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Research on the Relationship Between L2 Grit, Academic Buoyancy and English Learning Engagement of Senior High School Students

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Abstract: *Grit and learning engagement are crucial psychological factors significantly impacting academic achievement. Prior studies mainly focus on the relationship between the two constructs in the general field. However, the relationship between them in second language acquisition has not been sufficiently investigated, especially in the group of senior high school students. The present study explores the relationship between senior high school students' L2 grit and English learning engagement to fill this gap. The study also examines how academic buoyancy plays a role in the relationship between the two constructs. The results show that L2 grit and English learning engagement are moderate. Academic buoyancy is at a high level. L2 grit and English learning engagement are both correlated with academic buoyancy, which partially mediates the effect of L2 grit on English learning engagement. The results of this study can provide empirical evidence for basic education teachers to promote students' English learning engagement from the perspective of fostering positive psychological personalities.*

Keywords: *L2 grit, academic buoyancy, English learning engagement, senior high school students*

1. Introduction

Grit and learning engagement are considered to be the key factors affecting students' academic achievement [1][2]. Although a large number of studies have explored the relationship between these two variables in the general field [3], relatively little research has been done in the field of second language acquisition (SLA). Moreover, the research with high school students as the subject is even more deficient. With the acceleration of globalization, English teaching has become an important part of Chinese basic education. However, due to the lack of a language environment and the existence of cultural differences, Chinese high school students often face challenges in English learning. Therefore, it is necessary to understand the L2 grit of senior high school students in English learning and the mechanism of its influence on English learning engagement. The purpose of this study is to fill the gaps by exploring the relationship between high school students' L2 grit and English learning engagement and to analyze the mediating role of academic buoyancy in this relationship. This study not only helps to deepen the understanding of senior high school students' psychological mechanism of English learning but also provides theoretical guidance for educational practice.

2. Literature Review

2.1 Definitions of L2 grit, Academic buoyancy, and English Learning Engagement

Teimouri et al. [4] first proposed the concept of "second language grit (L2 grit)" and defined it as "passion and perseverance for long-term second language learning." It contains two sub-dimensions: perseverance of effort and consistency of interest in L2 learning. L2 grit mainly represents a personal strength that enables students to persistently and consistently achieve long-term foreign language learning goals.

Foreign scholars first propose the construct of "academic buoyancy" based on "academic resilience". It refers to academic resilience in daily study life [5], which means the ability of students to effectively manage and overcome common academic obstacles encountered in their school environment.

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"English learning engagement" is based on Fredricks et al.'s theory [6]. It contains three sub-dimensions: behavioral engagement, emotional engagement, and cognitive engagement. Behavioral engagement refers to students' effortful behaviors and their degree of participation in English learning activities. Emotional engagement represents students' emotional investment in English learning. Cognitive engagement involves students' motivations, and application of learning strategies during the English learning process.

2.2 Relationships among L2 Grit, Academic Buoyancy, and English Learning Engagement

Previous research has found that students with higher learning engagement demonstrate higher grit in learning. Existing research has demonstrated that grit has a direct or indirect effect on learning engagement [7]. Hence, there is relatively little research exploring the relationship between L2 grit and English learning engagement among high school students.

Regarding the relationships between grit and academic buoyancy, previous studies proposed that buoyant and gritter EFL learners are more aware of evaluating their academic emotional experiences and pursuing their goals [8][9]. However, existing research in foreign language education has predominantly focused on university and graduate education students, with relatively limited research conducted on senior high school students.

As for the relationships between academic buoyancy and learning engagement, academic buoyancy can predict learner's learning engagement in different paths [10][11], and further interact with learner's positive psychological factors. Foreign scholars mostly explore the impact of academic buoyancy on academic engagement among high school students, with less attention paid to the relationship between these two factors during the second language acquisition process, whereas Chinese research on the relationship between academic buoyancy and learning engagement is still in its early stage.

In conclusion, research on the impact mechanisms of grit and academic buoyancy on learning engagement focuses on general domains. Most studies have been devoted to exploring the relationships between these factors in pairs and have not collectively examined their effects on English learning engagement. Therefore, this study aims to explore the mechanism by which L2 grit and academic buoyancy influence learning engagement in the field of SLA.

2.3 The Present Study

According to the literature review, studies focusing on Chinese senior high school students and investigating the links between L2 grit, academic buoyancy, and English learning engagement remain in their infancy. Therefore, the study will explore the relationship between L2 grit and English learning engagement, and verify the mediating role of academic buoyancy between them. With this purpose, the present study aims to answer three research questions as follows:

(1) What are the general profiles of L2 grit, academic buoyancy, and English learning engagement among senior high school students?

