Investigating the Effects of Growth Mindset Interventions on Motivation, Grit, Basic Psychological Needs, and Language Achievement in EFL Learners

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Abstract

This thesis delves into exploring how interventions promoting a growth mindset impact English as a Foreign Language (EFL) learners with a focus on their academic progress. The concept of a growth mindset, which involves believing that skills can be developed through effort and perseverance influences students' motivation, resilience, and success. While there is research in educational contexts there is a notable gap in understanding its specific effects on EFL learners. This study aims to address this gap through three investigations. The initial study delves into the effects of growth mindset interventions on learners' mindsets, motivation levels, grit, and language achievement. The second study assesses how these interventions impact needs such as autonomy, competence, and relatedness. Lastly, the third study examines how basic psychological needs can predict and mediate the relationships between EFL students' language mindsets, grit, and motivation. The first two studies employ a mixed methods approach that combines data with insights to offer a comprehensive analysis. The third study utilizes Structural Equation Modelling (SEM) to explore the mediating roles of needs. Findings from the first study indicate enhancements in growth mindset, motivation, grit, and language achievement among participants when compared to those in the control group. The second study reveals impacts on autonomy, competence, and relatedness, among participants. The third study shows that having a growth mindset can positively impact motivation in learning a language with our basic psychological needs playing a role in this connection. This study emphasizes the significance of Self Determination Theory and mindset theory and provides suggestions for educators to incorporate growth mindset principles and cater to psychological needs more effectively. Future studies should focus on addressing limitations like sample size and duration of the study to improve the applicability and depth of the results.

Key terms: Growth mindset intervention, English, EFL learners, motivation, grit, language achievement, basic psychological needs satisfaction

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Table of Contents

Chapter One 12
Background and Context 12
Research Problems and Questions 14
Literature Review 16
Background of Language Mindset 16
Growth Mindset Intervention 20
Second Language Grit 24
Motivation 28
Language Mindset and L2 Motivation 31
Basic Psychological Need Satisfaction Theory 33
Basic Psychological Need Satisfaction and Students' Achievement 35
Language Mindset and Basic Psychological Needs Satisfaction 39
Methodological Approach 41
Thesis Structure 44
Chapter Two 46
Examining the Impact of Growth Mindset Interventions on L2 Grit, Motivation, and Language Achievement of EFL Learners 46
Method 48
Participants 48
Pilot Study 49
Instruments 50
Language Mindset Inventory (LMI) 50
The Motivated Behaviour Scale 50
L2 Grit Scale 51
Semi-structured Interviews 51
Data Collection 52
Data Analysis 55
Results 55
Results of the Quantitative Phase 55
Results of the Qualitative Phase 73
Discussion 77
Limitations of the Study and Suggestions for Future Research 79
Theoretical and Pedagogical Implications 79
Conclusion 81

Chapter Three 83
Examining the Impact of Growth Mindset Interventions on Autonomy, Relatedness, and Competence in EFL Learners 83
Method 85
Participants 85
Pilot Study 86
Instruments 87
Basic Psychological Needs of Second Language Scale 87
Semi-structured Interviews 87
Data Collection 88
Data Analysis 91
Results 91
Results of the Quantitative Phase 92
RQ1: Does the implementation of growth mindset intervention influence EFL learners' autonomy? 92
RQ2: Does the implementation of growth mindset intervention influence EFL learners' relatedness? 95
RQ3: Does the implementation of growth mindset intervention influence EFL learners' competence? 97
Results of the Qualitative Phase 100
Discussion 103
Implications, Limitations, and Suggestions for Future Research 105
Conclusion 107
Chapter Four 108
Exploring the Interplay of Growth Mindset, Motivation, and L2 Grit with the Mediating Role of Basic Psychological Needs Satisfaction 108
Method 110
Design of the Study 110
Participants 110
Instrumentation 111
Language Mindset Inventory (LMI) 111
L2 Grit Scale 112
The Motivated Behaviour Scale 112
Basic Psychological Needs Satisfaction 113
Data analysis 113
Results 114
Construct validity 115

Descriptive and Correlation Analyses of the Relationship between Constructs 118
Structural Model 118
Mediation Analysis 120
Discussion 121
Limitations of the Study and Suggestions for Future Research 127
Pedagogical Implications of the Study 127
Conclusion 129
Chapter Five 131
Conclusion Chapter 131
Findings of the First Study 131
Findings of the Second Study 132
Findings of the Third Study 133
Theoretical and Pedagogical Implications 134
Theoretical Implications 134
Pedagogical Implications 135
Limitations and Future Research Suggestions 136
Conclusion 137
References 139
Appendix A 155
Appendix B 160
Appendix C 163
Appendix D 167

List of Abbreviations

ASB	Age Sensitivity Beliefs
CEFR	Common European Framework of References for Languages
COI	Consistency of Interest
EFL	English as a Foreign Language
ELT	English Language Teaching
GLB	General Language Beliefs
GPA	Grade Point Average
LMI	Language Mindset Inventory
L2	Second Language
L2B	Second Language Learning Beliefs
POE	Perseverance of Effort
RM ANOVA	Repeated Measures Analysis of Variance
RQ	Research Question
SDT	Self Determination Theory
SEM	Structural Equation Modeling
SLA	Second Language Acquisition
SPSS	Statistical Package for the Social Sciences

List of Tables

Table 1 *Intervention Protocol* 53
Table 2 *Repeated Measures ANOVA Results for Growth Mindset across Intervention Phases* 57
Table 3 *Pairwise Comparisons of Growth Mindset Scores for Experimental and Control Groups across Time Points* 58
Table 4 *Repeated Measures ANOVA Results for Fixed Mindset across Intervention Phases* 59
Table 5 *Pairwise Comparisons of Fixed Mindset Scores for Experimental and Control Groups across Time Points* 60
Table 6 *Repeated Measures ANOVA Results for Motivation across Intervention Phases* 62
Table 7 *Pairwise Comparisons of Motivation Scores for Experimental and Control Groups Across Time Points* 63
Table 8 *Repeated Measures ANOVA Results for COI across Intervention Phases* 65
Table 9 *Pairwise Comparisons of COI Scores for Experimental and Control Groups across Time Points* 66
Table 10 *Repeated Measures ANOVA Results for POE across Intervention Phases* 68
Table 11 *Pairwise Comparisons of POE Scores for Experimental and Control Groups across Time Points* 69
Table 12 *Repeated Measures ANOVA Results for Language Achievement across Intervention Phases* 71
Table 13 *Pairwise Comparisons of Language Achievement Scores for Experimental and Control Groups across Time Points* 72
Table 14 *Intervention Protocol* 89
Table 15 *Repeated Measures ANOVA Results for Autonomy across Intervention Phases* 92
Table 16 *Pairwise Comparisons of Autonomy Scores for Experimental and Control Groups across Time Points* 93
Table 17 *Repeated Measures ANOVA Results for Relatedness across Intervention Phases* 95
Table 18 *Pairwise Comparisons of Relatedness Scores for Experimental and Control Groups across Time Points* 96
Table 19 *Repeated Measures ANOVA Results for Competence across Intervention Phases* 98
Table 20 *Pairwise Comparisons of Competence Scores for Experimental and Control Groups across Time Points* 99
Table 21 *The Unstandardized and Standardize Estimates of the CFAs, Reliability, and Validity of the Constructs* 116
Table 22 *Evaluation of the CFAs Goodness of Fit* 117
Table 23 *The Descriptive Statistics and Correlation Matrix* 118
Table 24 *Mediating Analysis by Bootstrapping* 120

List of Figures

Figure 1 The Sequential Explanatory Mixed Methods Design.....43
Figure 2 *The Hypothesized Research Model* 115
Figure 3 *Final SEM Model* 119

Chapter One

Background and Context

Research on mindset theory by Carol Dweck has captivated researchers across various domains. Language mindset researchers have been particularly interested in the positive effects of growth versus fixed language mindset on language learners' motivation, grit, language achievement, and overall engagement. In contrast to a growth language mindset, learners with a fixed mindset towards language learning have been associated with demotivation, decreased persistence in the face of challenges, and consequently, lower levels of language achievement (Blackwell, 2007; Khajavy et al., 2020). Since a growth language mindset can be enhanced through interventions (Blackwell et al., 2007), it appears that language learners in diverse contexts worldwide can benefit from these strategies. In other words, implementing mindset interventions could significantly improve learners' attitudes and outcomes in language acquisition.

In Iran, where this research was conducted, language learning, particularly English, has gained significant importance over recent years due to globalization and the growing necessity for international communication. English is commonly taught in schools and universities, and many students attend private language institutes to improve their proficiency. English language learning is more popular than other languages because so many people are trying to study or apply for jobs abroad, especially in English-speaking countries such as England, Canada, the USA, and Australia.

Despite the structured education system, there are challenges such as limited exposure to native speakers and modern teaching methodologies. Additionally, in Iran, you often hear the phrase, "I don't have that innate intelligence or aptitude to become successful," a

sentiment echoed by both students and parents. English language learners and teachers are no exceptions; sometimes, students think they are not intelligent enough or lack the natural ability or talent to succeed in language learning. Teachers may also believe that some of their students will not become proficient in English, regardless of their efforts, due to a perceived lack of talent. In other words, in the Iranian English as a foreign language (EFL) context, having a fixed language mindset is prevalent among learners, teachers, and parents. However, advancements in technology, including online resources and language learning apps, have provided new opportunities for Iranian learners to enhance their English skills. Consequently, English proficiency has become a valuable asset for academic and professional advancement in Iran, reflecting the country's increasing integration into the global community.

Having taught English in various settings and levels in Iran with different age groups for nearly eleven years, I have often seen my students expressing their frustration when learning some complicated grammatical structures and saying they do not have the inner intelligence or aptitude for learning English. I have interestingly observed that these learners usually either give up halfway or their motivation gradually fades away while they try to finish the course.

When I first learned about mindset theory and realized the opposing effects that growth and fixed mindsets can have on learners' entire language learning journey, it truly fascinated me. As I delved deeper and discovered that there are structured interventions that can promote students' growth mindset and consequently enhance their learning experience, it sparked an idea within me. I thought, why not apply this concept to the Iranian EFL context? Conducting this research in Iran is particularly important because it can address the prevalent fixed mindset among learners, teachers, and parents, challenging the entrenched beliefs about language aptitude and intelligence. By implementing growth mindset interventions, we may be able to potentially transform the educational landscape, leading to improved motivation,

persistence, and achievement in English language learning across the country. This could be very helpful in demystifying the ideas behind language aptitude and intelligence, making the learning process more enjoyable and effective for students.

Research Problems and Questions

This thesis investigates the impact of growth mindset interventions on EFL learners, focusing on their psychological and academic outcomes. Growth mindset, the belief that abilities can be developed through dedication and hard work, is a critical factor influencing students' motivation, perseverance, and achievement. Despite extensive research in general educational contexts, there is a gap in understanding how growth mindset interventions specifically affect EFL learners. This thesis addresses this gap through three separate studies, each exploring different dimensions of growth mindset effects on EFL learners. The first study examines changes in learners' mindsets, motivation, grit, and language achievement. The second study focuses on learners' basic psychological needs: autonomy, relatedness, and competence. The third study investigates the predictive and mediating roles of basic psychological needs on learners' language mindsets, grit, and motivation. By encompassing these studies, the thesis aims to provide a comprehensive understanding of how growth mindset interventions can enhance EFL learning experiences and outcomes.

The first study aims to answer the following research questions:

1. Does the implementation of growth mindset intervention influence EFL learners' growth vs. fixed language mindset?
2. Does the implementation of growth mindset intervention influence EFL learners' motivation?
3. Does the implementation of growth mindset intervention influence EFL learners' grit?

4. Does the implementation of growth mindset intervention influence EFL learners' language achievement?

The second study seeks to address the following research questions:

1. Does the implementation of growth mindset intervention influence EFL learners' autonomy?
2. Does the implementation of growth mindset intervention influence EFL learners' relatedness?
3. Does the implementation of growth mindset intervention influence EFL learners' competence?

The third study aims to explore the following research questions:

1. To what extent do students' language mindsets (both fixed and growth mindsets) predict EFL learners' L2 grit, and motivation, considering the roles of autonomy, relatedness, and competence? By addressing this question, the study examines the direct relationships between mindset, L2 motivation, and grit while also considering the roles of autonomy, relatedness, and competence.
2. What is the mediating effect of students' basic psychological needs (autonomy, relatedness, and competence) on the relationship between growth mindsets (both fixed and growth mindsets) L2 grit, and motivation? By addressing this question, the study examines the mediated relationships.

The objectives of these studies are as follows: The first study aims to evaluate how a growth mindset intervention impacts EFL learners by examining changes in their growth versus fixed mindsets, motivation, L2 grit, and language achievement. The second study focuses on how this intervention affects EFL learners' autonomy, relatedness, and

competence. The third study explores the predictive relationships between EFL learners' language mindsets (both fixed and growth) and their L2 grit, and motivation as well as the mediating role of basic psychological needs—autonomy, relatedness, and competence—on these relationships.

Literature Review

Background of Language Mindset

In recent years, L2 researchers have shown growing interest in exploring the impact of mindsets on various constructs (Lou & Noels, 2017; Mercer & Ryan, 2010; Molway & Mutton, 2020). Recognizing that mindset is a domain-specific construct, several scholars in the field of SLA have extended the theory of mindsets to second and foreign language learning over the past decade (Lou & Noels, 2017; Mercer & Ryan, 2010; Zarrinabadi & Afsharmehr, 2022) Research has revealed that language mindsets differ from other academic mindsets (Mercer & Ryan, 2010).

Lou and Noels (2017) define language learning mindset as a set of beliefs about language learning. According to Dweck's (2013) conceptualization of mindset theory, there are two main types: fixed mindset and growth mindset (Ryan & Mercer, 2012). Learners with a fixed mindset believe that language learning ability is innate and cannot be improved through practice (Mercer & Ryan, 2010; Ryan & Mercer, 2012). Conversely, those with a growth mindset believe that language learning ability can be developed through practice and effort (Lou & Noels, 2017). For learners with a fixed mindset, failures indicate a lack of inherent ability to succeed in language learning. However, for those with a growth mindset, failures signify the need for more effort.

Moreover, research by Karlen et al. (2021), Khajavy et al. (2021), and Irie et al. (2018) has expanded the investigation of mindsets to the domain of language learning, emphasizing the domain-specific nature of language mindsets and their impact on academic achievement, grit, and teaching competences. These studies emphasize the significance of understanding how beliefs about the malleability of language abilities shape engagement, persistence, and performance in language learning contexts (Irie et al., 2018; Karlen et al., 2021; Khajavy et al., 2021).

One of the pioneering studies in this area was conducted by (Mori, 1999). In this study, 187 college students studying Japanese as a foreign language completed a belief questionnaire. The study aimed to explore language learners' beliefs about the nature of knowledge and learning. Mori (1999) found that a strong belief in innate abilities was associated with lower achievement. This suggests that learners who perceive their abilities as manageable and controllable are more likely to achieve higher proficiency.

Similarly, Mercer and Ryan (2010) examined foreign language learners' mindsets and reported that language mindset is a unique type of mindset, distinct from mindsets related to other skills, such as playing the piano. They further categorized language mindset into subskills, such as listening and writing mindsets. Their study also found that language mindsets significantly influence EFL learning, affecting learners' approaches, goal setting, strategy use, and success. These findings align with those of (Khajavy et al., 2021) who confirmed that language mindset is a distinct construct that can be studied independently.

In one recent study by Bai and Wang (2023) carried out an investigation into the role of growth mindset along with self-efficacy and intrinsic value in self-regulated learning and language achievement among 690 Chinese EFL learners. It was shown that growth mindset was a stronger predictor of self-regulated learning than intrinsic value and self-efficacy. It

was also revealed that growth mindset positively predicted English language achievement of the learners. These findings are in line with the results of the study conducted by Lou et al. (2022) who also concluded that learners who endorsed a growth mindset had high engagement and language achievement.

Moreover, recent studies have focused on the interplay between mindset, grit, and language achievement (Hu et al., 2022; Khajavy et al., 2021). In a study by Hu et al. (2022), the relationship between growth mindset and English language performance among Chinese EFL university students was investigated, with a focus on the mediating roles of grit and foreign language enjoyment. A questionnaire and an English language performance test were used to collect the data. Through the structural equation modeling, it was revealed that the relationship between growth mindset and language performance was partly influenced by learners' grit and foreign language enjoyment.

This highlights that learners who endorse a growth mindset may as well experience higher levels of enjoyment in language learning and be grittier than those with a fixed mindset which could result in greater success in language learning. This research underscores the interconnectedness of mindset, psychological factors, and language learning outcomes, emphasizing the importance of cultivating a growth mindset to enhance language proficiency and academic achievement (Hu et al., 2022). Moreover, the findings of Hu et al. (2022) are consistent with those of Teimouri et al. (2024) who suggest that individuals with growth mindsets in language learning may exhibit higher levels of grit, experience more enjoyment in learning the language, and ultimately become more successful language learners.

In a large-scale study by Khajavy et al. (2021), a total of 1178 EFL students who were undertaking an English course participated and were asked to complete a questionnaire to examine the roles of language mindset and L2 grit as predictors of language learning

achievement. Khajavy et al. (2021) concluded that growth mindset had a strong positive influence on L2 achievement while none of the subscales of grit (i.e., perseverance of effort and consistency of interest) were the predictors of L2 achievement.

Lou and Noels (2017) introduced a language mindset inventory to measure language-specific mindsets, shedding light on how individuals perceive their language learning abilities. This tool has been instrumental in assessing fixed and growth mindsets in language learning contexts, providing valuable insights into how these mindsets influence learning outcomes and behaviours. By utilizing the Language Mindset Inventory, researchers have been able to assess participants' fixed and growth mindsets about language learning ability, providing valuable insights into the factors that shape language learners' attitudes and behaviours.

Additionally, research by Deng et al., (2022), and Zarrinabadi et al. (2022) have delved into the mediating role of growth mindset in relationships between personality traits, creativity, adaptability, teaching enjoyment, and work engagement among language learners and teachers. These studies underscore the interconnectedness of mindset with various psychological constructs and its influence on attitudes, behaviors, and outcomes in language learning and teaching settings (Deng et al., 2022; Li, 2023; Zarrinabadi et al., 2022).

In the same vein, Hu et al. (2022) explored the relationships between growth mindset, grit, language performance, and teacher-student dynamics in language learning environments. These studies highlight the significance of individuals' implicit theories about intelligence, talent, and language aptitude in shaping motivation, engagement, and success in language learning (Hu et al., 2022).

In summary, research from Mori (1999) to the present has consistently shown that language learning mindset is a distinct form of mindset (Khajavy et al., 2021; Lou & Noels,

2017; Mercer & Ryan, 2010). For example, a language mindset is different from a mathematics mindset. Throughout this thesis, the term language mindset refers to individuals' beliefs about language learning abilities, as defined by Lou and Noels (2017). Students with a growth language mindset believe that these abilities can be improved, while those with a fixed language mindset believe their abilities are fixed. When they fail to complete a learning task, they attribute it to a lack of inherent traits or abilities (Lou & Noels, 2017).

Overall, the integration of Dweck's theory of mindsets, along with the innovative tools developed by researchers like Lou and Noels (2017), has enriched our understanding of how beliefs about intelligence and abilities impact language learning processes and outcomes. The literature on language mindset highlights the importance of cultivating a growth mindset in language learners to enhance their engagement, well-being, and academic success. By understanding the nuanced relationship between mindset, grit, self-efficacy, and other psychological factors, educators and researchers can develop effective interventions and pedagogical strategies to support language learners in their journey toward proficiency and fluency.

Growth Mindset Intervention

To foster a growth mindset one effective approach is through growth mindset interventions (Khajavy et al., 2021). These interventions are structured strategies aimed at instilling the belief that abilities can be developed through effort and perseverance (Khajavy et al., 2021). The goal of these interventions is to shift individuals' fixed mindset beliefs towards a growth-oriented perspective, encouraging them to embrace challenges, persist in the face of setbacks, and view failures as opportunities for growth and learning (Dong et al., 2023).

One of the most cited intervention studies is by Blackwell et al. (2007), who manipulated participants' mindsets by teaching them about brain malleability. They carried out two separate studies, in their second study, ninety-one seventh-grade students participated in the growth mindset intervention, with forty-eight students in the experimental group and forty-three in the control group. Over four of the eight lessons (equivalent to 1 hour and 40 minutes), students in the experimental condition engaged in science-based readings, activities, and discussions to learn about brain malleability and how the brain can develop. The experimental group scored significantly higher than the control group on items assessing the contents of the incremental theory intervention. Three weeks after the final workshop session, the theory of intelligence was reassessed in the participants. A paired sample t-test revealed that those in the experimental condition showed a significant positive change (4.36 pre-intervention vs. 4.95 post-intervention, Cohen's $d = .66$, $t = 3.57$, $p < .05$), indicating a stronger growth mindset post-intervention.

Likewise, Paunesku et al. (2015) conducted a study with 1,594 high school students in the United States to evaluate the effects of two mindset interventions. The participants were divided into four groups: one received a growth mindset intervention, another a sense of purpose intervention, a third group received both interventions, and the fourth group served as the control. The interventions were evaluated using brief measures at the start and end of the sessions. The students' beliefs about the malleability of intelligence were assessed with two items previously used in research (e.g., Blackwell et al., 2007). The content and procedures for the growth mindset intervention were adapted from prior studies (Aronson et al., 2002; Blackwell et al., 2007) to fit a single 45-minute online session. Linear regression analysis of the results demonstrated that the growth mindset intervention effectively promoted a more malleable view of intelligence among the students.

In one study Beatty et al. (2020) conducted a large-scale quasi-experimental study with university students enrolled in algebra and calculus courses across three public universities in the US. The study, repeated with three samples in different semesters (N = 265, 201, 387), aimed to develop and validate a scalable intervention that promotes STEM self-efficacy by endorsing growth mindset beliefs and developing a sense of control over academic success. Participants were divided into intervention and control groups, with the intervention involving an introduction to the topic, two videos illustrating the main ideas, and classroom discussions. An online questionnaire was distributed three times: before the intervention, a few weeks after, and in the following semester, measuring learners' mindset beliefs, STEM self-efficacy, and perceived academic control. Results revealed a significant effect of the intervention on participants' mindset beliefs, with a highly significant increase in growth mindset beliefs post-intervention compared to pre-intervention. However, there was no significant increase in their self-efficacy or perceived academic control.

