

Individual Influencing Factors of L2 Grit: A Structural Equation Modeling Approach

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Received: February 21, 2024

Accepted: April 7, 2024

Online Published: June 15, 2024

doi:10.5430/wje.v14n2p79

URL: <https://doi.org/10.5430/wje.v14n2p79>

Abstract

An increasing number of research is focusing on L2 grit, which plays a significant role in SLA. But few studies examine the factors that affect L2 grit. This study investigates the internal predictors influencing L2 grit in Chinese college students, specifically focusing on L2 willingness to communicate (WTC), L2 anxiety and L2 joy. A structural equation model (SEM) is constructed to examine these relationships. There are 148 valid final questionnaire survey participants. The findings reveal that both L2 WTC and L2 joy positively and directly predict L2 grit; while L2 anxiety has a direct negative effect on L2 grit; and there is a significant correlation among L2 WTC, L2 anxiety as well as L2 joy. This research contributes to the field by promoting further studies on L2 grit, and adds to pedagogical implications for teachers to take appropriate teaching methods that enhance students' level of L2 grit so as to promote foreign language learning.

Keywords: L2 grit, SEM, L2 willingness to communicate, L2 anxiety, L2 joy

1. Introduction

Emerging interest exists in an important personality trait--grit, defined as "perseverance and passion for long-term goals" (Duckworth, et al., 2007: 1087). Initially, most research on grit adopted a domain-general perspective (e.g., Duckworth et al., 2007). However, language-specific grit has gained sustained attention in recent years (Keegan, 2017; Giordano, 2019; Khajavy, MacIntyre, & Hariri, 2020; Teimouri, Pionsky & Tabandeh, 2020; Wei, Liu & Wang, 2020; Sudina et al., 2021; Sudina & Pionsky, 2021). Previous studies have probed into the internal structure of L2 grit, and most of them have concluded that grit comprises two lower-order constructs: perseverance of effort and consistency of interest (e.g., Duckworth et al., 2007; Teimouri et al., 2020). Researchers have explored the correlation between the level of L2 grit and learners' language proficiency (e.g., Wei, Gao & Wang, 2019); as well as its relationship with some psychological factors such as second language motivation (Giordano, 2019; Teimouri et al., 2020; Chen, Lake & Padilla, 2021), mindset (Teimouri et al., 2020), or anxiety (Changlek & Palanukulwong, 2015; Teimouri et al., 2020) and so on. Nevertheless, only a small number of studies have comprehensively examined the internal predictors of L2 grit. The present study explores interrelationships of these factors using structural equation modeling (SEM). In addition, while studies have analyzed L2 grit among college students in South Korea (J. S. Lee, & Lee, 2019), Indonesia (Lee & Drajadi, 2019), and Iran (Teimouri et al., 2020), there is a dearth of research on this topic in the Chinese EFL (English as a foreign language) context. With a large number of college EFL students in China, this study seeks to provide a more comprehensive understanding of the L2 grit network. To this end, the present study identifies and examines the internal factors influencing L2 grit among Chinese college students.

1.1 Studies on Learners' Individual Influencing Factors of L2 Grit

Considerable evidence supports a positive relationship between L2 grit and students' willingness to communicate (WTC) (e.g., Lee & Drajadi, 2019; Lee & Lee, 2019; Teimouri et al., 2020). Lee and Drajadi's (2019) study, which examined the relationship between informal digital learning of English (IDLE) activities, affective variables and L2

WTC, found a significant correlation between students' WTC and L2 grit. This finding provided new empirical evidence for the previously under-research relationship between L2 WTC and L2 grit. Lee and Lee's study (2019) further confirmed this conclusion by demonstrating that students with higher level of L2 grit exhibited higher WTC, both in-class, outside-class, and in digital settings. Additionally, Sharifi and Hamzavi (2021) hypothesized L2 grit as a mediating variable in a L2 WTC model, and their results were confirmative with the findings, suggesting that grit should be considered as an important factor in enhancing WTC of students, as previously discussed in studies conducted in Iran (Sharifi & Hamzavi, 2021) and elsewhere (Lee, 2020; Lee & Drajeti, 2019; Lee & Lee, 2019). Lee et al. (2022) showed evidence from an interdisciplinary study supporting the positive relationship between L2 WTC and L2 grit, specifically highlighting the significant predictive power of the perseverance of effort (PE) subcomponent of grit on L2 WTC behavior. Similarly, the close relationship between emotional variables (L2 anxiety and L2 joy) and L2 grit has also been supported by previous studies. The negative impact of L2 anxiety on L2 grit is widely accepted. Students' L2 anxiety, including the fear of negative evaluation, text anxiety, is a powerful predictor of L2 grit, ultimately affecting English language learning negatively for learners (Changlek & Palanukulwong, 2015). This finding is further supported by Sudina and Plonsky (2021), who examined the two-dimensional factor structure of language learning grit and found that the PE grit subscale had superior criterion validity compared to the consistency of interests(CI) subscale, and they further investigated the mutual effect between L2 grit and L2 anxiety. Conversely, numerous studies have been carried out to find out the promising role of positive emotions, such as L2 joy, in influencing L2 grit. Wei, Gao and Wang (2019) explored the mediating role of foreign language enjoyment (FLE) in the path from L2 grit to foreign language performance (FLP) and found that L2 grit not only directly promoted FLP but also indirectly influenced it through FLE. They concluded that the merrier multi-linguals were the grittier L2 learners. Accordingly, the existence of a parallel process (co-development) of FLE and L2 grit was pointed out by Shirvan, Taherian, Shahnama and Yazdanmehr (2021), suggesting that students' L2 joy is a significant predictor of L2 grit. Therefore, L2 anxiety and L2 joy are closely related to L2 grit. In details, grit and foreign language enjoyment exhibit a positive correlation, while both are negatively correlated with anxiety. Besides, the mediating effect of L2 anxiety tends to be stronger than that of L2 joy (Liu & Wang, 2021).

