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Research Paper

Structural Equation Modelling of the Relationship Between EFL Learners' Language Mindset and Individual Attributes: The Case of Self-efficacy, Autonomy, Critical Thinking

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ABSTRACT
This study aimed at exploring a host of objectives: it examined whether self-efficacy, learner autonomy, and critical thinking play a significant part in predicting EFL learners' language mindset. Moreover, it inspected the direct and indirect relationships among all the above-mentioned variables. To achieve these purposes, a correlational survey design was used; survey questionnaires (Motivated Strategies for Learning Questionnaire (MSLQ), Learner Autonomy Questionnaire, California Critical Thinking Skills Test (CCTST), and Language Mindsets Inventory (LMI) were administered to more than 700 male and female intermediate EFL learners selected through convenient sampling from several language institutes in Isfahan, Iran, and the required data were collected and statistically analyzed by path analysis in the SmartPLS environment. The obtained results showed that all the variables are partially related to language mindset. However, the significant relationship with mindset was that of self-efficacy. This finding has useful implications for language teachers. Growth mindsets must be captured and modeled by them for the proper implementation of mindset interventions so that learners can understand their flexible capacities as a reflection of their efforts. They can also develop attitudes and behaviors in the learner that will help them succeed in life. Learners who undergo a growth mindset intervention to increase self-efficacy will benefit from greater academic success and commitment to learning.
Key Terms: *Critical Thinking; Language Mindset; Learner's Autonomy; Self-efficacy*

مدل سازی معادلات ساختاری رابطه بین ذهنیت زبان زبان آموزان زبان انگلیسی و ویژگی های فردی: مورد خودکارآمدی، خودمختاری، تفکر انتقادی
این مطالعه با هدف بررسی تعدادی از اهداف انجام شد: بررسی کرد که آیا خودکارآمدی، استقلال یادگیرنده، و تفکر انتقادی نقش مهمی در پیش‌بینی ذهنیت زبان زبان آموزان EFL دارند یا خیر. همچنین روابط مستقیم و غیرمستقیم بین تمامی متغیرهای فوق را مورد بررسی قرار داد. برای دستیابی به این اهداف، از طرح پیمایش همبستگی استفاده شد. پرسشنامه های نظرسنجی (پرسشنامه راهبردهای انگیزشی برای یادگیری(MSLQ) ، پرسشنامه خودمختاری یادگیرنده، آزمون مهارت های تفکر انتقادی کالیفرنیا (CCTST) و پرسشنامه ذهنیت های زبانی (LMI) بر روی بیش از ۷۰۰ زبان آموز زبان انگلیسی متوسطه مرد و زن که از طریق نمونه گیری آسان انتخاب شده بودند، اجرا شد. موسسات زبان در اصفهان، ایران و داده های مورد نیاز جمع آوری و با روش تحلیل مسیر در محیط SmartPLS مورد تجزیه و تحلیل آماری قرار گرفت. این یافته پیامدهای مفیدی برای معلمان زبان دارد. ذهنیت‌های رشد باید برای اجرای صحیح مداخلات ذهنی توسط آنها گرفته شود و مدل‌سازی شود تا فراگیران بتوانند ظرفیت‌های انعطاف‌پذیر خود را به عنوان بازتابی از تلاش‌های خود درک کنند. یادگیرنده ای که به موفقیت آنها در زندگی کمک می کند. یادگیرندگانی که برای افزایش خودکارآمدی تحت مداخله ذهنیت رشد قرار می‌گیرند، از موفقیت تحصیلی بیشتر و تعهد به یادگیری بهره خواهند برد.
کلمات کلیدی: تفکر انتقادی. ذهنیت زبانی؛ خودمختاری یادگیرنده؛ خودکارآمدی

Introduction

A quick review of the literature in second language learning shows that studies have recently begun to incorporate the theory of mindsets, from the field of educational psychology, into L2 learning (Lou & Noels, 2017). These studies have revealed that the beliefs that learners bring into their L2 learning process about their L2 learning ability can determine their L2 learning success. In other words, if students believe that they can improve in an L2 with hard work, they will; if they believe that L2 learning abilities are largely innate and unaffected by effort, they will improve less.

Psychologist Albert Bandura (1986) described self-efficacy as a belief in one's own ability to be successful in particular circumstances. Self-efficacy attitudes governed how prospects and hindrances were observed and affected not only people's choices but how much they were willing to strive and persist until they were successful. (Bandura, 1997). Academic self-efficacy significantly affected students' success at the secondary level and in higher-education coursework. "Self-efficacy beliefs have shown convergent validity in influencing such key indices of academic motivation as a choice of activities, level of effort, persistence, and emotional reactions" (Zimmerman, 2000, p. 86). Therefore, students who had greater levels of academic self-efficacy were more likely to work harder to complete a challenging task. Students with high academic self-efficacy tended to be eager to participate in an activity, persevered through trials, and had fewer emotional frustrations or negative feelings when they were not successful than students who had lower academic self-efficacy (Zimmerman, 2000).

