L2 Grit and Language Mindset as Predictors of L2 Proficiency

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Abstract: This study aimed to broaden the understanding of the predictive roles of these two non-cognitive abilities (i.e., L2 grit and language mindset) in L2 proficiency. The participants of this study were 100 English major students in China who took the TEM4 in 2021. The author adopted the questionnaire survey method to collect the data on L2 grit, language mindset, and TEM4 grades. The result of multiple regression modeling showed that perseverance of effort was the only significant predictor of L2 proficiency. In the end, suggestions for future study and pedagogical implications regarding L2 teaching are presented.
***Keywords*:** L2 grit, language mindset, L2 proficiency, multiple regression analysis

1. Introduction

L2 learning is a long process that requires L2 learners to flexibly exert cognitive abilities (e.g., learning intelligence, learning strategies) and non-cognitive abilities (e.g., language mindset, L2 grit). In recent years, researchers' attention has been directed towards the roles of non-cognitive abilities in L2 learning because Duckworth et al (2007) appealed to focus on the roles of non-cognitive abilities in learning based on the phenomenon that the learning achievements of individuals of equal intelligence are different. Recently, the predictive roles of L2 grit and language mindset have attracted the attention of L2 learning researchers (e.g., Khajavy et al. 2020; Lou & Noels., 2020; Khajavy & Aghaee, 2022). The reasons why scholars are interested in this topic can be explained in two ways: firstly, more and more researchers have recognized the long-term nature of L2 learning process and the key roles of permanent individual factors. Secondly, some of the individual factors like L2 motivation are considered to be volatile (Ryan & Dörnyei, 2013), changing with environment and time; others are more permanent like L2 grit and language mindset. Most of the related previous studies have found the predictive role of L2 grit in L2 achievement (Khajavy et al., 2020; Khajavy & Aghaee, 2022) and L2 proficiency (Sudina et al., 2020; Sudina & Plonsky, 2021a). Meanwhile, the predictive role of another non-cognitive factor, language mindset, is only beginning to attract researchers' interest (Khajavy et al., 2020; Lou & Noels, 2020). Nevertheless, there is very little research exploring the roles of L2 grit and language mindset simultaneously in L2 learning. Therefore, the current study filled in the gap above.

The current study is significant in two ways. First, this study adds the evidence of the empirical role of L2 grit and language mindset in L2 proficiency thereby extending current research which concentrates on the role of L2 grit and language mindset in L2 achievement. In terms of pedagogical application, this study may provide insights into the non-cognitive factors for language instructors, so that proper intervention could be designed and implemented to maximize the teaching effect in second language learning classrooms and improve the L2 proficiency of Chinese EFL learners better and faster.

2. The Roles of L2 Grit and Language Mindset in L2 Proficiency

2.1 L2 Grit as Predictor of L2 Proficiency

As one of the non-cognitive personalities, Grit was defined as “perseverance and passion for long-term goals” (Duckworth et al, 2007). Consistency of interests (COI) and perseverance of effort (POE) are two components of grit that was measured by the scales developed by Duckworth and her colleagues (Duckworth et al., 2007; Duckworth & Quinn, 2009).

Recently, to precisely admeasure students’ grit in the L2 learning context, Teimouri et al (2020) developed a L2 grit scale and conceptualized the definition of L2 grit: perseverance and passion for second language learning. In line with the general grit scale, the L2 grit scale has two related but distinct subcomponents (i.e., COI and POE). COI measures the changes in students’ interests during L2 learning and POE assesses how persistent learners are in achieving their L2 goals.