The relationship among L2 WTC, L2 anxiety and L2 joy is not simply one of separate impacts but rather a cross-influence relationship among them. Studies (e.g., Devaele & MacIntyre, 2019; Dewaele & MacIntyre, 2022; Zhao, Lan & Zhang, 2023) found that learners with a higher level of joy in a second language tended to have lower language anxiety and could get better learning results, indicating that a negative correlation exists between joy and anxiety and therefore they have distinct impacts on L2 learners' academic performance. Apart from these, L2 emotional variables have direct impact on L2 WTC. Zhang (2021) proposed a virtuous circle between positive emotions and WTC, suggesting that students who experience enjoyment are more confident and willing to communicate with others to improve their foreign language proficiency.

Although previous studies have shown that the motivational and emotional factors are closely related to grit, respectively, we did not find such a relationship which integrates the three internal factors influencing language-specific grit as a whole picture. And such findings provide researchers a new perspective to better explain the level of learners' L2 grit, then further assist in comprehending the functions which L2 grit plays in the field of SLA and add to the previous literature. In addition, just a few previous studies of L2 grit in English as a second language context began not until the recent years in China, which has the largest population of English learners. And more, the present study's analytical approach, which combines statistics with SEM, will be conducted to figure out the closely related predictors of L2 grit with convincing and accurate support.

Accordingly, by using SEM, this study examines individual factors (i.e., WTC, anxiety and joy) that influence L2 grit in a Chinese university context. The research questions are as follows: 1) What are the relationships between WTC, L2 anxiety, L2 joy and L2 grit? 2) How does WTC predict grit? 3) How do emotional variables (i.e., L2 anxiety, L2 joy) predict grit?

2. Method

2.1 Participants

A total number of 178 undergraduate students from a university of science and engineering in Beijing, China enrolled in the present study, which included 30 pilot study participants, and 148 valid final questionnaire survey participants. The sample of the students' ages range from 18 to 21 years old. They all had at least 12 years of learning English.

2.2 Instruments

A survey questionnaire with a total number of 21 question items, a 5-point Likert scale, was used to collect data (see Appendix). The questionnaire was mainly adapted from previous studies' questionnaires (i.e. Teimouri et al., 2020; Yashima, 2002; Taguchi, Magid & Papi, 2009; Teimouri, 2017), and its reliability and validity analysis have been conducted in Teimouri et al.'s study (2020) and the evidence illustrated that all the scales depicted from good to excellent internal consistencies. The questionnaire consists of the following four parts: L2 grit (nine items), L2 WTC (four items), L2 anxiety (four items) as well as L2 joy (four items).

2.3 Hypotheses Based on Literature

Based on previous studies four hypotheses are proposed:

H1: L2 WTC has a direct positive effect on L2 grit.

H2: L2 anxiety has a direct negative effect on L2 grit.

H3: L2 joy has a direct positive effect on L2 grit.

H4: L2 WTC, L2 anxiety and L2 joy are interrelated.

2.4 Hypothetical Research Model

An initially hypothetical model about L2 grit, L2 WTC, L2 anxiety and L2 joy was constructed to integrate the four variables according to the previous studies and the above hypotheses, which can be seen in Figure 1.