Students with more of a growth mindset characteristically had higher levels of self-efficacy than students with more of a fixed mindset (Dweck & Master, 2009). Furthermore, students with a growth mindset were usually willing to participate and persevere in a task and to put forth additional effort (Turner, & Lapan, 2005). Thus, students with a growth mindset were likely to have had high academic self-efficacy and persisted through challenging tasks, resulting in academic achievement (Dweck, 2008).

The notion of autonomy has been one of the most debatable issues in language learning and teaching over the past decades. In the field of second and foreign language learning, helping students become autonomous is a necessity that has gained importance (Benson, 2001). The present study, among its several aims, will examine the possible effects of autonomy on language learning mindsets.

Critical thinking has been defined as the ability to analyze and evaluate information. Critical thinkers ask questions and search for problems, explain them clearly, collect and assess relevant information, utilize abstract ideas, think open-mindedly, and interact effectively with others (Duron et al., 2006). Critical thinking is considered a deliberate metacognitive and cognitive act whereby a person thinks over the quality of the reasoning process simultaneously while reasoning to a conclusion. The thinker has two vital goals attaining a solution and progressing the way s/he reasons.

As for the relationship between mindset and critical thinking, Dweck (2019) states that students who believe that they can become successful create more success in their lives than students who have a fixed mindset or do not necessarily believe they can develop their intelligence (Dweck, 2019).

Mindset research and L2 learning research have historically existed in parallel, with few studies applying the concept of mindset to language learning until recently (Yang & Priyadarshini, 2019). It can be claimed that researchers have only recently started to bridge the gap between findings in mindset research on one hand and L2 learning research on the other. Along the same line of research, it seems necessary to connect the relatively new theory of language mindset to other well-researched individual attributes.

Among such very well-researched attributes are self-efficacy, autonomy, and critical thinking and their roles in language mindsets. All these personal attributes have been the target of extensive scholarly research, yet, to the researcher's best knowledge, their roles and relationships with language mindset, as posited in this study, have not been investigated before.

Literature Reviews

In a study, Sadeghi et al. (2020) looked at any connections between language mindset and orientation as well as connections between language mindset and how students react to failure. They discovered a significant link between language mindset and learning objectives as well as a rising trend toward significance between language mindset and helpless and nervous reactions. In other words, their results supported the validity and significance of LMS research by confirming those of Lou and Noels's (2016, 2017, 2020) entire body of work.

Vaghei et al. (2020) looked into the language mindsets of intermediate Iranian EFL learners and any connections between those mindsets and feedback preferences in Students ' writing. The findings showed that students disagreed (though not significantly) with the entity items on the three subcomponents of the mindsets questionnaire (general language intelligence beliefs, second language aptitude beliefs, and age sensitivity beliefs about language learning), but they strongly agreed with the incremental items. The SEM findings also showed that whereas incremental mindsets failed to significantly predict feedback preferences, entity mindsets did. This model examined the link between entity/incremental mindsets and feedback preferences.

The domain-specificity of linguistic mentality was examined by Khajavi et al. (2021), with an emphasis on reading mindset in foreign language (L2). They also looked at whether, in addition to general language mentality, L2 reading mindset may predict a number of L2 reading-specific consequences, such as L2 reading achievement and L2 reading emotions. Participants filled out a questionnaire that asked about their attitudes toward reading, general language use, stress, and pleasure in L2. They also completed a reading comprehension task in L2. The findings showed that included L2 reading attitudes considerably increased the amount of variation in L2 reading anxiety, L2 reading pleasure, and L2 reading achievement that could be explained. The study's findings confirmed the incremental validity of the L2 reading mentality because it was able to predict L2 reading outcomes in addition to general language attitude.

Vaghei et al. (2021) looked into intermediate Iranian EFL learners' feedback preferences about their L2 writing and examined the possible differences between learners with the entity and incremental language mindsets, and Zarrinabadi et al. (2021) investigated how autonomy support predicts language mindsets and provided implications for developing communicative competence and willingness to communicate in EFL classrooms. The present study, however, aimed to fill the gap in previous studies by seeking the interrelations between language mindset and the aforementioned personal traits (i.e., self-efficacy, autonomy, and critical thinking)and finding out the direct and indirect relationships among them. In so doing, the study sought to address the following research questions:

RQ1. Is there a significant relationship between Iranian EFL learners' self-efficacy and language mindsets? Is self-efficacy a significant predictor of language mindsets?

RQ2. Is there a significant relationship between Iranian EFL learners' autonomy and language mindsets? Is autonomy a significant predictor of language mindsets?

RQ3. Is there a significant relationship between Iranian EFL learners' critical thinking and language mindsets? Is critical thinking a significant predictor of language mindsets?

RQ4. Which of the variables of self-efficacy, learner autonomy, and critical thinking could account most for the variance in EFL learners' language mindsets?

