University of Tehran press

JOURNAL OF FOREIGN LANGUAGE RESEARCH
p-ISSN:2588-4123 e-ISSN:2588-7521
https://jflr.ut.ac.ir **Email**:jflr@ut.ac.ir

Investigating the Association among Iranian Intermediate EFL Learners' Critical Thinking, L2 Grit, Problem Solving, and Resilience: A Structural Equation Modelling

Mohsen Shahrokhi*✉ 0000-0002-5447-7918
Department of English Language, Shahreza Branch, Islamic Azad University, Shahreza, Iran.
Email: shahrokhi1651@yahoo.com

Leila Nikbakht 0009-0002-1009-7240**
Department of English Language, Shahreza Branch, Islamic Azad University, Shahreza, Iran.
Email: nikbakht1631370@yahoo.com

ABSTRACT
In order to further highlight the relationship among Iranian intermediate EFL learners' critical thinking (CT), second language grit (L2G), problem-solving (PS), and resilience (R), the current study set out to create a structural equation model of evidence. This study used a descriptive methodology and was quantitative in nature. Convenience sampling was used to choose the three hundred eighty-two Iranian intermediate EFL learners who participated in the study. All participants were students from English language schools in Shahreza, Iran. With approval from the department chair, data collection was done in classrooms, and it took an average of thirty minutes to complete the questionnaires. They were asked to respond to four components' self-report questionnaires on critical thinking, L2 grit, problem-solving, and resilience. The structural Equation Modeling (SEM) and the schematic illustration confirmed the hypothesized model (RMSEA=.0.04; GFI =.0.824; NFI =0.551; CFI =0.746; IFI =0.551; TLI0.735), demonstrating a strong internal interaction among critical thinking, L2 grit, problem-solving, and resilience. According to the findings of the study, critical thinking enhances L2 grit, and L2 grit promotes resilience and problem-solving. Furthermore, the study discovered that L2 grit has a greater impact on resilience than problem-solving. The study's conclusions have educational implications for educators, policymakers, and investors.

ARTICLE INFO
Article history:
Received: 09 May 2024
Received in revised form 12 August 2024
Accepted: 18 August 2024
Available online: Autumn 2024

Keywords:
Critical thinking, L2 grit, problem-solving, resilience, structural equation modeling.

Shahrokhi, M., & Nikbakht, L. (2024). Investigating the Association among Iranian Intermediate EFL Learners' Critical Thinking, L2 Grit, Problem Solving, and Resilience: A Structural Equation Modelling. *Journal of Foreign Language Research*, *14* (3), 385-401. http//doi.org/ 10.22059/jflr.2024.379089.1140.

 Publisher: The University of Tehran Press.
DOI: http//doi.org/ 10.22059/jflr.2024.379089.1140.

*✉ As an associate professor of Applied linguistics, my research interest includes issues in teaching and learning English as a foreign language. My contributions to the field deals with EFL learners Pragmatics development and EFL teachers' professional development.
** Ph.D. student in the field of English language education, author of two articles in the field of material adaptation, one article on teaching English grammar, and one article in the field of educational psychology.

1. Introduction

Within the framework of the 21st-century educational paradigm, students need to develop a range of competencies, such as critical thinking, creativity, and cooperation. One of these skills that is essential in social settings when making the right decisions is required is critical thinking. It is also essential in the workplace, where problem-solving is essential (Dwyer & Walsh, 2020). Teachers must ensure that students are developing and using their critical thinking abilities as part of the learning process (Saavedra & Opfer, 2017).

Critical thinking and education are highly correlated, according to Moseley et al. (2004). The need to support students in developing critical thinking skills has become more pressing in recent decades due to their unique profile in the labor market and in adapting to the demands of 21st-century society, which is characterized by rapid advancements in technology and social and economic issues (Crenshaw, Hale, & Harper, 2011). Critical thinking is taught in many different ways and is widely recognized as an essential educational ability (Ennis, 2013).

Since critical thinking requires students' attention and presence, it requires grit, much like any other learning process (Yeh et al. 2019). Teachers think that research on grit leads to successful pupils by directing creative processes (Keegan, 2017). Due to its relatively recent introduction into the field of language learning and instruction, L2 grit has emerged as a significant personality attribute of successful learners (Teimouri et al., 2020). L2 Grit is thought to be just as important as talent and can guarantee students' productivity and accomplishment above and beyond their intrinsic or inherent capacities (Duckworth et al., 2007). Students with higher levels of grit are more interested in and commit more time to their studies, according to Sudina and Plonsky (2021). In order to achieve their long-term goals, students with high grit can endure in the face of obstacles and setbacks (Xu et al., 2023; Yang et al., 2022). According to Hardin (2023), pupils are always faced with problems that need to be solved when they are uncertain of how to complete the assignment.

Problem-solving is valuable, and many academics have asserted that it is the most significant cognitive activity in both professional and daily contexts (Jonassen, 2014). This implies that the ability to solve problems is crucial in both academic and real-world settings (Aouine & Fodil, 2020). Students' resilience is greatly aided by their ability to solve problems since it enables them to overcome obstacles and adapt to change (Martin, 2013).

According to Masten (2018, p. 16), resilience is described as the "ability to adapt successfully to significant challenges." Educational resilience is the capacity of students to deal with difficulties, pressure, and difficult situations in a college setting and it can increase the likelihood of success in education and other aspects of life, and it is crucial to comprehend the mechanism and components that make up resilience (Fallon, 2010).