(2) What are the relationships among senior high school students' L2 grit, academic buoyancy, and English learning engagement?

(3) Does senior high school students' academic buoyancy mediate the relationship between L2 grit and English learning engagement?

3. Methods

3.1 Participants

This study adopts cluster sampling and selects high school students from three different levels of schools in a provincial city in Northern China as the subjects. A total of 580 questionnaires were distributed, with 558 eventually returned. Of these 558 questionnaires, 547 were valid questionnaires, resulting in an effective response rate of 98%. Among these participants, there are 212 males and 335 females. They are all learners who use English as a second language. They have been learning English since the third grade and have no experience of studying abroad.

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3.2 Instruments

This study used the L2 Grit Scale, the Academic Buoyancy Scale, and the Classroom Engagement Inventory as quantitative research instruments to access three variables associated with this study. These three scales have received broad acknowledgment in previous studies.

3.2.1 L2-Grit Scale

Teimouri's [4] L2-Grit Scale is one of the research instruments. This scale is a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), and comprises 9 items classified into two dimensions: perseverance of effort (PE) and consistency of interest (CI). The PE dimension depicts the learner's unwavering effort in learning English, consisting of 5 items. The CI dimension depicts the learner's consistent interest in English learning over time, comprising 4 items that are all reverse-scored. The internal consistency of the L2-Grit scale is satisfactory (Cronbach's alpha=0.847). To be more specific, Cronbach's alpha of the PE dimension and the CI dimension are 0.865 and 0.728 respectively.

3.2.2 Academic Buoyancy

This study adopted the Academic Buoyancy Scale (ABS), which was developed by Martin and Marsh [5] and was also widely used as an authoritative scale. The scale consists of 4 items, rated on a 5-point Likert scale. The Cronbach's alpha of the ABS is 0.822, indicating a high internal consistency.

3.2.3 The Classroom Engagement Inventory

This study also adopted the Classroom Engagement Inventory (CEI) to measure all dimensions of engagement in the classroom. This scale was first invented by Wang et al. [12] and was more suitable for high school students in China. The scale is a 5-point scale with 21 items containing four dimensions: behavioral engagement, emotional engagement, cognitive engagement, and disengagement. In this study, the disengagement dimension is scored in reverse. The questionnaire demonstrates high internal consistency. The Cronbach's alpha of the total scale and its sub-dimensions are 0.956, 0.852, 0.929, 0.903, and 0.835 respectively.

3.3 Procedure

Three senior high schools were selected from a provincial city in Northern China. In September 2024, the questionnaires were formally distributed to participants with the help of head teachers in those three schools. Two classes from each grade were selected to finish the questionnaires in each school. Before finishing the questionnaires, the researcher explained the content of the questionnaire to ensure that every student could understand the purpose of the questionnaire. The students took the survey seriously and carefully. The time for participants to complete the questionnaire was approximately 15 minutes.

3.4 Data Analysis

The collected quantitative data was input into IBM SPSS 26.0 for data analysis. To understand the general profiles of senior high school students' L2 grit, academic buoyancy, and English learning engagement, descriptive statistical analysis was conducted to answer RQ1. To answer RQ2, Pearson correlation analysis and regression analysis were also conducted. To answer RQ3, a Process plug-in in SPSS 26.0 was used to analyze the mediation effect.

4. Results

4.1 General Profiles of L2 Grit, Academic Buoyancy, and English Learning Engagement

The general profiles of senior high school students' L2 grit, academic buoyancy, and English learning engagement are shown in Table 1.

As shown in Table 1, senior high school students' L2 grit, academic buoyancy, and English learning engagement are at different levels. Firstly, the L2 grit of high school students is at a high-medium level (M=3.45, SD=0.72), slightly lower than 3.5. Specifically, the mean scores of PE and CI are 3.36 and 3.57 respectively. This suggests that the participants' PE is at a medium level, while their CI is at a high level. Secondly, the mean score of academic buoyancy is at a high level (M=3.51, SD=0.82). Thirdly, the overall English learning engagement and its sub-dimensions are both at medium levels (M=3.37, 3.28, 3.33, 3.36; SD=0.76, 0.83, 0.93, 0.78).