In line with the aforementioned research questions, the following hypotheses were formulated:

$H_0$1: There is no significant relationship between Iranian EFL learners' self-efficacy and language mindsets. Self-efficacy is not a significant predictor of language mindsets.

$H_0$2: There is no significant relationship between Iranian EFL learners' autonomy and language mindsets. Autonomy is not a significant predictor of language mindsets.

$H_0$3: There is no significant relationship between Iranian EFL learners' critical thinking and language mindsets. Critical thinking is not a significant predictor of language mindsets.

$H_0$4: There are no differences among self-efficacy, learner autonomy, and critical thinking in their prediction power to account for variance in EFL learners' language mindsets.

Method

Research Design

This research had a correlational survey design in which data were collected on several variables, and the interrelationships among them were identified. As stated by Creswell (2012, p. 340), a correlational design is a design in which the "researcher is interested in the extent to which two variables (or more) co-vary, that is, where changes in one variable are reflected in changes in the other." Moreover, this kind of design is justifiable for the present research because it has been claimed that the correlational research approach produces a correlation coefficient, which is a "precise way of stating the degree to which one variable is related to another, and the direction of the relationship (positive or negative)" (Gall et al., 2007, p. 333). The interrelationships among the variables in the present study were examined through path analysis procedures.

Participants

The participants of this study were selected from among Iranian EFL learners who were enrolled in EFL classes of different language institutes in Isfahan with both male and female learners. Through availability sampling, more than 700 male and female intermediate EFL learners within the age range of 20 to 40 were contacted based on their voluntary participation to fill out the questionnaires on self-efficacy, autonomy, critical thinking, language mindset, L2 speaking anxiety, demotivation, and resilience. The level of language proficiency of the learners was not a relevant variable in this study; however, to make sure that the learners have the required English proficiency to read and understand the questionnaire items, the participants were selected from the intermediate level of proficiency. All the participants had Persian as their first language, and they were learning English as a foreign language in reputable institutes in the town.

Instruments

The following instruments were utilized in the present study:

Oxford Quick Placement Test (OQPT)

The first instrument used in this research was an OQPT to make certain that learners were at the intermediate level of proficiency. The OQPT is an internationally recognized and widely used language proficiency test, which contains 60 multiple-choice items on vocabulary, grammar, and reading comprehension. Those who obtain a score between 30 and 47 will be labeled intermediate, as specified by the scoring rubric of the OQPT.

Motivated Strategies for Learning Questionnaire (MSLQ)

To assess the learners' self-efficacy, the self-efficacy subscale of the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich, et. al (1991) was used. The MSLQ is based on a social-cognitive view of motivation and self-regulated learning (Pintrich et al., 1991). Eight items (#5, #6, #12, #15, #20, #21, #29, and #31) in this scale measure learners' self-efficacy

for learning and performance. The learners rate themselves on a 5-point Likert-type scale, from 1 (*not at all true of me*) to 5 (*completely true of me*). For scoring the scale, all responses are added up to a sum score. The range is from 8 to 56 points. The motive for selecting this instrument was its high index of reliability (r = .93, based on Pintrich et al., 1991).

Learner Autonomy Questionnaire

This questionnaire was designed by (Zhang & Li, 2004) to assess learner autonomy. The questionnaire comprises two parts, including 21 items. The first part contains 11 items, and each has 5 options on the Likert scale from *never* to *always*. In the second part, there are 10 questions, and the respondents should select the closest answer to their beliefs and attitudes, or ideas in 30 minutes. The participants' choices in the questionnaire yield scores from 21 to a maximum possible score of 105.

California Critical Thinking Skills Test (CCTST)

CCTST) was used to assess EFL learners' critical thinking skills. The questionnaire consists of 34 items, measuring five categories of critical thinking ability; namely, analysis (9 items), evaluation (14 items), inference (11 items), deductive reasoning (16 items), and inductive reasoning (14 items). Each question is a multiple-choice item designed to be scored dichotomously, with one correct answer and three or four distracters. The reliability of this questionnaire, using Cronbach alpha, has been reported to be .78 to .80 (Facione, 1990).

Language Mindsets Inventory (LMI)

Another data collection instrument used in this study was Lou and Noels's (2017) Language Mindsets Inventory (LMI), whose overall score shows the type of overall language mindset of participants and whose subscale scores indicate their subscale language mindsets. This questionnaire includes 18 items and uses a 6-point Likert scale that ranges from *strongly agree* to *strongly disagree*. More precisely, it includes *strongly agree* = 6, *moderately agree* = 5, *slightly agree* = 4, *slightly disagree* = 3, *moderately disagree* = 2, and *strongly disagree* = 1. The 18 items consist of three subscales, each has six items. These are general language intelligence beliefs (GLB), second language aptitude beliefs (L2B), and age sensitivity L2 learning beliefs (ASB). The instrument measures the overall language mindset of the learners. The questionnaire has been proven effective in terms of reliability and validity by Lou and Noels (2019).