2. Review of the Literature

According to Shahriyaripour and Aghdami (2012), it is also regarded as a

crucial cognitive process for the acquisition and pleasure of knowledge. Dewey (1933) first discussed the importance of higher-order thinking in the context of educational environments. He emphasized the need to swap out outdated teaching methods that placed a premium on memorization and superficial instruction for more modern methods that place an emphasis on technology use and critical thinking. According to Birjandi et al. (2018), an overwhelming majority of Iranian graduates in all levels of education from diploma to PhD lack a substantive concept of critical thinking. The relationship between autonomous learning and critical thinking has been demonstrated by an increasing amount of research (Mahmoudi & Asadi, 2016). Upon analysis of the literature, it becomes evident that critical thinking has already been explored in relation to other constructs, dimensions, and fields of interest, including problem-solving skills (Kırmızı et al., 2015), learning styles (Shirazi & Heidari, 2019), creative thinking (Mohammadi et al., 2022), student performances (Ghazivakili et al., 2014), and motivation (Fahim & Hajimaghsoodi, 2014). Critical thinking is thought to be a favorable predictor of independent learning and academic grit, according to Yüce (2023).

Academic grit, according to Clark and Malecki (2019), is a personal quality or aptitude that includes perseverance, attention, and drive in the pursuit of difficult long-term educational goals. The Grit hypothesis, first proposed by Duckworth (2016), emphasized the reciprocal relationships between excitement and persistence and how these relationships affected people's ability to achieve their goals. Prior research in the area of grit revealed a strong relationship between this construct and other constructs pertaining to teachers and students, which promotes educational performance (Shafiee Rad & Jafarpour, 2022). In particular, L2 grit and its role in language assessment and academic achievement are highly significant since students' achievement in acquiring a language is heavily dependent on their effort and drive for long-term goals. According to Khajavy et al. (2020), having grit can help students navigate and effectively overcome obstacles they may encounter when learning a second language.

Early in the 20th century, problem-solving was viewed as a mechanical, methodical, and usually abstract (decontextualized) set of skills, akin to those used to solve mathematical puzzles or equations. Following the popularity of cognitive learning theories, problem-solving evolved into a complex mental process requiring a variety of cognitive functions and behaviors (Kirkley 2003). Higher-order thinking skills like visualization, understanding, reasoning, and analysis that needed to be controlled and integrated were also necessary for problem resolution, according to Garofalo and Lester (1985).

There has been a lot of research on problem-solving strategies in the literature. Lim and Han (2020) asserted that confidence and critical thinking skills can lead to improvements in problem-solving abilities. Moreover, Elbyaly and Elfeky (2023) came to the conclusion that learners' critical

thinking abilities are positively enhanced by their problem-solving skills. Problem-solving is a strong predictor of increased resilience, according to earlier research. Problem-solving abilities have been shown to raise pupils' resilience levels in high school (Jabari Mohammad Abadi, 2011). Nafisi and Wastoghi (2017), stated that problem-solving skills lead to progress in the general language test of Iranian students.

According to Duckworth (2016), one of the characteristics of grit is resilience in the face of adversity or struggle. It is anticipated that students possessing resilience and grit will shield them from unfavorable results. Grit is the capacity to deal with daily difficulties, setbacks, and problems, whereas resilience is the ability to overcome significant challenges (Perkins-Gough, 2013). Resilience can be defined as the ability to cope with and adapt to challenging circumstances, whether they are anticipated or unexpected (Chisholm-Burns et al., 2019). Certain resilience skills that help students become more analytical and capable of making decisions through critical thinking are necessary for the development of resilience (Benitez & Canales, 2013). Abdoli et al. (2022) have demonstrated the connection between critical thinking and resilience. Put another way, students' critical thinking abilities can increase their level of adaptability and resilience.

As per Waxman et al. (2003), resilient kids are those who succeed academically despite adverse circumstances. Resilient pupils, according to Cazan and Truta (2015), view stressors as less problematic and are more adept at handling difficulties.

According to earlier research on L2 grit and critical thinking, teachers have been the subject of these two abilities' investigations (Namaziandost et al., 2023). Nevertheless, no study has specifically examined the relationship between L2 grit and EFL learners' critical thinking. Furthermore, based on earlier research on L2 grit, it appears that, with the exception of a small number of earlier studies (Lavoie, 2021), the possible relationship between learners' grit and problem-solving has not been well examined. In other words, the body of research already in existence has shown that second/foreign language education has given emphasis to the significance of L2 grit and resilience. (For instance, Hossain et al., 2021; Mohan & Kaur, 2021; Warren & Hale, 2020). This is true even though the majority of earlier studies in social studies, mathematics, and medicine have looked at the connection between grit and problem-solving (e.g., B Miele et al., 2022; Kim & Jang, 2022; Yang & Kim, 2022) and resilience (Demir, 2023; Montas et al., 2020; Shakir et al., 2020).

To the best of the researcher's knowledge, no studies have examined the connections between the critical thinking, L2 grit, problem-solving, and resilience of EFL learners, despite the fact that each of these four elements is crucial to the learning process. The present study attempted to extend the previous research by employing a structural model of possible associations among Iranian intermediate EFL learners' aforementioned variables. With the intention of bringing attention to this issue and initiating additional studies after identifying

JOURNAL OF FOREIGN LANGUAGE RESEARCH, Volume 14, Number 3, Autumn2024, Page 385 to 401

this gap. The results of this analysis may have both theoretical and practical ramifications. Language directors, syllabus designers, language teachers, academics, students, and their families should take into consideration the information this research offers. Alternatively, the goal of this study was to identify the association between EFL learners' critical thinking and L2 grit, L2 grit and problem-solving, and L2 grit and resilience. These goals are rewritten as the following questions.

1. Is there a significant association between EFL learners' critical thinking and L2 grit?

2. Is there a significant association between L2 grit and EFL learners' problem-solving?

3. Is there a significant association between L2 grit and EFL learners' resilience?

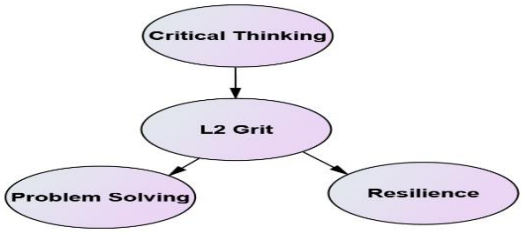
The following model was developed in light of the research hypotheses.

