 2003).

Scholars have done many researches on foreign language anxiety and have put forward different opinions on it. Basically, they believe foreign language anxiety is a kind of anxiety under specific situations, which has negative impact on learners' learning to a certain extent. Besides, they believe emotion awareness, one of the core components of emotion regulation, plays an important role in reducing anxiety and is of great significance to learning effectiveness (Pourmohammadi et al. 2020).

According to relevant literature research, academic burden, introverted personality, and short temper are the main reasons for university students to develop anxiety.

Emotional anxiety is universal in foreign language learning, and it has been found that there is a significant negative correlation between foreign language anxiety and learning performance. Emotional anxiety in project-based learning can force learners to filter out positive factors, affecting professional knowledge acquisition, which, then, is likely to bring about changes in personal learning behaviors. On the basis of this, Hypothesis 1 is proposed: Emotional anxiety negatively predicts project-based learning performance.

One of the major characteristics of project-based learning is collaborative learning relationships. Language learners need to show their participation in the learning process. Since learning is cumulative and cannot be smooth sailing, learners may experience learning adaptation frustration, that is, point-like emotional changes in the process of learning. Continuous accumulation of emotions may cause learners to produce self-denial in learning. Emotional anxiety can directly lead

to frustration of failure, which will have a negative impact on predicting learning performance. Based on this, Hypothesis 2 is put forward: Frustration of failure is a mediating variable between emotional anxiety and learning performance.

The more emotional anxiety, the more troubles learners may experience in project-based learning, which affects learner satisfaction of this teaching model, and consequently, learning performance may decrease. Researches also have shown that learner satisfaction has a significant positive predictive effect on learning performance. Hence, Hypothesis 3 is proposed: Learning satisfaction is a mediating variable between emotional anxiety and project-based learning performance.

The theory of humanistic psychology emphasizes human dignity, value, creativity and self-realization, and attributes self-realization of human nature to the display of potential. In addition, emotional anxiety has the effect of inhibiting creativity, which in turn affects learners' potential development, causes frustration of failure in the learning process, affects learning satisfaction, and lowers learning performance. Based on this, Hypothesis 4 is brought about: Emotional anxiety affects project-based learning performance through the chain mediating effect of frustration of failure and learning satisfaction.

The theoretical model of chain mediating effect of emotional anxiety on project-based learning is shown in Figure 1.

SUBJECTS AND METHODS

This research chooses non-English major undergraduates in Chongqing, China as the research objects. At present, more and more teachers in English language teaching try to adopt the project-based teaching model and have achieved a wealth of teaching practice. Choosing non-English majors is conducive to the development of research. With research objects from different majors, grades, and universities, a higher degree of participation in the language project-based learning model is ensured. At the same time, the diversity of research participants also guarantees a larger degree of external validity. A total of 370 questionnaires were sent out in the research, and 321 recovered. After excluding invalid questionnaires, the number of valid

questionnaires was 318, and the questionnaire effective rate reached 85.68%. Among the valid research objects, there are 132 males and 186 females. The proportion of first-year undergraduates is 16.04%, sophomores 35.22%, juniors 31.76%, and seniors 16.98%. The average age of participants is 19.27 years old.

The FLCAS has been widely employed to measure learners' anxiety arising from learning in second and foreign language situations as well as to assess the relation of anxiety to L2 performance (Matsuda et al. 2004). According to the preliminary application and factor analysis of FLCAS by Wang Caikang in Chinese college students, it is found that the Chinese version of FLCAS is reliable and valid, and can be used in related research or practical work. His research also points out the effects of Chinese college students' learning English. It is considered that anxiety mainly includes worry, nervousness, fear of speaking English and fear of questioning in class (Sendzik et al. 2017). Foreign language anxiety is a unique anxiety phenomenon that is different from trait anxiety and state anxiety. Based on the classic research, this paper also proposes 33 questions in total, and uses the Likert 5-point scale scoring method to measure emotional anxiety in foreign language learning, with "1 = strongly disagree", "2 = disagree", "3 = neither agree nor disagree", "4 = agree", "5 = strongly agree".