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Table 1 Descriptive Statistics and Correlation Analysis of L2 Grit, AB, and ELE (N=547)

	Mean	SD	Skewness	Kurtosis
L2 Grit	3.45	0.72	-.385	-.625
PE	3.36	0.82	-.625	-.330
CI	3.57	0.85	-.330	-.604
AB	3.51	0.82	-.604	-.669
ELE	3.37	0.76	-.669	-.587
BE	3.28	0.83	-.587	-.501
EE	3.33	0.93	-.501	-.683
CE	3.36	0.78	-.683	-.625

Note: PE=Perseverance of Effort; CI=Consistency of Interest; AB=Academic Buoyancy; ELE=English Learning Engagement; BE=Behavioral Engagement; EE=Emotional Engagement; CE=Cognitive Engagement. The same as below.

4.2 Relationships Among Senior High School Students' L2 Grit, Academic Buoyancy, and English Learning Engagement

This section first conducts a Pearson correlation analysis on these three variables and their sub-dimensions. Subsequently, regression analyses are employed to examine the predictive effect of L2 grit on academic buoyancy and English learning engagement, as well as the predictive effect of academic buoyancy on English learning engagement.

4.2.1 Correlation Analysis Between L2 Grit, Academic Buoyancy, and English Learning Engagement

The Pearson correlation analysis results can be seen in Table 2.

Table 2 Correlation analysis between L2 grit, AB, and ELE (N=547)

	L2 Grit	PE	CI	AB	ELE	BE	EE	CE
L2 Grit	1							
PE	.887**	1						
CI	.828**	.475**	1					
AB	.588**	.564**	.434**	1				
ELE	.816**	.812**	.569**	.651**	1			
BE	.722**	.739**	.479**	.631**	.927**	1		
EE	.754**	.734**	.545**	.581**	.910**	.798**	1	
CE	.739**	.777**	.465**	.627**	.943**	.865**	.795**	1

Note: **indicates that p<.01; *indicates that p<.05.

First, there is a moderate and significant correlation between L2 grit and academic buoyancy (p<.01, r=.588). As for the sub-dimensions of L2 grit, the PE dimension shows a moderate and significant correlation with academic buoyancy (p<.01, r=.564). The CI dimension also exhibits a moderate and significant correlation with academic buoyancy (p<.01, r=.434).

Second, there is a significant positive correlation between L2 grit and English learning engagement (p<.01, r>0), which is a strong effect (r=.816). Significant positive correlations are also found between the sub-dimensions of L2 grit and the sub-dimensions of English learning engagement (p<.01, r>0). Compared to the CI dimension, the PE dimension exhibits a relatively stronger correlation with all dimensions of English learning engagement.

Third, it can also be concluded from Table 2 that academic buoyancy is correlated with English learning engagement in its overall and sub-dimensions respectively (p<.01, r>0). In terms of the strength of correlation, the overall dimension of English learning engagement exhibits the strongest correlation with academic buoyancy. Behavioral engagement exhibits a stronger correlation with academic buoyancy compared with other sub-dimensions of engagement.

4.2.2 Regression Analysis Between L2 Grit, Academic Buoyancy, and English Learning Engagement

Based on the significant correlations between the three variables and their sub-dimensions in 4.2.1, this part conducts the regression analysis among these variables.

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Table 3 Regression Analysis Between L2 Grit, AB, and ELE

	Model		β	t	R2	F
L2 Grit→AB	Model 1	Constant		8.650***	.345	287.293
		L2 grit	.588	16.950***		
	Model 2	Constant		8.895***	.354	149.020
		PE	.462	11.807***		
		CI	.214	5.474***		
L2 Grit→ELE	Model 3	Constant		4.069***	.666	1088.614
		L2 grit	.816	32.994***		
	Model 4	Constant		4.964***	.703	642.799
		PE	.699	26.320***		
		CI	.237	8.922***		
AB→ELE	Model 5	Constant		11.309***	.423	400.255
		AB	.651	20.006***		

Note: ***indicates that p<.001

As shown in Table 3, L2 grit can predict academic buoyancy significantly and positively (p < .001). L2 grit can predict 58.8% of the variance in academic buoyancy (β=.588). When both sub-dimensions of L2 grit are input as independent variables in the stepwise regression analysis, the results showed that PE and CI had significant predictive effects on academic buoyancy (p<.001). Specifically, L2 grit predicts PE positively and significantly with a strong effect (β=.462, p<.001). L2 grit predicts CI positively and significantly with a moderate effect (β=.214, p<.001).

In terms of the relationship between L2 grit and ELE, L2 grit can predict ELE significantly and positively (p<.001). L2 grit can predict 81.6% of the variance in English learning engagement (β=.816). When both sub-dimensions of L2 grit are input as independent variables in the regression analysis equations, the results also showed that PE and CI also had significant predictive effects on ELE (p<.001). PE predicts ELE positively and significantly with a strong effect (β=.699, p<.001). CI can also predict ELE positively and significantly with a moderate effect (β=.237, p<.001).