H1: There is a significant positive association between EFL learners' critical thinking and L2 grit.

H2: There is a significant positive association between L2 grit and EFL learners' problem-solving.

H3: There is a positive significant association between L2 grit and EFL learners' resilience.

Figure 1.
Hypothesized Structural Model



3. Methods

3.1. Participants

For the purpose of conducting the present study, the researcher used three hundred eighty-two Iranian intermediate EFL learners between the ages of twelve and eighteen years old as the participants. Convenience sampling was employed by the researcher to choose participants, taking into account factors such as geographic proximity, availability, and accessibility (Dörnyei & Csizer, 2012). All participants were students from Shahreza's language departments. With authorities' approval obtained, the data collection was done in classrooms, and it took an average of thirty minutes to complete the questionnaires.

3.2. Instruments

Several questionnaires were utilized in this investigation. They were used to measure EFL learners' critical thinking, L2 grit, problem-solving ability, and resilience. Likert scales were used in all of the surveys. In the following sections, each questionnaire is explained individually. To measure EFL learners' critical thinking, the researcher used the critical thinking questionnaire developed by Kobylarek et al. (2022). The scale included 25 critical thinking items which covered broad areas of critical thinking: Analyzing, evaluating, creating, remembering understanding, and applying.

A modified version of the L2 scale created by Teimouri et al. (2020) was employed by the researcher to evaluate the grit of the participants. The scale, which has nine items, assesses two aspects of L2 grit: the persistence and consistency of L2 learners' enthusiasm for learning a second

language. Persistence of effort, evaluated with four items, indicated a learner's persistence in reaching his or her L2 goals, whereas consistency of interest, examined with five items, represented shifts in learners' interests during L2 learning.

The Parker Problem-Solving Style Questionnaire (PSSQ), (1997), which has 20 Likert scales, was used to measure the problem-solving styles of the participants. Four components of problem-solving were examined by the questionnaire: perceiving, intuition, feeling, and thinking. Therefore, there were five questions for all concepts.

The researcher employed an original scale that was derived from Shin et al. (2012) and then verified by Kim et al. (2017) in order to gather data regarding the resilience of L2 learners. A total of 15 items were included in this measure, 9 of which dealt with the learners' well-being, 3 with persistence, and 3 with self-regulation.

Every survey used a Likert scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree." The Cronbach's alpha method was used to determine the research questionnaires' reliability. For the purpose of improving reliability, certain questionnaire items were removed. The findings revealed that the levels of Cronbach's alpha for critical thinking, L2 grit, problem-solving, and resilience were, respectively, 0.718, 0.778, 0.678, and 0.759 at a favorable level.

3.3. Procedures

To carry out the present investigation, three hundred eighty- two EFL students from various departments at Shahrazad were chosen. The researcher requested that participants complete four hard-copy scales on critical thinking, L2 grit, problem-solving, and resilience after obtaining permission from department administrators. It was requested of all participants to fill out the scale as honestly and completely as possible. The participants were apprised of the aim of the research as well as their freedom to leave the study at any moment and without consequence. Participants were given the assurance by the researcher that their answers would be kept private and used exclusively for the study.

3.4. Data Analysis

Examining the data for normality and outliers was the first step in the data analysis process. Following that, calculations were made for the participants' descriptive statistics, reliability, normality, and correlations. To test the accuracy of the scales, a confirmatory factor analysis (CFA) was carried out with Amos version 26. The suggested model was then tested using structural equation modeling (SEM) analysis, and goodness-of-fit indices were used to assess the model's fit.

4. Results

4.1. Pre-Processing of the Data

The acquired data were initially screened for non-normal data, outliers, and missing values. There were no missing data found in the data. Subsequently, the Kolmogorov-Smirnov test was employed to examine the normal descriptions of the data. When using SEM, acceptable skewness values are between -3 and + 3, while proper kurtosis is between -1 and + 1 (Brown & Greene, 2006). The quantity of skewness and kurtosis in Table 1 indicated that the data had a normal distribution, proving that parametric

techniques were appropriate for data analysis.

Table 1.
Evaluation of normality of variables by Kolmogorov– Smirnov Test

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Critical Thinking	382	-.236	.125	1.346	.249
L2 Grit	382	-.788	.125	.320	.249
Problem-Solving	382	-.178	.125	.26 3	.249
Resilience	382	-.534	.125	.434	.249

4.2. The Descriptive Analysis

This section contains the data analysis reports, along with an explanation of each report's component parts. The results of the descriptive and correlation analysis are shown in Table 2. The research variables exhibited a noteworthy association, as demonstrated by the correlation matrix. Notably, there was a substantial and significant association ($r = 0.448$, $p < 0.01$) between students' critical thinking and resilience. Students' problem-solving ($r = 0.394$, $p < 0.01$) and L2 grit ($r = 0412$, $p < 0.01$) also demonstrated strong correlations with resilience.

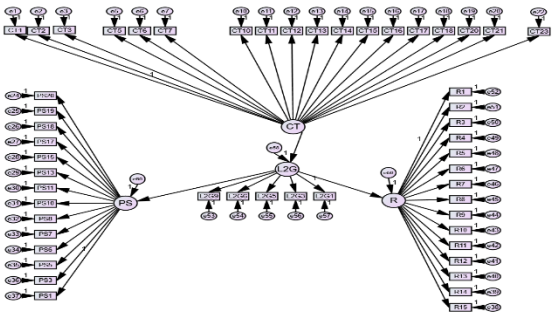
Table 2.
Descriptive Analysis

	Mean	SD	1	2	3	4
Critical Thinking	3.595	.430	1			
L2 Grit	3.225	.523	.318**	1		
Problem-solving	3.461	.458	.432**	.248**	1	
Resilience	3.648	.624	.448**	.412**	.394**	1
**p-value < 0.01.						