Donohoe et al. (2012) explored the impact of the Brainology program on fostering growth mindsets, resilience, and a sense of mastery among secondary students. Their quasi-experimental study utilized a mixed methods approach with pre, post, and follow-up assessments. The study involved 33 students aged 13 to 14 from a Scottish secondary school, with 18 in the intervention group and 15 in the comparison group. The comparison group continued their usual classes, while the intervention group completed four units of the Brainology program, with each session lasting around 40 minutes. Participants also answered questions related to the units to ensure comprehension. Students' mindsets were measured before the intervention, the week after completing the program, and three months later. The results indicated a significant increase in mindset scores for the intervention group immediately after the program. However, the follow-up scores showed a decline, suggesting the effects were not sustained. Qualitative analysis supported these findings, revealing that

the intervention's impact diminished over time. The control group showed no significant changes in their post-test scores.

In the language acquisition context, the study by Lou and Noels (2016) is a pioneer study in which the LMI was also created to measure the language mindset. In their study, 150 participants were assigned into two groups. In one of the groups, the learners read an article that supported the fixed mindset while in the other group, the participants read an article that supported the growth mindset. In both groups, a reading comprehension task that asked the learners to write a summary was included to confirm their understanding of the articles. The participants' language mindsets were measured before and after the intervention using the LMI and were analysed by running ANOVA tests. It was revealed that the beliefs of the learners did not differ in the pre-intervention stage. However, in the post-intervention stage, it was shown that participants in the growth mindset group earned higher scores in the growth mindset as compared to their counterparts in the fixed mindset group. These results indicate that growth mindset intervention could successfully change the language mindset of the learners towards a more growth mindset.

These interventions appear to be most successful when they concentrate on the psychological traits of the learners—their emotions, ideas, and beliefs (Yeager & Walton, 2011). These convictions affect motivational and self-control behaviors (Dweck, 2008). Though they were short, they maximized the experience's impact by applying persuasion psychology (Yeager & Walton, 2011). These interventions entailed more than just appealing to the reason of the participants; the majority involved the active participation of students in deep processing activities such as applying the growth mindset message's content to a new environment. Most intervention studies used this as a writing assignment, asking students to compose a letter encouraging growth mindset ideas to a struggling student. Research on the

"saying-is-believing" effect has shown that writing a persuasive message to a receiver can have a strong persuading effect (Aronson, 1999).

While mindset studies have successfully altered learners' mindsets, it is essential to consider the issue of publication bias. Systematic reviews of cognitive sciences literature indicate that publication and reporting biases have become prevalent in recent years (Ioannidis et al., 2014). Publication bias involves the selective reporting and publication of studies based on their results (Lefebvre et al., 2011). In response, many journals are now striving to minimize this bias to ensure a more balanced reporting of interventions. It is important to acknowledge that our understanding of the true outcomes of mindset research may be incomplete, as many studies with different results may not have been published.

Second Language Grit

The acquisition of a second language is influenced by several psychological factors, notably growth mindset and grit. Duckworth et al. (2007) define grit as "perseverance and passion for long-term goals" (p. 1087). They describe grit as a personality trait characterized by sustained effort and persistence over extended periods, even when faced with challenges and setbacks. According to Duckworth et al. (2007), grit comprises two key components: perseverance of effort and consistency of interest. Perseverance of effort refers to an individual's ability to maintain persistent effort toward their goals over time, while consistency of interest denotes the stability of an individual's passion for long-term objectives.

In her book "Grit: The Power of Passion and Perseverance," Duckworth (2016) delves into the concept of grit and its importance in achieving long-term success. She asserts that grit, defined by a combination of passion and perseverance, is crucial for goal attainment.

Duckworth (2016) suggests that one of the origins of grit is a growth mindset. Learners with a growth mindset tend to exhibit higher levels of commitment and persistence towards their objectives, which can lead to increased levels of grit. Neuroscience supports this connection, as growth mindset mediates the relationship between brain structures and grit (Myers et al., 2016). Myers et al. (2016) used fMRI to find functional connectivity between the ventral striatal and bilateral prefrontal networks, highlighting a neural connection between growth mindset and grit, although they also noted differences in the neural correlates of these variables.

In second language acquisition (SLA), grit manifests as continuous effort, determination, and resilience in the face of challenges. A key difference between general grit and L2 grit lies in the measurement focus area: general grit measures perseverance and passion for long-term goals in various fields, whereas L2 grit specifically assesses these values in the context of second language learning. To this aim, Teimouri et al. (2022) developed and validated the L2 grit scale based on Duckworth et al. (2007) that can be used in the SLA field to assess language learners' L2 grit.

Language learners' success heavily depends on their sustained effort (Teimouri, 2017), making the relationship between grit and language performance highly relevant. Yeager & Dweck (2012) found a correlation between grit and language mindset, which significantly impacts student success in educational contexts. Similarly, Dweck et al. (2014) note that students with a growth mindset about intelligence are more likely to display perseverance and determination, characteristics of grit. The link between grit and mindset lies in the interpretation of failure: a fixed mindset views failure as a sign of lacking ability, while a growth mindset sees it as an opportunity for learning and development. Understanding this

interplay is essential for grasping the connection between grit and mindsets in language learning.

Research in applied linguistics on the relationship between grit and academic success is limited (Wei et al., 2020). For instance, Teimouri et al. (2022) studied grit in the Iranian context and found that L2 grit positively predicts learners' language motivation and achievement. Similarly, Wei et al. (2020) explored L2 grit in the Chinese EFL context and reported that higher proficiency correlates with higher L2 grit, also linking grittiness to happiness. In the same vein, Khajavy et al. (2021) examined grit and language mindsets as predictors of foreign language achievement among 1224 Persian-speaking participants, revealing that only a growth language mindset weakly but positively predicted second language achievement. This suggests that learners' perceptions of their learning abilities are closely related to their effort in language learning. This is consistent with Sudina and Plonsky (2021b) who also concluded that POE positively predicted L2 and L3 achievement and proficiency, while COI was not a significant determinant of these variables.

A more recent study by Sadoughi and Hejazi (2023) investigated the relationship between perceived teacher support, growth language mindset, and academic engagement, considering the mediating role of L2 grit. Involving 295 Iranian EFL learners, their findings from structural equation modeling (SEM) indicated that perceived teacher support and growth language mindset positively affect academic engagement. Furthermore, L2 grit mediated the relationships between perceived teacher support and academic engagement, and between growth language mindset and academic engagement. This suggests that EFL learners who receive greater teacher support and possess a stronger growth language mindset are better equipped to handle failures and challenges, exhibiting greater persistence and interest, which enhances their engagement in the learning process.

To determine how grit and L2 affect balance and second language engagement are related and how grit influences L2 learners' engagement, Wu et al. (2024) collected data from 394 English learners through an online questionnaire. It was revealed that both grit and affect balance were notably associated with learners' engagement. However, between the two subcategories of grit, COI did not show any noticeable correlation with engagement, while POE played a significant positive role in enhancing engagement among the learners (Wu et al., 2024). This is in agreement with the results from Mohammed et al.'s (2022) study. They also found a positive correlation between motivation, emotions, and grit, indicating that gritty students were more engaged in L2 classes. Furthermore, Zheng et al. (2022) investigated the interplay between emotion regulation, self-efficacy, and L2 grit in higher education among 356 EFL university professors, revealing the complex relationships among these constructs (Zheng et al., 2022).

Grit is intricately linked to basic psychological needs, with its emphasis on perseverance and passion, which could enhance the satisfaction of these needs by fostering resilience and determination among the learners (Shirvan & Alamer, 2022). In their study, Shirvan and Alamer (2022) proposed a model linking L2 learners' basic psychological needs to their L2 grit and eventually L2 achievement. They found that satisfaction of the learners' basic psychological needs led to improved grit which could ultimately result in mediating the relationship between basic psychological needs and L2 achievement.

Moreover, the interplay between L2 motivation and grit is crucial, as motivated learners are more likely to exhibit grit in persisting towards their language learning goals (Zheng et al., 2022). The relationship between L2 grit and language mindset highlights the significance of learners' perceptions of their language learning abilities in sustaining effort and commitment over time (Khodaverdian Dehkordi et al., 2021). By fostering a growth

mindset and emphasizing perseverance, educators can support learners in developing grit and maintaining motivation throughout their language learning journey.

In summary, the integration of grit into the realm of SLA research has provided valuable insights into the role of perseverance and passion in language learning outcomes. Understanding the relationship between grit, basic psychological needs, L2 motivation, and language mindset is essential for creating effective language learning environments and supporting learners in achieving their language proficiency goals.

Motivation

Motivation, derived from the Latin verb "movere," refers to the force that drives individuals to undertake specific actions, make choices, or sustain efforts toward certain goals (Dörnyei & Ushioda, 2021). It refers to the internal drive that motivates a person to achieve specific goals or meet certain needs (Slavin, 2006). Over the years, extensive research and theoretical models have explored motivation, leading to diverse interpretations and debates about its nature. Despite these differences, many scholars agree that motivation fundamentally concerns the direction and intensity of human behavior, including action choices, persistence, and effort (Dörnyei & Ushioda, 2021).

According to Dörnyei and Csizér (1998) motivation in second language (L2) learning is crucial for determining both the speed and success of language acquisition. Motivation serves as the initial spark that prompts learners to start learning a new language and acts as the sustaining energy needed to continue through the often lengthy and challenging learning journey. They argue that without adequate motivation, even individuals with exceptional abilities cannot achieve their long-term language learning goals, and no curriculum or quality of teaching alone can guarantee student success.

In the realm of language learning, motivation pertains specifically to acquiring a second language (L2). Ellis (1994) defines this motivation as the effort learners invest in learning an L2, driven by their need or desire to acquire it. Lightbown and Spada (2001) describe L2 motivation as a complex construct influenced by learners' communicative needs and their attitudes towards the L2 community. They argue that learners' motivation depends on their perception of the L2 community and the necessity to speak the L2 for communication purposes. This is similar to Gardner & Lambert's (1972) concept of integrative motivation, where learners' motivation is linked to their desire to integrate with another ethnolinguistic group, adopting their speech styles and behaviors (Gardner, 2001) . However, this integrative aspect of motivation may not always apply in educational settings without direct interaction with the L2 community.

Ellis's definition focuses on the behavioural aspect, emphasizing effort. A broader and more inclusive definition is provided by Williams and Burden (1997), who describe language motivation as a "state of cognitive and emotional arousal, which leads to a conscious decision to act, and which gives rise to a period of sustained intellectual and/or physical effort in order to attain a previously set goal (or goals)" (p.120). This definition incorporates cognitive, emotional, and behavioural dimensions of motivation.

The relationship between second language motivation and language achievement has been extensively studied, with research indicating that learners with stronger motivation tend to set higher goals, leading to improved academic performance (Becirovic, 2017). Without motivation, individuals may struggle to achieve their language learning goals, even with access to optimal learning resources (Becirovic, 2017). Research has demonstrated that high levels of motivation are correlated with improved proficiency in a second language (Dunn & Iwaniec, 2021). Autonomous motivation has been associated with engagement in English as a

Foreign Language (EFL) learners, with buoyancy and boredom playing intermediary roles in enhancing motivation and subsequently affecting language achievement (Wang & Liu, 2022).

Additionally, motivation acts as a driving force that propels learners to persist in their language learning journey, while grit, defined as perseverance of effort and passion for long-term goals, complements motivation by fostering resilience and determination in the face of challenges (Duckworth et al., 2007). Grit has been linked to second language motivation and achievement (Pawlak et al., 2022). Grit plays a crucial role in sustaining learners' efforts and commitment to language learning, especially when faced with challenges or setbacks (Pawlak et al., 2022). The interplay between grit and motivation in SLA underscores the importance of persistence and resilience in achieving language proficiency (Pawlak et al., 2024).

Moreover, the influence of parental emotional companionship on children's second language acquisition emphasizes the role of emotional support in meeting learners' psychological needs and fostering motivation in language learning (Cheng & Zhou, 2023). Previous studies have indicated that there is a multifaceted relationship between second language motivation and language mindset that significantly influences language learning outcomes. In exploring the relationship between second language motivation and language mindset, it is essential to consider the impact of learners' attitudes, beliefs, and perceptions on their language learning outcomes. In a study by Zhao et al. (2018) it was revealed that grittier learners persist in tasks and develop intrinsic motivation, and it also highlights the significant impact of a growth mindset on their grit. In other words, learners with a growth mindset are more persistent and dedicated to improving their performance.

In conclusion, the relationship between second language motivation, grit, basic psychological needs, and language achievement is intricate and multifaceted. Motivation serves as a driving force that influences learners' persistence, engagement, and success in acquiring a new language. Grit plays a crucial role in sustaining learners' efforts and

resilience in the face of challenges. Basic psychological needs are essential for fostering intrinsic motivation and enhancing language performance. Understanding the interplay between motivation, grit, psychological needs, and language mindset is vital for educators and researchers seeking to optimize language learning outcomes in diverse linguistic contexts. In the current study, L2 motivation refers to learners' interest in learning English as a foreign language, driven by either personal desire or the need to achieve proficiency. This interest directly influences the effort they put forth to reach their language learning goals.

Language Mindset and L2 Motivation

Theoretical underpinnings suggest that growth mindset interventions can positively impact learners' motivation by fostering the belief that intelligence and abilities can be developed through effort and perseverance (Khajavy et al., 2021). This belief in the malleability of language learning skills can lead to increased motivation and engagement in the learning process (Hu et al., 2022). Additionally, research has shown that growth mindset interventions can indirectly influence motivation through intrinsic factors such as self-efficacy and goal orientation (Dong et al., 2023).

Research on mindset intervention and its effect on motivation is limited. One of the pioneering studies is by Aronson et al. (2002). In their study they tested the theory of encouraging students, particularly African American students, to view intelligence as a malleable rather than a fixed capacity. This intervention aimed to shift students' mindsets towards a growth-oriented perspective, which has been shown to have positive effects on academic performance. The findings from this study demonstrated that by promoting a growth mindset and encouraging students to believe in the potential for intellectual development, students showed improvements in their academic performance. This highlights the importance of mindset interventions in shaping students' beliefs about intelligence and their academic outcomes.

In another intervention study, by Blackwell et al. (2007) adolescents transitioning to middle school who received growth mindset training reported higher motivation and experienced a less severe decline in grades compared to a control group. This research focused on mindset interventions and their impact on academic achievement, particularly emphasizing the role of motivation. The findings demonstrated that promoting a growth mindset can enhance students' intrinsic motivation, highlighting the importance of fostering adaptive beliefs about intelligence to improve students' engagement and academic performance.

Empirical studies have further explored the link between growth mindset interventions and language learners' motivation. For instance, a study by Al-Ghamdi, (2020) utilized an experimental approach to explore how a mindset intervention affected the motivation and mindset beliefs of Saudi university students studying their second language. The experimental group (N=103) received the intervention while the control group (N=113) continued with classes. Statistical analyses showed improvements, in the intervention group's language mindset beliefs, attitudes toward learning English, motivational intensity for L2, goal orientation, and responses to failure immediately after the intervention. Although these effects lessened after two months, qualitative data indicated that most participants maintained their growth mindset beliefs and motivation levels. The study suggested that mindset interventions can have an impact on L2 motivation and beliefs. Multiple interventions may be needed for lasting effects.

Moreover, research by Liu et al, (2022) delved into the role of English as a foreign language learners' academic motivation and language mindset in their grit, providing insights into how motivation and mindset interact to influence learners' perseverance and effort in language learning (Liu et al., 2022). These empirical studies contribute to a better understanding of how growth mindset interventions can affect language learners' motivation

and ultimately their language learning outcomes. In conclusion, the literature review on the relationship between growth mindset interventions and language learners' motivation underscores the importance of considering both theoretical underpinnings and empirical research to gain a comprehensive understanding of how interventions in mindset can impact learners' motivation in the language learning process.

In conclusion, motivation plays a fundamental role in driving individuals to pursue and achieve specific goals (Aronson et al., 2002; Blackwell et al., 2007). According to Burnette et al. (2023), if these interventions effectively promote growth mindsets, leading to increased motivation and improved behaviour, the resulting positive outcomes justify the investment in such programs. By fostering a growth mindset, educators can enhance student engagement, motivation, and overall academic success.

Basic Psychological Need Satisfaction Theory

Basic psychological needs theory posits that three fundamental needs must be met to maintain motivation: competence, relatedness, and autonomy (Ryan & Deci, 2017). The theory emphasizes that satisfying these needs is essential for everyone, as it is universal and fundamental (Deci et al., 2001). Thus, meeting these needs should lead to positive outcomes across various aspects of life (Deci et al., 2001). Deci et al. (2001) compared these needs to essential nourishment for survival, integrity, and growth.

Competence refers to one's perception of their ability to effectively face challenges (Ryan & Deci, 2017). Deci et al. (2001) were among the first to articulate the three basic psychological needs, noting that when learners successfully tackle optimally challenging tasks and achieve desired outcomes, their need for competence is fulfilled. Competence

involves effective interaction within an environment and is linked to optimal challenges, mastery, and self-efficacy.

Relatedness is the need to feel part of a group and to be cared for by its members, who play significant roles in one's life (Ryan & Deci, 2017). This need is satisfied when individuals feel socially connected and experience reciprocal belonging and inclusion within their group. In educational contexts, this sense of relatedness can be fostered among classmates through mutual caring, reliance, and respect (Deci et al., 2001).

Autonomy, often considered the most crucial of the three needs, involves the willingness to perform an action and the sense of being the initiator rather than feeling coerced (Ryan & Deci, 2017). Autonomy represents a sense of volition, where actions align with personal values, beliefs, and interests. In language learning, learners must feel personally engaged in the process (Ryan & Deci, 2017). Autonomy is satisfied when individuals experience choice and control over their actions (Deci et al., 2001).

A number of studies offer valuable insights into the importance of basic psychological needs satisfaction and its consequences for various outcomes in education contexts (Cordiero et al., 2016; Tian et al., 2018). As an example, Tian et al. (2018) explored the effects of fulfilling basic psychological needs at school on children's behaviour, emphasizing the mediating role of school satisfaction. The study highlighted the significance of meeting autonomy, relatedness, and competence needs in improving prosocial behaviour and reducing antisocial behaviour (Tian et al., 2018). In another study, Cordeiro et al. (2016) examined the relationship between basic need satisfaction and well-being among high school students, revealing a link between need satisfaction, subjective vitality, and life satisfaction (Cordeiro et al., 2016).

Furthermore, studies have found that basic psychological need satisfaction directly predicts intrinsic motivation and innovative behaviour among teachers, emphasizing the importance of addressing these needs for both students and educators (Zhang et al., 2022). Autonomy support and grit predict life satisfaction through the satisfaction of basic psychological needs, highlighting the interconnectedness of these factors in promoting well-being in higher education settings (Lozano-Jiménez et al., 2021).

In conclusion, for individuals to remain motivated, their needs for autonomy, relatedness, and competence must be supported (Deci et al., 2001; Lou & Noels, 2017; Molway & Mutton, 2020; Ryan & Deci, 2017). The fulfilment of these three basic psychological needs fosters self-motivation, encouraging learners to persist in language learning (Dincer et al., 2019; Noels et al., 2016).

Basic Psychological Need Satisfaction and Students' Achievement

Results from earlier studies demonstrate an association between satisfaction of the learners' needs for autonomy, competence, and relatedness with their achievement (Alamer, 2022; Joe et al., 2017; Karbakhsh & Ahmadi Safa, 2020; Shirvan & Alamer, 2022). In the EFL context, Alamer (2022) posits that the satisfaction of these basic psychological needs plays a crucial role in shaping students' language learning experiences and outcomes.

Concerning the positive correlation between basic psychological need satisfaction theory and students' achievement, there is a piece of evidence provided by Ryan & Deci (2000). They claimed that two of the basic psychological needs which are autonomy and competence, put emphasis on the importance of integrating efforts in order to achieve learning goals and the sense of accomplishment to face the challenges. Thus, it can be concluded that satisfaction of autonomy along with competence is a predictor of learners'

effort and as a result their achievement in the learning process. This is in line with the findings of Dörnyei & Ushioda (2009) who also claimed that satisfaction of the students' basic psychological needs has significant effects on the amount of effort they put into learning, which could consequently determine their achievement.

In second language learning context, Joe et al. (2017) carried out an investigation into the relationship between satisfaction of learners' basic psychological needs, willingness to communicate (WTC), and students' second language achievement. 381 secondary school students in Korea participated in this study. In order to measure learners' basic psychological needs satisfaction, 5-likert scale questionnaires were used. It was revealed that satisfaction of students' three basic psychological needs (competence, autonomy, relatedness) leads to stronger self-determined motivation.

According to Joe et al. (2017), the reason why satisfaction of the language learners' basic psychological needs has a direct impact on their classroom achievement, can be attributed to their higher engagement and well-being. In other words, it was indicated by Joe et al. (2017) that when language learners' needs for autonomy, competence, and relatedness are met, their engagement and well-being thus increase. Because of this, their classroom achievement is also improved. They also reported that self-determined motivation could positively affect second language willingness to communicate and as a result academic achievement of the students.

Moreover, Karbakhsh and Ahmadi Safa (2020) carried out a study in the Iranian EFL context. The context of their investigation is the same as the current study. In their study, they investigated the effects of cognitive and psychological factors such as basic psychological needs satisfaction on language learning. To this aim, they asked 506 Iranian undergraduate English students to complete the related surveys. GPA score of students' general English was

used as a measure of their L2 achievement. In order to measure needs satisfaction, Karbakhsh and Ahmadi Safa (2020) used the general need satisfaction scale (Deci & Ryan, 2000), which addresses basic psychological needs satisfaction.

They reported that although basic psychological needs satisfaction did not directly account for second language achievement, there was found to be an indirect association with second language achievement through goal orientation. According to Karbakhsh and Ahmadi Safa (2020), it seems justified to conclude that basic psychological needs satisfaction positively correlates with EFL learners' willingness to communicate. Such findings are consistent with the research illustrating that there is a correlation between basic psychological need satisfaction theory and language learners' L2 achievement (Joe et al., 2017).