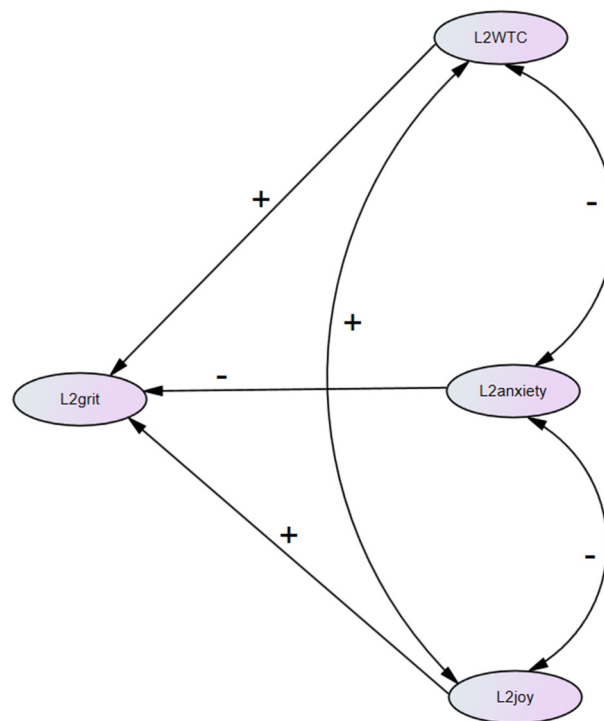


Figure 1. Hypothetical Research Model

3. Results

3.1 Reliability of the Questionnaire

The Cronbach's α of the L2 grit scale was 0.904. L2 WTC's Cronbach's α was 0.954. And the Cronbach's α for L2-Anxiety scale and L2-Joy scale was 0.895 and 0.953 respectively. We can see a high quality of the reliability of all the scales.

3.2 Validity of the Questionnaire

The construct validity estimates for the questionnaire are acceptable, which are shown in Table 1. The KMO

coefficient is 0.943, which exceeds 0.7. The Bartlett text indices are significant, which indicates that the questionnaire is suitable for factor analysis.

Table 1. The Test of KMO and Bartlett’s

Kaiser-Meyer-Olkin Measure	Bartlett’s Test of Sphericity		
of Sampling Adequacy.	Approx. Chi-Square	df	Sig.
0.943	2962.880	153	0.000

3.3 Exploratory Factor Analysis

The variance explanation of the four factors, aimed at explaining the level of information extraction, were 33.558%, 25.326%, 12.184%, 12.085%, respectively, and the cumulative variance explanation after rotation is 83.153% >50%. The results are shown in Table 2. The common degree values corresponding to all research items were higher than 0.4, and they are used to exclude unreasonable research items. Hence, the research item information can be effectively extracted (see Table 3).

Table 2. Variance Explained

Component	Characteristic Root % of Explained Variance		Cumulative % of Explained Variance			
	Before Rotation	After Rotation	Before Rotation	After Rotation	Before Rotation	After Rotation
1	11.964	6.040	66.468%	33.558%	66.468%	33.558%
2	1.739	4.559	9.659%	25.326%	76.127%	58.884%
3	0.688	2.193	3.823%	12.184%	79.950%	71.068%
4	0.577	2.175	3.203%	12.085%	83.153%	83.153%

Table 3. Rotated Component Matrix

Item	Component				common degree
	1	2	3	4	
Grit1		0.766			0.877
Grit3		0.729			0.812
Grit4		0.517			0.584
Grit5		0.756			0.835
Grit6		0.645			0.730
Grit7		0.683			0.755
WTC1	0.801				0.873
WTC2	0.827				0.913
WTC3	0.798				0.831
WTC4	0.792				0.847
Anxiety1				0.911	0.897
Anxiety2				0.806	0.867
Anxiety3				0.844	0.939
Anxiety4				0.815	0.951
Joy1			0.653		0.772
Joy2			0.662		0.798
Joy3			0.739		0.837
Joy4			0.717		0.848

It is important to confirm whether the corresponding relationship between the factor and the research item is consistent with the expectation by combining factor load coefficient. If the correlation is consistent, it indicates validity; otherwise, it needs to be adjusted again. When the absolute value of factor loading coefficient is greater than

0.5, it indicates that there is a corresponding relationship between option and factor. As can be seen in Table 3, four components were extracted. As shown in the Table, standardized factor loadings were set above the 0.60 benchmark, which means that each item fell into the corresponding factor, and the questionnaire was worthwhile further analyzing. So all the items in the modified questionnaire should be retained.

3.4 Structural Equation Modeling

The initial structural model drawn through AMOS 21.0 was shown in Figure 2. And the model consists of four latent variables (i.e., L2 grit, L2 WTC, L2 anxiety and L2 joy), and each of them was indicated by several indicators (namely, questionnaire items). Also, Figure 2 has drawn six hypothesis casual paths in the model, and there are three single-headed arrows and three double-headed arrows based on the hypotheses previously mentioned.