Procedures

The data collection method for this study was accomplished by administering the above-mentioned survey questionnaires to more than 700 male and female intermediate EFL learners, aged 20 to 40, who enrolled in English classes for the spring term of 2022 in several language institutes in Isfahan, Iran. Firstly, the managers of these institutes were informed about the objectives of the research, and their consent was taken. Based on availability sampling, the contact information (phone number with a WhatsApp account) of those participants who volunteered to participate was taken from teachers. Then, through an audio file sent via WhatsApp, the researcher explained the objectives of the study to the participants and provided them with the necessary information about the questionnaires. Additionally, Internet surveys were used by employing Google Docs. Thus, the participants were asked to fill in the online questionnaires, which were later accessed via different Google Docs links sent to them on WhatsApp. Every week, a questionnaire was sent to them so that they could take the questionnaires over time. In the same manner, the questionnaire data were collected. Also, the OQPT scores of the learners were collected online. Once all the required data were ready, measures were taken to analyze the data.

Results

Before analyzing the models, the descriptive statistics for the used questionnaires are presented in Table 1 below. Mean, mode, median, min, and max values for each item are also shown in the following table.

Table 1

Descriptive Statistics for the Used Questionnaires

Questionnaire	M	Min	Max	S.D
Self-Efficacy	7.48	6.33	8.00	0.51
Critical Thinking	20.45	10.00	30.00	5.65
Learner Autonomy	3.03	1.00	4.95	1.14
Language Mindset	4.97	2.94	5.67	0.32

Question 1

Is there a significant relationship between Iranian EFL learners' self-efficacy and language mindsets? Is self-efficacy a significant predictor of language mindsets?

Table 2

Obtained Statistics for the Self-efficacy and Language Mindset

Matrix	Mindset	Overall Load Factor
Self-Efficacy	0.45	1.00

The path coefficient alpha level is between -1 and 1. As Table 2 shows, the obtained value is within the significant range. Since the obtained p-value for the relationship between self-efficacy and language mindset is in the moderate range (p-value=0.45), it indicates a moderate effect of self-efficacy on language mindset. Moreover, since a total score for self-efficacy was calculated for each individual in this study, the path analysis showed a factor load of one for the relationship between self-efficacy and language mindset.

Table 3

Obtained Statistics for the Self-efficacy and Language Mindset

Matrix	R^2	R^2 adjusted
Self-Efficacy and Mindset	0.206	0.198

The coefficient of determination (R-squared correlation) measures the degree of the linear relationship between two variables. R2 measures the proportion of changes in the dependent variable that can be attributed to the independent variable. In the existing definitions, R2 is also called the determination coefficient or detection coefficient. In simple terms, it can be said that the coefficient of determination shows how many percent of changes in the dependent variables in a regression model are explained by the independent variable. Table 3. indicates that self-efficacy explained 19.8% of the variance of language mindset.

Table 4

Bootstrapping Values for the Effectivity of Self-Efficacy on Language Mindset

	Mean	S. D	T-value	P-value
Self-Efficacy and Mindset	0.45	0.08	4.96	0.000

The standard t-value to prove the significance of the influence of the independent variable on the dependent variable is equal to 1.96. As Table 4 shows, the obtained t-value is 4.96. Therefore, the obtained positive effect is significant. Also, the obtained p-value shows that the positive effect of self-efficacy on language mindset is significant.

Table 5 shows the appropriateness of the criteria. In the above model, the average extracted variance of the variables is within an acceptable range.

Table 5

Construct Reliability and Validity

Matrix	Cronbach alpha	Rho	CR	AVE
Self-Efficacy	1.00	1.00	1.00	1.00
Mindset	1.00	1.00	1.00	1.00

CR= Composite Reliability

Thus, the first hypothesis is not confirmed, and the obtained results indicated a significant relationship between Iranian EFL learners' self-efficacy and language mindsets. So, self-efficacy can significantly predict the language mindset.

Question 2

Is there a significant relationship between Iranian EFL learners' autonomy and language mindsets? Is autonomy a significant predictor of language mindsets?

Table 6

Obtained Statistics for the Learners' Autonomy and Language Mindset

Matrix	Mindset	Overall Load Factor
Autonomy	0.05	1.00

The alpha level of the path coefficient is between -1 and 1. As Table 6 shows, the obtained value is in the significant range. Since the obtained p-value for the relationship between learner autonomy and language attitude is close to 0.00 (p-value=0.05), this indicates a moderate effect of learner autonomy on language mindset. Since a total learner autonomy score was calculated for each individual in this study, the path analysis yielded a factor loading of one for the relationship between autonomy and language mindset.