4.3. Confirmatory Factor Analysis

The construct validity was first established using a CFA. The measuring model contained four components (i.e., CT, L2G, PS, R). The CFA model's factor loadings were all significant. However, the factor loadings for the EFL learners' critical thinking items with the labels CT4, CT8, CT9, and CT22 were 0.232, 0.350, 0.332, and 0.230, respectively. Due to factor loadings that were less than 0.5, these four elements were eliminated from the model. The completed CFA model is displayed in Figure 2.

Figure 2.
The Final CFA Model with Standardized Estimates



Using the structural equation modeling technique, the researcher assessed how well the data fit the model before estimating the hypothesis. After the SEM model with AMOS, the researchers looked into the relationships between critical thinking, L2 grit, problem-solving skills, and

resilience. According to Hoyle & Panter (1995), the GFI, NFI, IFI, TLI, and CFI values range from 0 to 1.0, with values nearer 1.0 typically indicating better-fitting models. They added that a good match is defined as having an RMSEA of less than 0.08. As a result, the model's fit indices— X^2/df = 1.688, PRATIO = 0.959, GFI =.824; NFI =.551; IFI =.750; TLI = 0.735, and RMSEA = 0.042—fall within reasonable bounds. The research demonstrated a satisfactory fit, as indicated in Table 3.

Table 3.
Model fit indexes

Categories	Fit indexes	Measurement	Values	Result
Parsimonious fit	**X2/df**	**< 5.00**	**1.688**	**+**
	PRATIO	**> 0.09**	**0.959**	**+**
Absolute fit	**RMSEA**	**< 0.08**	**0.042**	**+**
	GFI	**<0, >1**	**0.824**	**+**
Incremental fit	**CFI**	**<0, >1**	**0.746**	**+**
	NFI	**<0, >1**	**0.551**	**+**
	IFI	**<0, >1**	**0.750**	**+**
	TLI	**<0, >1**	**0.735**	**+**

RMSEA, Root Mean Square of Error Approximation; X^2/df, PRATIO, Parsimony Ratio; CFI, Comparative Fit Index; GFI, Good of Fit Index; NFI, Normal Fit Index; TLI, Tucker- Lewis Index; IFI, Incremental Fit Index. Table 4 displays the outcomes of the route analysis for the structural model.

Table 4.
Structural Model Path Coefficients

	Estimate	S.E.	C.R.	P	Label
CT --- > L2G	**.702**	**.145**	**7.353**	*******	**Par_ 49**
L2G --- > PS	**.653**	**.069**	**4.734**	*******	**Par_ 50**
L2G --- > R	**.732**	**.073**	**6.093**	*******	**Par_51**

Based on Table 4, there was significance at the 0.001 level for each of the three paths in the structural model. The path from critical thinking to L2 grit ($\beta = 0.702$, $p < 0.001$), L2 grit to problem-solving ($\beta = .0653$, $p < 0.001$), and to resilience ($\beta = 0.732$, $p < 0.001$). L2grit significantly improved PS and R in the sample of Iranian intermediate EFL learners, according to the results of the SEM study. Moreover, it may be said that L2 grit has a greater impact on resilience than it does on problem-solving.

5. Discussion

Several theoretical and empirical studies support the findings of the current study, establishing a robust framework for understanding how these variables operate in language learning contexts.

Firstly, the positive relationship between critical thinking and L2 grit (Hypothesis 1) corroborates previous research indicating the significant role critical thinking plays in fostering perseverance and passion for long-term goals. Critical thinking, often associated with problem-solving and analytical skills, is

JOURNAL OF FOREIGN LANGUAGE RESEARCH, Volume 14, Number 3, Autumn2024, Page 385 to 401

essential in promoting students' persistence in learning a second language (Teimouri et al., 2022). Yüce (2023) found similar relationships among preservice EFL teachers, where critical thinking contributed significantly to academic grit, fostering autonomous learning and improving language proficiency. This study extends these findings to EFL learners, suggesting that developing critical thinking skills can enhance students' L2 grit, thus promoting sustained effort in language acquisition.

Secondly, the finding that L2 grit positively affects problem-solving abilities (Hypothesis 2) aligns with the literature on grit and cognitive abilities. Kalia et al. (2019) identified a strong link between perseverance (a core component of grit) and enhanced problem-solving capacities, particularly in challenging situations. This relationship is further supported by Lim and Han (2020), who demonstrated that confidence and critical thinking are pivotal for problem-solving efficacy. The present study extends these conclusions by situating grit as a central factor in EFL learners' problem-solving abilities. Furthermore, Elbyaly and Elfeky (2023) highlighted that problem-solving skills are strengthened by critical thinking, a finding echoed in the current research, which underscores the cyclical relationship between these constructs.

Thirdly, the significant impact of L2 grit on resilience (Hypothesis 3) is consistent with theories positing that perseverance in the face of adversity enhances individuals' ability to adapt to challenging situations. Grit and resilience are often viewed as overlapping constructs, with grit fostering resilience through sustained effort and emotional regulation (Duckworth, 2016; Crawford-Garrett, 2018). The findings of this study align with prior research, such as the work of Masten (2018), who identified resilience as the ability to adapt successfully to significant challenges, a skill closely linked to academic and personal success. Similarly, research by Sun (2022) on Chinese EFL teachers demonstrated that grit and resilience significantly contribute to creative problem-solving and emotional well-being. In the present study, L2 grit emerged as a critical predictor of resilience, suggesting that EFL learners who exhibit perseverance and passion for long-term goals are better equipped to overcome language learning challenges.

The theoretical implications of these findings are substantial. The interplay between critical thinking, grit, problem-solving, and resilience can be understood through the lens of self-determination theory (Deci & Ryan, 2000), which emphasizes the importance of intrinsic motivation in achieving long-term success. L2 grit, as conceptualized by Duckworth et al. (2007), aligns with this theory by framing perseverance and passion for long-term goals as intrinsic motivational factors that drive academic success. Additionally, problem-solving theories (Jonassen, 2014) emphasize the role of cognitive processes in overcoming obstacles, further supporting the interconnectedness of grit, critical thinking, and resilience in educational settings.