Only two studies have explored the prediction of L2 grit on self-reported L2 proficiency (Sudina et al., 2020; Sudina & Plonsky, 2021a), the finding of which contended POE was a significant positive predictor but COI wasn’t. Despite the consistent result, these two studies used the data of participants’ self-reported English proficiency as the indicator of L2 proficiency, which is subjective and might be affected by the performance of their peers. Moreover, there are a few studies

focusing on the prediction of L2 grit on L2 achievement or foreign language (FL) achievement, and the results of which are mixed. One claimed POE was a positive predictor of L2 achievement (Khajavy & Aghaee, 2022); the other illustrated neither POE nor COI has a significant predictive role (Khajavy et al., 2020). The most possible reason that caused the inconsistency is that they used a general grit scale to test L2 grit. Meanwhile, COI was reported as the strongest positive predictor of FL achievement (Sudina & Plonsky, 2021b).

To sum up, the current study chose an objective indicator (i.e., TEM4 grades) and L2 grit scale in order to add its validity and reliability. Also, the number of studies on L2 grit as a predictor of L2 proficiency is scant, and thus, this study explored it to prove the result of previous studies.

2.2 Language Mindset as Predictor of L2 Proficiency

Dweck (2006) proposed the theory of mindset about how people think about their intelligence. There are two kinds of mindsets: fixed mindset and growth mindset. According to previous studies, students with fixed mindsets espouse that their intelligence is innate, and they can't improve or change it. While, for students with a growth mindset, intelligence can be prompted by their learning efforts (Dweck & Leggett, 1988).

Mercer and Ryan (2010) conceptualized the notion of mindset in the L2 domain, named language mindset: the individuals' belief about the respective roles of talent and effort in the language learning process. In line with the division of mindset, language mindset is divided into fixed language mindset and growth language mindset (Ryan & Mercer, 2012a, 2012b). Students with a fixed language mindset believe that their talent for language is constant, and they can't change it by effort whereas those with growth language mindset support the idea that their language talent can be improved only if they put effort into language learning. In Burnette et al.' (2013) meta-analysis, the studies of mindsets were classified into different domains, and mindsets played different roles in different domains, which enlightened the subsequent L2 learning scholars focusing on the research of language mindset independently. Lou and Noels (2016) firstly proved language mindset is independent of other domains' mindsets. Then, they developed a language mindset inventory-especially for measuring the language-specific mindset scale (Lou & Noels, 2017) which was used in the later studies (e.g., Khajavy et al., 2020; Lou & Noels, 2020).

So far, there isn't a study that examines the predicting role of language mindset in L2 proficiency in the context of Chinese EFL learners. However, there are a few studies that examined the prediction of language mindset in L2 achievement in the context of Iranian EFL students (Khajavy et al., 2020) and self-reported English proficiency in the context of ESL students (Lou & Noels, 2020), and all of which indicated the significant positive role of growth mindset, whereas fixed language mindset didn't have an evident predictive role.

Hence, this study will fill in the research gap of language mindset as a predictor of L2 proficiency and whether or not language mindset functions differently in Chinese EFL students.

2.3 The Present Study

Building on existing L2 grit as a predictor of L2 proficiency studies lacked objective indicators for reflecting L2 proficiency and in view of the scarcity of research into language mindset as a predictor of L2 proficiency, the purpose of the present study was to examine the predicting role of L2 grit and language mindset on L2 proficiency which measured by TEM4 grades. For this purpose, the predicting role was analyzed in multiple regression modeling.

Research Question: What are the roles of L2 grit and language mindset in Chinese EFL students' L2 proficiency?

3. Methods

3.1 Participants

The total population of the present study was university students in China who major in English. The sampling frame included students who have already participated in the Test for English Majors—Band 4 (TEM4) in 2021. Questionnaires were distributed among 130 students and 114 returned the questionnaires (response rate = 87.7%). The author received 100 (12% male, 88% female) electronic consent when asking for permission for the anonymous use of TEM4 grades. Participants' age ranged from 20 to 23 (M = 21.17, SD = 0.85). According to six levels' standards of the Common European Framework of Reference for Languages (CEFR), students self-reported their English proficiency (M = 3.66 out of 6, SD = 0.91) as a beginner (1%), elementary (6%), intermediate (39%), upper-intermediate (35%), advanced (18%) and proficient (1%). All participants spoke Chinese as their mother tongue.