In this research, the frustration of failure refers to the academic frustration caused by project-based learning. Academic frustration generally refers to the negative emotional experience that students produce when they encounter setbacks in related learning activities, which has the characteristics of diffusion, persistence, and duality. That is, this emotional experience has a wide range of influences and a long duration, which has both negative and positive effects. Typical researches in this field mainly explore the learning experience of students from the perspective of academic failure, pointing out that academic frustration is not conducive to the physical and mental health of students, and the increase in frustration frequency will make the level of mental health deteriorating (Tabakue et al. 2014). The academic frustration questionnaire designed in this paper is based on the "Young Students Academic Frustration Questionnaire" compiled by Zhang Xudong. etc. (Tang et al. 2020).
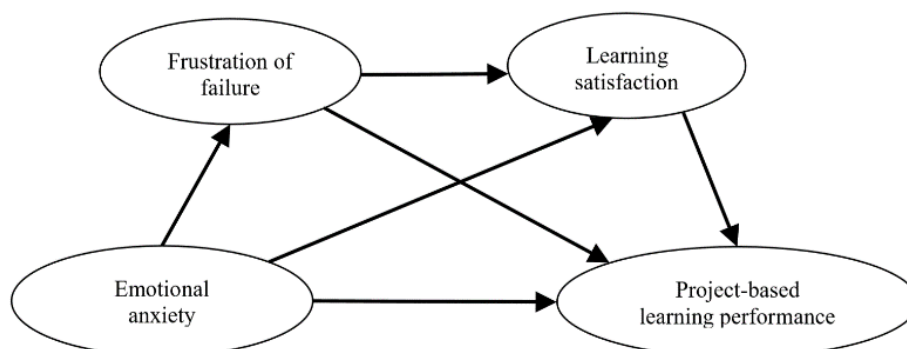
Figure 1. Theoretical model of chain mediating effect of emotional anxiety on project-based learning

The original questionnaire has 41 questions, including six dimensions: learning environment frustration, learning motivation frustration, test frustration, learning pressure frustration, learning adaptation frustration, and learning confidence frustration. This paper intends to consider learning pressure frustration, learning adaptation frustration, and learning self-confidence frustration including nine questions. The questionnaire uses Likert's 5-point positive scoring method, in which 1 means completely inconsistent, that is, experienced less academic frustration and 5 means completely consistent, that is, experienced more academic frustration (Wang et al. 2012).

Learning satisfaction can effectively improve learners' learning motivation and willingness to actively acquire knowledge, thereby enhancing the level of learning performance. In former researches, there are mainly two typical college students' learning satisfaction evaluation scales. One is the American College Student Satisfaction Inventory (SSI) released by Noel-Levitz. Since SSI mainly reflects the relationship between enrollment and campus life, related satisfaction in SSI is not suitable for the setting of this research. The other one is Number Cruncher Statistical System of China (NCSS), which includes learning perspectives and learning styles, college student curriculum learning experience, college student internship training, college student gains, college student learning time allocation, college satisfaction, learning participation, degree of learning importance, learning experience, ways to face pressure and frustration, campus life experience, life and learning, the number of occurrences of various events, ideological and political theory classes, employment choices, etc. There is a total of 31 questions concerning satisfaction in the scale. In accordance with the purpose of this research, this paper selects the NCSS questions related to curriculum learning experience, and sets up a 9-question project-based learning satisfaction scale, including the setting of teaching links, the degree of learning participation and ability improvement training. Then, the questionnaire adopts Likert's 5-point scale scoring method to measure learning satisfaction, with "1 = very dissatisfied", "2 = relatively dissatisfied", "3 = fair", "4 = relatively satisfied", and "5 = very satisfied".

The project-based foreign language learning performance in this research is more focused on the evaluation of students' language communication ability, with speaking and writing as its external manifestations. Take writing for example. Since it is very important in international business exchanges, in project-based teaching model, international trade written communication is often set up as the teaching scenario. And leaners' writing level reflects their learning performance to a certain extent. As for the evaluation of writing, the two most common scoring methods in the world are holistic scoring method and analytic scoring method. The former is a method to score a piece of writing with an overall impression of its content and language, while the latter means that each component of the writing is scored from different angles and then a total score will be obtained through calculation. This paper uses the scores of CET-4 writing as a main measurement index. Scores are divided into five levels from 1 to 5, which indicates a learning performance from low to high, and the scoring method adopted is holistic scoring.

RESULTS

Scale reliability test

This research uses SPSS 21.0 to test the reliability and validity of the data collected during the pre-investigation stage. It is generally believed that if the KMO value of the scale is above 0.9, validity is established and the structure of the questionnaire is very good. The reliability coefficient can reflect the stability or reliability of the measurement tool. Generally speaking, when the Cronbach's α is above 0.8, the scale is acceptable. The KMO value and Cronbach's α of the scale in the survey of this research both reached significant levels, which suggests that the reliability and validity of the scale meet the requirements and can be used in research investigations. In addition, after measurement, the internal consistency of the scale Cronbach's α is above 0.8, and the scale is significantly applicable.