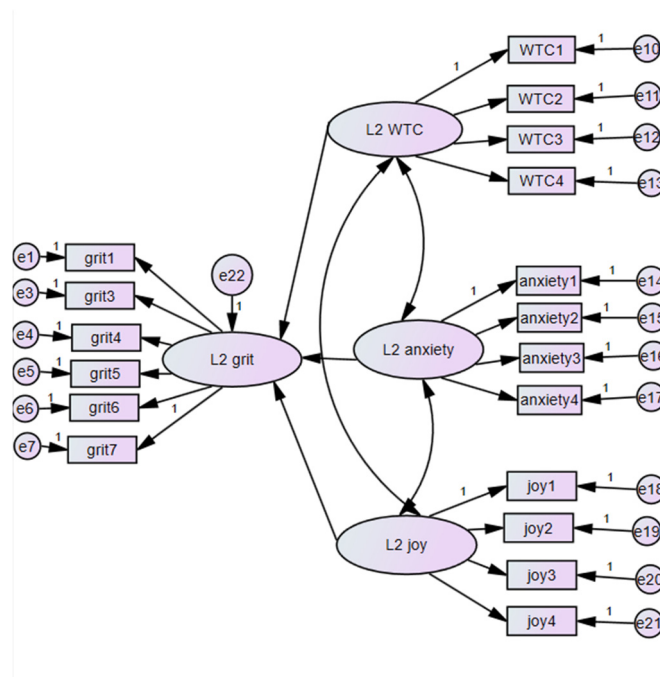


Figure 2. Initial Model

CMIN/DF=2.174 p=.000
 GFI=.822 AGFI=.764 CFI=.949
 RMSEA=.092 RMR=.059

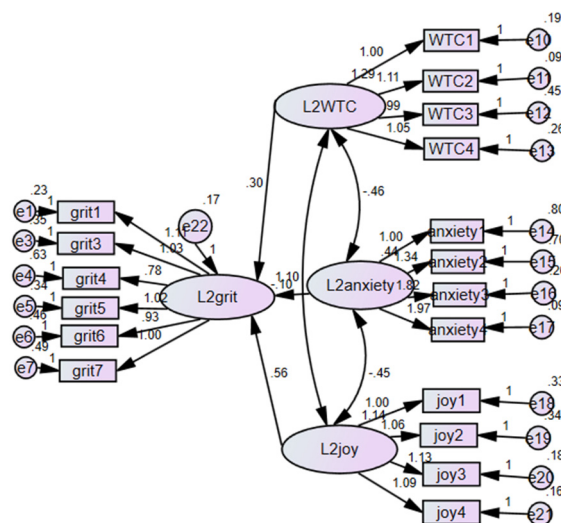


Figure 3. Original Model

The initial model can only explain most of the data but not all of it. Based on Figure 3 and Table 4, we can see both Goodness to Fit Index (GFI) and Adjusted Goodness to Fit Index (AGFI) were smaller than 0.90, which indicated that the fitting degree of model and data was not ideal. And also, RMSEA, which was the root mean square error of approximation, was 0.092, which meant that the model was not so acceptable. Because a close fit was indicated by values not exceeding 0.1 or even 0.07. However, the values of the four model fit indexes of CMIN/DF, p-value, CFI as well as RMR were 2.174, 0.000, 0.949, 0.059, respectively, which indicated a high level of fitting degree between data and model and thus it was acceptable. The initial structural model needs to be modified or adjusted.

Table 4. Goodness-of-fit of the Original Model

Absolute fit measures	Levels of acceptance	Value
CMIN/DF	≤5	2.174
GFI	≥0.90	0.822
AGFI	≥0.90	0.764
RMSEA	≤0.08	0.092
CFI	≥0.90	0.949
RMR	≤0.10	0.059
P	>0.05	0.000

Modification Indices (Group number 1 - Default model)

Covariances: (Group number 1 - Default model)

	M.I.	Par Change
e20 <--> e22	6.378	-.052
e20 <--> e21	7.912	.051
e19 <--> e22	4.540	.055
e19 <--> e20	5.933	-.062
e18 <--> e21	10.851	-.077
e17 <--> e22	9.329	.067
e16 <--> e22	11.273	-.080
e15 <--> e16	4.680	-.089
e14 <--> e15	53.214	.477
e13 <--> e19	8.115	.083
e12 <--> e15	10.783	-.165
e12 <--> e14	8.405	-.154
e12 <--> e13	6.192	.080
e10 <--> e20	5.853	.048
e10 <--> e14	4.582	.078
e10 <--> e12	8.022	-.079
e1 <--> e20	4.800	-.051
e1 <--> e19	5.584	.069
e1 <--> e17	9.210	.075
e1 <--> e16	7.262	-.072
e3 <--> e1	12.663	.104
e4 <--> e22	4.623	-.072
e4 <--> e11	4.025	.056
e4 <--> e3	6.661	-.113
e6 <--> e4	4.031	.097
e7 <--> e3	4.973	-.088

Figure 4. Modification Indices 1

We modify the model according to Modification Indices (M.I.) by building some covariant relationships among observed variables. The results of the M.I. in AMOS output can be found in Figure 4, M.I. represents that if errors items establish covariant relationships with each other by changing fixed parameters into free parameters, the values of X² will be reduced to some extent.

As can be seen in Figure 4, the M.I. of error items higher than ten are e18-e21, e16-e22, e14-e15, e3-e1. After repeatedly numerous modifications, it is clearly reported that constructing covariant relationships of e18-e21, e16-e22, e14-e15, e3-e1 can enhance the goodness-fit of the model effectively by decreasing X2 value of 10.851, 11.273, 53.214, 10.783, and 12.633 separately.

On the ground of M.I., a number of double-headed arrows were drawn to the model. The modified model figures are shown in Figure 5.