3.2 Instruments

Data were gathered through Wenjuanxing–a free online questionnaire collected tool (https://www.wjx.cn) measuring

language mindset and L2 grit. Items for language mindset were assessed on a six-point Likert type scale ranging from 1 (strongly disagree) to 6 (strongly agree); items for L2 grit were assessed on a five-point Likert type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Students were asked to write their real names so that we could access their corresponding TEM4 grades. They were informed that both participation and writing their real names were voluntary. Their TEM4 grades were considered as the measure of L2 proficiency. The original scales were in English, so the author translated them into Chinese (see the Chinese version in Appendix 4). Subsequently, the translated scales with items in random order were piloted in a sample of 14 English major students who weren't involved in the above 100 students. They were instructed to read the items and make comments on the ones that were unclear, and some changes to the phrasing were made based on their comments. Finally, the final version of the survey was distributed to participants via Enterprise WeChat. The data were collected over three weeks. Before doing descriptive and inferential statistical analyses, data cleaning and manipulation (e.g., reverse-coded negatively worded items) were undertaken. For all scales, the author used Cronbach's α to assess internal consistency (Geldhof et al., 2014), which was presented in the Results part.

3.2.1 L2 Grit

The author used the L2 grit scale developed by Teimouri et al (2020). It includes nine items as five items measure POE (e.g., "I am a diligent English language learner.") and four items measure COI (e.g., "My interests in learning English change from year to year."). The four items of COI were reverse-coded so that a larger value shows higher COI. Its factorial structure was confirmed in the Chinese EFL context (Wei et al., 2020). Its validity and reliability have been proved in several studies (e.g., Sudina et al., 2020; Sudina & Plonsky, 2021a, 2021b; Teimouri et al., 2021).

3.2.2 Language Mindset

For language mindset, we used Lou and Noels's (2017) language mindset inventory. This scale includes 18 items in a way that nine items measure fixed language mindset (e.g., "You have a certain amount of language intelligence, and you can't really do much to change it."), and nine items measure growth language mindset (e.g., "No matter who you are, you can significantly change your language intelligence level."). Its validity and reliability have been verified in the previous study by confirmatory factor analysis (CFA) (e.g., Khajavy et al., 2020; Lou et al., 2021; Lou & Noels, 2020).

3.2.3 L2 Proficiency

To assess Chinese EFL students' L2 proficiency, their TEM4 grades were obtained. TEM4 is a national test that all English majors must take, which aims to assess the ability of English majors to comprehensively use basic abilities that include English pronunciation, vocabulary, grammar, discourse, and other English knowledge. Moreover, this examination adopts various test forms to ensure its validity and reliability, considering the principle that exams should be scientific, objective, and feasible. To pass the exam, they should get a minimum grade of 60.

3.3 Data Analysis

The data analysis was divided into two phases (i.e., pre-analysis phase and analysis phase). The internal consistency of the two instruments (i.e., language mindset and L2 grit) was assessed using Cronbach's alpha. According to the standard of (Hair et al., 2014), the cutoff value of Cronbach's alpha is set at 0.70, and that of corrected item-total correlations is set at 0.5.

In the pre-analysis phase, a pilot study (N = 14) has confirmed the questionnaire was applicable to EFL students in China and the questionnaires' reliability for Cronbach's alpha of both instruments (i.e., language mindset and L2 grit) were equal or above 0.70.

After ensuring all the components' internal consistency was satisfied with the above standard, the mean scores of each component were calculated for (a) POE (b) COI (c) fixed language mindset (d) fixed language mindset.

In the analysis phase, although the result of Khajavy et al (2020) showed there was an interactive relationship between L2 grit and language mindset by using Structural Equation Modeling (SEM), the author chose multiple regression modeling rather than SEM because the result of the former one could explain the variance to the great extent. In terms of the multiple regression modeling of the current study, it was adopted with L2 proficiency as the dependent variable, the above four (i.e., from (a) to (d)) as the predictors. Specifically, the present author adopted entered all the predictors at the same time and removed the predictors one by one with the predictor with the highest p-value removed first. Altogether, there are four models, and the best model was chosen on the basis of parsimony (see Model 1, 2, 3 in Appendix 1; Model 4 in part 4.2).