Common method deviation test

Common method biases (CMB) refers to the artificial covariation between predictor variables and benchmark variables caused by the same data source or raters, the same measurement environment, project context, and the characteristics of the project itself. Testing CMB has become a regular link in empirical research in psychology. Since data in this research is collected in the form of research objects' self-reports, there may be homology deviations in data acquisition. Harman's single factor test is used for common method deviation test and it is thought that the more variance explained by the method factor, the more serious the deviation. Moreover, it is generally believed that the variance explained by a single factor cannot exceed 40% (Wen et al. 2014). Putting all the variables together for exploratory factor analysis, it is found that the first factor only explained 18.67% of the total variance variation, which is less than 40%. Therefore, common method biases do not exist in this research.

Correlation analysis

The mean value, standard deviation of each variable and the correlation between the variables are statistically analyzed, as shown in Table 1. There is a significant correlation between the key variables such as emotional anxiety, frustration of failure, learning satisfaction and learning performance in foreign language learning. Among them, emotional anxiety and frustration of failure are significantly positively correlated, while they are negatively correlated to learning satisfaction and

Table 1. Factors correlation analysis table

Variables	M±SD	1	2	3	4	5	6
Age	19.27±1.85	1	-	-	-	-	-
Gender	0.58±0.49	0.20**	1	-	-	-	-
Emotional Anxiety	86.55±12.33	-0.06*	-0.08**	1	-	-	-
Frustration of failure	33.93±10.07	-0.02	0.09*	0.31***	1	-	-
Learning Satisfaction	28.42±11.09	-0.05	0.02	-0.45**	-0.47***	1	-
Learning Performance	3.28±1.02	0.05*	0.11**	-0.38***	-0.37***	0.57***	1

Note: *p<0.05; **p<0.01; ***p<0.001; Male=0, Female=1

learning performance. Frustration of failure is significantly negatively correlated to learning satisfaction, and it also has a significant negative relationship with learning performance. There is a significant positive relationship between learning satisfaction and learning performance. The above analysis results lay a foundation for subsequent hypothesis testing.

Significance test of mediating effect

Common methods to test the mediating effect are the causal steps approach proposed by Baron and Kenny (1986) (Tóth et al. 2008) and the Bootstrap method which directly tests the significance of the coefficient product. Wen Zhonglin put forward a new inspection process based on an analysis of different methods. The process he suggested combines the advantages of the causal steps approach (piecemeal) and the Bootstrap method which is recommended to try to test a*b in sequence first. If it is not significant, Bootstrap method can be used directly to inspect the coefficient ab to improve the inspection. With this process, compared with the pure Bootstrap method to test the coefficient ab, whether it is to consider the first type of error rate, inspection ability or the interpretability of the result, the inspection result will only be better (Zhang et al. 2020). This research adopts the mediating effect test procedure recommended by Wen Zhonglin, and controls the influence of gender and age.

This research selects root-mean-square error of approximation (SMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI) and standardized residual mean root (SRMR) for testing.

First, inspecting the direct effect of foreign language learning emotional anxiety on learning performance, it is shown that the model fitting indexes are RMSEA=0.05, CFI=0.95, TLI=0.94, SRMR=0.04, so it can be concluded that the data fits the model well. Emotional anxiety significantly negatively predicts the achievement of learning performance, which supports Hypothesis 1. Emotional anxiety has negative influences on project-based learning performance (Zu et al. 2021).

Second, with an inspection of the mediating effect of the frustration of failure between emotional anxiety and learning performance, it is shown that the model fitting indexes are RMSEA=0.05, CFI=0.94, TLI=0.93, SRMR=0.04, which means that the data fits the model well. Bootstrap (repeated sampling 5000 times, the same

below) mediating effect significance test results show that the mediating effect of the frustration of failure in emotional anxiety and learning performance does not include 0 in the 95% interval, so the mediating effect is significant, and conclusion can be drawn that frustration of failure is a mediating variable between emotional anxiety and learning performance. That is, Hypothesis 2 is verified.

Third, with an inspection of the mediating effect of learning satisfaction between emotional anxiety and learning performance, the model fitting indexes are RMSEA=0.05, CFI=0.96, TLI=0.95, SRMR=0.03, which demonstrates that the data fit the model well. Bootstrap mediating effect significance test of the deviation-corrected percentile shows that the mediating effect of learning satisfaction between emotional anxiety and learning performance does not include 0 in the 95% interval, so the mediating effect is significant, and it can be concluded that learning satisfaction is a mediating variable between emotional anxiety and project-based learning performance, which confirms Hypothesis 3.