In SLA context, research consistently demonstrates that the satisfaction of autonomy, relatedness, and competence significantly enhances learners' motivation and grit in the language learning process (Alamer et al., 2023; Shirvan & Alamer, 2022). Studies have highlighted the positive impact of fulfilling basic psychological needs on learners' motivation and academic achievement (Alamer et al., 2023). The findings suggest that need satisfaction is closely related to increased motivation and the development of specific language skills among learners. Additionally, research has indicated that learners with heightened self-efficacy are more likely to set ambitious language-learning goals, driven by their belief in their ability to achieve them (Fan & Cui, 2024). Moreover, studies have shown that basic psychological needs satisfaction directly predicts intrinsic motivation among students (Vergara-Morales & Valle, 2021).

Moreover, the role of learners' psychological well-being and academic engagement in fostering grit has been investigated, highlighting the positive impact of psychological well-being and engagement on learners' perseverance and resilience in language learning (Huo,

2022). Addressing learners' psychological well-being and academic engagement as positive emotional constructs have been identified as essential for promoting grit among English as a foreign language learner (Huo, 2022).

Concerning second language achievement, Alamer (2022) used a motivational process based on self-determination theory to measure the interrelationship between basic psychological needs satisfaction, efforts, and vocabulary knowledge. It was found that basic psychological needs satisfaction was directly related to learners' vocabulary knowledge. In other words, the more autonomy, competence, and relatedness are satisfied the higher vocabulary knowledge will be. These results are also echoed in another investigation carried out by Alamer and Lee (2019), in which it was found that basic psychological need satisfaction is associated with L2 achievement. According to Alamer & Lee (2019) this association could be accounted for by the intrinsic motivation and language positive emotions that are entailed in the language learners' need satisfaction. These findings are also supported by the earlier studies carried out in second language learning domain (McEown et al., 2014; Noels, 2013).

Likewise, in their study of second language basic psychological needs, L2 grit (i.e. perseverance of effort & consistency of interest), and L2 achievement, Shirvan and Alamer (2022) distributed an online survey among 213 university students. To measure basic psychological needs satisfaction, the BPN-L2 scale developed by Alamer (2022) was used. This is the same instrument which was used in this study to measure participants' basic psychological needs satisfaction. It was reported that there is a significant relationship between L2 grit, L2 achievement and basic psychological needs satisfaction. Moreover, Shirvan and Alamer (2022) concluded that both L2 grit and basic psychological needs satisfaction positively associated with L2 achievement. This research conducted by Shiravn and Alamer (2022), confirms previous findings highlighting the positive correlation that

exists between basic psychological need satisfaction theory and achievement (Alamer & Lee, 2019; Diseth et al., 2012; Karbakhsh & Ahmadi Safa, 2020; Zhen et al., 2017).

Language Mindset and Basic Psychological Needs Satisfaction

The relationship between basic psychological needs satisfaction and mindset theory has received little attention in academic research. One of the few studies on this topic was conducted by Lou & Noels, (2020), the impact of meta-lay theories on ESL learners' mindsets and need satisfaction was examined. In Lou and Noel's study, meta-lay theories refer to individuals' beliefs on how they believe they are perceived by the people around them or the society, this can in include learners' beliefs about how others view their abilities in language learning.

The research illustrated how mindsets and basic psychological needs satisfaction can predict language confidence and beliefs about mistakes, revealing the relationship between learners' mindsets, psychological needs, and language learning outcomes in the EFL context. Their findings indicated that students who received ability-consoling feedback perceived lower belief in their potential from the teacher and felt less competent compared to those receiving no feedback. On the other hand, students who received improvement-oriented feedback perceived higher belief in their potential from the teacher.

As discussed above, satisfaction of the language learners' needs for autonomy, competence, and relatedness can positively predict their language learning achievement (Alamer, 2022; Joe et al., 2017; Karbakhsh & Ahmadi Safa, 2020; McEown et al., 2014; Noels, 2013; Ryan & Deci, 2000; Shirvan & Alamer, 2022). Collectively these studies outline a critical role for understanding how specific psychological factors, such as mindsets, grit, and basic psychological needs satisfaction impact second language acquisition (see Sadoughi & Hejazi, 2023). Research consistently demonstrates that a growth mindset, where

learners believe their abilities can improve through effort and perseverance, significantly influences their language learning success. This is supported by evidence from various mindset interventions that foster this growth-oriented perspective and enhance motivation and academic performance (see Aronson et al., 2002; Blackwell et al., 2007).

Furthermore, the satisfaction of basic psychological needs—competence, relatedness, and autonomy—has been shown to positively affect learners' engagement and achievement in language learning contexts (see Alamer & Lee, 2021; Diseth et al., 2012; Karbakhsh & Ahmadi Safa, 2020). The interplay between these psychological constructs and their impact on second language acquisition underscores the importance of fostering an environment that supports growth mindsets and meets learners' psychological needs to optimize educational outcomes.

While various studies have individually examined the impacts of growth mindset interventions on L2 grit, motivation, basic psychological needs satisfaction, and language achievement, there is a notable gap in the literature. Firstly, no research has specifically examined the influence of growth mindset interventions on EFL learners' grit, motivation, satisfaction of basic psychological needs, and language achievement. To bridge this gap, future studies should focus on exploring how growth mindset interventions influence EFL learners' grit, motivation, satisfaction of basic psychological needs, and language proficiency. Another gap is, no study has specifically investigated the extent to which EFL learners' language mindsets (both fixed and growth) predict their L2 grit and motivation.

To address this gap, it is crucial to explore to what extent students' language mindsets predict EFL learners' L2 grit, and motivation. Additionally, no study has explored the mediating effect of students' basic psychological needs (autonomy, relatedness, and competence) on the relationship between language mindsets, L2 grit, and motivation. To fill

this gap, future research should investigate how students' basic psychological needs mediate the relationship between language mindsets and L2 grit, motivation, and proficiency. By addressing these questions, the study examines both the direct and mediated relationships between these constructs. Gaining insight into the interplay among growth mindset interventions, L2 grit, motivation, basic psychological needs satisfaction, and language achievement can shed light on the mechanisms through which these factors promote language learning success and persistence among EFL learners.

This proposed study seeks to fill this research gap by exploring the relationships between growth mindset interventions, L2 grit, motivation, basic psychological needs satisfaction, and language achievement among EFL learners. By understanding how these constructs interact, the study aims to inform the creation of targeted interventions that enhance resilience, motivation, and positive learning outcomes in language education.

Moreover, by understanding how satisfaction of the three basic psychological needs of EFL learners mediates the relationship between their mindsets (fixed & growth) and L2 grit, and motivation this study intends to offer a detailed understanding of the underlying mechanisms driving language learning success. Ultimately, the findings could contribute to the development of effective interventions and strategies to help EFL learners achieve their language learning objectives.

Methodological Approach

Quantitative and qualitative research methods each have unique strengths and weaknesses when used independently. Dörnyei (2006) highlights two significant limitations of quantitative research: it averages responses, potentially missing the individual subjective

experiences, and it often fails to uncover the underlying reasons behind specific phenomena. To mitigate these issues, integrating qualitative methods can be beneficial (Dörnyei, 2006).

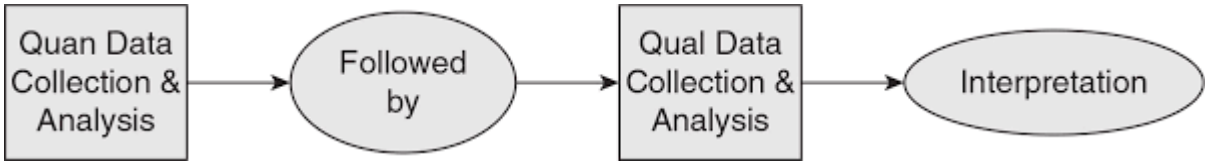
In the context of English Language Teaching (ELT) research, Wang (2018) emphasizes the benefits of qualitative research, particularly its ability to explore and understand the complexity and diversity of themes and individuals. This approach allows for a deeper investigation into the subject matter, providing insights and perspectives that quantitative methods might not capture. However, qualitative research also has drawbacks, such as the risk of conclusions being too narrow or too general due to a lack of a strict theoretical framework (Wang, 2018). Without this framework, findings might lack the depth or context needed for precise interpretations.

To avoid the limitations of using only one method, study one and two adopted a mixed-methods approach, specifically an explanatory sequential design. According to Creswell et al. (2004), mixed methods involve systematically collecting, analyzing, and integrating both quantitative and qualitative data within a single study. This approach aims to provide a comprehensive understanding of the research problem (Cresswell et al., 2004; Tashakkori & Teddlie, 2003). Combining both types of data addresses the inadequacies of using either method alone, capturing the full scope and intricacies of the situation under study.

Creswell et al. (2004) identified six common mixed-methods designs, including three concurrent and three sequential approaches. The mixed-methods sequential explanatory design is the one adopted in studies one and two. This design is favored by researchers such as Ivankova et al. (2006), which involves collecting and analyzing quantitative data first, followed by qualitative data in two successive phases. Initially, the researcher gathers and analyzes numeric data, then collects and analyzes text-based data. The qualitative phase

elaborates on the quantitative results, providing deeper insights into participants' perspectives. This design connects the two phases at an intermediate stage, with the quantitative data offering a general understanding and the qualitative data refining and elucidating these results (Rossman & Wilson, 1985; Tashakkori & Teddlie, 1998; Creswell, 2003).

Figure 1 The Sequential Explanatory Mixed Methods Design



The mixed-methods sequential explanatory design offers several advantages, including its simplicity and the ability to delve deeper into quantitative findings. This approach proves particularly valuable when unanticipated outcomes arise from a quantitative investigation (Morse, 1991). However, it is essential to acknowledge certain limitations, such as the considerable time required, and the feasibility of resources needed to gather and analyze data from both quantitative and qualitative sources.

For the first and second study, it was decided to utilize both quantitative and qualitative methods to complement each other, and their results were integrated at the interpretation level. The two sets of data were employed to gain a deeper understanding of EFL learners' experience of growth mindset intervention and to elaborate on students' perceptions of how growth mindset intervention affected their motivation, L2 grit, autonomy competence, relatedness and language achievement.

Regarding the third study, a quantitative method was chosen to collect data, as structural equation modelling (SEM) was employed for data analysis. The aim was to test a model to determine whether the variables of autonomy, relatedness, and competence acted as

mediators between growth mindset vs. fixed mindset and EFL learners' L2 grit and motivation. Quantitative methods, particularly the use of a 5-point Likert-type scale, are well-suited for this type of analysis because they allow for the precise measurement and statistical testing of hypotheses (Deem and Brehony, 2000; Dawes, 2008).

Thesis Structure

This thesis is journal-based and structured into five comprehensive chapters. The first chapter serves as the introduction, providing an overview of the research topic, its significance, objectives, and the overall framework of the thesis. This chapter sets the stage for the studies that follow by outlining the key research questions and hypotheses.

The second chapter is dedicated to the first study. This chapter includes a detailed data collection procedure, analysis and the results of the study. It concludes with a discussion of the findings in relation to the existing literature.

The third chapter presents the second study. Similar to the second chapter, it includes a description of the data collection procedures, analysis, and the results. The chapter ends with a discussion of how these findings contribute to the overall research objectives.

The fourth chapter covers the third study. It follows the same structure as the previous study chapters, providing methodology, data analysis, and presentation of results. The discussion section interprets the findings and highlights their implications for the research questions and hypotheses.

The final chapter is the conclusion. This chapter synthesizes the findings from all three studies, discusses the overall implications for theory and practice, and suggests

directions for future research. It also addresses the limitations of the studies and provides a reflective summary of the entire research project.

Chapter Two

Examining the Impact of Growth Mindset Interventions on L2 Grit, Motivation, and Language Achievement of EFL Learners

One effective approach to reducing achievement disparities and promoting positive behaviours in classrooms involves nurturing students' growth mindsets (i.e., the belief that one's abilities can be improved). The idea of a growth mindset is thought to enhance language learning by motivating students to put in effort and dedication (Bai & Wang 2023). In other words, a growth mindset entails the belief that intelligence and learning capabilities can be developed through hard work and commitment, while those with a fixed mindset tend to believe that abilities cannot be changed and are fixed (Dweck, 2007).

Students who adopt a growth mindset are more inclined to set mastery-oriented goals empowering them to persevere through challenges and stay engaged in their studies (Tang et al., 2019). Several research studies have highlighted a connection between having a growth mindset and students' academic achievements, grit, and learners' motivation. The importance of growth mindset interventions, in different contexts, has been widely discussed in numerous studies (Coppersmith et al., 2022; Dong et al. 2023; Hu et al., 2022; Noskeau et al., 2021; Zarrinabadi et al., 2022).

Another crucial element in achieving success in learning is grit, defined by Duckworth et al. (2007) as the perseverance and passion individuals exhibit in pursuing long-term goals which are essential for mastering languages (Khajavy et al., 2021). Previous studies have shown a correlation between students' grit and their academic performance (Duckworth & Quinn, 2009) and their proficiency in language learning (Sudina & Plonsky, 2021a; Wei et al., 2019). Furthermore, researchers have investigated how grit and enjoyment of learning a language mediate the relationship, between a growth mindset and language skills (Hu et al., 2022).

Motivation is another popular area of study (Dörnyei & Ryan, 2015; Ushioda, 2012). The connection between mindsets and learners' motivation is a trending subject in research. Studies consistently show a correlation between having a growth mindset and increased motivation (Blackwell et al., 2007). Simply put, learners who believe they can enhance their skills and intelligence through effort, perseverance, and learning from mistakes tend to have higher levels of motivation as opposed to learners who endorse a fixed mindset. These studies lay a foundation for exploring if and how growth mindset interventions impact the language mindset, motivation, grit, and language achievements of EFL learners.

The impact of interventions promoting a growth mindset on grit, motivation, and language achievements of EFL learners has not been thoroughly explored in a single research study. While some studies have touched upon aspects of this relationship there remains a gap in the literature for a comprehensive investigation. For example, Khajavy et al. (2021) delved into grit and language mindset as predictors of success in foreign language learning underscoring the importance of mindset in mastering languages. Similarly in a recent study, Wu et al. (2024) investigated how grit impacts students' engagement in L2 learning environments emphasizing its role in language acquisition. These studies collectively emphasize the necessity for examining how growth mindset interventions influence the motivation, grit, and language achievement of EFL learners.

This study's importance lies in its potential to bridge this gap by conducting an analysis on how growth mindset interventions can enrich the language learning journey for EFL learners. By exploring how L2 grit, motivation, and language achievement are interconnected this research can provide insights for educators aiming to implement teaching methodologies. Moreover, comprehending the effects of mindset interventions on language learning can aid in developing curricula and instructional approaches that promote grit and motivation among learners.

To sum up, the main objective of this research is to investigate how introducing growth mindset interventions can impact EFL students' shift from a fixed to a growth language mindset. The study seeks to measure the effects of these interventions on students' motivation, L2 grit, and language achievement.

Method

Participants

In this study, convenience sampling was chosen due to practical considerations and easy access to participants. Time, resource constraints, or other limitations may have made it difficult to conduct a more extensive and representative sampling method. Although convenience sampling may not guarantee a fully representative sample, it still provides valuable insights and serves the study's purpose, especially given the constraints of time and resources. Convenience sampling has emerged as a popular method among researchers in the field EFL recently. This approach has notably been utilized in mindset research papers (e.g., Derakhshan, 2022).

Consequently, the final sample comprised 60 Iranian EFL learners who took part in this research. The sample represented both male (N = 26) and female (N = 34) EFL students and their ages varied from 19 to 26, with a mean age of 22.58 (SD = 1.99). The level of English proficiency of all the students was Intermediate (CEFR level: B1) which was reported by the institute at which they were studying English. I selected one class comprising 30 students as the experimental group and another class with 30 students as my control group, using intact groups due to the inability to randomly allocate them into two groups.

For the qualitative phase of the study, a total number of ten students were purposefully selected and asked to participate in the semi-structured interviews. The interview participants were selected from among those who were willing to be interviewed, and it was made sure to have participants from both groups. Purposeful sampling was used to ensure that the selected

participants could provide valuable insights related to the study's focus. The interviews were conducted when quantitative data were collected and analysed. The number of interview participants was not predetermined, and we collected data until we thought we had reached saturation, and no new information would emerge.

Pilot Study

Dörnyei (2003) emphasizes the importance of conducting a pilot study to create an appropriate instrument. In this research, I conducted a pilot for the student questionnaires and interview questions. Initially, I translated the student questionnaires from English to Persian to ensure that students could understand and respond to the questions without language barriers. This approach aligns with the belief, as noted by Dörnyei and Csizér (2012), that translating questionnaires into participants' native language is a common practice to enhance data quality. To ascertain the accuracy of the translated version, a qualified and experienced translator was asked to back-translate the instruments into the original language which was English. After conducting some revisions, the final version of the questionnaire was agreed upon.

As recommended by Dornyei (2003) Piloting the questionnaires with participants who closely resemble the intended respondents is a critical step. Thus, ten students whose level of English proficiency was the same as the participants were asked to participate in the pilot study. The students were not only asked to have a look at the questionnaires and interview questions to see if they could fully understand them or not but also they were interviewed to evaluate whether the interview questions successfully elicited the required information or not. Both the questionnaire and interview questions were totally understandable to them and did not need any further changes.

Instruments

Language Mindset Inventory (LMI)

To evaluate students' language learning mindsets, the 18-item Language Mindset Inventory (LMI) created by Lou and Noels in 2017 was employed as shown in Appendix A. This inventory consists of three categories: general language intelligence beliefs (GLB), second language aptitude beliefs (L2B), and age sensitivity beliefs about language learning (ASB), each with six items. Participants were asked to rate their agreement on nine growth mindset items (e.g., 'How good you are at using a foreign language will always improve if you really work at it.') and nine fixed mindset items (e.g., 'You have a certain amount of language intelligence, and you can't really do much to change it.') using a five-point scale (1=Strongly Disagree to 5=Strongly Agree).

In order to measure learners' language achievement before and after the intervention the manager of the institute was asked to give the GPA of all the participants for the previous term and the current term once it was finished. This allowed for a comparison to measure the effect of the intervention on both groups.

The Motivated Behaviour Scale

To measure students' motivation toward learning English, the motivated behaviour scale developed by Taguchi et al. (2009) was employed. This scale, which can be found in Appendix A, measures different aspects of motivation among which criterion measures and integrativeness items were well-suited for this study. Criterion refers to the aspect of motivation related to students' practical goals and outcomes. Six items were designed to evaluate criterion measures (e.g., ' If an English course was offered in the future, I would like to take it.'). Concerning integrativeness, it involves the motivation driven by a desire to connect with the culture and people of the language being learned. To assess integrativeness, three items were used (e.g. ' I think learning English is important in order to learn more about

the culture and art of its speakers.'). This scale presents a method for assessing students' enthusiasm for studying English taking into account their practical goals and cultural integration. Through the inclusion of criterion measures items and items related to integration, this scale offers perspectives on students' motivation of language learning.

L2 Grit Scale

To measure L2 grit, the Language-Specific Grit Scale, which was created and validated by Teimouri et al. (2022), was employed. This scale, which is provided in Appendix A, is structured as a six-point Likert-type assessment, gauged two dimensions of grit: the persistence of effort and the constancy of interest. Five items were utilized to evaluate the persistence of effort (POE) (e.g., 'I put much time and effort into improving my English language weaknesses'), while four items were used to appraise the consistency of interest (COI) (e.g., 'I am not as interested in learning English as I used to be' reverse coded).

Semi-structured Interviews

In this study, it was decided to use semi-structured interviews as the main method, for collecting qualitative data. The interview consists of 11 questions that delve into the following areas: the impact of growth mindset intervention, evaluating growth vs. fixed mindsets of the learners, and some aspects of grit and motivation in learning English. These questions aim to delve into the perspectives and experiences of learners providing information that goes beyond what can be captured through surveys and numbers alone.

To this aim, interviews were conducted to gain a better understanding of the participants' attitudes, beliefs, and experiences. Interviews allow for discussions that can reveal nuances and complexities in how learners perceive the growth mindset intervention and their approach to learning English. This approach is particularly valuable for exploring the aspects of learners' experiences that are not easily measured. The qualitative data

gathered from these interviews complemented data by offering context and depth. While quantitative data may show trends and connections, qualitative data can shed light on the reasons underlying these patterns. For example, if quantitative data indicates an enhancement in language skills following the growth mindset intervention, interviews can unveil how and why this intervention worked based on the learners' viewpoints. The interview questions can be found in Appendix B at the end of this thesis.

The interviews were conducted in person in one of the classes of the institute and in Persian, which was the mother tongue of all the participants of the study. They were transcribed verbatim by myself and later the excerpts were translated into English by one of my former classmates from my B. A. program who is now a professional translator. Each interview lasted approximately between 30 to 40 minutes. Pseudonyms are used throughout the study.

Data Collection

The growth mindset intervention employed in this study was significantly influenced by previous research, particularly drawing upon the findings of Blackwell et al. in 2007, both in terms of content and methodology. The detailed intervention procedure can be found in Appendix C. However, it is important to note that, due to the larger number of participants in this study, some adjustments were made. In contrast to the 45-minute sessions specified in Blackwell et al. (2007), the sessions in this study extended to 90 minutes.

At the outset, the consent forms were obtained from all participants. For this study, two classes with a total of 60 language learners were chosen from an English Learning Institute in Isfahan, Iran. One of the classes which had 30 students was selected to be the experiment group and the other which also had 30 students was regarded as the control group. Their term comprised a total of 18 sessions, with 8 sessions specifically dedicated to this research. The intervention protocol that was followed in this study can be found in Table 1 below. To begin

with, students in both groups were informed that, in addition to their regular classroom curriculum, they would have the opportunity to learn more about the brain and its functions through a series of eight sessions. In the control condition, students engaged with materials that appeared similar, but these materials centred on functional localization in the brain rather than neural plasticity. Consequently, they did not convey the crucial message that intelligence is adaptable. The following provides an overview of the sessions, which primarily involved reading passages, followed by various activities and discussions:

Table 1 *Intervention Protocol*

Sessions	Experimental Group	Control Group
1 and 2	The Brain Structure & Function: Brain Anatomy, Localization of Function, Neuronal Structure, Neurotransmission	Same as experimental group
3 and 4	Incremental Theory Intervention Reading (aloud in class): ‘‘You Can Grow Your Intelligence’’ Activity: ‘‘Neural Network Maze,’’ showing how learning makes your brain smarter	Alternative Lesson: Memory Reading (aloud in class): ‘‘Memory’’ Activity: ‘‘Grocery Store Tricks,’’ teaching mnemonic strategies
5 and 6	Anti-Stereotyping Lesson: Slides, activity, discussion to illustrate the pitfalls of	Same as experimental group

	stereotyping. Study Skills Lesson: Slides, lecture, discussion, handouts teach time management and study skills.	
7 and 8	Discussions: Learning makes you smarter; Labels (e.g., stupid, dumb) should be avoided	Discussions: Academic difficulties and successes, preferences; Memory and the brain

To assess language mindset, grit, and motivation, measurements were taken at three key points: session 1 (pre-intervention), session 5 (during-intervention), and session 8 (post-intervention) in both groups. Once the intervention was over during session 8 students were given a multiple-choice test to evaluate their understanding of the content. The multiple-choice test can be found in Appendix D. It is important to note that these tests were not intended for grading purposes; they were solely designed to gauge how effectively the materials had been taught. To evaluate the impact of the intervention on students' academic performance, the grades for both groups from the preceding term and the current term were collected from the institute.