4. Results

4.1 Pre-analysis of Questionnaires

In order to prevent different participants and the small sample size of the pilot study from causing different questions to be deleted, the final version of the questionnaire made appropriate modifications according to the proposals of the participants

in the pilot study so that the respondents could better understand the questions. After doing the same thing as above with the final version of the questionnaire data, the items of language mindset that need to be deleted, as the authors expected, are not exactly the same, and there is a slight difference between the value of Cronbach's alpha. (see Table 1 & Table 2 in supplementary materials).

Critically, after removing items from the L2 Grit scale (i.e., the fifth question of the POE, and the second question of the COI), the reliability of the final L2 grit scale increased from α = 0.70 to 0.82 (COI), and α = 0.83 to 0.86 (POE), and the reliability of the language mindset scale increased from 0.86 to 0.88 (FM) after deleting the fourth and seventh questions of the fixed language mindset. The pretreated reliability of all scales was showed in Table 5 below.

Table 3. Reliability analyses for all scales (N = 100)

Variable	*k*	*M*	*SD*	*α*	95%CI
L2 General Grit	7	2.54	0.77	0.81	[0.75, 0.86]
Perseverance of Effort	4	3.80	0.79	0.86	[0.81, 0.90]
Consistency of Interests	3	3.15	0.62	0.82	[0.74, 0.87]
Fixed Language Mindset	7	3.55	0.79	0.88	[0.84, 0.91]
Growth Language Mindset	9	2.86	0.75	0.89	[0.85, 0.92]

Note. *k* = number of items; 95% CI = 95% confidence intervals of coefficient alphas.

4.2 Language Mindset and L2 Grit as Predictors of L2 Proficiency

Comparing four models in Table 4, the author decided to only keep Model 4 which entered one independent variable–POE in this model and explains a combined 7%–8% of the variance in L2 proficiency in the EFL sample. The model was statistically significant: F(1, 100) = 3.73, p = .005, R2 = 0.08, adjusted R2 = 0.07 (see Model 4). Although the adjusted R2 of Model 2, which entered fixed language mindset, growth language mindset, and POE, is the highest, the removal of fixed language mindset and growth language mindset only causes a less than 1% decrease in the adjusted R2. Meanwhile, fixed language mindset and growth language mindset are two non-significant predictors in Model 2. Thus, Model 4 is more parsimonious than Model 2, and the author selected Model 4 as the final best model on the basis of parsimony.

Table 4. Summary of linear regressions model comparisons

Model	Variables Entered	*corrected* R^2	*F-statistics*	*p*
Model 1	Perseverance of Effort, Consistency of Interests, Fixed Language Mindset, Growth Language Mindset	0.07	2.83	.029
Model 2	Perseverance of Effort, Fixed Language Mindset, Growth Language Mindset	0.08	3.73	.014
Model 3	Perseverance of Effort, Fixed Language Mindset	0.07	4.77	.014
Model 4	Perseverance of Effort	0.07	8.39	.005

Model 4 lm(formula = Proficiency ~ POE)

	B	*SE*	*β*	*t*	*p*
Perseverance of Effort	2.69	0.93	0.28	2.90	.005

Note. N = 100. Overall model: R2 =0.08; adjusted R2 = 0.07; F-statistic = 8.39 on 1 and 98 DF; p-value = .005.

5. Discussion

5.1 L2 Grit as Predictor of L2 Proficiency

The result of the current study shows that POE is a significant predictor of L2 proficiency. In other words, students who put more into language learning are more proficient, which finding echoes the findings of previous L2 grit research that respectively adopted L2 achievement and self-reported L2 proficiency as outcomes.