Finally, inspecting the chain mediating model, the model fitting indexes are RMSEA=0.05, CFI=0.96, TLI=0.96, SRMR=0.03, which indicates that the data fits the model well. Bootstrap mediating significance test of the deviation-corrected percentile shows that the chain mediating effect of the frustration of failure and learning satisfaction between emotional anxiety and learning performance does not include 0 in the 95% confidence interval, so the chain mediating effect is significant. In other words, Hypothesis 4 is authenticated: emotional anxiety affects project-based learning performance through the chain mediating effect of frustration of failure and learning satisfaction.

The specific results are shown in Table 2. It can be seen that emotional anxiety directly affects learning performance, with a direct effect value of 0.86, accounting for 59.31% of the total effect. In addition, the impact is produced through three intermediary paths, and the indirect effect accounts for 40.69% of the total effect. First, the highest proportion of mediating effects is the path "Emotional anxiety → Frustration of Failure → Learning Satisfaction → Learning Performance", with a mediating effect value of 0.24, which accounts for 40.68% of the total mediating effect. It is indicated that emotional anxiety can hinder the improvement of project-based learners' knowledge acquisition ability by increasing the frustration of failure and reducing learning

Table 2. Statistics of Mediating Effect

	Value of Mediating Effect	Percentage in Total Effect	Percentage in Mediating Effect
Emotional Anxiety→ Frustration of Failure →Learning Satisfaction→ Learning Performance	-0.24	16.55%	40.68%
Emotional Anxiety→ Frustration of Failure → Learning Performance	-0.22	15.17%	37.29%
Emotional Anxiety→ Learning Satisfaction → Learning Performance	-0.13	8.97%	22.03%
Total Mediating Effect (Indirect effect)	-0.59	40.69%	100.00%
Direct Effect	-0.86	59.31%	
Total Effect	-1.45	100.00%	

satisfaction. Second, the mediating effect of the path of "Emotional Anxiety → Frustration of failure → Learning Performance" is 0.22, accounting for 37.29% of the total mediating effect, which indicates that the impact of emotional anxiety on learning performance is the accumulation of the frustration of failure in the learning process, and it may in turn lead to a decline of learning effectiveness. Finally, the mediating effect of the path "Emotional Anxiety → Learning Satisfaction → Learning Performance" is 0.13, which accounts for 22.03%, the smallest proportion of the total mediating effect. Nevertheless, it still shows that emotional anxiety significantly affects learning satisfaction and leads to a decline of learning results.

In summary, in addition to directly affecting learning performance, emotional anxiety also affects the learning performance of project-based learners through the chain mediation of the frustration of failure and learning satisfaction.

DISCUSSION

The results of this research indicate that emotional anxiety negatively predicts learning performance; that is, with an increase of emotional anxiety, students' learning performance will be significantly affected in the process of project-based learning. This research also confirms that there is a negative relationship between anxiety and learning acquisition. In the learning process, emotional anxiety is considered to be an unstable psychological state, and according to humanistic psychology theories, it can affect people's behaviors over a long period of time. However, traditional foreign language teaching researches highlight the language cognitive ability but ignore learners' emotional factors. From the perspective of the present research, due to the negative predictive effect of emotional anxiety on learning performance, more attention should be paid to the emotional changes of learners in the process of foreign language teaching. It is necessary to alleviate or even relieve the emotional anxiety of learners, so as to effectively promote the learning cognitive ability as well as the learning behavior and learning performance.

At the same time, the research results also show that the frustration of failure have a mediating effect between emotional anxiety and learning performance. Compared with traditional teaching models, great changes in the teaching environment and learners' roles take place in project-based learning. Sometimes, students may have difficulty adapting themselves to the changes and the transition of learning roles. If they cannot get sufficient external support, they are subject to helplessness. As a result, their enthusiasm for learning will be lowered, which will ultimately affect their learning performance. Therefore, in project-based learning, students should be given sufficient encouragement and support in the learning process and affirmative education should be strengthened. Such scaffolding ensures students to have a stable mindset in the face of those changes in the potential learning environment. Teaching should be student-oriented, so that students can fully devote themselves to their studies.

This study also found that learning satisfaction has a mediating effect between emotional anxiety and leaning performance. Emotional anxiety can easily lead to a decrease in learning satisfaction, which in turn negatively influences learning performance. Since emotional anxiety can affect learning performance through the chain mediation of failure frustration and learning satisfaction, the transmission problem of this influence mechanism must be effectively managed.

CONCLUSION

English learning is not only a process of language cognition, but also a process of psychological changes in learners. The achievement of learning performance is not only affected by language characteristics, students' cognitive ability, and learning environments, but also by non-intellectual factors such as learning attitude, learning motivation and emotions.

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