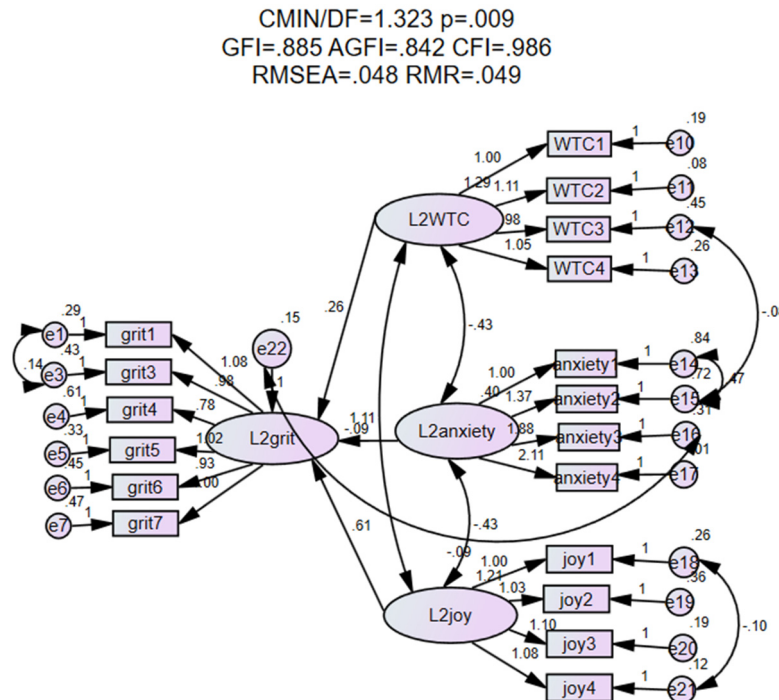


Figure 5. Modified Model 1

After the model modification, the modified model is again to input into AMOS 21.0 to test its' goodness-fit. The overall indices can be seen in Table 5. And CMIN/DF, RMSEA, CFI, RMR, p-value are all acceptable. Although GFI and AGFI are nearly reach 0.9, and also according to convention, GFI and AGFI are better higher than 0.9. The SEM is also acceptable if GFI is higher than 0.85 and AGFI is higher than 0.8 (Arpaci & Baloglu, 2016). In addition, the level of GFI is 0.885, which is higher than 0.85 and close to 0.9; the level of AGFI is 0.842, which is higher than 0.8. Hence, all of them were acceptable.

Table 5. Goodness-of-fit of the Original Model 1

Absolute fit measures	Levels of acceptance	Value
CMIN/DF	≤5	1.323
GFI	≥0.90	0.885
AGFI	≥0.90	0.842
RMSEA	≤0.08	0.048
CFI	≥0.90	0.986
RMR	≤0.10	0.049
P	>0.05	0.009

Figure 6 shows the final L2 grit model. And the final structural equation model of this study can be constructed as Figure 6.

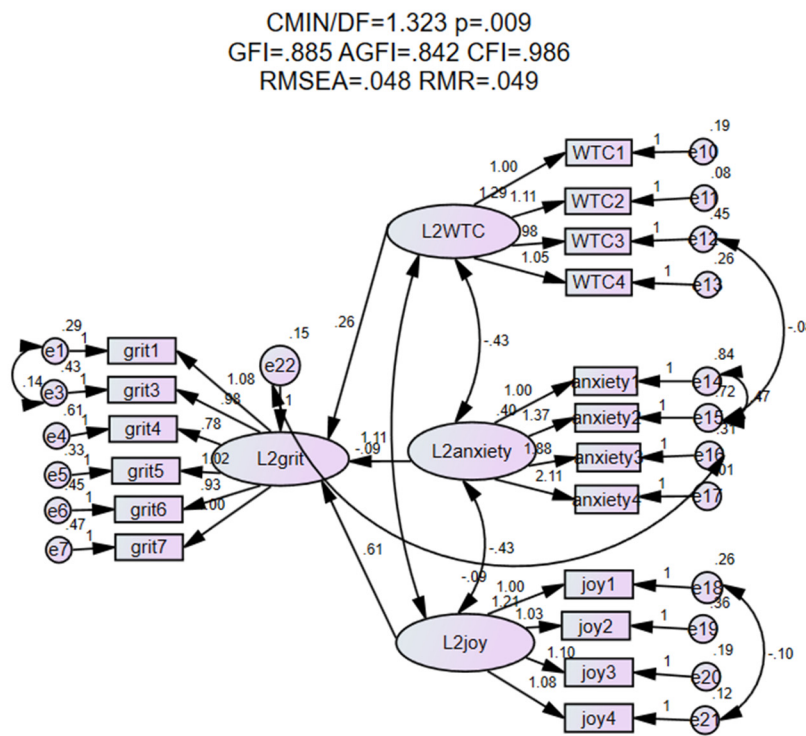


Figure 6. Structural Equation Model

3.5 Test Results and Interpretation of Hypotheses

Through SEM analysis, test results of hypotheses can be concluded as shown by Table 6 and Table 7.

Before the explanation in detail, to be considered firstly that Figure 6 has already shown the final structural equation model with standardized path coefficients for each path. Besides, tables below show if the effects of these paths were significant; whether the hypothesized L2 grit model is supported could be indicated by these tables; and also, how these four factors’ affect each other. In the Table 6, the test results of hypotheses 1, 2 and 3 is shown clearly.