6. Conclusions

This study aimed to explore the relationships among critical thinking, L2 grit,

problem-solving, and resilience in Iranian intermediate EFL learners through structural equation modeling (SEM). The findings indicated significant associations between these constructs, revealing how critical thinking positively impacts L2 grit, which in turn fosters both problem-solving and resilience. These findings provide important implications for EFL teaching and learning by underscoring the role of psychological constructs like grit and resilience in language acquisition.

In terms of practical implications, the study suggests that fostering critical thinking in EFL learners is a vital component of enhancing their perseverance and success in language learning. Teachers should, therefore, focus on incorporating critical thinking tasks into the curriculum to help students develop cognitive skills that support long-term commitment to language learning. Moreover, enhancing L2 grit in learners can lead to improved problem-solving abilities, a finding that aligns with previous research (Kalia et al., 2019), which demonstrates that grit plays a pivotal role in students' cognitive flexibility and persistence in tackling complex tasks. Furthermore, resilience, as supported by research from Masten (2018), is critical for EFL learners to navigate the challenges they face in language learning environments. Thus, EFL instructors should incorporate strategies to foster resilience, such as creating supportive and adaptive learning environments, to bolster students' emotional and academic outcomes.

Despite the valuable contributions of this study, several limitations must be acknowledged. First, the study relied on self-report questionnaires, which are subject to biases such as social desirability or inaccurate self-assessment (Dörnyei, 2007). Future research should incorporate qualitative methods, such as interviews or classroom observations, to provide a more in-depth understanding of the relationships among critical thinking, L2 grit, problem-solving, and resilience. Second, the use of convenience sampling from a specific geographic area limits the generalizability of the findings to broader populations. Future studies should aim to include more diverse and representative samples, potentially from different educational settings and levels of language proficiency, to increase the generalizability of the findings.

References

بیرجندی، پرویز، باقری، محمدباقر، و مفتون، پرویز. (۱۳۹۶). جایگاه تفکر نقادانه در نظام آموزشی ایران. *پژوهشهای زبانشناختی در زبانهای خارجی*، ۷ (۲)، ۳۲۴-۲۹۹.
https://doi.org/10.22059/jflr.2017.236677..353

نفیسی، زهره، و وثوقی، مرجان. (۱۳۹۶). همسوسازی روش های بازتابی رایج درآموزش زبان انگلیسی با ویژگیهای روانشناختی زبان آموزان ایرانی. *پژوهشهای زبانشناختی در زبانهای خارجی*، ۷ (۱)، ۲۵۱-۲۷۰. ۲۳۱٤٥۷/۳۲٦.
https://doi.org/10.22059/jflr.2017.231457.326

Abdoli, M., Shahbazi, S., Mahdian, M. J., & Abdoli, Z. (2022). The effect of critical thinking training on the adaptability and resilience of sixth grade students. *New Approach in Educational Sciences*, *4*(1), 16-26.

https://doi.org/10.22034/naes.2021.281155.1117

Aouine, A., & Sadek Fodil, M. (2020). EFL Teachers' Views and Implementation of Problem-Solving Tasks in the Algerian Secondary Schools. *International Journal of Research in English Education*, *5*(2), 61-81. http://dx.doi.org/10.29252/ijree.5.2.61

Benítez, L., & Canales, E. (2013). Critical thinking as a resilience factor in an engineering. *Creative education*, *4*(9), 611-613. http://dx.doi.org/10.4236/ce.2013.49087

Brookfield, S. D. (2011). *Teaching for critical thinking: Tools and techniques to help students question their assumptions*. https://www.igiglobal.com/chapter/teaching-for-critical-thinking/80276

Brown, S. C., & Greene, J. A. (2006). The wisdom development scale: Translating the conceptual to the concrete. *Journal of college student development*, *47*(1), 1-19. https://doi.org/10.1353/csd.2006.0002

Cazan, A. M., & Truta, C. (2015). Stress, resilience and life satisfaction in college students. *Revista Cercetare si Interventie Sociala*, *48*, 95. https://www.proquest.com/openview/bea13bd13071fde6d23972e232b773d8/1?pq-origsite=gscholar&cbl=2031098

Changlek, A., & Palanukulwong, T. (2015). Motivation and grit: Predictors of language learning achievement. *Veridian E-Journal, Silpakorn University (Humanities, Social Sciences and arts)*, *8*(4), 23-36. https://he02.tcihaijo.org/index.php/Veridian-E-Journal/article/view/40089

Chisholm-Burns, M. A. (2019). Building resilience to combat stress, burnout, and suicidalideation among pharmacists. *American journal of health-system pharmacy*, *76*(18), 1364-1367. https://doi.org/10.1093/ajhp/zxz172

Clark, K. N., & Malecki, C. K. (2019). Academic Grit Scale: Psychometric properties and associations with achievement and life satisfaction. *Journal of school psychology*, *72*,49-66. https://doi.org/10.1016/j.jsp.2018.12.001

Comrey, A. L., & Lee, H. B. (2013). *A first course in factor analysis*. Psychology press. https://doi.org/10.4324/9781315827506

Crawford-Garrett, K. (2018). Lacking resilience or mounting resistance? Interpreting the actions of indigenous and immigrant youth within Teach First New Zealand. *American Educational Research Journal*, 55(5), 1051-1075. https://doi.org/10.3102/0002831218769563

Crenshaw, P., Hale, E., & Harper, S. L. (2011). Producing intellectual labor in the classroom: The utilization of a critical thinking model to help students take command of their thinking. *Journal of College Teaching*

and Learning, *8*(7), 13. https://www.proquest.com/openview/a946a507db0e95c5aa39f7beef680e10/1?pq-origsite=gscholar&cbl=60280