After the experiment and quantitative data collection, ten participants from both groups were invited for semi-structured interviews through the institute. Each interview took 30 minutes approximately. The interviews were conducted to gather additional insights and understand participants' perspectives.

Data Analysis

Statistical analysis was carried out using SPSS software, version 29. To explore the changes in language mindset, L2 grit, motivation, and language achievement variables. To compare results between the two groups, a Repeated Measures Analysis of Variance (RM ANOVA) was conducted. This analysis involved taking repeated measurements considering both within-subjects and between-subjects. Before conducting the RM ANOVA, necessary assumptions were checked to ensure that its assumptions such as multivariate normality, homogeneity of variances-covariances (multivariate homogeneity of variances), and linearity were met.

To analyse the data obtained in the qualitative phase, I followed Braun and Clarke's (2006) six-step thematic analysis process. Firstly, I immersed myself in the interview data, engaging with the content, and jotting down thoughts. Then I derived initial codes from the data by highlighting some interesting features and underlying themes. After that, I organized these codes into themes. These themes were scrutinized to verify their alignment with both the coded excerpts and the complete dataset. Subsequently, I refined the details of each theme and crafted a narrative through defining and labelling the themes. Lastly, I documented the identified themes and then polished the narrative structure. These steps guided my examination of the interview data ensuring a well-organized approach to identifying and presenting themes. Then an independent researcher who was a colleague of mine coded half of the data with good agreement (inter-rater reliability =0.75). A colleague of mine with expertise in research and language psychology reviewed and provided suggestions for the report of the qualitative results.

Results

Results of the Quantitative Phase

The following results section provides a detailed analysis of the study's findings, addressing each research question specifically. The first part of the results will present quantitative findings from the statistical analyses, including the repeated measures ANOVA and pairwise comparisons. These quantitative results offer insights into the overall effects of the growth mindset intervention on growth vs. fixed mindset, motivation, L2 grit (COI and POE), and language achievement and highlight the differences between the experimental and control groups across various intervention phases.

Each section is designed to correspond directly to the research questions posed, ensuring a comprehensive examination of how the intervention influenced language achievement and the distinctions observed between the experimental and control groups. The subsequent part will focus on qualitative results, which will further contextualize and elaborate on the quantitative findings, providing a deeper understanding of the impact of the intervention.

RQ1: Does the implementation of growth mindset intervention influence EFL learners' growth vs. fixed language mindset?

The results of the repeated measures ANOVA, as shown in Table 2, indicated that for growth mindset, there was a significant main effect of time, $F(2, 58) = 73.36$, $p < .05$, $\eta^2 = .44$, as well as a significant interaction between time and group, $F(2, 58) = 12.93$, $p < .05$, $\eta^2 = .18$. Therefore, it can be concluded that there is a significant difference in the mean scores of growth mindset across the different time points (pre-intervention, during-intervention, and post-intervention) and between the two groups (experimental and control).

Table 2 *Repeated Measures ANOVA Results for Growth Mindset across Intervention Phases*

Source			Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observe Power
Within-Subjects	time	Sphericity Assumed	2.435	2	1.218	36.753	.000	.388	1.000
	time * group	Sphericity Assumed	3.138	2	1.569	47.350	.000	.449	1.000
	Error(time)	Sphericity Assumed	3.843	116	.033	-	-	-	-
Between-Subjects	group		6.52	1	6.52	12.93	.001	.18	.94
	Error		29.24	58	.50	-	-	-	-

According to common benchmarks, an η^2 of .44 suggests a large effect size, indicating that about 44% of the variance in growth mindset scores can be attributed to the effect of time, after controlling for other variables. Similarly, the η^2 of .18 for the interaction effect suggests a medium effect size, indicating that about 18% of the variance in growth mindset scores can be attributed to the interaction between time and group, after controlling for other variables.

Pairwise comparisons using Bonferroni post-hoc tests were conducted to evaluate the mean differences between the pre-intervention, during-intervention, and post-intervention time points for both the experimental and control groups in terms of growth mindset scores. Table 3 presents the results.

Table 3 *Pairwise Comparisons of Growth Mindset Scores for Experimental and Control Groups across Time Points*

group	Mean	(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
							Lower Bound	Upper Bound
Experimental	2.79	1	2	-.224*	.046	.000	-.337	-.110
			3	-.600*	.051	.000	-.726	-.474
	3.01	2	1	.224*	.046	.000	.110	.337
			3	-.377*	.043	.000	-.483	-.270
	3.39	3	1	.600*	.051	.000	.474	.726
			2	.377*	.043	.000	.270	.483
Control	2.68	1	2	-.029	.046	1.000	-.143	.085
			3	.031	.051	1.000	-.095	.158
	2.71	2	1	.029	.046	1.000	-.085	.143
			3	.060	.043	.510	-.047	.167
	2.65	3	1	-.031	.051	1.000	-.158	.095
			2	-.060	.043	.510	-.167	.047

For the experimental group, significant differences were found between the pre-intervention (M = 2.79), during-intervention (M = 3.01), and post-intervention (M = 3.39) scores. The difference between the pre-intervention and during-intervention was statistically significant, MD = -0.224, SE = 0.046, $p < .001$, with a 95% confidence interval (CI) ranging from -0.337 to -0.110. Similarly, the difference between the pre-intervention and post-intervention was significant, MD = -0.600, SE = 0.051, $p < .001$, 95% CI [-0.726, -0.474]. Additionally, the difference between the during-intervention and post-intervention was also significant, MD = -0.377, SE = 0.043, $p < .001$, with a CI of -0.483 to -0.270.

In contrast, for the control group, no statistically significant differences were observed between the three-time points. The difference between the pre-intervention and during-intervention was MD = -0.029, SE = 0.046, p = 1.000, 95% CI [-0.143, 0.085]. Likewise, the difference between the pre-intervention and post-intervention was MD = 0.031, SE = 0.051, p

= 1.000, 95% CI [-0.095, 0.158]. The difference between the during-intervention and post-intervention was not significant, MD = 0.060, SE = 0.043, p = 0.510, 95% CI [-0.047, 0.167].

These results suggest that the growth mindset intervention significantly improved the mindset scores in the experimental group across all phases of the study, while no significant changes were found in the control group. Following this, the results for fixed mindset are presented in Tables 4 and 5 to enable a comparison with the growth mindset outcomes.

Table 4 *Repeated Measures ANOVA Results for Fixed Mindset across Intervention Phases*

Source			Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observe Power
Within-Subjects	time	Greenhouse-Geisser	1.48	1.84	.80	5.26	.008	.08	.80
	time * group	Greenhouse-Geisser	1.37	1.84	.74	4.87	.011	.07	.76
	Error(time)	Greenhouse-Geisser	16.40	107.00	.15	-	-	-	-
Between-Subjects	group		1.67	1	1.67	4.16	.046	.06	.51
	Error		23.41	58	.40	-	-	-	-

The repeated measures ANOVA for fixed mindset, detailed in Table 7, revealed significant findings. For within-subjects effects, the analysis showed a significant main effect of time, F (1.84,107.00) =5.26, p=.008, η2=.08. This indicates that fixed mindset scores varied significantly across the three time points (pre-intervention, during-intervention, and post-intervention). Additionally, the interaction between time and group was significant, F(1.84,107.00)=4.87, p=.011, η2=.07. This suggests that the change in fixed mindset scores

over time differed between the experimental and control groups. For between-subjects effects, the group factor was also significant, F (1,58) =4.16, p=.046, η2=. This indicates that there were significant differences in fixed mindset scores between the experimental and control groups.

The partial eta squared (η2) values provide the following effect sizes:

- The η2 of .08 for the main effect of time indicates a small to medium effect size, meaning that approximately 8% of the variance in fixed mindset scores can be attributed to the effect of time.
- The η2 of .07 for the interaction between time and group represents a small effect size, indicating that about 7% of the variance in fixed mindset scores can be explained by the interaction effect.
- The η2 of .06 for the between-subjects effect of group indicates a small effect size, meaning that about 6% of the variance in fixed mindset scores can be attributed to group differences.

Observed power values for these effects were generally moderate to high, suggesting sufficient power to detect the effects. Further pairwise comparisons using Bonferroni post-hoc tests were conducted to explore the specific mean differences between the intervention phases for both groups. The results of these comparisons are presented in Table 5.

Table 5 *Pairwise Comparisons of Fixed Mindset Scores for Experimental and Control Groups across Time Points*

group	Mean	(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
							Lower Bound	Upper Bound
Experimental	3.17	1	2	.179	.082	.099	-.023	.382
			3	.432*	.106	.000	.171	.693

	2.99	2	1	-.179	.082	.099	-.382	.023
			3	.253*	.102	.047	.002	.503
	2.73	3	1	-.432*	.106	.000	-.693	-.171
			2	-.253*	.102	.047	-.503	-.002
Control	3.14	1	2	-.041	.082	1.000	-.243	.162
			3	.004	.106	1.000	-.257	.265
	3.18	2	1	.041	.082	1.000	-.162	.243
			3	.045	.102	1.000	-.206	.295
	3.14	3	1	-.004	.106	1.000	-.265	.257
			2	-.045	.102	1.000	-.295	.206

For the experimental group, notable differences were observed in fixed mindset scores across the time points. The comparison between the pre-intervention (M = 3.17) and during-intervention (M = 2.99) scores revealed a mean difference of MD=0.179, SE=0.082, p=.099, with a 95% confidence interval (CI) ranging from −0.023 to 0.382. This difference was not statistically significant. However, the contrast between pre-intervention and post-intervention (M = 2.73) was significant, with MD=0.432, SE=0.106, p<.001, and a 95% CI ranging from 0.171 to 0.693. Additionally, the difference between the during-intervention and post-intervention scores was significant as well, MD=0.253, SE=0.102, p=.047, with a 95% CI of 0.002 to 0.503.

However, concerning the control group no significant differences were found between the three time points. The comparison between pre-intervention (M = 3.14) and during-intervention (M = 3.18) resulted in a mean difference of MD=−0.041, SE=0.082, p=1.000, with a 95% CI of −0.243 to 0.162. Similarly, the difference between pre-intervention and post-intervention (M = 3.14) was MD=0.004, SE=0.106, and the 95% CI ranged from −0.257 to 0.265. The difference between during-intervention and post-intervention was MD=0.045, SE=0.102, p=1.000, with a 95% CI of −0.206 to 0.295.

Overall, these findings suggest that the growth mindset intervention produced significant changes in fixed mindset scores for the experimental group, particularly from pre-

intervention to post-intervention and from during-intervention to post-intervention. Conversely, the control group exhibited no significant changes in fixed mindset scores across the different time points.

RQ2: Does the implementation of growth mindset intervention influence EFL learners' motivation?

The repeated measures ANOVA for motivation, as summarized in Table 6, revealed significant effects across the intervention phases.

Table 6 *Repeated Measures ANOVA Results for Motivation across Intervention Phases*

Source			Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observe Power
Within-Subjects	time	Sphericity Assumed	5.50	2	2.75	24.15	.000	.29	1.00
	time * group	Sphericity Assumed	4.65	2	2.32	20.43	.000	.26	1.00
	Error(time)	Sphericity Assumed	13.21	116	.11	-	-	-	-
Between-Subjects	group		8.00	1	8.00	5.38	.024	.085	.626
	Error		86.31	58	1.48	-	-	-	-

For within-subjects effects, the analysis demonstrated a significant main effect of time, $F(2,116) = 24.15$, $p < .001$, $\eta 2 = .29$. This indicates substantial changes in motivation scores across the three intervention phases (pre-intervention, during-intervention, and post-intervention). The effect size, with $\eta 2$ of .29, suggests a large effect, accounting for approximately 29% of the variance in motivation scores.

Additionally, the interaction between time and group was also significant, F (2,116) =20.43, p<.001, η2=.26. This indicates that the change in motivation scores over time differed between the experimental and control groups. The partial eta squared of .26 reflects a large effect size, suggesting that about 26% of the variance in motivation scores can be attributed to the interaction between time and group.

For between-subjects effects, the group factor was significant, F (1,58)=5.38, p=.024, η2=.085. This finding suggests that there were significant differences in motivation scores between the experimental and control groups. The partial eta squared of .085 indicates a small to medium effect size, meaning that approximately 8.5% of the variance in motivation scores can be attributed to group differences. Observed power values were high for all significant effects, indicating that the tests had sufficient power to detect these effects. Following this part, the results of pairwise comparisons using the Bonferroni test are presented in Table 7.

Table 7 *Pairwise Comparisons of Motivation Scores for Experimental and Control Groups Across Time Points*

group	Mean	(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
							Lower Bound	Upper Bound
Experimental	2.82	1	2	-.440*	.093	.000	-.670	-.211
			3	-.812*	.089	.000	-1.030	-.593
	3.26	2	1	.440*	.093	.000	.211	.670
			3	-.371*	.079	.000	-.566	-.176
	3.63	3	1	.812*	.089	.000	.593	1.030
			2	.371*	.079	.000	.176	.566
Control	2.76	1	2	-.124	.093	.565	-.354	.106
			3	-.029	.089	1.000	-.247	.190
	2.89	2	1	.124	.093	.565	-.106	.354
			3	.096	.079	.694	-.099	.290
	2.79	3	1	.029	.089	1.000	-.190	.247
			2	-.096	.079	.694	-.290	.099

For the experimental group, significant differences were observed in motivation scores across the time points. The comparison between pre-intervention (M = 2.82) and during-intervention (M = 3.26) revealed a mean difference of MD = -0.440, SE = 0.093, p<.001, with a 95% confidence interval (CI) ranging from -0.670 to -0.211. This difference was statistically significant, indicating a notable decrease in motivation scores during the intervention.

Likewise, the contrast between pre-intervention and post-intervention (M = 3.63) was significant, with MD = -0.812, SE = 0.089, p<.001, and a 95% CI ranging from -1.030 to -0.593. This result highlights a significant reduction in motivation scores from pre-intervention to post-intervention. Additionally, the difference between the during-intervention and post-intervention scores was also significant, MD = -0.371, SE = 0.079, p<.001, with a 95% CI of -0.566 to -0.176, reflecting a significant decrease in motivation scores from during-intervention to post-intervention.

In contrast, no significant differences were found for the control group. The comparison between pre-intervention (M = 2.76) and during-intervention (M = 2.89) resulted in a mean difference of MD = -0.124, SE = 0.093, p=.565, with a 95% CI of -0.354 to 0.106. Similarly, the difference between pre-intervention and post-intervention (M = 2.79) was MD = -0.029, SE = 0.089, p=1.000, and the 95% CI ranged from -0.247 to 0.190. The difference between during-intervention and post-intervention was MD = 0.096, SE = 0.079, p=.694, with a 95% CI of -0.099 to 0.290.

Overall, these results indicate significant changes in motivation scores in the experimental group, whereas the control group did not show significant changes across the different time points. Further details are presented in Table 8.

RQ3: Does the implementation of growth mindset intervention influence EFL learners' grit (COI and POE)?

As previously noted, grit consists of Consistency of Interest (COI) and Perseverance of Effort (POE). To clarify, results for these components are reported separately. The following results presented in Tables 8 and 9 pertain specifically to COI.

Table 8 *Repeated Measures ANOVA Results for COI across Intervention Phases*

Source			Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observe Power
Within-Subjects	time	Greenhouse-Geisser	4.33	1.79	2.42	13.82	.000	.19	.99
	time * group	Greenhouse-Geisser	3.16	1.79	1.76	10.08	.000	.14	.97
	Error(time)	Greenhouse-Geisser	18.18	103.86	.17	-	-	-	-
Between-Subjects	group		4.90	1	4.90	6.41	.014	.10	.70
	Error		44.33	58	.76	-	-	-	-

For within-subjects effects, the analysis showed a significant main effect of time, $F(1.79,103.86)=13.82$, $p<.001$, $\eta 2=.19$. This indicates substantial changes in COI scores across the three intervention phases (pre-intervention, during-intervention, and post-intervention). With an effect size of $\eta 2=.19$, this reflects a large effect, suggesting that approximately 19% of the variance in COI scores can be attributed to the changes over time.

Additionally, the interaction between time and group was significant, F (1.79,103.86)=10.08, p<.001, η2=.14. This result shows that the pattern of change in COI scores over time differed between the experimental and control groups. The partial eta squared of .14 denotes a large effect size, indicating that about 14% of the variance in COI scores is explained by the interaction between time and group.

For between-subjects effects, the group factor was significant, F (1,58)=6.41, p=.014, η2=.10. This finding suggests that there were significant differences in COI scores between the experimental and control groups. The partial eta squared of .10 represents a medium effect size, indicating that approximately 10% of the variance in COI scores can be attributed to group differences. Observed power values were high for all significant effects, indicating that the tests had sufficient power to detect these effects. Following, the results of pairwise comparisons using the Bonferroni test are presented in Table 9.

Table 9 *Pairwise Comparisons of COI Scores for Experimental and Control Groups across Time Points*

group	Mean	(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
							Lower Bound	Upper Bound
Experimental	2.77	1	2	-.275*	.109	.044	-.544	-.006
			3	-.698*	.083	.000	-.903	-.494
	3.05	2	1	.275*	.109	.044	.006	.544
			3	-.423*	.112	.001	-.699	-.148
	3.47	3	1	.698*	.083	.000	.494	.903
			2	.423*	.112	.001	.148	.699
Control	2.75	1	2	.017	.109	1.000	-.253	.286
			3	-.050	.083	1.000	-.255	.155
	2.74	2	1	-.017	.109	1.000	-.286	.253
			3	-.067	.112	1.000	-.342	.209
	2.80	3	1	.050	.083	1.000	-.155	.255
			2	.067	.112	1.000	-.209	.342

Regarding the experimental group, significant differences were observed in COI scores across the intervention phases. The comparison between the pre-intervention (M = 2.77) and during-intervention (M = 3.05) revealed a significant mean difference of MD = -0.275, SE = 0.109, p = .044, with a 95% confidence interval (CI) ranging from -0.544 to -0.006. This indicates a statistically significant decrease in COI scores from pre-intervention to during-intervention.

The difference between the pre-intervention and post-intervention (M = 3.47) was also significant, with a mean difference of MD = -0.698, SE = 0.083, p < .001, and a 95% CI ranging from -0.903 to -0.494. This result shows a significant decrease in COI scores from pre-intervention to post-intervention. Furthermore, the comparison between the during-intervention and post-intervention scores was significant, with a mean difference of MD = -0.423, SE = 0.112, p = .001, and a 95% CI of -0.699 to -0.148. This finding indicates a significant decrease in COI scores from during-intervention to post-intervention.

On the other hand, in terms of the control group, no notable differences were found between the three time points. The comparison between the pre-intervention (M = 2.75) and during-intervention (M = 2.74) yielded a mean difference of MD = 0.017, SE = 0.109, p = 1.000, with a 95% CI of -0.253 to 0.286. Similarly, the difference between the pre-intervention and post-intervention (M = 2.80) was not significant, with MD = -0.050, SE = 0.083, p = 1.000, and a 95% CI ranging from -0.255 to 0.155. The difference between the during-intervention and post-intervention was also not notable, with a mean difference of MD = -0.067, SE = 0.112, p = 1.000, and a 95% CI of -0.342 to 0.209.

These results suggest that COI scores in the experimental group significantly changed across the intervention phases, while no significant changes were observed in the control group. Further analyses for Perseverance of Effort (POE) will be presented to complete the

examination of grit components. Following, the results of RM ANOVA for POE are presented in Table 10.

Table 10 *Repeated Measures ANOVA Results for POE across Intervention Phases*

Source			Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observe Power
Within-Subjects	time	Greenhouse-Geisser	3.16	1.89	1.67	24.42	.000	.29	1.00
	time * group	Greenhouse-Geisser	1.99	1.89	1.05	15.41	.000	.21	.99
	Error(time)	Greenhouse-Geisser	7.52	109.93	.06	-	-	-	-
Between-Subjects	group		4.04	1	4.04	4.19	.045	.06	.52
	Error		55.97	58	.96	-	-	-	-

As it can be seen in Table 10, the within-subjects analysis revealed a significant main effect of time on POE, $F(1.89, 109.93) = 24.42$, $p < .001$. This effect size ($\eta^2 = .29$) represents a large effect, indicating that changes in POE across intervention phases accounted for a substantial portion of the variance in scores. The observed power was 1.00, indicating strong statistical power to detect this effect.

A significant time × group interaction was also found, $F(1.89, 109.93) = 15.41$, $p < .001$, with a large effect size ($\eta^2 = .21$). This suggests that the effect of time on POE differed between groups and accounted for a meaningful portion of variance. The observed power for this interaction was .99. The error term for time had a sum of squares of 7.52 and a mean square of .06.

The between-subjects analysis indicated a significant main effect of group, $F(1, 58) = 4.19$, $p = .045$, with a medium effect size ($\eta^2 = .06$). This finding suggests that group membership explained a moderate portion of the variance in POE scores. The observed power was .52. The error term for the between-subjects effect had a sum of squares of 55.97 and a mean square of .96.

In summary, the results showed significant effects of both time and the time × group interaction on POE, with large effect sizes. The between-subjects analysis revealed a medium effect of group on POE. These findings suggest that the intervention phases had a substantial impact on POE, particularly in relation to the interaction between time and group. The results of the Bonferroni post-hoc test are presented in the following table (Table 11).