Table 6. Test Results of Hypotheses 1, 2 and 3

Path	Path relationship	Standardized Coefficients	Non standardized Coefficients	Standard error	P	Support Hypothesis or not
1	Grit<---WTC	1.556	1.553	0.090	0.031*	Yes
2	Grit<---Anxiety	-0.400	-1.383	0.085	0.003**	Yes
3	Grit<---Joy	0.876	0.939	0.102	***	Yes

Note: *p<0.05 **p<0.01 ***p<0.001

Firstly, the standardized coefficient of L2 WTC to L2 grit is 1.556 and the significance p-value is 0.031, which is less than 0.05, indicating that L2 WTC has a significant positive effect on L2 grit. Thus, L2 WTC will have a direct positive effect on L2 grit. And, hypothesis 1 is valid. In addition, the standardized coefficient of L2 anxiety to L2 grit is -0.400, and the significance p-value less than 0.001, indicating that language anxiety has a significant negative effect on L2 grit. Therefore, hypothesis 2 is valid. Apart from these, the influence coefficient of L2 joy on the standardized path of L2 grit is 0.876 and the significance p-value is less than 0.001, indicating that L2 joy has a significant positive effect on L2 grit. Accordingly, hypothesis 3 is valid.

Table 7 clearly shows test results of hypotheses 4. As shown in Table 7, the standardized coefficient of the path between L2 WTC and L2 anxiety is -1.254 and the significance p-value is less than 0.001, indicating that there is a significant negative correlation between L2 WTC and L2 anxiety. The standardized coefficient of L2 WTC and L2 joy is 0.785 and the significance p-value is less than 0.001, indicating that L2 WTC is positively correlate with L2 joy in a significant way. The influence coefficient of L2 anxiety on the standardized path of L2 joy is -3.596, and the significance p-value is also less than 0.001, meaning that L2 anxiety has a significant negative correlation with L2 joy. Therefore, hypothesis 4 is valid, which means the predictors, including L2 WTC, L2 anxiety and L2 joy are significantly correlated with each other, and which verifies the conclusion drawn by some study (Devaele & MacIntyre, 2019).

Table 7. Test Results of Hypotheses 4

Path	Path relationship	Standardized Coefficients	Non-standardized Coefficients	Standard error	P	Support Hypothesis or not
1	WTC<--->Anxiety	-1.254	-0.362	0.091	***	Yes
2	WTC<--->Joy	0.785	0.731	0.090	***	Yes
3	Anxiety<--->Joy	-3.596	-1.115	0.153	***	Yes

Note: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

In conclusion, four hypotheses proposed in the present study are valid through calculation and interpretation, which shows the conceptual research model has a research significance.

4. Discussions

4.1 Relationships among the L2 WTC, L2 Anxiety, L2 Joy and L2 Grit

As expected, in response to the first research question, the SEM analysis found that the predictors of L2 grit, including L2 WTC, L2 anxiety and L2 joy are significantly correlated with each other.

As for the finding of the negative correlation between L2 anxiety on L2 WTC, it can be seen L2 anxiety, as a result-oriented emotion, often represents responsibilities, obligations, and even burdens and pressure, so it is likely to lead language learners to feel more easily nervous and awkward when using a foreign language for communication (Devaele & MacIntyre, 2019), thus limiting and weakening their willingness to engage in English communication. The conclusion that L2 joy is significantly correlated with L2 WTC is also verified by previous studies. Based on Krashen's affective filter hypothesis (1985) and Wen and Clément's Model of L2 WTC (2003), students who are willing to speak English in class tend to have a high level of self-confidence, and likely not fear negative evaluation when they make mistakes in communicating in English, thus it is easier to enjoy the language learning experience. At the same time, the more they have fun learning a second language, the more they may be involved in communicating with others in English. Besides, the results of this study show that there is a direct inverse correlation between L2 anxiety and L2 joy, which is slightly differ from previous research conclusion. According to Dewaele and MacIntyre (2019), FLE and FLCA were separate dimensions, because the most frequent cause of the FLE experience was the teacher while FLCA experiences were mostly frequently linked to the self. Therefore, this study to some extent challenges the conventional notion in previous research that language learners' L2 joy and L2 anxiety exist independently, demonstrating that students' second language learning joy and anxiety are closely interconnected and jointly influence their willingness to engage in second language communication.

Moreover, L2 WTC, L2 anxiety and L2 joy interact with each other and jointly affect the level of L2 learners' grit. In detail, the improvement of students' communicative intention in a second language can not only directly promote the enhancement of L2 grit, but also indirectly promote L2 grit by influencing L2 joy. And the same goes for increased L2 joy. However, anxious L2 learners may reduce their L2 joy and eL2 anxiety, thus it is difficult to improve their L2 grit. All of these indicate that L2 grit is a complex personality trait. In this sense, we should pay more attention to the complex interrelationship among the internal factors influencing L2 grit. And whether there are mediating factors in the influence paths of these three influencing factors on L2 grit remains to be further elucidated.