First, the finding about POE as a predictor of L2 proficiency is in agreement with previous findings about the predictive role of POE in L2 achievement (Khajavy & Aghaee, 2022; Sudina & Plonsky, 2021a). Importantly, there is one exception that claimed the role of POE was non-significant in L2 achievement (Khajavy et al., 2020). After comparing the method of the above three studies, the author finds it is the measurement of L2 grit that makes the role of L2 grit in L2 achievement

inconclusive, specifically, two studies adopted a domain-general grit scale to test L2 grit (Khajavy et al., 2020; Khajavy & Aghaee, 2022), which not only indicates the necessity of using a domain-specific scale to test L2 grit but also verify the result of the current study is more reliable with applying L2 specific grit scale.

Importantly, despite POE also acting as a significant predictor of self-reported L2 proficiency (Sudina et al., 2020; Sudina & Plonsky, 2021a), the result of the current study is more solid than the above two studies with the use of the standardized test grades as the measurement of L2 proficiency rather than self-reported L2 proficiency. Moreover, the plausible reason why POE has a consistent prediction in L2 proficiency in all related studies is that the definition of L2 grit highlights long-term, and the L2 proficiency test is exactly examined English level based on a long-term study, which hints that L2 grit is an important factor for L2 proficiency.

In the current study, COI couldn't predict L2 proficiency, which is in an agreement with the findings of previous studies exploring COI as a predictor of either L2 achievement (Khajavy et al., 2020; Khajavy & Aghaee, 2022) or self-reported L2 proficiency (Sudina et al., 2020; Sudina & Plonsky, 2021a) but contrasts with one study (Sudina & Plonsky, 2021b). To be more specific, COI was reported to be the strongest positive predictor of foreign language achievement (Sudina & Plonsky, 2021b). The contrast of the findings can be explained in two ways. On the one hand, possibly it is the genuine interests of students in the culture and history of other countries (e.g., France and Spain) rather than perseverance that is the important driving factor for learning minority languages, whereas that isn't always the case in the context of EFL, which is frequently regarded as essential for furthering one's education and job (Sudina & Plosnky, 2021b); on the other hand, the current study and (Sudina & Plonsky, 2021b) imported different non-cognitive factors combinations besides both entered L2 grit variable, which implies the roles of non-cognitive factors aren't same in different non-cognitive factors groups. Remarkably, most previous studies only proved the role of the unique non-cognitive factor, and thus, the above inconsistency suggests that the future study is necessary to probe the roles of various non-cognitive factors groups on L2 proficiency based on large sample size.

In sum, as the roles of POE and COI in the previous and current studies are various, it gives the future study a hint that L2 proficiency, L2 achievement, and foreign language proficiency are distinct things needed to be researched separately. For foreign language achievement, COI might be an important predictor, whereas for the ultimate attainment of language–L2 proficiency and L2 achievement, POE is more crucial. So far, the number of studies about the predictive role of L2 grit on whether L2 proficiency, L2 achievement, or foreign language achievement is still far from enough, and more studies are needed to confirm the suppose of the current study.

5.2 Language Mindset as Predictor of L2 Proficiency

As gleaned in Model 2, neither fixed language mindset nor growth language mindset was significant predictor of L2 proficiency. The interpretation of this finding is explained in two ways by comparing the role of growth language mindset and fixed language mindset respectively in the previous and current studies' results. First, the result about the non-significant role of fixed language mindset echoes that of previous studies (Khajavy et al., 2020; Lou & Noels, 2020), which implies the role of fixed language mindset in language attainment is inessential and POE plays a more important role than language mindset in long-term language learning.

Second, the result about the role of the growth language mindset contrasts with the findings of the previous studies (Khajavy et al., 2020; Lou & Noels, 2020), and both these two studies indicated a significant positive role.