Table 7

Obtained Statistics for the Learners' Autonomy and Language Mindset

Matrix	R^2	R^2 adjusted
Autonomy and Mindset	0.003	-0.007

The coefficient of determination (R-squared correlation) measures the degree of the linear relationship between two variables. R2 measures the proportion of change in the dependent variable that can be attributed to the independent variable. In existing definitions, R2 is also referred to as the coefficient of determination or the coefficient of detection. In simple terms, we can say that the coefficient of determination indicates the percentage of changes in the dependent variable in a regression model that is explained by the independent variable. Table 7 shows that learner autonomy explains -0.7% of the variance in language attitude. The obtained R-squared, which is negative, indicates that there is an inverse relationship between the degree of learner

autonomy and language attitude. However, this inverse relationship is not significant as the obtained R-squared is close to zero.

Table 8

Bootstrapping Values for the Effectivity of Self-Efficacy on Language Mindset

	Mean	S.D	T-value	P-value
Autonomy and Mindset	0.04	0.09	0.54	0.59

The standard t-value to prove the significance of the influence of the independent variable on the dependent variable is equal to 1.96. As Table 8 shows, the obtained t-value is 0.54. Therefore, the obtained positive effect is not significant. The obtained p-value also shows that the negative effect of learner autonomy on language attitude is not significant. Table 9 below shows the adequacy of the criteria. In the above model, the average extracted variance of the variables is in an acceptable range.

Table 9

Construct Reliability and Validity

Matrix	Cronbach alpha	Rho	CR	AVE
Learner Autonomy	1.00	1.00	1.00	1.00
Language Mindset	1.00	1.00	1.00	1.00

CR= Composite Reliability

Thus, the hypothesis of the second research question is confirmed, and the obtained results do not indicate a significant relationship between Iranian EFL learners' autonomy and attitude toward language. Therefore, learner autonomy is not a good predictor of language attitude.

Question 3

Is there a significant relationship between Iranian EFL learners' critical thinking and language mindsets? Is critical thinking a significant predictor of language mindsets?

Table 10

Obtained Statistics for the Critical Thinking and Language Mindset

Matrix	Mindset	Overall Load Factor
Critical Thinking	0.01	1.00

The alpha level of the load factor is from -1 to 1. As Table 10 shows, the values obtained are within the significant range. The p-value obtained for the relationship between critical thinking and language mindset is close to 0.00 (p-value = 0.01), indicating a modest effect of learners' critical thinking on language mindset. Because the study also calculated the overall learner critical thinking score for each individual, the path analysis yielded a factor loading of 1 for the association between critical thinking and language mindset.

Table 11

Obtained Statistics for the Critical Thinking and Language Mindset

Matrix	R^2	R^2 adjusted
Critical thinking and Mindset	0.000	-0.010

The alpha level of the pass factor is from -1 to 1. As Table 10 shows, the values obtained are within the significant range. The p-value obtained for the relationship between critical thinking and language mindset is close to 0.00 (p-value = 0.01), indicating a modest effect of learners' critical thinking on language mindset. Because the study also calculated the overall learner critical thinking score for each individual, the path analysis yielded a factor loading of 1 for the association between critical thinking and language mindset.

Table 12

Bootstrapping Values for the Effectivity of Critical Thinking on Language Mindset

	Mean	S.D	T-value	P-value
Critical Thinking and Mindset	0.02	0.10	0.12	0.90

The standard t-value to prove the significance of the influence of the independent variable on the dependent variable is equal to 1.96. As Table 12 shows, the obtained t-value is 0.12. Therefore, the obtained positive effect is not significant. Also, the obtained p-value shows that the negative effect of critical thinking on language mindset is not significant.

Table 13 shows the appropriateness of the criteria. In the above model, the average extracted variance of the variables is within an acceptable range.

Table 13

Construct Reliability and Validity

Matrix	Cronbach alpha	Rho	CR	AVE
Critical Thinking	1.00	1.00	1.00	1.00
Language Mindset	1.00	1.00	1.00	1.00

CR= Composite Reliability

Thus, the third hypothesis is confirmed, and the obtained results did not indicate a significant relationship between Iranian EFL learners' critical thinking and language mindsets. So, a language mindset cannot be predicted by critical thinking.

Question 4

Table 14

Obtained Statistics for the Self-Efficacy, Autonomy, Critical Thinking, and Language Mindset

Which of the variables of self-efficacy, learner autonomy, and critical thinking could account most for the variance in EFL learners' language mindsets? Matrix	Mindset	Overall Load Factor
Self-Efficacy	0.45	1.00
Autonomy	0.18	1.00
Critical Thinking	-0.04	1.00

Table 14 and Figure 7 indicate the Path Coefficient for the testing variables, namely, self-efficacy, autonomy, and critical thinking. The obtained p-values for the mentioned variables are respectively (0.45, 0.18, -0.04). These values show that the most effective variable for predicting the language mindset is self-efficacy. It should be noted that although autonomy and critical thinking effectivity are observed, these differences are not meaningful.