Table 11 *Pairwise Comparisons of POE Scores for Experimental and Control Groups across Time Points*

group	Mean	(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
							Lower Bound	Upper Bound
Experimental	2.91	1	2	-.288*	.063	.000	-.444	-.133
			3	-.583*	.073	.000	-.763	-.403
	3.20	2	1	.288*	.063	.000	.133	.444
			3	-.294*	.061	.000	-.444	-.145
	3.49	3	1	.583*	.073	.000	.403	.763
			2	.294*	.061	.000	.145	.444
Control	2.87	1	2	-.015	.063	1.000	-.170	.140
			3	-.067	.073	1.000	-.247	.113
	2.89	2	1	.015	.063	1.000	-.140	.170
			3	-.052	.061	1.000	-.201	.098
	2.94	3	1	.067	.073	1.000	-.113	.247
			2	.052	.061	1.000	-.098	.201

Regarding the experimental group, distinct differences were observed in POE scores across the intervention phases. The comparison between the pre-intervention phase (M = 2.91) and the during-intervention phase (M = 3.20) revealed a clear mean difference of MD =

-0.288, SE = 0.063, p < .001, with a 95% confidence interval (CI) ranging from -0.444 to -0.133. This indicates a statistically meaningful increase in POE scores from the pre-intervention to the during-intervention phase.

The difference between the pre-intervention and the post-intervention phase (M = 3.49) was also evident, with a mean difference of MD = -0.583, SE = 0.073, p < .001, and a 95% CI ranging from -0.763 to -0.403. This result shows a marked increase in POE scores from the pre-intervention to the post-intervention phase. Furthermore, the comparison between the during-intervention and post-intervention phases revealed a meaningful mean difference of MD = -0.294, SE = 0.061, p < .001, with a 95% CI ranging from -0.444 to -0.145, indicating a continued clear rise in POE scores from during-intervention to post-intervention.

In contrast, for the control group, no substantial differences were found across the phases. The comparison between the pre-intervention phase (M = 2.87) and the during-intervention phase (M = 2.89) yielded an insignificant mean difference of MD = -0.015, SE = 0.063, p = 1.000, with a 95% CI ranging from -0.170 to 0.140. Similarly, the difference between the pre-intervention and post-intervention phases (M = 2.94) was minor, with MD = -0.067, SE = 0.073, p = 1.000, and a 95% CI ranging from -0.247 to 0.113. The comparison between the during-intervention and post-intervention phases showed no considerable change, with a mean difference of MD = -0.052, SE = 0.061, p = 1.000, and a 95% CI ranging from -0.201 to 0.098.

These findings suggest that POE scores in the experimental group significantly increased throughout the intervention, while the control group showed no remarkable changes across the phases.

RQ4: Does the implementation of growth mindset intervention influence EFL learners' language achievement?

A repeated measures ANOVA was conducted to assess the effects of time and group on language achievement across the intervention phases and the results can be found in the following table (Table 12).

Table 12 *Repeated Measures ANOVA Results for Language Achievement across Intervention Phases*

Source			Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observe Power
Within-Subjects	time	Sphericity Assumed	17.63	1	17.63	16.31	.000	.22	.97
	time * group	Sphericity Assumed	30.00	1	30.0	27.76	.000	.32	.99
	Error(time)	Sphericity Assumed	62.67	58	1.08	-	-	-	-
Between-Subjects	group		16.87	1	16.87	6.92	.011	.10	.73
	Error		141.30	58	2.43	-	-	-	-

Concerning the within-subjects effects, the results of RM ANOVA revealed a significant main effect of time, $F(1, 58) = 16.31$, $p < .001$, $\eta^2 = .22$. This represents a large effect, indicating substantial changes in language achievement across the intervention phases. The observed power for this effect was .97.

The interaction between time and group was also significant, $F(1, 58) = 27.76$, $p < .001$, $\eta^2 = .32$, demonstrating a large effect. This suggests that the pattern of change in language achievement over time differed significantly between the experimental and control groups. The observed power for this interaction was .99.

For the between-subjects effects, there was a notable main effect of group, $F(1, 58) = 6.92$, $p = .011$, $\eta^2 = .10$, reflecting a medium effect. This indicates that group effect had a moderate impact on language achievement. The observed power for this effect was .73.

The results indicate that language achievement was significantly influenced by time and the interaction between time and group, with large effect sizes observed. Group effect also had a moderate impact on language achievement. The subsequent table (Table 13) will present the results of the Bonferroni pairwise comparisons to further elucidate the differences between specific time points and groups.

Table 13 *Pairwise Comparisons of Language Achievement Scores for Experimental and Control Groups across Time Points*

group	Mean	(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
							Lower Bound	Upper Bound
Experimental	15.95	1	2	-1.767*	.268	.000	-2.304	-1.229
	17.75	2	1	1.767*	.268	.000	1.229	2.304
Control	16.20	1	2	.233	.268	.388	-.304	.771
	15.97	2	1	-.233	.268	.388	-.771	.304

For the experimental group, notable differences were observed between the intervention phases. The comparison between pre-intervention ($M = 15.95$) and during-intervention ($M = 17.75$) showed a substantial mean difference of $MD = -1.767$, $SE = 0.268$, $p < .001$, with a 95% confidence interval (CI) ranging from -2.304 to -1.229. This indicates a significant increase in language achievement from pre-intervention to during-intervention.

Conversely, the comparison between during-intervention and pre-intervention resulted in a mean difference of MD = 1.767, SE = 0.268, $p < .001$, and a 95% CI from 1.229 to 2.304, confirming the same substantial increase.

Regarding the control group, no significant differences were observed across the intervention phases. The comparison between pre-intervention (M = 16.20) and during-intervention (M = 15.97) yielded a mean difference of MD = 0.233, SE = 0.268, $p = .388$, with a 95% CI ranging from -0.304 to 0.771. Similarly, the comparison between during-intervention and pre-intervention resulted in a mean difference of MD = -0.233, SE = 0.268, $p = .388$, with a 95% CI from -0.771 to 0.304, indicating no notable change in language achievement scores.

These pairwise comparisons highlight that the experimental group experienced a substantial increase in language achievement from pre-intervention to during-intervention, while the control group exhibited no meaningful changes across the intervention phases. This underscores the effectiveness of the intervention in enhancing language achievement for the experimental group.

In summary, these post-hoc analyses underscore the effectiveness of the intervention across various measures, demonstrating notable improvements in growth mindset, subcategories of L2 grit, motivation, and language achievement for the experimental group compared to the control group.

Results of the Qualitative Phase

The qualitative data gathered from the participants from experimental and control groups were analysed. It was revealed that most of the participants from the experimental group had found the growth mindset intervention to be a positive and effective experience. This can be seen in the following comments.

> The intervention really helped me change my attitude on challenges. I feel more motivated and confident in my ability to improve and succeed. I noticed a big improvement in my overall attitude towards learning English. I think it was a positive experience and will have a lasting impact on my mindset. (Arad, 19, male)

When asked about their beliefs on the growth and fixed mindsets regarding language learning one of the interviewees from the control group, who did not believe in the malleability of language learning ability, stated: “Yes, from my own experiences, I believe that language intelligence is real; some individuals possess it while others do not” (Sara, 24, female).

However, another participant who endorsed a fixed mindset from the experimental group commented that:

> I started learning English when I was 23 but even with hard work and practice I can’t speak English well now. I am now even thinking it is impossible for me to become very good in English because even with consistent effort and practice I still don’t think my English is very good. (Mahdi, 26, male)

In terms of their second language grit, the individuals were asked about their enjoyment of English learning and their willingness to study it, and participants with different language mindsets responded differently. Most of the learners who endorsed a growth language mindset stated they enjoy learning English and willingly engage in studying it, while those with a fixed mindset often saw it as a compulsory task rather than an enjoyable activity, expressing less enthusiasm and voluntary engagement in their studies. One learner with a growth mindset mentioned that they find learning English enjoyable because it allows them to explore new ideas, connect with people from different cultures, and expand their worldview. They approach their studies with enthusiasm, viewing each lesson as an

opportunity to improve their language skills and broaden their horizons. Similarly, another participant with a growth language mindset commented that:

> I really enjoy learning English because it challenges me and helps me grow. I love discovering new aspects of the language and culture, and I willingly spend extra time studying because I know it will benefit me in the long term. (Farnoosh, 22, female)

In contrast, one language learner with a fixed mindset pointed out:

> I see learning English as something I have to do rather than something I enjoy. These days if you want to become successful and have a decent job you must know English. That's why I don't feel very much excited about it, and I only study because it's necessary, not because I want to. (Alireza, 25, male)

When asked about their grit to share the experience of a tough time they did not give up, one participant who had a growth mindset mentioned:

> When I first started learning English, I struggled a lot with pronunciation. It was so different from my native language, and I often felt embarrassed when I spoke. However, instead of getting discouraged, I decided to focus on improving step by step. I practiced every day, listened to native speakers, and even recorded myself to identify mistakes. Over time, my pronunciation improved significantly. (Nasrin, 26, female)

However, another participant with a fixed mindset mentioned struggling with an essay in the target language, feeling that despite hours of effort and help from others, her difficulties reinforced her belief that she was not naturally good at languages. As she pointed out:

> I once had to write an essay in English for a class assignment, and it was extremely difficult for me. I felt that no matter how much I tried, I just couldn't get it right because I'm not naturally good at languages. I spent hours trying to improve my writing, but it felt like I was just hitting a wall. In the end, I managed to complete the essay with a lot of help from my teacher and classmates. (Parisa, 23, female)

When asked about their motivation and if they aspire to become culturally similar to native speakers of English, learners who had a growth mindset provided a mixture of comments. For example, one learner pointed out:

> I believe it's important to understand and appreciate the culture of native English speakers to improve communication. It helps make our interactions better. However, I don't feel the need to become exactly like them. I value my own cultural identity and want to keep it while learning from and respecting other cultures. (Arad, 19, male)

However, another learner who also had a growth mindset mentioned "I want to be more like English people because I think it will help me fit in and feel more connected to the community of native speakers of English" (Zara, 22, female). Similarly, another participant holding a fixed mindset commented:

> I like to stay with what I'm used to instead of trying new cultural customs. I feel comfortable with what's familiar and think it's important to stay connected to my own cultural background. (Atefe, 24, female)

The qualitative analysis of participant responses from both experimental and control groups provides compelling insights into the impact of a growth mindset intervention on different factors involved in language learning. Participants in the experimental group reported positive transformations in their approach to challenges and learning experiences. They expressed increased motivation, confidence, and a proactive engagement with English

learning, viewing it as an opportunity for personal growth and cultural exploration. In contrast, individuals in the control group often exhibited fixed mindsets, perceiving language learning as a compulsory task rather than a fulfilling endeavour. Their responses highlighted reluctance towards embracing cultural diversity and a tendency to adhere to familiar practices. These findings underscore the profound influence of mindset on language learning outcomes and emphasize the importance of fostering a growth mindset to enhance better language learning experience and achievement.

Discussion

The main goal of this research was to examine how growth mindset interventions impact the academic outcomes of EFL learners. The focus was on understanding the influence of these interventions on learners' beliefs about growth and fixed mindsets, their motivation levels, and their grit in terms of POE and COI, and language achievement. Through this exploration valuable insights were sought into the effectiveness of growth mindset interventions in promoting changes in learners' attitudes and performance with the goal of enhancing teaching strategies in EFL education.

The study findings revealed significant differences between the experimental and control groups across various measures, showcasing the impact of growth mindset interventions on psychological constructs and academic achievements. Specifically, the experimental group exhibited a steady increase in mean scores for growth mindset, motivation, and consistency of interest (COI) over time, while the control group's scores remained relatively stable. This trend was also observed in language achievement, with the experimental group demonstrating a notable increase compared to the control group, indicating a significant interaction effect across group and time. However, fixed mindset and Perseverance of Effort (POE) scores remained stable over the study period in both groups, with no significant interaction effect observed. These results underscore the importance of

growth mindset interventions in fostering positive psychological outcomes and academic achievements.

The findings emphasize the effectiveness of such interventions in promoting desirable psychological traits and academic success among individuals, aligning with previous research that has shown the benefits of growth mindset interventions on academic outcomes (Blackwell et al., 2007). These results mirror those of the previous studies that have examined the effects of growth mindset intervention on learners' academic achievement which found the role of growth mindset interventions positive in improving students' achievement (Blackwell et al., 2007). This positive influence can be attributed to the fact that individuals with a growth mindset tend to exhibit adaptive self-regulation strategies, enhancing their resilience against academic setbacks (Zeng et al., 2019).

Language learners' motivation also increased in the experimental group compared to the control group. The results of this study on motivation are keeping with previous empirical studies, which indicated that these interventions have the potential to significantly enhance academic achievement and boost motivation in SLA studies (Lou & Noels, 2016; Molway & Mutton, 2020). The increase in learners' motivation observed in those who received growth mindset interventions can be attributed to the positive impact these interventions have on motivational beliefs. Growth mindset interventions may enhance learning engagement and foster a preference for progress cues that emphasize learning and improvement (Zeng et al., 2019).

Finally, regarding perseverance of effort (POE), one of the subdomains of grit, a non-significant increase was observed among participants in the experimental group. This finding aligns with Khajavy et al. (2021), who also reported no statistical significance for POE. However, the other subdomain of grit, consistency of interest (COI), showed a significant increase in the experimental group. This increase in COI suggests that the growth mindset

intervention may have positively influenced participants' ability to maintain a strong and enduring interest in their language-learning endeavours. Moreover, several studies have emphasized the mediating role of grit, including COI, in the relationship between growth mindset and various outcomes, such as academic achievement and language performance (Hu et al., 2022; Zhang et al., 2022).

Limitations of the Study and Suggestions for Future Research

Before concluding, it is important to acknowledge several limitations of this study and suggest areas for further research. Firstly, we used only final-term grades to assess students' L2 achievement. While this is a common practice in SLA research, it has been criticized for validity issues (see Brown et al., 2018 for a review). Therefore, employing standardized tests of foreign language achievement could provide a more reliable measure of students' L2 proficiency. Secondly, another limitation of the current study is the relatively small sample size, with only 60 participants divided into two groups of 30 each. This limited sample size may impact the generalizability of the findings to a larger population of language learners (Khajavy et al., 2021). Furthermore, it is crucial to consider that the study focused on short-term effects of the growth mindset intervention. To provide a more comprehensive understanding, future research should explore the long-term effects of such interventions using delayed-post questionnaires. Lastly, the results of this study are only applicable to the specific participants involved. Further research is necessary to validate these findings in broader contexts.

Theoretical and Pedagogical Implications

Researching growth mindset interventions in the EFL context has implications for understanding how these interventions affect learners' mindsets, motivation, grit, and language achievement. By studying how growth mindset interventions on psychological

constructs and academic results, this study aims to enhance our knowledge of mindset theory and its practical application in EFL settings. The study's theoretical implications are diverse contributing to an understanding of how interventions promoting a growth mindset impact aspects of language learning and achievement. To begin with, this study offers real-world evidence supporting the idea that believing in a growth mindset positively affects students' psychological well-being and academic performance. The noticeable rise in the growth mindset, motivation, and consistency of interest within the group confirms that fostering a growth mindset can enhance academic success and mental resilience.

Moreover, the varying impacts on different aspects of grit—such as the significant increase in consistency of interest but not in perseverance of effort—highlight the intricate relationship between grit and mindset. This finding implies that interventions promoting a growth mindset may influence components of grit differently underscoring the significance of developing a nuanced understanding of how mindset impacts persistence and sustained interest over time. This distinction could shape frameworks and interventions designed to enhance particular facets of grit, within educational settings.

This study also highlights how growth mindset interventions play a role in boosting students' motivation and academic success within settings. The increased motivation and language achievement resulting from these interventions validate the idea that they can bring about improvements in students' engagement and performance ultimately benefiting EFL teaching methods. These results emphasize the significance of mindset theory indicating that incorporating growth mindset principles into education can enhance students' results and resilience.

The findings of this study extend beyond theory and suggest several pedagogical implications for L2 educators. Given the positive influence of a growth mindset on L2

achievement, implementing interventions and programs aimed at fostering a growth mindset in language learning settings is recommended. To begin with, teachers can encourage effort rather than innate ability when students perform well in language tasks. For instance, saying "you are very intelligent in learning English" is likely to promote a fixed mindset, whereas "your English speaking is very good because you have worked very hard to learn English" is more likely to encourage a growth mindset. Second, teachers could highlight successful language learners who achieved mastery of L2 through diligent effort.

It is crucial, however, for teachers to believe in the malleability of language aptitude, understanding that it can be developed through practice and effort (Lou & Noels, 2016). Third, formal workshops and interventions can further foster a growth mindset (Blackwell et al., 2007). In this study by integrating active learning techniques such as having role-playing scenarios, interactive discussions, and group problem-solution activities a supportive and interactive community of learners was built which could have added to the effectiveness of the growth mindset intervention. In the context of language learning, teacher training programs should start to include mindset theory to help teachers and instructors promote effort-based praise and resilience in learners. Curriculum designers could integrate activities that cultivate growth mindset characteristics, such as reflection on learning challenges and discussions about language learning as a developmental process. Instructional materials should highlight stories of success through effort and provide resources explaining how the brain can be strengthened through learning. By aligning teacher beliefs, curriculum structure, and materials with growth mindset principles and traits, educational contexts can better support motivated and persistent language learners.

Conclusion

In conclusion, the study’s findings provide compelling evidence of the significant impact of growth mindset interventions on psychological constructs and academic

achievements. The results demonstrated notable differences between the experimental and control groups, with the experimental group showing consistent improvements in growth mindset, motivation, and consistency of interest over time, leading to enhanced language achievement. These outcomes align with previous research highlighting the positive effects of growth mindset interventions on academic performance. The study also revealed an increase in learners' motivation in the experimental group, consistent with existing literature emphasizing the motivational benefits of such interventions. However, the findings regarding perseverance of effort (POE) were inconclusive, with no significant changes observed. While the study underscores the positive influence of growth mindset interventions on psychological outcomes and academic success, it is essential to consider the long-term sustainability of these effects.

Chapter Three

Examining the Impact of Growth Mindset Interventions on Autonomy, Relatedness, and Competence in EFL Learners

Individuals hold varying beliefs regarding the malleability of human attributes such as personality, morality, and intelligence (Dweck, 2007). Among these perspectives, intelligence mindsets, or implicit theories of intelligence, are considered influential in shaping academic motivation and achievement (Dweck, 2013). A growth mindset, characterized by an incremental theory of intelligence, suggests that intellectual ability can be enhanced through effort and strategic approaches. In contrast, a fixed mindset, embodying an entity theory of intelligence, views human intellect as static and immutable (Dweck, 2007).

In recent years, educational research has increasingly focused on interventions aimed at cultivating growth mindsets among students, alongside the satisfaction of basic psychological needs within educational settings (Alamer, 2022; Blackwell et al., 2007; Molway & Mutton, 2020). A growth mindset intervention revolves around fostering the belief that intelligence and abilities can be developed through effort, effective strategies, and support from others, as opposed to being fixed traits (Dweck, 2007). Concurrently, the satisfaction of basic psychological needs, as posited by Self-Determination Theory (SDT), encompasses the fulfilment of autonomy, competence, and relatedness within learning environments (Ryan & Deci, 2017).

Prior studies indicate that a growth mindset fosters positive learning outcomes as individuals with this perspective tend to experience more favourable emotions (Yeager & Dweck, 2012), and hold stronger beliefs in the efficacy of effort (Lou & Noels, 2016). Previous research has also shown that students with growth mindsets are more likely to achieve better learning results than their counterparts with fixed mindsets (Dong et al., 2023). On the other hand, when the psychological needs of the learners are satisfied, they become

more motivated to learn languages (Alamer, 2022; Joe et al., 2017; Karbakhsh & Ahmadi Safa, 2020; Shirvan & Alamer, 2022) and enjoy facing challenges and keep trying even when it is hard (Noels et al., 2019).

Methods that help students believe in their ability to improve (Park et al., 2016) and ensure their needs are met (Jang et al., 2009) are essential for designing effective teaching approaches. This way, students can actively engage and succeed in their learning experiences (also refer to Linnenbrink-Garcia et al., 2016). Additionally, supporting students' growth mindsets and basic psychological needs is an important way to sustain their motivation and resilience after challenging situations (Lou & Noels, 2020).

The relationship between growth mindset intervention and EFL learners' basic psychological needs (autonomy, relatedness, and competence) has not been comprehensively studied in a single research study. While individual studies have explored aspects of this relationship, there is a gap in the literature for a holistic investigation. Dweck (2007) and Dweck (2013) have highlighted the predictive nature of intelligence mindsets on academic motivation and achievement. However, the specific relationship between growth mindset intervention and EFL learners' basic psychological needs has not been thoroughly examined.

Studies such as Liu et al. (2022) have explored the relationship between EFL learners' language mindset and grit, shedding light on the importance of mindset in language learning. However, the specific focus on the impact of growth mindset intervention on EFL learners' basic psychological needs remains an area that requires further investigation. Therefore, this study will contribute to the understanding of how growth mindset interventions can influence the satisfaction of basic psychological needs among English language learners. By synthesizing the existing literature on growth mindset and basic psychological needs satisfaction, this study

aims to provide valuable insights into the potential benefits of growth mindset interventions in the language learning context.

Method

Participants

Dörnyei (2003) discusses various sampling strategies, emphasizing the need to consider practical factors when creating a sampling plan. In this research, convenience sampling was used due to practical constraints and ease of access. While it may not ensure complete representativeness, it still provides valuable insights, especially given the constraints. Convenience sampling has gained popularity in recent EFL mindset research (e.g., Derakhshan, 2022).

Appropriate sample size is crucial for the validity of research findings. Dörnyei (2003, 2006) recommends a minimum of 30 participants for reliable results. In this study, two classes were chosen from the institute, in each of which there were 30 students (total: 60). One of the classes served as the experimental group and the other as the control group. Since random assignment was not possible, these two pre-existing classes were used. The participants in the quantitative phase of this study comprised 26 male and 34 female English as a Foreign Language (EFL) students, with ages ranging from 19 to 26. The average age was 22.58, with a standard deviation of 1. 99. The English proficiency level of the participants was reported as Intermediate (CEFR: B1) by the institute at which they were studying English.