Credé, M., Tynan, M. C., & Harms, P. D. (2017). Much ado about grit: A meta-analytic synthesis of the grit literature. *Journal of Personality and social Psychology*, *113*(3), 492. https://psycnet.apa.org/doi/10.1037/pspp0000102

Datu, J. A. D., King, R. B., & Valdez, J. P. M. (2018). Psychological capital bolsters motivation, engagement, and achievement: Cross-sectional and longitudinal studies. *The Journal of Positive Psychology*, *13*(3), 260-270. https://doi.org/10.1080/17439760.2016.1257056

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227-268. https://doi.org/10.1207/S15327965PLI1104_01

Demir, B. (2023). The mediating effect of academic resilience on the relationship between psychological resilience and academic achievement. e. *International Journal of Educational Research*, *14*(3), 52-67. https://doi.org/10.19160/e-ijer.1253101

Derakhshan, S., Shafiee-Rad, M., Shafiee, Q., & Jahed-Motlagh, M. R. (2022). Decentralized robust LMI-based voltage control strategy for autonomous inverter-interfaced multi-DG microgrids. *IEEE Transactions on Power System.* *https://doi.org/10.19160/e-ijer.1253101*

Dewey, J. (1933). Why have progressive schools? Current History, 38(4), 441-448. https://doi.org/10.1525/curh.1933.38.4.441

Dwyer, C. P., & Walsh, A. (2020). An exploratory quantitative case study of critical thinking development through adult distance learning. *Educational Technology Research and Development*, *68*(1),17-35. https://link.springer.com/article/10.1007/s11423-019-09659-2

Dörnyei, Z., & Csizér, K. (1998). Ten commandments for motivating language learners: Results of an empirical study. *Language teaching research*, *2*(3), 203-229. https://doi.org/10.1177/136216889800200303

Dörnyei, Z. (2007). *Research methods in applied linguistics: Quantitative, qualitative, and mixed methodologies*. Oxford University Press. https://thuvienso.hoasen.edu.vn/handle/123456789/14893

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087-1101. https://psycnet.apa.org/buy/2007-07951-009

D'Zurilla, T. J., Maydeu-Olivares, A., & Gallardo-Pujol, D. (2011). Predicting social problem-solving using personality traits. *Personality and individual Differences*, *50*(2), 142-147. https://doi.org/10.1016/j.paid.2010.09.015

Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). The impact of problem-solving programs in developing critical thinking skills. *European Chemical Bulletin*, 12, 6636-6642. https://www.researchgate.net/profile/AbdellahElfeky2/publication/372159965

Ennis, R. (2013). Critical thinking across the curriculum: The Wisdom CTAC Program. *Inquiry: Critical thinking across the disciplines*, *28*(2),25-45. https://doi.org/10.5840/inquiryct20132828

Fahim, M., & Hajimaghsoodi, A. (2014). The relationship between motivation and critical thinking ability of Iranian EFL learners. *International Journal of Language Learning and Applied Linguistics* World, *5*(2), 454-463. https://www.researchgate.net/profile/Arezoo-Hajimaghsoodi/publication/314977318

Fallon, C. M. (2010). *School factors that promote academic resilience in urban Latino high school students*. Loyola University Chicago. https://www.proquest.com/openview/7e46bbfa696701

Fisher, A., & Scriven, M. (2001). Critical thinking. *Cambridge, UK, Cambridge University*. https://pgwritinghub.net/wp-content/uploads/2024/09

Gallardo- Pujol, D., & Pereda, N. (2013). Person–environment transactions: personality traits moderate and mediate the effects of child sexual victimization on psychopathology. *Personality and Mental Health*, *7*(2),102-113. https://doi.org/10.1002/pmh.1192

Garofalo, J., & Lester, F. K. (1985). Metacognition, cognitive monitoring, and mathematical performance. *Journal for Research in Mathematics Education*, *16*, 163–176. https://doi.org/10.5951/jresematheduc.16.3.0163

Ghazivakili, Z., Nia, R. N., Panahi, F., Karimi, M., Gholsorkhi, H., & Ahmadi, Z. (2014). The role of critical thinking skills and learning styles of university students in their academic performance. *Journal of advances in medical education & professionalism*, *2*(3),95. https://pmc.ncbi.nlm.nih.gov/articles/PMC4235550

Halonen, J. S. (1995). Demystifying critical thinking. *Teaching of psychology*, *22*(1), 75-81. https://pmc.ncbi.nlm.nih.gov/articles/PMC4235550/

Hardin, L. E. (2003). Problem-solving concepts and theories. *Journal of veterinary medical education*, *30*(3),226-229. https://doi.org/10.3138/jvme.30.3.226

Hejazi, S. Y., & Sadoughi, M. (2023). How does teacher support contribute to

learners' grit? The role oflearning enjoyment. *Innovation in Language Learning and Teaching*, *17*(3),593-606. https://doi.org/10.1080/17501229.2022.2098961

Hill, P. L., Burrow, A. L., & Bronk, K. C. (2016). Persevering with positivity and purpose: An examination of purpose commitment and positive affect as predictors of grit. *Journal of Happiness Studies*, *17*, 257-269. https://psycnet.apa.org/doi/10.1007/s10902-014-9593-5

Hossain, B., Chen, Y., Bent, S., Parenteau, C., Widjaja, F., Haft, S. L., ... & Hendren, R. L. (2021). The role of grit and resilience in children with reading disorder: A longitudinal cohort study. *Annals of dyslexia*,1-27. https://doi.org/10.1007/s11881-021-00238-w

Hoyle, R. H. (Ed.). (1995). *Structural equation modeling: Concepts, issues, and applications*. Sage. https://books.google.com/books

Jabari Mohammad Abadi, M. (2011). Study of the effect of problem-solving skills training on the resilience of high school students in Khuzestan in the academic year of 2009-2010. Master's Thesis, Allameh Tabatabaee University. https://journal.iepa.ir/article_89166_1550737b8b8c0edbd5e5cabb10ae218c