Table 15
Obtained Statistics for the Critical Thinking and Language Mindset

Matrix	R^2	R^2 adjusted
SE, A, and Cr. Th and Mindset	0.209	0.184

SE= Self-Efficacy, A=Autonomy, and Cr. Th=Critical thinking

Table 15 indicates that self-efficacy, autonomy, and critical thinking can explain -18.4% of the variance of language mindset. The obtained R-Square, which is positive, indicates that there is a positive relationship between the level of self-efficacy, autonomy, critical thinking, and language mindset. However, this inverse relationship is not significant because the obtained R square is not considerable.

Table 16
Bootstrapping Values for the Effectivity of Critical Thinking on Language Mindset

	Mean	S.D	T-value	P-value
Autonomy and Mindset	0.004	0.087	0.213	0.832
Critical Thinking and Mindset	-0.28	0.095	0.476	0.634
Self-Efficacy and Mindset	0.466	0.090	4.755	0.000

The standard t-value to prove the significance of the influence of the independent variables on the dependent variable is equal to 1.96. As Table 16 shows, the obtained t-value for the independent variables (autonomy, critical thinking, and self-efficacy) are respectively: 0.83, 0.63, and 0.00. Therefore, the only obtained positive effect is for self-efficacy, and the results indicate significance for self-efficacy. Also, the obtained p-values for critical thinking and autonomy show the negative effects on language mindset are not significant.

Table 17 shows the appropriateness of the criteria. In the above model, the average extracted variance of the variables is within an acceptable range.

Table 17
Construct Reliability and Validity

Matrix	Cronbach alpha	Rho	CR	AVE
Critical Thinking	1.00	1.00	1.00	1.00
Autonomy	1.00	1.00	1.00	1.00
Self-Efficacy	1.00	1.00	1.00	1.00
Language Mindset	1.00	1.00	1.00	1.00

Thus, the fourth hypothesis is rejected. Among all variables, self-efficacy could meaningfully affect the learner's language mindset.

Discussion

The present study aimed to find the interrelations between language mindset and several personal traits (i.e., self-efficacy, autonomy, and critical thinking). The findings indicated that self-efficacy was a significant predictor of language mindsets. The findings of this research and those of the previous ones all revealed that students with a growth mindset were usually willing to take part and persevere in a task and to put forth additional effort which are indicative of high self-efficacy Thus, students with a growth mindset are likely to have high academic self-efficacy and persist

through challenging tasks resulting in academic achievement. Regarding the relationship between mindset and autonomy, the results indicated that there was not a significant relationship between Iranian EFL learners' autonomy and language mindsets. Therefore, it can be inferred that learner autonomy is not a good predictor of language mindsets. According to Thanasoulas (2000), learning autonomy is a process that students strive towards. Both Dickinson (1992) and Little (1991) are in favor of the idea that learners must be prepared in order to accept autonomy and that this cannot happen naturally. Benson (2011) contends that learner autonomy should now focus more on the characteristics of the individual learner rather than the procedure. This can be an acceptable justification for the findings of this study and the reason for coming up with a negative relationship between learner autonomy and language mindsets. It is quite evident that the learners in this study have not been properly trained to develop genuine autonomous capabilities. One significant reason can be attributed to the fact that the development of learner autonomy is sometimes constrained by particular situations, communities, societies, cultures, and individual characteristics (Pennycook, 1997). Given their traditions of family compliance, the social systems of many Eastern societies, including Iran, may obstruct activities that promote individual control. Accordingly, there is a strong focus on the significance of the teacher's role in encouraging these qualities and skills associated with language learning and in utilizing learners' inherent independence in classroom activities (Benson, 2001). Without these qualities, students would still think that it is the teacher's responsibility to teach them what they need to know.

It is plausible that students who feel more supported in their autonomy will be more prone to adopt growth mindsets. According to Kim et al. (2017), fostering learner autonomy may foster a sense of authority and control, which may help learners believe that fundamental qualities are flexible and can be enhanced through effort. Earlier studies also revealed that pupils' views can be influenced by how others express failure (Haimovitz & Dweck, 2017). In particular, pupils are more likely to acquire growth mindsets when teachers put an emphasis on the learning process (e.g., give constructive criticism and exhort students to try hard; (Haimovitz & Dweck, 2017).

This interpersonal interaction, which promotes development mindsets, is consistent with a learning environment that supports student autonomy.

The reason for such a contradiction between the results of the previous studies and those of this research might be related to methods of applying mindsets and also the proficiency level, limitations in learning context, and the culture of Iranian EFL learners that might affect their way of thinking, decision making, and learning and researching on their own.

The same results were found for the relationship between mindset and critical thinking. The analysis of the collected data pointed to a lack of a significant relationship between the variables in question. This lack of a significant relationship can be justified on the grounds that students must know what critical thinking is, why it is so vital for educational practice, and what their role is in its development so that the strategies used in the critical setting have meaning and are recognized as part of a greater overall result (Emerson, 2007). The findings of the study were in contradiction with the ones conducted by Taghinejad et al. (2020) on the effectiveness of the growth mindset intervention on critical thinking in middle school gifted underachievers. Based on this finding, the growth mindset intervention can be utilized as an appropriate method to improve the critical thinking ability of underachieving gifted students.