For the qualitative phase of the study, a total number of ten students were purposefully selected and asked to participate in the semi-structured interviews. The interview participants were selected from among those who were willing to be interviewed, and it was made sure to have participants from both groups. The participants were chosen purposefully from both of the groups to ensure they could offer valuable insights related to the study's focus. The

interviews were carried out once the data collection and analysis of the quantitative phase was over. The number of interview participants was not fixed in advance and data collection continued until it was believed no new information was likely to emerge. The interviews were conducted when quantitative data were collected and analysed. Furthermore, the number of interview participants was not predetermined and data collection continued until a point was reached where saturation was believed to have been achieved, and no new information was expected to emerge.

Pilot Study

The significance of conducting a preliminary investigation as a crucial step in developing an appropriate research instrument has been underscored by Dörnyei (2003, 2006). In the present study, I carried out a pilot phase for the student surveys and interview questions. Initially, I translated the student questionnaires from English to Persian to ensure that language barriers would not hinder students from comprehending and responding to the questions, aligning with the belief expressed by Dörnyei and Csizér (2012) that translating questionnaires into participants' native language is a common practice to enhance the quality of collected data. To validate the accuracy of the translated version, a proficient and experienced translator was enlisted to reverse-translate the instruments back into the original English language. After implementing some revisions, the final version of the questionnaire was agreed upon.

In accordance with Dornyei's (2003) recommendation, the questionnaires were subjected to a pilot test with participants closely resembling the intended respondents. Therefore, ten students with English proficiency levels matching those of the target participants were invited to review the questionnaires and interview questions to assess their comprehensibility. Remarkably, both the questionnaire and interview questions were found to be entirely comprehensible to this group of students and required no further modifications. Following this, they were asked the interview questions to ensure they elicited the necessary information.

Instruments

Basic Psychological Needs of Second Language Scale

To assess the satisfaction of students' basic psychological needs, a 12-item survey designed by Alamer in 2022 was employed to evaluate these needs within the context of language learning. The questionnaire's reliability was determined using Cronbach's Alpha, and the results indicated a high level of reliability (Cronbach's Alpha = 0.871).

This 12-item tool was employed to measure students' self-perceptions regarding autonomy, competence, and relatedness within the domain of language learning. Specifically, four items were dedicated to assessing perceptions of autonomy (e.g., 'My English teacher allows my class to choose how we approach English learning.') another four were designed to evaluate feelings of competence(e.g., 'I am competent enough to meet the challenges and tasks posed in English learning'.), and the remaining four were focused on students' need for a sense of relatedness(e.g., ' My classmates are willing to help and cooperate with me while learning the language'.). The choice of this questionnaire was intentional because it was custom-designed for the language learning context, featuring an equal distribution of four items for each of the fundamental psychological needs, aligning with the study's requirements.

Semi-structured Interviews

Semi-structured interviews served as the primary data collection method in the second phase of the study. The interview consists of 9 questions that delve into the following areas: the effectiveness of the growth mindset intervention and investigating the satisfaction of the learners' basic needs for autonomy, competence, and relatedness. These questions seek to explore the experiences and viewpoints of learners offering insights that extend beyond what could be gained through surveys and numbers in the quantitative phase of the study.

The qualitative data gathered from these interviews supplemented the data gathered in the quantitative phase by providing context. For instance, if quantitative data indicates an improvement in language learners' need for competence, interviews may reveal how and why this intervention worked based on the learners' viewpoints and could enhance their need for competence. The interview questions can be found in Appendix B at the end of this thesis.

The interviews were carried out in person in one of the classes of the institute and in the first language of the interviewees, which was Persian. I myself transcribed the interviews word for word. Subsequently, the transcribed passages were translated into English by an expert in English language translation who used to be my classmate from my B.A. program. Each interview had a duration of roughly between 15 to 20 minutes. Pseudonyms are used throughout the study to protect the anonymity of the participants.

Data Collection

The growth mindset intervention utilized in this study was significantly inspired by prior research, with a particular emphasis on the findings of Blackwell et al. in 2007, both in terms of content and methodology. Nevertheless, it is important to highlight that, due to the larger participant pool, certain modifications were implemented. In contrast to the 45-minute sessions specified in Blackwell et al. (2007), the sessions in this study were extended to a duration of 90 minutes.

For this research, 60 students from an English learning institute in Isfahan, Iran, were divided into two groups: 30 in the experimental group and 30 in the control group. The study encompassed a total of 18 sessions, with 8 sessions specifically dedicated to this study. Initially, consent forms were secured from all participants. Following this, students in both groups were informed that, alongside their regular classroom curriculum, they would have the opportunity to gain additional insights into the brain and its functions through a series of eight sessions.

In the control group, students engaged with materials that resembled the experimental group's content but focused on functional localization in the brain instead of neural plasticity. Consequently, the control group did not convey the critical message that intelligence can be developed. The following table presents an outline of the sessions, which primarily included reading passages followed by various activities and discussions:

Table 14 *Intervention Protocol*

Sessions	Experimental Group	Control Group
1 and 2	The Brain Structure & Function: Brain Anatomy, Localization of Function, Neuronal Structure, Neurotransmission	Same as experimental group
3 and 4	Incremental Theory Intervention Reading (aloud in class): ‘‘You Can Grow Your Intelligence’’ Activity: ‘‘Neural Network Maze,’’ showing how learning makes your brain smarter	Alternative Lesson: Memory Reading (aloud in class): ‘‘Memory’’ Activity: ‘‘Grocery Store Tricks,’’ teaching mnemonic strategies
5 and 6	Anti-Stereotyping Lesson: Slides, activity, discussion to illustrate the pitfalls of stereotyping. Study Skills Lesson: Slides, lecture,	Same as experimental group

	discussion, handouts teach time management and study skills.	
7 and 8	Discussions: Learning makes you smarter; Labels (e.g., stupid, dumb) should be avoided	Discussions: Academic difficulties and successes, preferences; Memory and the brain

To evaluate students' language mindset and their fulfilment of autonomy, relatedness, and competence, assessments were conducted at three distinct time points: session 1 (before the intervention), session 5 (at the midpoint of the intervention), and session 8 (after the intervention) for both the experimental and control groups. After the completion of the intervention, which occurred in session 8 students were administered a multiple-choice test to assess their comprehension of the materials. It is important to emphasize that these tests were not employed for grading purposes but rather served the sole purpose of evaluating the effectiveness of the instructional materials.

Following the conclusion of the experiment and the collection of the quantitative data, a total of ten participants were selected from both groups to participate in semi-structured interviews. The interviews were conducted over one-to-one sessions in the institute. The interviews were held in Persian, the native language of the participants. The interviews were typed verbatim by myself and later the excerpts were translated into English by one of my former classmates from my B. A. program who is a professional translator now. Each interview took about 30 to 40 minutes. Pseudonyms are used throughout the study. These interviews were conducted to gather additional insights and gain a deeper understanding of the perspectives of the participants.

Data Analysis

For the quantitative phase, statistical analysis was performed using SPSS software, version 29. To investigate the relationship between growth mindset intervention and basic psychological needs and in order to make a comparison between the outcomes of the two groups, repeated measures ANOVA was conducted. This analysis incorporated repeated measures and a between-subjects factor. Before running the RM ANOVA, its assumptions including multivariate normality, homogeneity of variances-covariances (multivariate homogeneity of variances), and linearity were checked.

Regarding the qualitative phase, the interview transcripts were analysed using thematic analysis (Clarke, 2006). The researcher carefully reviewed interviews a few times and tried to deeply engage with the transcripts. Following this, initial codes by highlighting notable aspects and core themes. Then similar codes were grouped into categories together. These categories were consolidated into broader themes. Finally, the identified themes were used in forming the basis for narrating the results of the qualitative phase of the study. An independent researcher coded half of the gathered data with good agreement (inter-rater reliability = 0.75). A colleague with expertise in research and language psychology reviewed and provided suggestions for the report.

Results

This results section is divided into two subsections. The first subsection addresses the results of the quantitative phase of the study. Each section is designed to correspond directly to the research questions posed, ensuring a comprehensive examination of how the intervention influenced language achievement and the distinctions observed between the experimental and control groups. Following this, the second subsection will present the results of the qualitative phase.

Results of the Quantitative Phase

A repeated measures analysis of variance (ANOVA) was employed to test these questions. Initially, the assumptions of repeated measures ANOVA were assessed using several tests: Box's M test, Mauchly's test of sphericity, Shapiro-Wilk test, Kolmogorov-Smirnov test, and Levene's test, and all of them were met (Meyers et al., 2016).

RQ1: Does the implementation of growth mindset intervention influence EFL learners' autonomy?

The results of the RM ANOVA for autonomy scores are presented in Table 15. As it can be seen the within-subjects effects analysis revealed a statistically significant main effect of time, $F(1.91, 110.83) = 8.80$, $p < .001$, $\eta^2 = .13$, with an observed power of .96. According to the benchmark criteria for interpreting effect sizes, where a small effect is defined as $\eta^2 \approx 0.01$, a medium effect as $\eta^2 \approx 0.06$, and a large effect as $\eta^2 \approx 0.14$, the effect size of $\eta^2 = .13$ indicates a large effect. This suggests a substantial change in the score of autonomy across the different time points.

The interaction effect between time and group status was also statistically significant, $F(1.91, 110.83) = 3.88$, $p = .025$, $\eta^2 = .06$, with an observed power of .67. The effect size of $\eta^2 = .06$ is considered medium, indicating that the intervention had a moderate, differing impact on the groups over time.

Table 15 *Repeated Measures ANOVA Results for Autonomy across Intervention Phases*

Source			Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observe Power
Within-Subjects	time	Greenhouse-Geisser	2.10	1.91	1.10	8.80	.000	.13	.96

	time * group	Greenhouse-Geisser	.93	1.91	.48	3.88	.025	.06	.67
	Error(time)	Greenhouse-Geisser	13.88	110.83	.12	-	-	-	-
Between-Subjects	group		2.75	1	2.75	4.31	.042	.06	.533
	Error		36.99	58	.63	-	-	-	-

Regarding the between-subjects effects, the main effect of group status was statistically significant, $F(1, 58) = 4.31$, $p = .042$, $\eta^2 = .06$, with an observed power of .533. The effect size of $\eta^2 = .06$ is also considered medium, suggesting that group status had a moderate impact on the scores of autonomy. The following table (Table 16) will present the results of the Bonferroni post hoc comparisons further to explain the differences between the three intervention phases and groups.

Table 16 *Pairwise Comparisons of Autonomy Scores for Experimental and Control Groups across Time Points*

group	Mean	(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
							Lower Bound	Upper Bound
Experimental	2.71	1	2	-.150	.080	.200	-.348	.048
			3	-.408*	.097	.000	-.648	-.169
	2.86	2	1	.150	.080	.200	-.048	.348
			3	-.258*	.090	.017	-.480	-.037
	3.12	3	1	.408*	.097	.000	.169	.648
			2	.258*	.090	.017	.037	.480
Control	2.55	1	2	-.175	.080	.100	-.373	.023
			3	-.117	.097	.703	-.356	.123
	2.73	2	1	.175	.080	.100	-.023	.373
			3	.058	.090	1.000	-.163	.280
	2.67	3	1	.117	.097	.703	-.123	.356
			2	-.058	.090	1.000	-.280	.163

For the experimental group, the analysis of autonomy scores revealed noteworthy differences across the intervention phases. The comparison between pre-intervention (M = 2.71) and during-intervention (M = 2.86) did not show a statistically significant change, with a mean difference of MD = -0.150, SE = 0.080, p = .200, and a 95% confidence interval (CI) ranging from -0.348 to 0.048. However, a significant increase in autonomy scores was observed when comparing pre-intervention (M= 2.71) to post-intervention (M = 3.12). The mean difference was MD = -0.408, SE = 0.097, p < .001, with a 95% CI ranging from -0.648 to -0.169.

The comparison between during-intervention and post-intervention phases also showed a significant increase in autonomy scores, with a mean difference of MD = -0.258, SE = 0.090, p = .017, and a 95% CI from -0.480 to -0.037. These results suggest that the intervention had a substantial impact on increasing autonomy in the experimental group over time.

In contrast, the control group did not demonstrate significant changes in autonomy scores across the intervention phases. The comparison between pre-intervention (M = 2.55) and during-intervention (M = 2.73) yielded a mean difference of MD = -0.175, SE = 0.080, p = .100, with a 95% CI ranging from -0.373 to 0.023, indicating a non-significant trend toward improvement.

Similarly, the comparison between pre-intervention and post-intervention (M = 2.67) was not statistically significant, with a mean difference of MD = -0.117, SE = 0.097, p = .703, and a 95% CI ranging from -0.356 to 0.123. Additionally, no significant difference was found between during-intervention and post-intervention, with a mean difference of MD = 0.058, SE = 0.090, p = 1.000, and a 95% CI from -0.163 to 0.280. These results indicate that the intervention did not result in notable changes in autonomy scores for the control group.

RQ2: Does the implementation of growth mindset intervention influence EFL learners' relatedness?

The table below (Table 17) summarizes the repeated measures ANOVA findings for relatedness throughout the intervention phases.

Table 17 *Repeated Measures ANOVA Results for Relatedness across Intervention Phases*

Source			Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observe Power
Within-Subjects	time	Greenhouse-Geisser	3.54	1.97	1.79	11.03	.000	.16	.99
	time * group	Greenhouse-Geisser	1.64	1.97	.83	5.10	.008	.08	.80
	Error(time)	Greenhouse-Geisser	18.64	114.36	.16	-	-	-	-
Between-Subjects	group		4.75	1	4.75	4.33	.042	.06	.53
	Error		63.66	58	1.09	-	-	-	-

Regarding the within-subjects effects, the analysis revealed a statistically significant main effect of time on relatedness, $F(2, 116) = 5.62$, $p = .004$, $\eta^2 = .09$. According to the effect size criteria, this η^2 of .09 represents a medium effect, suggesting a meaningful change in relatedness across the intervention phases. The observed power for this effect was .87, indicating a high probability of detecting a true effect. Furthermore, the interaction between time and group was also statistically significant, $F(2, 116) = 3.45$, $p = .035$, $\eta^2 = .06$. This η^2 of .06, indicating a medium effect size, suggests that the intervention's impact on relatedness

varied moderately between the groups over time. The observed power for this interaction was .73.

Concerning the between-subjects effects, the analysis identified a significant main effect of group, $F(1, 58) = 4.89$, $p = .031$, $\eta^2 = .08$. This η^2 of .08 also represents a medium effect size, indicating a moderate difference in relatedness between the groups. The observed power for this effect was .62, suggesting a reasonable likelihood of detecting the true effect in the population. These results demonstrate that the intervention had a statistically significant impact on relatedness, with moderate differences observed both over time and between groups. The results of the Bonferroni post hoc comparisons, which further clarify the differences between the three intervention phases and groups, are presented in Table 18.

Table 18 *Pairwise Comparisons of Relatedness Scores for Experimental and Control Groups across Time Points*

group	Mean	(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
							Lower Bound	Upper Bound
Experimental	3.10	1	2	-.242	.106	.079	-.544	-.006
			3	-.575*	.107	.000	-.903	-.494
	3.35	2	1	.242	.106	.079	.006	.544
			3	-.333*	.097	.003	-.699	-.148
	3.68	3	1	.575*	.107	.000	.494	.903
			2	.333*	.097	.003	.148	.699
Control	3.00	1	2	-.033	.106	1.000	-.253	.286
			3	-.108	.107	.949	-.255	.155
	3.04	2	1	.033	.106	1.000	-.286	.253
			3	-.075	.097	1.000	-.342	.209
	3.11	3	1	.108	.107	.949	-.155	.255
			2	.075	.097	1.000	-.209	.342

The experimental group observed notable differences in the scores of relatedness between the intervention phases. The comparison between the pre-intervention (M = 3.10) and during-intervention (M = 3.35) revealed a mean difference of MD = -0.242, SE = 0.106,

p = .079, with a 95% CI ranging from -0.544 to -0.006. Although this result did not reach statistical significance at the .05 level, it approaches significance, indicating a trend toward increased relatedness during the intervention. In contrast, the comparison between pre-intervention and post-intervention scores (M = 3.68) showed a significant mean difference of MD = -0.575, SE = 0.107, p < .001, with a 95% CI of -0.903 to -0.494, indicating a substantial increase in relatedness from pre-intervention to post-intervention. Additionally, the results from the during-intervention to post-intervention phase also demonstrated a significant change, with a mean difference of MD = -0.333, SE = 0.097, p = .003, and a 95% CI ranging from -0.699 to -0.148. These findings suggest a significant increase in relatedness as the intervention progressed.

By comparison, the control group showed no significant differences across the intervention phases. The comparison between pre-intervention (M = 3.00) and during-intervention (M = 3.04) resulted in a mean difference of MD = -0.033, SE = 0.106, p = 1.000, with a 95% CI ranging from -0.253 to 0.286. Similarly, the comparison between pre-intervention and post-intervention (M = 3.11) yielded a mean difference of MD = -0.108, SE = 0.107, p = .949, with a 95% CI from -0.255 to 0.155. The differences between during-intervention and post-intervention also indicated no statistically significant change, as shown by MD = -0.075, SE = 0.097, p = 1.000, and a 95% CI ranging from -0.342 to 0.209. On the whole, these results highlight the significant improvements in relatedness scores for the experimental group across intervention phases, while the control group exhibited no significant changes.

RQ3: Does the implementation of growth mindset intervention influence EFL learners' competence?

Table 19 presents the results of the repeated measures ANOVA conducted to examine the changes in competence scores across the intervention phases.

Table 19 *Repeated Measures ANOVA Results for Competence across Intervention Phases*

Source			Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observe Power
Within-Subjects	time	Greenhouse-Geisser	4.65	1.87	2.48	21.79	.000	.27	1.00
	time * group	Greenhouse-Geisser	2.85	1.87	1.52	13.36	.000	.18	.99
	Error(time)	Greenhouse-Geisser	12.38	.11	-	-	-	-	-
Between-Subjects	group		5.25	1	5.25	5.86	.019	.09	.66
	Error		51.98	58	.89	-	-	-	-

In terms of the within-subjects effects the analysis indicated a statistically significant main effect of time, $F(1.87, 110.42) = 21.79$, $p < .001$, $\eta^2 = .27$, with an observed power of 1.00. According to the specified criteria, the effect size of $\eta^2 = .27$ represents a large effect, indicating a substantial change in competence scores across the various time points.

In addition, the interaction effect between time and group status was also significant, $F(1.87, 110.42) = 13.36$, $p < .001$, $\eta^2 = .18$, which is considered a large effect. This finding suggests that the intervention had a pronounced impact on competence scores, demonstrating that the effects differed between groups over time.

Moreover, the between-subjects analysis revealed a significant effect of group, $F(1, 58) = 5.86$, $p = .019$, $\eta^2 = .09$, indicating a medium effect. This suggests that group membership had a moderate influence on competence scores, with an observed power of .66, reflecting moderate statistical power. In summary, these results highlight significant changes in competence scores across the intervention phases and demonstrate varying

effects depending on group factor. The effect sizes indicate that time had a substantial impact on competence, while the interaction with group status also played a critical role in these outcomes. The following table (Table 20) will present the pairwise comparisons of competence scores for experimental and control groups across the time points.

Table 20 *Pairwise Comparisons of Competence Scores for Experimental and Control Groups across Time Points*

group	Mean	(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
							Lower Bound	Upper Bound
Experimental	2.76	1	2	-.356*	.091	.001	-.579	-.132
			3	-.697*	.089	.000	-.915	-.478
	3.12	2	1	.356*	.091	.000	.132	.579
			3	-.341*	.073	.000	-.521	-.161
	3.46	3	1	.697*	.089	.000	.478	.915
			2	.341*	.073	.000	.161	.521
Control	2.71	1	2	-.120	.091	.572	-.343	.103
			3	-.085	.089	1.000	-.303	.133
	2.83	2	1	.120	.091	.572	-.103	.343
			3	.035	.073	1.000	-.145	.215
	2.79	3	1	.085	.089	1.000	-.133	.303
			2	-.035	.073	1.000	-.215	.145

The results suggest that the experimental group demonstrated significant improvements in competence scores from pre-intervention to during-intervention and post-intervention. For the experimental group, the comparison between pre-intervention (M = 2.76) and during-intervention (M = 3.12) revealed a substantial mean difference of MD = -0.356, SE = 0.091, p = .001, with a 95% confidence interval (CI) ranging from -0.579 to -0.132. This finding indicates a significant increase in competence scores from pre-intervention to during-intervention.

Moreover, the comparison between pre-intervention and post-intervention scores also yielded notable results, with a mean difference of MD = -0.697, SE = 0.089, p < .001, and a

95% CI from -0.915 to -0.478, reflecting a significant enhancement in competence scores over the intervention phases. The comparison of scores between during-intervention and post-intervention also demonstrated a significant difference, with a mean difference of MD = -0.341, SE = 0.073, $p < .001$, and a 95% CI ranging from -0.521 to -0.161, indicating that competence scores continued to improve through to the post-intervention phase.

Conversely, the control group did not exhibit significant changes across the intervention phases. The comparison between pre-intervention (M = 2.71) and during-intervention (M = 2.83) resulted in a mean difference of MD = -0.120, SE = 0.091, $p = .572$, with a 95% CI of -0.343 to 0.103, indicating no statistically significant change. Similarly, the comparisons between during-intervention and post-intervention (MD = -0.085, SE = 0.089, $p = 1.000$) and pre-intervention and post-intervention (MD = 0.035, SE = 0.073, $p = 1.000$) also demonstrated no significant differences.

These results suggest that while the experimental group experienced marked improvements in competence scores across all phases of the intervention, the control group showed no notable changes, highlighting the effectiveness of the intervention implemented for the experimental group.

In summary, the intervention significantly improved autonomy, relatedness, and competence scores for the experimental group, especially from pre-intervention to post-intervention phases. These enhancements indicate increased scores in these areas. In contrast, the control group showed no significant changes, underscoring the effectiveness of the intervention in fostering these learner outcomes.

Results of the Qualitative Phase

The qualitative data gathered from the interviews revealed that most of the learners from the experimental group had found growth mindset intervention to be beneficial and said it has helped them to have better experience in language learning. This is evident in the reply

from one of the participants from the experimental group, "Ever since the intervention I try to view mistakes as chances to improve rather than setbacks. Now I try new approaches to solve problems when faced with something" (Farnoosh, 22, female). Another participant from the experimental group remarked "I feel more driven to practice consistently and persist through difficulties when learning not just English but anything" (Arad, 19, male).