The predictive effect of academic buoyancy on ELE is significant and positive (p<.001). The standardized coefficient Beta (β) is 0.651, indicating that academic buoyancy can predict 65.1% of the variance in English learning engagement.

4.2.3 Mediating Role of Academic Buoyancy Between L2 Grit and ELE

To further verify the mediating role of academic buoyancy, this study uses the PROCESS plug-in Model 4 in SPSS 26.0 and the most commonly used Bootstrap method to test the mediating effect.

Table 4 Multiple Regression Analysis Results

Regression Equation		Fit Index			Coefficient			
Independent Variable	Outcome Variable	R	R^2	F	95%CI	t	B	β
L2 Grit	ELE	.816	.666	1088.614***	[.815, .918]	32.070***	.866	.816
L2 Grit	AB	.588	.345	287.293***	[.590, .745]	16.950***	.667	.588
L2 Grit	ELE	.843	.711	669.493***	[.644, .763]	22.260***	.703	.663
AB					[.192, .296]	9.568***	.244	.261

Note: ***indicates that p<.001

According to Table 4, the direct effect of L2 grit on ELE is significant and positive (R^2=.666, β=.816, p<.001). Therefore, the path coefficient c is 0.816. L2 grit can predict academic buoyancy significantly and positively (β=.588, p<.001), with an explanatory power of 34.5% (R^2=.345). Therefore, the path coefficient a is 0.588. As for the mediating path (L2 grit→academic buoyancy→ELE), when academic buoyancy enters the path from L2 grit to English learning engagement, the indirect predictive effect remains significant (R^2 = .711, β=.663, p <.001), and academic buoyancy still predicts English learning engagement significantly and positively (β=.261, p<.001). Therefore, the path coefficients b and c' are 0.261 and 0.663 respectively. These results suggest that academic buoyancy partially mediates the relationship between L2 grit and English learning engagement. The relationship model between L2 grit, academic buoyancy, and English learning engagement is presented in Figure 1.

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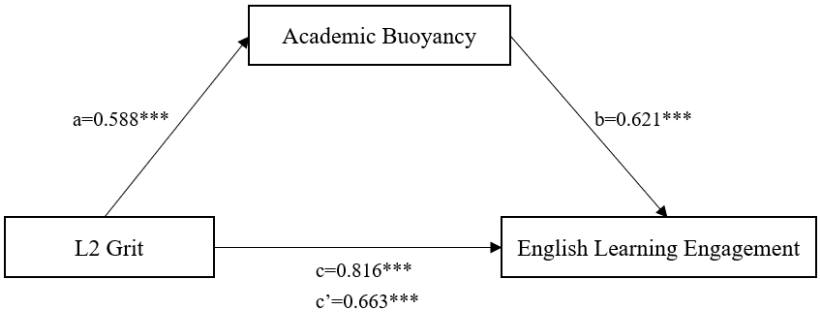

Figure 1 Mediation Model of the Influence of L2 Grit and AB on ELE

According to Table 5, after 1000 random samplings of the Bootstrap test, the direct effect size of the path from L2 grit to English learning engagement is 0.703, with a confidence interval of [.629, .780], indicating that the direct effect is significant and accounting for 81.1% of the total effect. The indirect effect value of the path from L2 grit to English learning engagement is 0.163, with a confidence interval of [.109, .223]. This indicates that the indirect path is also significant, which accounts for 18.9% of the total effect value.

Table 5 Mediating Effect of Academic Buoyancy Between L2 Grit and ELE

	Effect	Boot SE	Boot LLCI	Boot ULCI
Total Effect	.866	.026	.815	.918
Direct Effect	.703	.039	.629	.780
Indirect Effect	.163	.029	.109	.223

5. Discussion

This study aims to investigate the relationship between L2 grit and English learning engagement in senior high school students, with a particular focus on whether academic buoyancy may act as a mediating factor in the path that influences the relationship between L2 grit and English learning engagement in the Chinese context.

5.1 Discussion on the General Profiles of L2 Grit, Academic Buoyancy, and ELE

According to this study, senior high school students' English learning engagement and L2 grit are all at medium levels. The academic buoyancy is at a high level. Regarding the sub-dimensions of these three variables, all of them are medium levels.