The fourth research hypothesis focused on comparing self-efficacy, learner autonomy, and critical thinking in their prediction power to unravel which one sets a more robust relationship with language mindsets. Comparing the above-mentioned variables, it was found that the only variable with a stronger and more significant relationship with mindsets is self-efficacy. With regard to SLA, the most consistent finding is that learners' self-efficacy influences their academic success in different language areas (Hsieh 2008). The results are in line with those of past research in that growth mindsets, relative to fixed ones, are positively associated with self-

efficacy (Zarrinabadi et al., 2021). Research has also indicated that the implementation of a growth mindset has a positive impact on developing students' self-efficacy (Dweck & Master, 2009). Therefore, learners processing a growth mindset would probably have high academic self-efficacy and sustain through difficult situations, leading to academic success (Dweck & Master, 2009). The findings of this study revealed that individuals with a growth mindset believe that they can learn better through perseverance. Such beliefs may provide them with a sense of management, which can reduce their stress if they experience failures. These findings support the results of previous research (Khajavi et al., 2021; Lou & Noels, 2020). This study adds that mindset still contributed to self-efficacy even when we controlled for perceived competence, which shows that perceptions about the ability to change one's language ability (mindsets) can be as important as the perceptions about one's current language ability (perceived competence) for L2 self-efficacy.

A plausible explanation for self-efficacy being more significantly correlated with mindsets might be that students who are learning with a growth mindset believe that their efforts will be successful and approach language learning willingly, joyfully, and with interest. This result is consistent with Teimouri et al. study's (2020), which demonstrated a favorable association between growth mindsets and self-efficacy. Additionally, the outcomes demonstrated that fixed attitudes negatively influenced self-efficacy. This is mainly due to the fact that people with fixed mindsets may not enjoy the learning process because they may believe that their efforts will not be successful in raising their level of language proficiency.

Conclusion

The major purpose of this study was to uncover the relationship between language mindsets and self-efficacy, Learners' autonomy, and critical thinking. The findings revealed that all variables were, to some extent, related to language mindsets; however, the significant relationship belonged to self-efficacy. Having a growth mindset is founded on the idea that intellect is something that can be acquired over time. Individuals who have a growth mindset may consider their educational achievement to be a reflection of their work and learning. Learners who have a growth mindset are in charge of their learning and success because they think that skills can be developed through practice. Teachers should pay attention to students' perceptions of learning and how it affects their achievement in addition to their academic performance. They ought to think about promoting a curriculum that uses a growth mindset approach to teaching, encouraging persistence, using constructive criticism to advance, and highlighting the adaptability of intelligence.

The findings of this study bear useful implications for language instructors. To effectively implement the mindset intervention, teachers must demonstrate a growth mindset to learners, helping them to understand that their flexible abilities are the result of their effort. Teachers can help pupils adopt attitudes and practices that will help them succeed in life. (Blazar & Kraft, 2017). With an increased sense of academic self-efficacy, the learners' performance and achievement would improve (Kaya & Bozdag, 2016). With increased self-efficacy, students would exhibit more positive learning behaviors, including motivation, engagement, and perseverance (Yilmaz et al., 2017). Students who get the growth mindset approach intervention to boost their sense of self-efficacy will benefit from academic success and a stronger desire to learn.

References

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Clinical and Social Psychology*, 4, 359–373.

Bandura, A. (1997). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191–215.

Benson, P., (2001), *Teaching and researching autonomy in language learning*. Harlow, England: Longman.

Benson, P. (2011). Teaching and researching autonomy (2nd ed.). London, England: Pearson Education.

Blazar, D., & Kraft, M. A. (2017). Teacher and Teaching Effects on Students' Attitudes and Behaviors. Educational Evaluation and Policy Analysis, *39*(1), 146–170. https://doi.org/10.3102/0162373716670260

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed.)*. Boston, MA: Pearson.

Dickinson, L. (1992). *Learner Autonomy 2: Learner Training for Language Learning*.

Duron, R., Limbach, B., & Waugh, W. (2006). Critical thinking framework for any discipline. *International Journal of Teaching and Learning in Higher Education*, *17*(2), 160-166.

Dweck, C., & Master, A. (2009). Self-theories motivate self-regulated learning. In D. H. Schunk & B. J. Zimmerman (Eds.), Motivation and self-regulated learning: Theory, research, and applications (pp. 31–51). New York: Taylor & Francis.

Dweck, C. (2019). The Choice to Make a Difference. Perspectives on Psychological Science. *14*(1), 21–25. *Https://Doi.Org/10.1177/1745691618804180*.

Dweck, C. S., & Yeager, D. S. (2019). Mindsets: A view from two eras. *Perspectives on Psychological Science*, *14*(3), 481–496. https://doi. org/10.1177/ 17456 9161 8804 166.