4.2 Effects of L2 WTC on L2 Grit

Our second research question addressed how does L2 WTC predict L2 grit. SEM analysis indicates that L2 WTC predict and has a direct positive effect on L2 grit, which is in line with the hypothesis. To be more specific, when students are at a high level of willingness to communicate in English, they are more likely to be gritter than those with a low level of L2 WTC. L2 learners who are willing to communicate in English usually have long-term passion and persistence in language learning. This finding is in line with the result of Lee and Lee's study (2019). They found that Korean EFL high school and university students had a strong willingness to communicate in English both inside and outside the classroom, because the English test was one of the required subjects of a high-stakes university entrance examination, and students tended to make more efforts to hone their English skills, by becoming willing to communicate in English. And also, they tended to become motivated and passionate about class discussion or daily practice in speaking English. In other words, a high level of willingness to communicate in English promoted their passion and persistence of learning English. The current data can be also interpreted in light of Lee and Drajeti's research (2019), who claimed that Korean middle school, high school, and university EFL learners who were more actively initiating English communication in the classroom tended to work industriously toward completing challenging tasks. Then they would always maintain persistent effort in improving English skills, and become grittier students. The consistency among the present study's findings and these previous studies may mainly due to similarities between two countries' socio - educational system. Chinese English education in high school also focuses on teaching how to use rigid grammar to get a high score in exams and memorizing words and sentences, and sometimes not pay attention to listening and oral expressions. That is what we call "Deaf-mute English". However, when students enter universities, a significant percent of assessment based on students' performance-based activities, like class discussion in English or English-speaking tasks. In order to perform well, Chinese university students are eager to expend their efforts during L2 learning, become more recognized cognitively involved in class and inclined to engage in class discussion. Accordingly, their willingness to communicate in English increases the level of L2 grit.

Therefore, this study provides new empirical evidence for the theoretical foundation of the close relationship between L2 WTC as an intrinsic variable of L2 grit. Besides, the insight can be gained from this finding is that Chinese educational style, such as exam-oriented education in high school and performed-based assessment in universities seem to play a significant role in imposing the path between L2 WTC and L2 grit. In order to simply get a high score, both students and teachers realize that a high level of L2 WTC is conducive, so students will actively participate in class communication in English, or teachers will encourage and push students to be involved in class discussion. In this process, students' L2 grit will be improved and it will have a long-term positive impact on their language learning.

4.3 Effects of L2 Anxiety and L2 Joy on L2 Grit

Our third research question focuses on emotional variables' influences on L2 grit, that is, L2 anxiety and L2 joy's impacts on L2 grit. The findings of this study show that L2 anxiety negatively impacts L2 grit while L2 joy positively influences L2 grit. L2 learners who feel anxious in class are thus expected to have a lower level of L2 grit. On the contrary, students who enjoy the process of learning a second language are likely to have a high level of L2 grit. The findings are supported by the research in which revealed that there were two pathways that L2 anxiety influenced learners' level of L2 grit, first by inhibiting passion, and second by lowering the learning efforts (Yovan & Rosalie, 2019). That is to say, when L2 learners feel anxious about learning a second language, their enthusiasm will be suppressed or even dissipated, they thus inclined to choose escape when they encounter difficulties and challenges in learning English. Likewise, Gyamfi and Lai's study (2020) also suggested that L2 anxiety had a consistently negative bearing on L2 grit. Anxious students have lower levels of passion and interest in learning English, reluctant to make efforts to overcome the obstacles they may meet in the process of language learning.

However, Huei's (2019) research finding is different from that of the present research, which concluded that there was no significant relationship between intended effort, one of the main sub-components of grit, and L2 anxiety. And it indicated that however anxious a language learner might be, the effort one put forward would not be diminished. The reason for this finding is mainly because the participants of the study were senior high school students in Taiwan. For them, English is an important subject not only because it is a compulsory school subject but also a subject of the entrance college examinations, which is a general situation in Taiwan. When they feel anxious about learning a second language, they may not have any choice but to continue overcoming it and making an effort since they were influenced by many external factors, like parents' high expectations, teacher's supervision, and so forth. But the participants of the present study are non-English majors from a key university of science and engineering in Beijing,

who face much less external pressure than high school students in Taiwan. So their performance in learning English may be more influenced by internal emotional factors.

As for the path between L2 joy and L2 grit, the research result of this study echoed previous studies. Wang (2023) verified that the strongest predictor of L2 grit turned out to be L2 joy, and the large effect size of L2 joy was attributable to the positive nature of these two variables: both L2 grit and L2 joy were positive psychological variables, which tended to intrinsically correlate with each other. L2 joy was an important positive psychological trait. Individuals with a high level of L2 joy were thought to be able to maximize their abilities and interest because they were less discouraged when facing failures and setbacks and intended to make great efforts overcoming them. In the process of language learning, students who could enjoy the learning procedure inside or outside the classroom likely have great interest in English learning. For their own learning interest or satisfaction, such students often enjoy reading English, attending English class, and maintain necessary efforts until the completion of the task even in the face of challenges.