Jonassen, D. H. (2014). Assessing problem solving. *Handbook of research on educational communications and technology*,269-288. http://dx.doi.org/10.1007/978-1-4614-3185-5_22

Kalia, V., Fuesting, M. A., & Cody, M. W. (2019). Perseverance and grit as predictors of problem-solving success. *Journal of Applied Cognitive Psychology*, 33(3), 484-496. https://www.researchgate.net/profile/Cathleen-Kappes/publication/376651200

Karbalaei, A. (2012). Critical thinking and academic achievement. *Íkala, revista de lenguaje cultura*, *17*(2), 121-128. http://dx.doi.org/10.17533/udea.ikala.10948

Keegan, K. (2017). Identifying and building grit in language learners. In *English teaching forum* (Vol. 55, No. 3, pp.2-9). US Department of State. Bureau of Educational and Cultural Affairs, Office of English Language Programs, SA-5, 2200 C Street NW 4th Floor, Washington, DC 20037. https://jtpsol.journals.ikiu.ac.ir/article_2790_9107146069974d67931602a3eddef57b.

Khajavy, G. H., MacIntyre, P. D., & Hariri, J. (2021). A closer look at grit and language mindset as predictors of foreign language achievement. *Studies in Second Language Acquisition*, *43*(2),379-402. https://www.cambridge.org/core/journals/studies-in-second-language acquisition/article/abs/closer-look-at-grit-and-language-mindset-as-predictors-of-foreign-language achievement/220C7A3BF3279C910FB3804E8EF6FA6A

Kim, G. M., Lim, J. Y., Kim, E. J., & Park, S. M. (2019). Resilience of patients with chronic diseases: A systematic review. *Health & social care in the community*, *27*(4), 797-807. https://doi.org/10.1111/hsc.12620

Kim, S. J., & Jang, G. J. (2022). Grit and problem-solving ability in nursing students: The mediating role of distress tolerance and self-directedness. *Journal of Health Informatics and Statistics*, *47*(2), 126-132. https://doi.org/10.1111/hsc.12620

Kirmizi, F. S., Saygi, C., & Yurdakal, I. H. (2015). Determine the relationship between the disposition of critical thinking and the perception about problem solving skills. *Procedia-Social and Behavioral Sciences*, *191*,661. https://doi.org/10.1016/j.sbspro.2015.04.719

Kirkley, J. (2003). Principles for teaching problem solving. *Technical Paper, Plato Learning Inc*. https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=97f0d0f6535b7002d73a5d001b16a6964f5a8c9e

Kobylarek, A., Błaszczyński, K., Ślósarz, L., Madej, M., Carmo, A., Hlad, Ľ., ... & Petrikovičová, L. (2022). The quality of life among university of the third age students in Poland, Ukraine and Belarus. *Sustainability*, *14*(4),2049. https://www.mdpi.com/2071 1050/14/4/2049

Lavoie, R. (2021). Illuminating moral distress: A grounded theory study informed by critical realism. https://mspace.lib.umanitoba.ca/items/7125db14-5332-4511-a742-7a079d440cc3

Lim, C., & Han, H. (2020). Development of instructional design strategies for integrating an online support system for creative problem-solving into a university course. *Asia Pacific Education Review*, *21*(4), 539-552.

Liu, O. L., Frankel, L., & Roohr, K. C. (2014). Assessing critical thinking in higher education: Current state and directions for next- generation assessment. *ETS Research ReportSeries*, *2014*(1),1-23. https://doi.org/10.1002/ets2.12009

Mahmoudi, H., & Asadi, M. (2016). The relationship among autonomy, self-efficacy, and critical thinking of Iranian upper-intermediate EFL learners. *Language Education Studies*, *2*(2),16-25. http://www.languageeducationstudies.ir

Martin, A. J. (2013). Academic buoyancy and academic resilience: Exploring 'everyday' and 'classic' resilience in the face of academic adversity. *School Psychology International*, *34*(5), 488-500. https://doi.org/10.1177/0143034312472759

Masten, A. S. (2018). Resilience theory and research on children and families: Past, present, and promise. *Journal of Family Theory & Review*, 10(1), 12-31. https://doi.org/10.1111/jftr.12255

Miele, D. B., Browman, A. S., Shen, C., Vasilyeva, M., & Tyumeneva, Y. A.

(2022). Domain-general and math-specific self-perceptions of perseverance as predictors of behavioral math persistence. *The Journal of Experimental Education*, *90*(3), 593-614. https://doi.org/10.1080/00220973.2020.1799312

Mohan, V., & Kaur, J. (2021). Assessing the Relationship between Grit and Academic Resilience among Students. *Issues and Ideas in Education*, *9*(1),39-47. https://doi.org/10.15415/iie.2021.91005

Mohammadi, M., Abbasian, G. R., & Siyyari, M. (2022). Adaptation and validation of a critical thinking scale to measure the 3D critical thinking ability of EFL readers. *Language Testing in Asia*, *12*(1), 24. https://link.springer.com/article/10.1186/s40468-022-00173-6

Montas, M., Rao, S. R., Atassi, H. A., Shapiro, M. C., Dean, J., & Salama, A. R. (2021). Relationship of grit and resilience to dental students' academic success. *Journal of Dental Education*, *85*(2),176-186. https://doi.org/10.1002/jdd.12414

Moseley, D., Baumfield, V., Elliott, J., Gregson, M., Higgins, S., Miller, J., & Newton, D. P.(2005). *Frameworks for thinking: A handbook for teaching and learning*. Cambridge University Press. https://durham repository.worktribe.com/output/1126689

Namaziandost, E., Heydarnejad, T., & Azizi, Z. (2023). To be a language learner or not to be? The interplay among academic resilience, critical thinking, academic emotion regulation, academic self-esteem, and academic demotivation. *Current Psychology*, *42*(20),17147-17162. https://link.springer.com/article/10.1007/s12144-023-04676-0

Parker, S. (1997). *Reflective teaching in the postmodern world: A manifesto for education in postmodernity*. McGraw-Hill Education (UK).