When the author compares the current study to (Khajavy et al., 2020), the possible reasons for inconsistent results are given as follows: 1) The nature of L2 achievement and L2 proficiency is different (Brown et al., 2018). 2) The role of growth language mindset is offset by L2 grit. For the first explanation, L2 achievement is normally measured by course grades which depend on the effort in a specific period, and thus, it combines purer to non-cognitive abilities rather than one's initial English level. On the contrary, L2 proficiency is tested for long-term learning and is naturally associated with cognitive factors (e.g., language aptitude). Therefore, the effect of language mindset in L2 proficiency may be weakened due to time. Accounting for the second explanation, Khajavy et al (2020) didn't put L2 grit and language mindset together into a multiple regression model, so whether or not the role of language mindset will be offset by L2 grit when L2 achievement as a dependent variable is still unknown. Meanwhile, this suggests future studies need to investigate the predictive effect of non-cognitive factors in the context of multiple non-cognitive factors to get a more comprehensive view to guide second language teaching. Remarkably, there was an interactive relationship between L2 grit and language mindset, that is, language mindset indirectly affects L2 achievement through L2 grit (Khajavy et al., 2020), and this study didn't involve the bivariate analysis between language mindset and L2 grit, which needs future study to investigate the relationship between language mindset and L2 grit when L2 proficiency is the dependent variable to further verify the relationship found in (Khajavy et al., 2020).

Compared with (Lou & Noels, 2020), the current study has the advantage in the measurement of L2 proficiency–the

outcome variable of (Lou & Noels, 2020) is the L2 proficiency perceived by the participant themselves, which lacks validity and reliability; meanwhile, the conflicting role of growth language mindset between (Lou & Noels, 2020) and the current study can be interpreted by the disparity in the population (i.e., ESL students (Lou & Noels, 2020), EFL students (this study)) since the language mindset is a complex system and is argued to act differently across diverse people (Lou & Noels, 2019a; Lou & Noels, 2019b).

In brief, there are diverse probable reasons (e.g., population, context) for the inconsistent results about the role of growth language mindset in L2 learning. So far, the current study is the first study that explores the role of language mindset in L2 proficiency measured by standardized test scores in the context of Chinese EFL learners. Therefore, more studies are needed to reconfirm the role of language mindset in L2 proficiency based on the large sample size of the particular group (i.e., Chinese EFL learners).

5.3 Limitations and Suggestions for Future Research

The limitations of this study are as follows: foremost, the participants filled in the questionnaires online, so the author can't make sure whether or not the participant met difficulty in understanding the item or there were environmental disturbances; secondly, the sample size of this study is smaller than the previous similar studies (e.g., Khajavy et al., 2020, N = 442; Sudina & Plonsky, 2021a, N = 486), which may be not enough to generalize the role of L2 grit and language mindset on L2 proficiency in the context of EFL Chinese learners. Thirdly, the translated version of the two scales in Chinese didn't back-translated like other scholars who did (e.g., Clark & Malecki, 2019; Schimidt et al., 2017; Teimouri et al., 2020) owing to the limited time and the capacity of the author. Consequently, the above three would decrease the validity and generalizability of the findings.

The suggestions for future studies are: First, reconfirming the result of this study in a large sample size to make sure the role of language mindset on L2 proficiency under the context of L2 grit. Second, separately researching the roles of non-cognitive factors on L2 proficiency and L2 achievement. Third, contextualizing the existing findings of the unique prediction of individual non-cognitive factors on L2 proficiency in the context of multiple non-cognitive factors to clarify the priorities in L2 teaching and learning strategies. Fourth, exploring whether or not an interactive relationship exists between L2 grit and language mindset when L2 proficiency is the outcome variable. Fifth, attempting to add limited new predictors in multiple regression modeling to increase R2. The predictors like anxiety and buoyancy for coping with poor grades and criticism are recommended by reference to the previous models for self-reported L2 proficiency (Sudina & Plonsky., 2021a) and foreign language achievement (Sudina & Plonsky, 2021b).

6. Conclusion

The purpose of the current study was to shed more light on the role of L2 grit and language mindset on L2 proficiency in one multiple regression model, which was the first attempt. Results of the study indicated that POE is the only significant predictor of L2 proficiency, while the predictions of COI, fixed language mindset, and growth language mindset aren't evident. This implies that it doesn't matter which type of language mindsets students possess under the context of POE. In other words, as long as students keep to persevere, they could improve their English proficiency regardless of the type of language mindset. In addition, the author believes that interventions and programs that are designed to increase students' perseverance can be used in second language classrooms.