When asked whether their capacity to learn English is limited or not, as it was expected most of the learners who endorsed a growth mindset toward learning English pointed out that they did not believe in limited capacity or talent. One of the learners with a growth mindset remarked " When I was younger I used to think I didn't have the talent for learning English but now it's a few years that I know there is no talent and if you want to be successful in language learning you must study a lot" (Zara, 22, female). However, participants with a fixed language mindset had an opposing viewpoint. For instance, one of them commented that:

> I started learning English at a very young age, and I have not been able to master it yet, for example I repeated my A1 English course three times and finally I could move to A2 course, I think I wasn't born with that innate ability and whatever I do I can never speak English like my teacher. (Sara, 24, female)

In terms of their autonomy in controlling their English learning process, learners with a growth mindset felt more empowered than those with a fixed mindset. One learner appreciated that he has control over his learning process and commented that "Because I feel I am not forced to do anything in the class I feel very good about it and it encourages me to do activities as much as I can" (Arad, 19, male). Nonetheless, one of the learners who endorsed a fixed language mindset mentioned they felt very limited in terms of their control over their learning and that they mostly had to follow their teacher's instructions.

Regarding relatedness, they interviewees were asked whether they felt as being a member of community with their classmates and teachers while they are learning English and mixed responses appeared. For instance, one learner with a fixed mindset commented "When I'm with my classmates I feel they support me and if I have a problem they help me solve it" (Mahdi, 26, male). While another learner with a fixed mindset responded:

> I think everyone cares about their own learning and my classmates don't really care to answer my questions and they usually tell me to check the dictionary when I have a problem. I remember last term I didn't know when the date was for our mid-term exam and when I asked one of my classmates she answered but not in a friendly way. I think they are good people but they don't want to be my friends they are just my classmates. (Atefe, 24, female).

Likewise, another participant with a growth mindset highlighted there is no sense of teamwork in their classroom and they are just some random people who have happened to be classmates.

Concerning their need for competence, their potential to be successful English learners was discussed. Those learners who endorsed a growth mindset expressed confidence. One of the interviewees noted constant practice and effort could lead to success. He commented:

> I believe if anyone with whatever age or level try hard and practice a lot and put in the work day after day they can finally achieve their goals. Mostly older people have this idea that intelligence is the key to success I, however, think practicing and working hard is more important than anything else. For example, by practicing speaking English every day and watching English movies and series daily, I can become more competent and successful in English. (Arad, 19, male)

Another participant mentioned they felt competent as long as they continued working hard, she marked " As long as I stay on my schedule and study every day I feel so much better about myself and feel more capable and confident in what I'm doing " (Zara, 22, female). However, most of those with a fixed mindset expressed doubts and questioned their abilities, with one learner commenting that due to the lack of natural talents and abilities, they feel whatever they do they would not feel competent in language learning.

Discussion

The study's findings showed substantial differences between the experimental and control groups in terms of the three basic psychological needs: autonomy, relatedness, and competence. Notably, a significant improvement in these needs was observed in the experimental group, highlighting the effectiveness of growth mindset interventions in fostering positive psychological changes. This aligns with previous research emphasizing the impact of such interventions on psychological well-being (Zeng et al., 2016).

The relationship between basic psychological need satisfaction (BPNS) and growth mindset can be explained through BPNS theory (Deci & Ryan, 2000) and mindset context theory. According to mindset context theory (Walton & Yeager, 2020), a supportive environment is considered "fertile soil," while a growth mindset is regarded as the seed; thus, the healthy development of these seeds depends on this fertile soil. When students engage in growth mindset interventions, they are likely placed in supportive learning environments that promote their psychological needs. Based on BPNS theory, individuals with high BPNS are more likely to be surrounded by such supportive environments (Deci & Ryan, 2000), which, in turn, fosters a growth mindset (Sun & Moon, 2020). Consequently, this creates a feedback loop where satisfying basic psychological needs enhances a growth mindset, leading to further improvements in psychological well-being.

Another potential reason for the heightened satisfaction of learners' autonomy, relatedness, and competence following the growth mindset intervention could be clarified by the results of the previous study, presented in Chapter 2 of this thesis. It was shown that growth mindset interventions positively improved EFL learners' grit and language mindset. Specifically, the intervention led to significant increases in learners' consistency of interest (COI) as a subdomain of grit, as well as enhanced growth mindset and motivation, all of which contributed to improved language achievement over time.

While perseverance of effort (POE) remained unchanged, the results demonstrated the value of growth mindset interventions in promoting resilience and sustained interest in language learning. For instance, a study by Eskreis-Winkler et al. (2014) found that individuals with higher levels of grit were more likely to achieve long-term goals, reinforcing the idea that interventions fostering a growth mindset can also enhance grit.

Although L2 grit was not directly measured in the present study, the findings from Chapter 2 suggest that the growth mindset intervention could have contributed to participants' L2 grit, which may have, in turn, positively influenced their satisfaction of basic psychological needs. While this is a speculative connection, as no direct empirical evidence was gathered in this study to confirm the mediating role of L2 grit, previous research (e.g., Hu et al., 2022) has established links between growth mindset, grit, and language performance. Therefore, it is possible that the observed improvements in psychological needs satisfaction in the experimental group were influenced, at least partially, by an increase in participants' grit following the intervention.

In conclusion, the findings of this study reinforce the importance of growth mindset interventions in enhancing psychological well-being, specifically in terms of autonomy,

relatedness, and competence, and highlight the potential for such interventions to support both academic success and positive psychological outcomes.

Implications, Limitations, and Suggestions for Future Research

The significant differences observed between the experimental and control groups in competence, relatedness, and autonomy scores in the EFL context have important theoretical and pedagogical implications. The findings of this study contribute to the existing body of knowledge by elucidating the interplay between growth mindset interventions and the satisfaction of basic psychological needs. By demonstrating substantial improvements in autonomy, relatedness, and competence among participants in the experimental group, this research supports and expands upon the foundational theories proposed by Deci and Ryan (2000) regarding basic psychological needs satisfaction. It emphasizes that fostering a growth mindset within educational settings can create a nurturing environment that not only satisfies learners' psychological needs but also enhances their overall well-being.

Educators can leverage these findings to tailor interventions that target the enhancement of the satisfaction of the three basic psychological needs among EFL learners. By focusing on fostering growth mindset, and satisfying the three basic psychological needs (competence, relatedness, and autonomy), educators can create a learning environment that promotes positive psychological changes and academic success. Implementing strategies that specifically address these domains can lead to increased student engagement, motivation, and resilience, thereby enhancing the overall learning experience in EFL classrooms (Dincer et al., 2019; Noels et al., 2016; Sadoughi & Hejazi, 2023).

Furthermore, by integrating growth mindset intervention principles into language teaching practices, educators can create a more engaging and supportive learning environment that enriches students’ language learning experiences. Teacher training courses

could also benefit from incorporating principles of growth mindset and basic psychological needs satisfaction theory, equipping teachers to foster autonomy, competence, and relatedness in their classrooms. Curriculum designers should integrate activities that explicitly target the satisfaction of these psychological needs, such as collaborative projects to enhance relatedness, scaffolded tasks to build competence, and opportunities for student choice to nurture their need for autonomy. Instructional materials should similarly reflect these goals by featuring student-centred approaches, offering differentiated tasks that match varying proficiency levels, and including examples of learners who achieved success through sustained effort. Resources that explain the process of learning and brain development can further reinforce the message that ability grows with practice.

However, it is essential to acknowledge the limitations of the study. The generalizability of the findings may be constrained by the specific characteristics of the sample and the intervention implemented. Future research should aim to replicate the study with a more diverse participant pool to enhance the external validity of the results. Additionally, the study's duration and scope may have influenced the observed effects, warranting further investigation into the long-term impacts of interventions targeting growth mindset, competence, relatedness, and autonomy in the SLA field.

Future research in the field of EFL education should delve deeper into the mechanisms through which interventions influence basic psychological needs and academic outcomes. Longitudinal studies could provide insights into the sustained effects of interventions on students' psychological well-being and academic performance over time (Fan & Cui, 2024). Exploring the interplay between growth mindset, basic psychological needs, grit, and academic achievement among EFL learners could shed light on the factors contributing to a positive learning experience. Understanding how satisfaction of basic psychological needs impacts language learning outcomes and teaching effectiveness can

guide the development of evidence-based interventions and teaching methodologies in EFL contexts.

In conclusion, the study's results provide a foundation for future research endeavours in SLA. By further investigating the impacts of growth mindset interventions on basic psychological needs, grit, and academic outcomes, researchers can inform evidence-based teaching practices and interventions that enhance students' basic psychological needs satisfaction and academic success in EFL contexts.

Conclusion

In conclusion, this study highlights the effectiveness of targeted interventions in enhancing growth mindset and satisfying the basic psychological needs of autonomy, relatedness, and competence among EFL learners. The experimental group's notable improvements across these domains underscore the positive impact of such interventions on both psychological and academic outcomes. These results offer valuable insights for educators, emphasizing the importance of creating supportive learning environments that address students' growth mindsets.

Despite the study's limitations, such as the specific sample and intervention characteristics, the implications are clear: carefully designed interventions can significantly benefit EFL learners. Future research should continue to explore the long-term effects of these interventions and their mechanisms, broadening the scope to include diverse participant pools and examining the interplay between growth mindset interventions, basic psychological needs satisfaction, grit and academic engagement. By doing so, researchers can further inform evidence-based teaching practices that foster resilience, well-being, and academic success in EFL contexts.

Chapter Four

Exploring the Interplay of Growth Mindset, Motivation, and L2 Grit with the Mediating Role of Basic Psychological Needs Satisfaction

When commencing the process of acquiring and using a new language, individuals frequently encounter obstacles and setbacks, such as making writing errors, experiencing miscommunication, receiving poor grades, and facing challenges in being understood due to accents or lack of proficiency. These experiences can have a substantial impact on learners' confidence in using the language and their motivation to persist in learning the second language. Research indicates that fostering learners' growth mindsets, which involve the belief in the potential for abilities to be developed, and addressing their basic psychological needs for autonomy, competence, and relatedness, are essential in maintaining their motivation and grit (Shirvan & Alamer, 2022; Teimouri, 2017; Zarrinabadi et al., 2022; Zhang et al., 2022).

In the context of second language (L2) learning, the concept of grit has gained attention as a significant factor in learners' perseverance of effort and consistency of interest (Teimouri et al., 2022). Longitudinal studies have shown that L2 grit plays a dynamic role and is not fixed; it does not solely depend on a learner's initial levels, indicating its potential to evolve and influence later achievement in L2 vocabulary (Shirvan et al., 2022). Additionally, L2 grit has been found to be influenced by learners' academic buoyancy, self-efficacy, and classroom enjoyment, highlighting the interconnectedness of these psychological factors in sustaining motivation (Shirvan et al., 2022).

Recent research has delved into the relationship between language mindset and EFL learners' L2 grit, basic psychological needs, and L2 motivation. For instance, Teimouri (2017) explored the interplay of L2 selves, emotions, and motivated behaviors, shedding light on the complex dynamics of language mindset and its impact on learners' motivational behaviors (Teimouri, 2017). In one study by Zarrinabadi et al. (2022), path analysis showed that fixed

mindsets negatively anticipated anxiety, enjoyment, self-concept, and self-efficacy through the mediation of adaptability. However, growth mindsets were found to be positively impacting enjoyment, self-concept, and self-efficacy through mediation of adaptability, emphasizing the importance of a growth mindset in cultivating positive learning outcomes in foreign language classrooms even after controlling for ideal L2 self and perceived competence. These studies contribute to a deeper understanding of the intricate relationship between language mindset and various aspects of language learning, offering valuable insights for educators and researchers in the field of second language acquisition.

This study aims to explore the extent to which students' language mindsets—both fixed and growth mindsets—impact EFL learners' motivation and grit, particularly considering the roles of autonomy, relatedness, and competence. Additionally, it seeks to examine the mediating effect of students' basic psychological needs on the relationship between these mindsets and L2 grit and motivation. A correlational approach will be employed to uncover the natural patterns of connection among these constructs within the context of language learning.

The significance of this study is underscored by the fact that no research to date has examined the interplay of growth mindset, L2 grit, motivation, and basic psychological needs in a single investigation. By addressing these variables together, this research has the potential to provide valuable insights into how these psychological factors collectively influence language learning outcomes. By investigating the mediating role of basic psychological needs, this study will deepen our understanding of the intricate dynamics among growth mindset, L2 grit, and motivation. The findings could have practical implications for educators and policymakers in designing more effective language learning interventions and programs. Furthermore, this study will contribute to the existing literature on the psychology of language

learning and establish a foundation for future research into the complex relationships among motivation, mindset, and language proficiency.

Method

Design of the Study

This study adopts a correlational design, emphasizing the exploration of relationships among variables without intervening or manipulating them. The primary objective is to investigate whether the relationships between growth mindset, L2 grit, and motivation are mediated by students' basic psychological needs. By employing a correlational approach, the research aims to unveil the natural patterns of connection between these constructs in the context of language learning.

Participants

A total of 180 participants, comprising undergraduate and graduate students majoring in English as a Foreign Language (EFL), were involved in this study at two state universities in the central region of Iran. Utilizing a convenience sampling approach, participants were selected based on the researchers' accessibility to individuals within these two universities. The gender distribution among the participants was as follows: 112 females (62.22%) and 68 males (37.78%). The average age of the sample was 27.69 (SD = 6.55), with an age range spanning from 19 to 46 years. the most frequent age groups being 30 and 34 years old, each accounting for 8.3% and 7.8% of the sample, respectively. The distribution suggests a diverse adult population predominantly in their early thirties. All participants identified Persian as their mother tongue.

In terms of English proficiency, participants were asked to self-report their English proficiency level at the beginning of the questionnaire. They displayed a range of levels from A1 (lowest) to C2 (highest) based on the Common European Framework of Reference for

Languages (CEFR). The majority of the participants were concentrated in the intermediate to advanced levels: B1 (27.2%, *n* = 49), B2 (32.2%, *n* = 58), and C1 (27.8%, *n* = 50). Only a small proportion of the sample was classified at the highest (C2, 3.3%, *n* = 6) and lowest (A1, 3.3%, *n* = 6) proficiency levels. This distribution indicates that the study predominantly involved participants with a significant command of English, which may influence the generalizability of the findings to populations with lower English proficiency

Instrumentation

Upon obtaining ethical approval from Essex University and signing the consent forms by the participants the data were collected using paper-based questionnaires. These questionnaires were designed to measure the participants' language mindset, L2 grit, basic psychological needs satisfaction, and motivation, with items rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). To ensure linguistic equivalence, the original English scales were translated into Persian and subsequently back-translated by an expert. The final Persian translation was developed after careful comparison and examination of the original and back-translated items. The Persian scales underwent a pilot test with 10 university students enrolled in a general English course. They were asked to evaluate the clarity of the questionnaires. Significantly, the questionnaire was deemed completely understandable by this cohort of students, necessitating no additional adjustments. The questionnaire had a total number of 48 items and was administered during regular classroom hours which took approximately 15 minutes to complete.

Language Mindset Inventory (LMI)

To measure students' language learning mindsets, the 18-item Language Mindset Inventory (LMI) developed by Lou and Noels (2017) was used. The inventory comprises three distinct categories: general language intelligence beliefs (GLB), second language aptitude beliefs (L2B), and age sensitivity beliefs about language learning (ASB), each containing six

items. Participants were asked to express their level of agreement on nine growth mindset items (e.g., 'How good you are at using a foreign language will always improve if you really work at it.') and nine fixed mindset items (e.g., 'You have a certain amount of language intelligence, and you can't really do much to change it.') using a five-point scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The reliability of this scale was measured using Cronbach's alpha, and it was found the reliability for fixed mindset items was good ($\alpha = 0.811$) and acceptable for growth mindset items ($\alpha = 0.781$).

L2 Grit Scale

To assess L2 grit, the Language-Specific Grit Scale, developed and validated by Teimouri et al. (2022) was employed. This scale, structured as a six-point Likert-type assessment, explores two dimensions of grit: the persistence of effort and the constancy of interest. Five items were utilized to examine the persistence of effort (e.g., 'Much time and effort are put into improving my English language weaknesses'), while four items were applied to appraise the constancy of interest (e.g., 'Interest in learning English is not as strong as it used to be,' reverse-coded). The reliability analysis for the L2 grit scale constructs showed that POE ($\alpha = 0.814$) and COI ($\alpha = 0.827$) both exhibited good internal consistency.

The Motivated Behaviour Scale

To gauge students' motivation towards learning English, the motivated behavior scale developed by Taguchi et al. (2009) was employed. Various aspects of motivation are measured by this scale, among which criterion measures and integrativeness items were deemed suitable for this study. Six items were crafted to assess criterion measures (e.g., 'If an English course were offered in the future, it would be liked by me.'). In evaluating integrativeness, three items were utilized (e.g., 'Learning English is considered important by me to learn more about the culture and art of its speakers.'). The reliability of the constructs in this scale was evaluated using Cronbach's alpha and it was excellent ($\alpha = 0.888$).

Basic Psychological Needs Satisfaction

To measure the fulfillment of students' basic psychological needs in the context of language learning, a 12-item survey designed by Alamer (2022) was utilized. The reliability of the questionnaire was assessed using Cronbach's Alpha, with the results indicating a good level of reliability for both competence (α= 0.835) and relatedness (α = 0.871), while the reliability of autonomy items was found to be questionable (α = 0.689). This 12-item instrument was employed to gauge students' self-perceptions concerning autonomy, competence, and connection in language learning. Specifically, four items focused on autonomy perceptions (e.g., 'My English teacher allows my class to choose how we approach English learning.'), another four assessed feelings of competence (e.g., 'I am competent enough to meet the challenges and tasks posed in English learning.'), and the remaining four targeted students' need for a sense of relatedness (e.g., 'My classmates are willing to help and cooperate with me while learning the language.'). The deliberate selection of this questionnaire was based on its custom design for the language learning context, featuring an equal distribution of four items for each fundamental psychological need, aligning with the study's requirements.

Data analysis

After collecting the data, preliminary analysis was performed to ensure that the assumptions for structural equation modeling (SEM) were met. The first step included checking the sample size, checking the normal distribution of the data, and assessing multicollinearity. Using SPSS 27, the assumptions for SEM were assessed following this descriptive analysis and the correlation matrix were calculated. Subsequently, confirmatory factor analysis (CFA) and SEM were carried out using Amos version 24 to investigate the relationships among EFL learners' English mindsets (fixed mindset and growth mindset), satisfaction of basic psychological needs (autonomy, competence, and relatedness), motivation, and L2 grit. Additionally, a bootstrap test with 5,000 samples was conducted to evaluate the mediating roles

of autonomy, competence, and relatedness. Following Kline's (2016) recommendations, several indices were assessed to determine model fit, including chi-square (χ^2), the chi-square to degrees of freedom ratio (CMIN/df), comparative fit index (CFI), Tucker-Lewis index (TLI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA).

Results

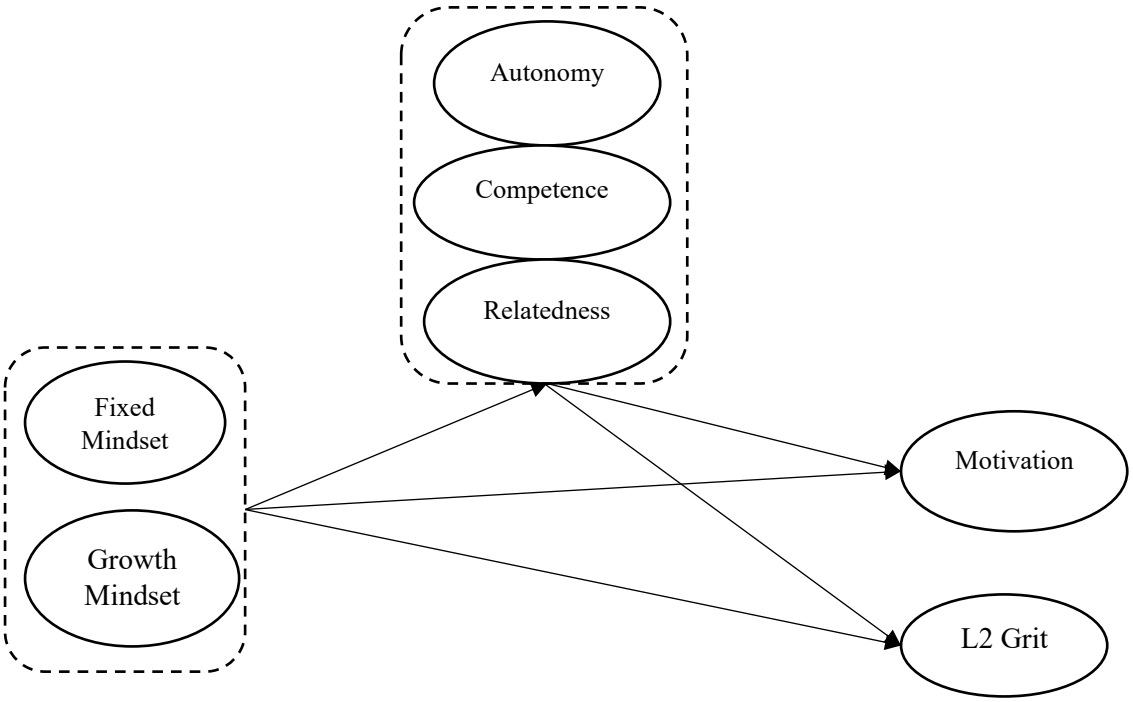
This section presents the results of the structural equation modelling performed using AMOS to investigate the following research questions:

RQ1: To what extent do students' language mindsets (both fixed and growth mindsets) predict EFL learners' L2 grit and motivation? By addressing this question, the study examines the direct relationships between mindset L2 grit, and motivation.

RQ2: What is the mediating effect of students' basic psychological needs (autonomy, relatedness, and competence) on the relationship between growth mindsets (both fixed and growth mindsets), L2 grit (POE & COI), and motivation? By addressing the question, the study examines mediated relationships among these constructs.

This study aimed to test the following model (Figure 2) encompassing these interconnected relationships empirically.