Emerson, M. K. (2007). A Model for Teaching Critical Thinking. *Online Submission*.

Facione, P. (1990). Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction (The Delphi Report). *ERIC*. Retrieved from https://eric.ed.gov/?id=ED315423

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction* (8th ed.). Pearson.

Haimovitz, K., & Dweck, C. (2017). The Origins of Children's Growth and Fixed Mindsets: New Research and a New Proposal. *Child development.* 88. 10.1111/cdev.12955.

Kaya, D., & Bozdağ, H.C. (2016). Resources of Mathematics Self-Efficacy and Perception of Science Self-Efficacy as Predictors of Academic Achievement. *European Journal of Contemporary Education.* 18. 438-451. 10.13187/ejced.2016.18.438.

Khajavi, M., Hajimoradloo, A., Zandi, M., Pezeshki-Modaress, M., Bonakdar, Sh.,& Zamani, A. (2021). Fish cartilage: A promising source of biomaterial for biological scaffold fabrication in cartilage tissue engineering. *Journal of Biomedical Materials Research Part A*. 109. 10.1002/jbm.a.37169.

Kim, D.-H., Lee, H., & Kwak, J. (2017) Standards as a driving force that influences emerging technological trajectories in the converging world of the Internet and things: An investigation of the M2M/IoT patent network. *Research Policy*, 46(7), pp. 1234-1254. (doi: 10.1016/j.respol.2017.05.008)

Little, D. (1991). *Learner autonomy 1: Definitions, issues and problems*. Dublin, Ireland: Authentik Language Learning Resources.

Lou, N. M., & Noels, K. A. (2016). Changing language mindsets: Implications for goal orientations and responses to failure in and outside the second language classroom. *Contemporary Educational Psychology*, *46*, 22–33. http:/ /dx. doi. Org /10. 1016 /j. cedpsych.2016.03.004

Lou, N. M., & Noels, K. A. (2017). Measuring language mindsets and modeling their relations with goal orientations and emotional and behavioral responses in failure situations. *The Modern Language Journal*, *101*(1), 214–243. http s://doi. org/10.1 111/modl.12380.

Lou, N. M., & Noels, K. A. (2020). Breaking the vicious cycle of language anxiety: Growth language mindsets improve lower-competence ESL students' intercultural interactions. *Contemporary Educational Psychology*, *61*, 1–17. https://doi.org/10.1016/j.cedpsych.2020.101847

Pennycook, A. (1997). Cultural alternatives and autonomy. In P. Benson and P. Voller (Eds), *Autonomy and Independence in Language Learning*. London: Longman.

Pintrich, P. R., & De Groot, E. V. (1991). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, *82*, 33-40

Sadeghi, F., Sadighi, F., & Bagheri, M. S. (2020). The relationship between Iranian EFL learners' language mindset with goal orientation and responses to failure. *Cogent Education*, *7*, 1–21. https://doi.org/10.1080/2331186X.2020.1833814.

Taghinejad, H., Suhrabi, Z., Kikhavani, S.R., Jaafarpour, M., & Azadi, A. (2014). Occupational Mental Health: A Study of Work-Related Mental Health among Clinical Nurses. *Journal of clinical and diagnostic research*: JCDR. 8. WC01-3. 10.7860/JCDR/2014/8247.4835.

Teimouri, Y. & Goetze, J. & Plonsky, L. (2019). Second language anxiety and achievement: A meta-analysis. *Studies in Second Language Acquisition*. 1-25. 10.1017/S0272263118000311

Thanasoulas, D. (2000). What is learner autonomy and can it be fostered? *The Internet TESL Journal*, *6*(11).

Vaghei, Sh., Rahimi Esfahani, F., & Shafiee, S. (2021). L2 writing feedback preferences and their relationships with entity vs. incremental mindsets of EFL learners. *International Journal of Foreign Language Teaching and Research, 9*(34), 119-134.

Yang, R., & Priyadarshini, M. (2019). Growth mindset and students' perception of their English language teachers' feedback as predictors of language proficiency of the EFL learners. *Asian EFL Journal*, *23*(3), 32–60.

Yilmaz S., M., Zeleny, M., Zhao, R., Dempsey, M., & Kauffman, D. (2017). Secondary Students' Writing Achievement Goals: Assessing the Mediating Effects of Mastery and Performance Goals on Writing Self-Efficacy, Affect, and Writing Achievement.

Zarrinabadi, N., Lou, N. M., & Shirzad, M. (2021). Autonomy support predicts language mindsets: Implications for developing communicative competence and willingness to communicate in EFL classrooms. *Learning and Individual Differences*, *86*, 101981.

Zhang, L. X., & Li X. X. (2004). A comparative study on learner autonomy between Chinese students and West European students. *Foreign Language World*, *4*, 15-23.

Zimmerman, B. J. (2000). Attainment of self-regulation: A social cognitive perspective. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation, research, and applications*. Orlando, FL: Academic Press.

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