Thesis Statement

This descriptive study used online questionnaires to explore the influence of L2 grit and language mindset on L2 proficiency based on a survey of 100 Chinese EFL students.

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Appendices

Appendix 1 Summary of the Models

Model 1 lm(formula = Proficiency ~ Fixed + Growth + POE + COI)

	B	*SE*	*β*	*t*	*p*
Perseverance of Effort	2.70	1.00	0.28	2.70	.008
Growth Language Mindset	-1.12	0.93	-0.12	-1.19	.236
Fixed Language Mindset	-1.11	0.97	-0.12	-1.15	.252
Consistency of Interests	0.44	0.97	0.05	0.46	.647

Note. $N = 100$. Overall model: $R^2 = 0.11$; adjusted $R^2 = 0.07$; F-statistic = 2.83 on 4 and 95 DF; p-value = .029.

Model 2 lm(formula = Proficiency ~ Fixed + Growth + POE)

	B	*SE*	*β*	*t*	*p*
Perseverance of Effort	2.84	0.94	0.30	3.00	.003
Fixed Language Mindset	-1.17	0.92	-0.13	-1.27	.207
Growth Language Mindset	-1.24	0.93	-0.13	-1.34	.184

Note. $N = 100$. Overall model: $R^2 = 0.10$; adjusted $R^2 = 0.08$; F-statistic = 3.73 on 3 and 96 DF; p-value = .014.

Model 3 Im(formula = Proficiency ~ Fixed + POE)

	B	*SE*	*β*	*t*	*p*
Perseverance of Effort	2.62	0.93	0.27	2.81	.006
Fixed Language Mindset	-0.96	0.90	-0.10	-1.06	.291

Note. N = 100. Overall model: $R^2 = 0.09$; adjusted $R^2 = 0.07$; F-statistic = 4.77 on 2 and 97 DF; p-value = .011

Appendix 2 Descriptive statistics for final L2 grit and language mindset scales

Table 1. Statistics for the final L2 grit scale ($N = 100$, $k = 9$)

	Perseverance of Effort ($\alpha = 0.83$)					Consistency of Interests ($\alpha = 0.70$)			
Item	1	2	3	4	5×	1r×	2r	3r	4r
M	2.81	2.82	2.95	2.86	2.93	2.91	3.83	3.27	3.54
SD	0.87	0.81	0.93	0.94	0.88	0.84	0.89	0.95	0.92
ITC	0.72	0.71	0.62	0.73	0.39	0.18	0.62	0.66	0.58
α‘	0.77	0.78	0.80	0.77	0.86	0.82	0.57	0.54	0.60

Table 2. Statistics for the final language mindset scale ($N = 100$, $k = 9$)

	Fixed Language Mindset ($\alpha = 0.86$)								
Item	1	2	3	4×	5	6	7×	8	9
M	2.61	2.61	2.50	3.91	2.41	3.18	3.13	2.25	2.23
SD	0.98	0.97	1.03	0.97	1.01	1.10	1.32	1.00	0.98
ITC	0.67	0.74	0.76	0.29	0.66	0.54	0.41	0.59	0.66
α‘	0.83	0.83	0.82	0.87	0.83	0.85	0.86	0.84	0.83

Growth Language Mindset (α = 0.89)									
Item	1	2	3	4	5	6	7	8	9
M	3.63	3.34	3.27	3.61	4.09	4.40	3.95	4.02	3.90
SD	1.24	1.24	0.93	1.13	1.02	0.96	1.04	1.04	1.10
ITC	0.61	0.63	0.60	0.54	0.69	0.56	0.80	0.75	0.67
α‘	0.88	0.88	0.88	0.89	0.87	0.88	0.87	0.87	0.87