The general profiles of L2 grit and academic buoyancy align with previous research [4][13], with the level of CI higher than that of PE. Individuals with higher grit can maximize their abilities because they have higher concentration and will not be discouraged by failure and frustration. Hence, in foreign language learning, students with higher grit will also persist in overcoming difficulties to achieve better learning outcomes.

However, the level of English learning engagement is not consistent with previous findings [14][15]. One possible reason is that high school students live in an external family environment that lacks adequate external incentives (rewards, recognition, etc.), and most family parenting styles in northern China are authoritative. This could lead to students feeling that their efforts have not been appropriately rewarded, which would lower their level of engagement in their studies.

5.2 Discussion on the Relationships Between L2 Grit, Academic Buoyancy, and ELE

As for RQ 2, this study found significant pairwise correlations and different levels of predicting effect between the three variables. Initially, the correlation between L2 grit and academic buoyancy is significant and positive. L2 grit can positively predict academic buoyancy. This indicates that when Chinese high school students are faced with obstacles in English learning, those who put forth constant effort tend to have a more optimistic achievement.

Secondly, L2 grit is also correlated with English learning engagement positively and significantly. L2 grit can also positively predict English learning engagement. This result aligns with previous findings

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[15][16], and further supports the influence of positive personality on English learning [17]. Although high school students face the pressure of college entrance exams, individuals at this stage begin to develop critical thinking skills and metacognitive strategies. They can better understand their own needs and goals, transform external pressure into internal motivation, and thus demonstrate higher levels of engagement and perseverance in their studies.

Finally, academic buoyancy is correlated with English learning engagement positively and significantly. Academic buoyancy can predict English learning engagement positively and significantly. Students with high academic buoyancy often have stronger motivation and higher engagement in learning [18]. They believe that they can overcome difficulties and manage their learning time, demonstrating a high sense of responsibility and determination. They can effectively manage stress and anxiety during their learning process and focus on important tasks. These factors all contribute to enhanced student engagement levels.

5.3 Discussion on the Mediating Role of Academic Buoyancy Between L2 Grit and ELE

As for RQ 3, this research found that academic buoyancy partially mediates the relationship between L2 grit and English learning engagement. This indicates that L2 grit has both direct and indirect effects on learning engagement. This mediating role of academic buoyancy can be explained by character strength theory and self-regulated learning theory.

According to the character strengths theory, grit can boost positive emotions like pleasure and self-efficacy [19]. Studies indicate that the development of academic buoyancy can be facilitated by both positive emotions and self-efficacy [20]. According to the self-regulated learning theory [21], self-regulated learning will be influenced by personality traits. Learners with grit can actively adjust themselves with academic buoyancy, and when they encounter difficulties in their English learning, they will continue to work hard. Studies have shown that academic buoyancy can also promote the formation of self-efficacy [22]. It can increase emotional engagement. Academic buoyancy can also encourage learners to reduce avoidance behavior and actively make plans when facing academic challenges [23]. It will increase behavioral engagement. Besides, academic buoyancy can promote learners to use strategies such as cognition and self-regulation [22]. It will increase cognitive engagement. Therefore, L2 grit can indirectly affect learning engagement through self-regulation of academic buoyancy.

6. Conclusion

The present study explores the relationship between Chinese senior high school students' L2 grit and English learning engagement, especially the mediating role of academic buoyancy between them. Three major findings can be concluded. First, Chinese senior high school students' L2 grit and English learning engagement are at medium levels. Academic buoyancy is at a high level. Second, students' L2 grit, academic buoyancy, and English learning engagement have significant and positive pairwise correlations with each other. Furthermore, three positive and significant predictive effects (L2 grit→academic buoyancy, L2 grit→English learning engagement, academic buoyancy→English learning engagement) are also testified. Third, academic buoyancy partially mediates the relationship between L2 grit and English learning engagement. It reveals the influence path of positive psychological factors on learning engagement in the group of Chinese high school students.

These findings could offer several implications for educators in the field of basic English education. Teachers can create a pleasant learning atmosphere and cultivate students' interest in second language learning by improving teaching design and curriculum setting in teaching practice. Teachers can also teach students how to actively cope with the fluctuation in their daily study life by sharing top students' learning experiences, cultivating academic buoyancy, and promoting English learning engagement.

Although this study has educational enlightenment, it still has limitations to some extent. First, the participants of this research are only from one province in Northern China. Future research can select high school students from different regions in China In this way, the theoretical model will be more meaningful. In addition, this study adopts cross-sectional research, and future research can use tracking research to explore the dynamic relationship among them more deeply. Third, this study verifies the relationship between the three variables through quantitative research. Future research can add qualitative research data to support the research results.

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