Perkins-Gough, D. (2013). How upper Darby school district builds student resilience. *Educational Leadership*, *71*(1), 18-19. https://www.researchgate.net/journal/Educational-leadership-journal-of-the-Department-of-Supervision-and-Curriculum-Development-NEA-0013-1784

Saavedra, A. R., & Opfer, V. D. (2012). Teaching and learning 21st century skills: Lessons from the learning sciences. *A Global Cities Education Network Report. New York, Asia Society*, *10*.

Scriven, M., & Paul, R. (1987). Critical thinking. In *The 8th Annual International Conference on Critical Thinking and Education Reform.*

Shafiee Rad, H., & Jafarpour, A. (2023). Effects of well-being, grit, emotion regulation, and resilience interventions on l2 learners' writing skills. *Reading & Writing Quarterly*, *39*(3),228-247.

http://dx.doi.org/10.1080/10573569.2022.2096517

Shahriyaripour, H., & Aghdami, N. (2012). Relationships between cultural intelligence and cognitive intelligence with success of managers of Semnan universities. *Quanti Stud Manag*, *2*, 48-64.

Shakirova, D. M. (2007). Technology for the shaping of college students' and upper-grade students' critical thinking. *Russian Education & Society*, *49*(9), 42-52. https://doi.org/10.2753/RES1060-9393490905

Shakir, H. J., Cappuzzo, J. M., Shallwani, H., Kwasnicki, A., Bullis, C., Wang, J., ... & Levy, E. I. (2020). Relationship of grit and resilience to burnout among US neurosurgery residents. *World Neurosurgery*, *134*, e224-e236. https://doi.org/10.1016/j.wneu.2019.10.043

Shaw, J., McLean, K. C., Taylor, B., Swartout, K., & Querna, K. (2016). Beyond resilience: Why we need to look at systems too. *Psychology of Violence*, *6*(1), 34. https://psycnet.apa.org/doi/10.1037/vio0000020

Shim, W. J., & Walczak, K. (2012). The Impact of Faculty Teaching Practices on the Development of Students' Critical Thinking Skills. *International Journal of Teaching and Learning in Higher Education*, *24*(1),16-30. http://www.isetl.org/ijtlhe

Shin, J., Taylor, M. S., & Seo, M. G. (2012). Resources for change: The relationships of organizational inducements and psychological resilience to employees' attitudes and behaviors toward organizational change. *Academy of Management journal*, *55*(3), 727-748. http://dx.doi.org/10.5465/amj.2010.0325

Singh, K., & Jha, S. D. (2008). Positive and negative affect, and grit as predictors of happiness and life satisfaction. *Journal of the Indian Academy of Applied Psychology*, *34*(2),40-45. https://www.researchgate.net/publication/285749956

Shirazi, F., & Heidari, S. (2019). The relationship between critical thinking skills and learning styles and academic achievement of nursing students. *Journal of Nursing Research*, *27*(4), e38. http://dx.doi.org/10.1097/jnr.0000000000000307

Sudina, E., & Plonsky, L. (2024). The effects of frequency, duration, and intensity on L2 learning through Duolingo: A natural experiment. *Journal of Second Language Studies*, *7*(1),1-43. http://dx.doi.org/10.1075/jsls.00021.plo

Sun, J. (2022). Grit and resilience as predictors of creativity among Chinese English as a foreign language teacher. *Frontiers in Psychology*, *13*,923313. https://doi.org/10.3389/fpsyg.2022.923313

Teimouri, M., Doser, J. W., & Finley, A. O. (2020). ForestFit: An R package for

modeling plant size distributions. *Environmental modelling & software*, *131*,104668. http://dx.doi.org/10.1016/j.envsoft.2020.104668

Teimouri, Y., Plonsky, L., & Tabandeh, F. (2022). L2 grit: Passion and perseverance for second-language learning. *Language Teaching Research*, 26(5), 893-918. http://dx.doi.org/10.1177/1362168820921895

Warren, J. M., & Hale, R. W. (2020). Predicting grit and resilience: Exploring college students' academic rational beliefs. *Journal of College Counseling*, *23*(2),154-167. https://psycnet.apa.org/doi/10.1002/jocc.12156

Waxman, H. C., Gray, J. P., & Padron, Y. N. (2003). Review of Research on Educational Resilience. Research Report. https://www.researchgate.net/publication/234574016

Xu, E., Wang, W., & Wang, Q. (2023). The effectiveness of collaborative problem solving in promoting students' critical thinking: A meta-analysis based on empirical literature. *Humanities and Social Sciences Communications*, *10*(1), 1-11. http://dx.doi.org/10.1057/s41599-023-01508-1

Yang, A. C., Chen, I. Y., Flanagan, B., & Ogata, H. (2022). How students' self-assessment behavior affects their online learning performance. Computers and Education: Artificial Intelligence, 3,100058. https://doi.org/10.1016/j.caeai.2022.100058

Yaure, R. G., Murowchick, E., Schwab, J. E., & Jacobson-McConnell, L. (2020). How grit and resilience predict successful academic performance. *Journal of Access, Retention, and Inclusion in Higher Education*, *3*(1), 6. https://digitalcommons.wcupa.edu/jarihe/vol3/iss1/6/

Yeh, H. C., Yang, S. H., Fu, J. S., & Shih, Y. C. (2023). Developing college students' critical thinking through reflective writing. *Higher Education Research & Development*, *42*(1),244-259. https://doi.org/10.1080/07294360.2022.2043247

Yüce, E. (2023). Critical thinking, autonomous learning, and academic grit among preservice EFL teachers. *Thinking Skills and Creativity*, 50, 101382. https://doi.org/10.1016/j.tsc.2023.101382