Of critical note, the enlightenment that can be gained from the finding is that controlling and guiding students' emotional factors is an effective way to cultivate learners' grit in second language learning. Although a few scholars have proposed that L2 anxiety is not significantly related to L2 grit, under the background of Chinese college English education or a similar research setting, college English teachers still need to guide students to reduce L2 anxiety and promote them to enjoy L2 learning.

Based on the research findings, some pedagogical implications can be drawn for English teaching as a second language. The importance of L2 grit should be pointed out and emphasized in the procedures of second language acquisition. The present study figured out the significant predictors of L2 grit. Therefore, helping L2 learners to acquire a second language successfully by promoting their level of L2 grit can start from L2 learners' WTC and emotional factors (i.e. L2 joy and L2 anxiety). However, improving learners' L2 WTC, L2 joy and reducing L2 anxiety is not only the students' own task, but also needed teachers, who shoulder the main responsibility, to provide guidance. Firstly, to promote students' L2 WTC in process of SLA. Teachers are suggested that they can improve their involvement in classes and be willing to devote time to students, such as expressing concern for students, liking to interact with students, paying attention to students' needs and emotions, and so forth. When students believe that their teachers have a strong degree of integration, they will feel that they are no longer simply the object of evaluation and supervision, and will feel a stronger sense of security, so that they are willing to participate in more interactions in English and show more enthusiasm for participation. Secondly, in order to decrease students' L2 anxiety, building up students' confidence in the classroom is significantly important. Mutual understanding between teachers and students is the basic condition to reduce stress and anxiety and maintain a harmonious atmosphere. Teachers are suggested making efforts to encourage them in class to help them build up their self-confidence. Finally, to achieve the improvement of students' L2 joy, the premise is to stimulate L2 learners' interest in SLA. Accordingly, teachers could innovate teaching methods and renew teaching content, then it will be beneficial to arouse students' interests and thus the level of their L2 grit will be increased.

4.4 Conclusions and Suggestions for Further Research

This study found L2 WTC was an important predictor of L2 grit. Emotional variables (i.e., L2 anxiety, L2 joy) also positively and negatively predicted L2 grit respectively. Besides, these predictors of L2 grit (i.e. L2 WTC, L2 anxiety and L2 joy) were closely related to each other. In terms of the relationship between L2 WTC and L2 anxiety, the present study claimed that there was an important negative co-relationship. At the same line, there was also an obvious negative co-relationship between L2 anxiety and L2 joy. Apart from these, L2 joy and L2 WTC were positively co-related to each other. It is important for us to know the influencing factors of L2 grit, which play a significant role in SLA. Teachers can provide various class activities to increase learners' WTC and enhance their enjoyment and decrease their anxiety so that students can persist in their L2 learning.

Indeed, this study has some limitations, which also provide insights for future research. The sample size of the present study is not large, and some qualitative methods could be used. Beyond that, exploring the mediating influencing factors between emotional variables and grit will be an important direction for further related research. Like in Dewaele and Li's research (2020), the influence of L2 anxiety on L2 grit may vary from one way to another, or L2 anxiety is the mediator of other emotional factors that affects L2 grit. Future research can establish the full impact of anxiety on L2 grit. By doing so, a more detailed network of relationships between L2 anxiety and L2 grit will be presented to help second language teachers adopt appropriate teaching methods more accurately and vigorously to improve students' grit in second language learning, so as to enhance second language learning.

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Appendix

Table 8. Questionnaire

Dimension	Question Items
L2 Girt	1. I am a diligent English language learner.
	2. My interest in learning English changes from year to year.
	3. I will not allow anything to stop me from my progress in learning English.
	4. I think I have lost my interest in learning English.
	5. When it comes to English, I am a hard-working learner.
	6. Now that I have decided to learn English, nothing can prevent me from reaching this.
	7. I put much time and effort into improving my English language weaknesses.
	8. I am not as interested in learning English as I used to be.
	9. I was obsessed with learning English in the past but have lost interest recently.
	10. If I am free to choose, I would like to participate in a group discussion in my English class.
L2 WTC	11. If I am free to choose, I would like to talk in front of the class in English.
	12. If I am free to choose, I would like to ask or answer questions in English in the class.
	13. If I am free to choose, I would like to speak English in the class.
L2 anxiety	14. I get nervous and confused when the teacher asks me a question in English.
	15. I get nervous and confused when I am speaking English in class.
	16. I am afraid of sounding stupid because of the mistakes I make speaking in my English class.
	17. I am afraid that other students will laugh at me when I speak English.
L2 joy	18. I feel happy in the English class.
	19. I feel high learning English.
	20. I enjoy speaking English.
	21. I enjoy learning English.

Acknowledgments

Not applicable

Authors contributions

Dr. Hong Shi were responsible for study design and revising. Shuqi Quan was responsible for data collection and drafted the manuscript. All authors read and approved the final manuscript.

Funding

The funding information is as follows: This work was supported by Science Foundation of China University of Petroleum, Beijing (No.ZX20230108).

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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