Figure 2 *The Hypothesized Research Model*



Construct validity

To assess the construct validity of the four constructs, separate confirmatory factor analyses were performed for each one. Table 21 displays both standardized and unstandardized item loadings for each factor. As shown in Table 21, all items had significant unstandardized estimated loadings; however, several items had standardized estimated loadings below 0.45. According to Kline (2016), such values jeopardize the convergent validity of the questionnaires. Consequently, these items were removed from the model. Then, the modification indices were checked with a threshold of 10, and only the suggested changes that were supported by the literature were implemented. Table 21 shows the fit indices of the final modified CFA models that confirm the construct validity of variables.

Table 21 *The Unstandardized and Standardized Estimates of the CFAs, Reliability, and Validity of the Constructs*

	Unstandardized				Standardized			
	Estimate	S.E.	C.R.	*P*	Estimate	AVE	CR	Alpha value
Fixed Mindset						.502	.830	.811
Fixed 1	1.29	.204	6.349	<.001	.724			
Fixed 2	1.585	.239	6.630	<.001	.866			
Fixed 3	1.400	.219	6.388	<.001	.766			
Fixed 8	1.454	.266	5.471	<.001	.637			
Fixed 15	1.000				.495			
Growth mindset						.525	.765	.781
Growth 16	.960	.137	7.006	<.001	.595			
Growth 17	1.534	.213	7.189	<.001	.854			
Growth 18	1.000				.702			
Autonomy						.522	.752	.689
Autonomy 1	1.943	.409	4.754	<.001	.798			
Autonomy 2	1.900	.400	4.751	<.001	.869			
Autonomy 3	1.00				.458			
Competence						.648	.846	.835
Competence 5	1.021	.099	10.296	<.001	.863			
Competence 6	1.317	.130	10.110	<.001	.819			
Competence 7	1.000			<.001	.726			
Relatedness						.697	.874	.871
Relatedness 9	.901	0.70	12.825	<.001	.841			
Relatedness 10	.967	.078	12.450	<.001	.818			
Relatedness 12	1.000			<.001	.846			
L2 Grit (POE)						.516	.836	.814
POE1	1.013	.179	5.649	<.001	.654			
POE 3	1.194	.189	6.310	<.001	.725			
POE 5	1.021	.168	6.063	<.001	.770			
POE 6	1.548	.244	6.334	<.001	.904			
POE 9	1.000			<.001	.464			
L2 Grit (COI)						.575	.800	.827
COI 4	1.143	.110	10.399	<.001	.722			
COI 7	.932	.095	9.826	<.001	.645			
COI 8	1.000			<.001	.888			
Motivation						.493	.881	.888
Motivation 1	1.940	.276	7.020	<.001	.861			
Motivation 2	1.438	.204	7.037	<.001	.827			
Motivation 3	1.865	.270	6.873	<.001	.833			
Motivation 4	1.859	.270	6.920	<.001	.784			
Motivation 5	1.277	.216	5.907	<.001	.587			
Motivation 6	1.614	.233	6.939	<.001	.638			

	Unstandardized				Standardized			
	Estimate	S.E.	C.R.	*P*	Estimate	AVE	CR	Alpha value
Motivation 8	1.000			<.001	.504			
Motivation 9	.864	.131	6.603	<.001	.452			

To ensure the reliability of the scale, both Cronbach's alpha and composite reliability (CR) were calculated and are presented in Table 22. As shown in the table, all variables achieved CR values exceeding 0.7, indicating acceptable reliability. Furthermore, the analysis of average variance extracted (AVE) confirmed that all constructs exhibited good discriminant validity, with each factor's AVE greater than 0.5. Additionally, the CR values were higher than the AVE values, reinforcing the convergent validity of the constructs. Notably, one of the AVE values was close to the cut-off of 0.50. According to Fornell and Larcker (1981), a composite reliability above 0.60 and an average variance explained greater than 0.40 for each construct suggest that the convergent validity is adequate, though not stringent. Therefore, both convergent and construct validity for the questionnaire were established. The Cronbach’s alpha values for each factor ranged from 0.69 to 0.89, reflecting sufficient internal consistency among the items. The fit indices for the confirmatory factor analysis models are presented in Table 22, demonstrating an excellent fit.

Table 22 *Evaluation of the CFAs Goodness of Fit*

constructs	CMIN	DF	CMIN/df	CFI	TLI	RMSEA	SRMR
Mindset	33.520	14	2.394	.964	.928	.088	.065
Basic Needs	42.917	20	2.146	.971	.948	.080	.048
L2 Grit	28.433	15	1.896	.982	.967	.071	.043
Motivation	30.662	15	2.044	.979	.961	.076	.041

Descriptive and Correlation Analyses of the Relationship between Constructs

Table 23 presents the descriptive statistics for the constructs examined in the SEM analysis, along with their corresponding subscales. Additionally, Pearson's correlation analyses are provided to explore the relationships between these constructs.

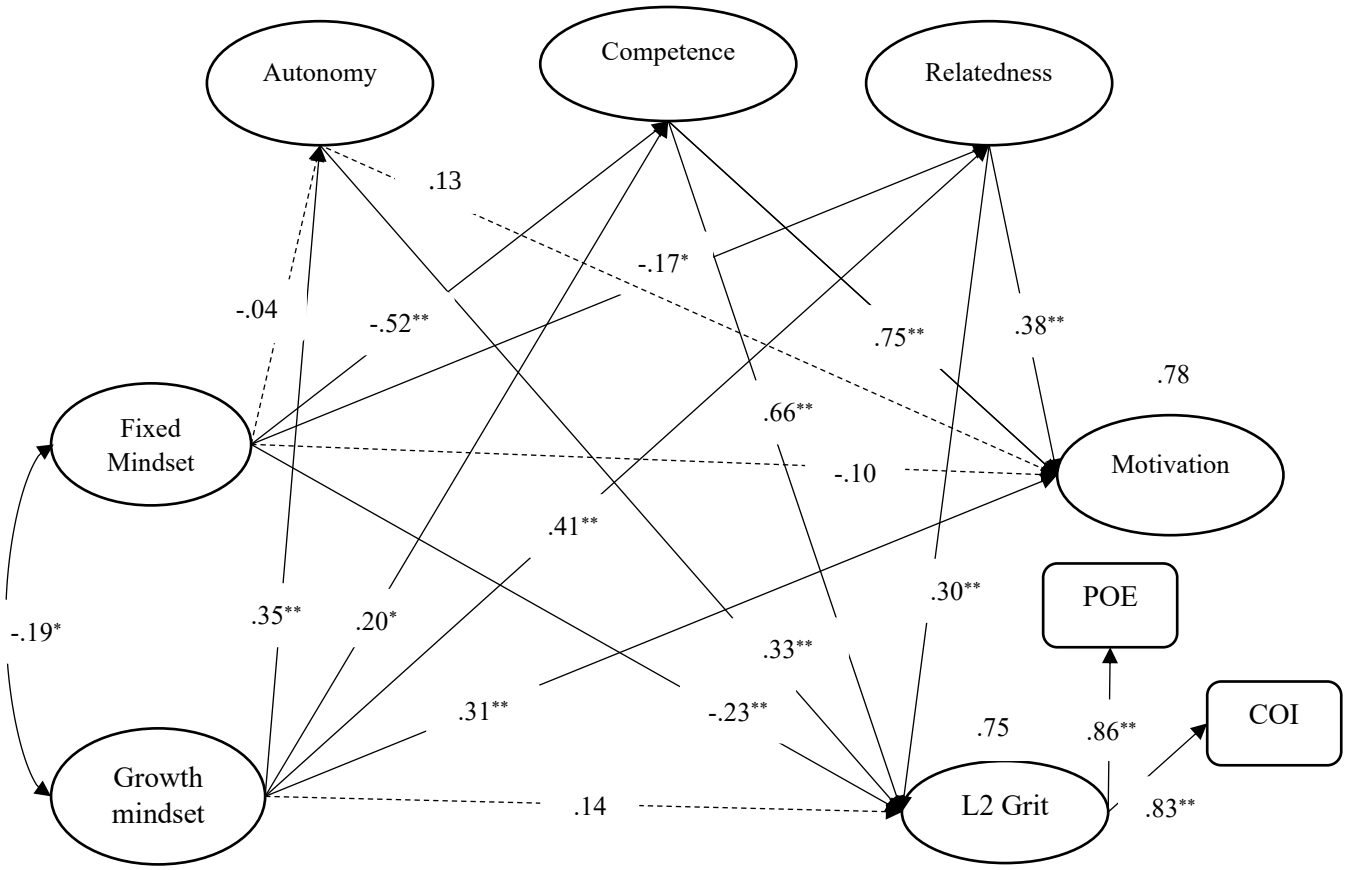
Table 23 *The Descriptive Statistics and Correlation Matrix*

variables	Mean	SD	Skewness	Kurtosis	1	2	3	4	5	6	7
1. Fixed Mindset	2.40	.79	.52	-.48	1						
2. Growth Mindset	3.79	.85	-.17	-1.02	-.27**	1					
3. Autonomy	3.61	.70	-.24	-.14	-.17*	.37**	1				
4. Competence	4.18	.70	-1.07	1.46	-.43**	.26**	.27**	1			
5. Relatedness	4.05	.73	-.52	-.07	-.27**	.34**	.59**	.35**	1		
6. L2 Grit	3.41	.74	-.85	-.18	.-.49**	.08	.18*	.58**	.31**	1	
7. Motivation	3.78	.69	-.87	.86	-.41**	.16*	.30**	.56**	.44**	.74**	1

Structural Model

The SEM analysis was conducted to explore the specific structural relationships between EFL learners' fixed and growth mindset, their motivation and grit with the mediating role of the basic psychological needs satisfaction. The final structural model is presented in Fig. 3. Initially, the results of the SEM model testing indicated a good model fit, supported by acceptable fit indices (χ^2 = 857.604; df = 292; p <.001; χ^2/df = 2.937; CFI = .89; TLI = .88; RMSEA =.073 [.068,.078]; SRMR = .080). Following this, a summary of the standardized path coefficients was analyzed, with significance levels indicated by asterisks in the figure.

Figure 3 *Final SEM Model*



To address the first research question, "To what extent do students' language mindsets (both fixed and growth mindsets) predict EFL learners' grit and motivation, considering the roles of autonomy, relatedness and competence?", the standard path coefficients and their significance levels were examined. The findings indicate that a growth mindset positively correlates with autonomy (β = .35, $p < .001$), competence (β = .20, $p < .05$), relatedness (β = .41, $p < .001$), and motivation (β = .31, $p < .001$); however, there was no significant relationship between growth mindset and grit (β = .14, $p > .05$) among EFL learners.

Conversely, a fixed mindset exhibited a significant negative direct effect on competence (β = -.52, $p < .001$), relatedness (β = -.17, $p < .05$), and grit (β = -.23, $p < .001$).

Notably, no significant direct effect was observed between fixed mindset and autonomy (β = -.04, $p > .05$). Furthermore, competence (β = .75, $p < .001$), and relatedness (β = .38, $p < .001$) demonstrated significant positive direct effects on motivation, while autonomy (β = .13, $p > .05$) had no significant direct effect on motivation. Similarly, autonomy (β = .33, $p < .001$), competence (β = .66, $p < .001$) and relatedness (β = .30, $p < .001$) were also positively correlated with grit. These results underscore the complexity of how different mindsets interact with various motivational factors in the context of EFL learning.

Mediation Analysis

To address the second research question, "What is the mediating effect of students' basic psychological needs (autonomy, relatedness, and competence) on the relationship between growth mindsets (both fixed and growth mindsets) and L2 grit, and motivation?", the study examines the mediated relationships among these variables. A mediation analysis was conducted using the bootstrap test with 5,000 bootstrap samples and a 95% confidence interval. The results of this analysis are reported in Table 24.

Table 24 *Mediating Analysis by Bootstrapping*

			Total effect	Direct effect	Indirect effect
Fixed Mindset	→ Competence	→ Motivation	-.49**	-.10	-.39**
Fixed Mindset	→ Relatedness	→ Motivation	-.17*	-.10	-.07
Fixed Mindset	→ Competence	→ L2 Grit	-.57**	-.23**	-.34**
Fixed Mindset	→ Relatedness	→ L2 Grit	-.28**	-.23**	-.05
Growth mindset	→ Competence	→ Motivation	.46**	.31**	.15*
Growth mindset	→ Relatedness	→ Motivation	.47**	.31**	.16*
Growth mindset	→ Autonomy	→ L2 Grit	.26**	.14	.12
Growth mindset	→ Competence	→ L2 Grit	.27**	.14	.13
Growth mindset	→ Relatedness	→ L2 Grit	.26**	.14	.12

The results of the mediation analysis indicate that competence fully mediates the relationship between fixed mindset and motivation. Specifically, the total effect of fixed mindset on motivation is -0.49, with a direct effect of -0.10 and an indirect effect of -0.39, suggesting that competence plays a crucial role in this relationship. Additionally, the total effect of fixed mindset on L2 grit through competence is -0.57, with a direct effect of -0.23 and an indirect effect of -0.34, further supporting the partial mediating role of competence. In contrast, for individuals with a growth mindset, competence also partially mediates the relationship with motivation, as evidenced by a total effect of 0.46, a direct effect of 0.31, and an indirect effect of 0.15. Also, relatedness partially mediates the relationship between growth mindset and motivation, as evidenced by a total effect of 0.47, a direct effect of 0.31, and an indirect effect of 0.16.

Discussion

This study aimed to explore two goals; firstly, to investigate how students' beliefs about language learning (fixed and growth mindsets) can predict grit along with motivation in EFL learning. This involved studying the connections between these mindsets and the outcomes. Secondly, this study sought to understand how basic psychological needs such as autonomy, relatedness, and competence play a role in mediating this relationship. The focus was on examining how these needs impact the influence of mindsets on grit and motivation, in learning a language.

In conclusion, a growth mindset enhances learners' sense of autonomy, competence, relatedness, and motivation, while a fixed mindset diminishes competence, relatedness, and grit. Competence and relatedness are strong predictors of motivation, while autonomy, competence, and relatedness are positively associated with grit. The results related to the first research question indicate that while having a growth mindset can predict motivation, it does

not significantly predict grit among English language learners. It was also revealed that holding a fixed language mindset can hinder grit among learners.

Contrary to previous research, this study shows that a growth mindset does not significantly predict grit among the EFL learners. This finding is inconsistent with the conclusions drawn by Hu et al. (2022) indicating that students who embrace a growth mindset tend to show increased levels of grit. This notion is further reinforced by the study conducted by Khajavy et al. (2021) which emphasizes that individuals with a growth mindset not only display higher levels of grit but also demonstrate enhanced resilience in navigating challenges encountered during language learning.

One plausible explanation for this inconsistency could be that the relationship between growth mindset and grit is mediated by other factors which are not addressed in this study. For instance, self-regulation, external support or stress management could play the roles of mediators or moderators in the relationship between grit and growth mindset which are not present in the present study's model. Although learners with a growth mindset are generally expected to have higher levels of grit, the presence or absence of other mediators and moderators might improve or even hinder the enhancement of grit.

Another factor to consider is that this non-significant relationship between growth mindset and grit could reflect the complex interplay between different motivational variables. Grit is a sophisticated construct that encompasses perseverance and passion for long-term goals. In this study, while growth mindset was found to have significant relationship with motivation, this might not directly translate into improvement of grit. Grit may be affected by other constructs such as self-efficacy or intrinsic motivation, which were not included in this study.

Another important finding from this research is that having a growth mindset correlates with motivation levels in English language learners. This supports the findings of Blackwell et al. (2007) who observed that students with a growth mindset show increased motivation leading to enhanced participation in learning activities. Moreover, the results on motivation align with Aronson et al.'s (2002) research, which demonstrated that promoting a growth mindset can boost student's motivation. By encouraging learners to embrace a growth-oriented mindset they are more inclined to see challenges as opportunities for growth than as overwhelming obstacles. This shift in perspective encourages involvement in learning and persistence in overcoming challenges ultimately increasing motivation levels.

Furthermore, Dweck and Yeager (2019) highlighted the influence of mindset on motivation emphasizing that individuals with a growth mindset generally display higher motivation levels compared to those with a fixed mindset. The increased motivation can be credited to the idea that hard work and planning can result in progress empowering students to approach obstacles persevere in their education.

Concerning the second research question, the SEM analysis shows that basic psychological needs play a role, in linking both fixed and growth mindsets to grit and motivation. Competence, influenced by a growth mindset also had a positive effect on motivation highlighting its role in enhancing motivation for language learning. Furthermore, competence was found to have a positive effect on grit (POE). In contrast, learners who endorse a fixed mindset tend to feel less competent. Relatedness, positively impacted by growth mindset strongly predicted motivation, suggesting that a sense of belonging to the group could improve motivation while its impact on grit is less prominent. However, autonomy, affected by a growth mindset did not significantly show a mediating role in the relationship between growth mindset, grit and motivation in this study.

In terms of competence, it was also revealed that EFL students who embrace a growth mindset are more likely to have their need for competence satisfied as shown in this study. This is in keeping with the study carried out by Dweck and Leggett (1988). They found that individuals, with a growth mindset are inclined to take on challenges and persevere through difficulties which may lead to a sense of competence. The proactive attitude and determination help them succeed through work boosting their confidence in their abilities may be a possible explanation for their need for competence to be met.

On the other hand, competence found to play a positive role in mediating the relationship between EFL learners' growth mindset and levels of POE. These results are consistent with those of Shirvan and Alamer (2022), who also reported that the need for competence positively affects POE. A possible explanation for this could be the results of the study by Bandura and Wessels (1997) which confirms this idea by showing that when the need for competence is satisfied it can lead to increased self-efficacy which may then as a result strengthen perseverance of effort among individuals. Concerning motivation, it was found that competence positively predicted the levels of motivation among individuals. These results for motivation are in keeping with previous empirical studies, which stated that satisfying the need for competence is fundamental to motivation (Ryan & Powelson, 1991).

Regarding the need for relatedness, it was found that EFL learners with a growth mindset are more likely to have their need for relatedness satisfied. One potential reason for the levels of relatedness observed among students with a growth mindset could stem from the research by Yeager and Dweck (2012). Their study suggested that individuals embracing a growth mindset are more inclined to seek and offer assistance, which plays a role in deepening their bonds with others. This increased openness to interacting with peers and providing mutual aid nurtures an atmosphere ultimately boosting feelings of relatedness. Essentially the growth mindset prompts students to perceive interactions as chances for

learning and encouragement resulting in positive relationships, within the academic community.

The findings also indicate that relatedness serves as mediator between growth mindset and motivation. One possible explanation for the mediating role of relatedness between growth mindset and motivation could be that individuals with a growth mindset view challenges as opportunities to grow which might in turn foster their desire to seek out collaborative learning environments. These environments could help satisfy their need for relatedness which will thereby lead to promoting their motivation. Another potential rationale can be when learners believe their language learning abilities can grow, they tend to have more positive relationships with their peers which could result in encouragement and constructive feedback reinforcing a growth mindset. Since they feel they are valued and being cared for in their learning context they may start to feel more motivated.

Additionally, it was found that the role of relatedness was less prominent as mediator in the relationship between growth mindset and grit. This may be because the influence of a growth mindset on motivation grit tends to be more direct and shaped by factors that extend beyond relationships. While some individuals draw grit through their need for relatedness, others might prioritize their beliefs and personal goals. Furthermore, external factors like learning environments, task complexities or individual motivational triggers can influence how relatedness serves as a mediator, in this context.

Regarding autonomy, it was reported that EFL students who have a growth mindset tend to have higher levels of autonomy. This can be supported by the study by Blackwell et al. (2007). In their study, they concluded that learners with a growth mindset proactively participate in establishing and working towards their objectives which in turn can lead to a boost in their autonomy. Learners who endorse a growth mindset perceive challenges as

chances for development and take charge of their learning journey by making independent decisions on how to approach their academic pursuits. Additionally, Schunk's (2005) findings that indicate that individuals with a growth mindset are more inclined to utilize self-regulated learning techniques like goal setting, self-monitoring, and reflection. These practices enable students to navigate their path efficiently ultimately enhancing their sense of autonomy.

The findings indicate that autonomy did not show a meaningful mediating effect in the relationship between growth mindset with grit and motivation in the current study. A possible explanation for the lack of a mediating role of autonomy between growth mindset and grit may be that grit defined as perseverance and passion for long-term goals is closely related to resilience and goal-directed behaviour. The qualities that define grit might inherently match with a sense of competence rather than autonomy. As an example, a leaner's aim to achieve long-term goals might derive primarily from their commitment to self-improvement and growth rather than their need for autonomy in choosing actions.

The findings of this study with regards to the role of autonomy in mediating the relationship between growth mindset and motivation is not supported by previous research which posits that autonomy is crucial for fostering intrinsic motivation (Deci & Ryan, 1985). According to Deci and Ryan (1985), when learners perceive themselves as having control over their learning choices and decisions, their motivation increases. One possible reason for this discrepancy could be attributed to the context in which this study was conducted. In other words, in academic settings such as universities and schools autonomy might not play a salient role as students are often required to operate within certain guidelines and parameters. Thus, in these contexts the sense of autonomy might not be adequately satisfied, making its role as a mediator less notable. When external guidelines and limitations

are imposed autonomy may be constrained and as a result might not add significant value to the motivation of the individuals.

Limitations of the Study and Suggestions for Future Research

This research has some limitations that could affect how widely the findings can be applied. The study had an adequate sample size according to Wolf et al. (2013) but it only included students from two universities in Iran so it may not reflect all EFL learners, especially those from different cultural or educational backgrounds. Using self-reported data could introduce biases and may not capture all aspects of student experiences or external factors affecting language learning. In addition, the study's cross-sectional design limits making conclusions about how growth mindset, L2 grit, motivation, and basic psychological needs are connected.

Future studies should use longer-term research methods to track changes over time with a larger group of participants coming from diverse cultural and educational backgrounds for better generalizability. It would also be helpful to include more objective measures such as teachers' assessments and behavioural observations along with self-reports in studies. Furthermore, future studies could also benefit from accounting for other constructs such as self-regulation, self-efficacy, external support, stress management and intrinsic motivation that could play the roles of moderators and mediators in their study models. Exploring how teaching methods, growth mindset interventions, and external factors such as classroom environment and socioeconomic status could give a more comprehensive picture of these dynamics.

Pedagogical Implications of the Study

The results of this research underscore how significant it is to encourage EFL students to foster a growth mindset towards language learning to improve their grit and motivation.

Educators should concentrate on creating learning environments that support beliefs focused on growth as these are linked to higher levels of persistence and engagement in language learning. The study also points out the role of meeting learners' basic psychological needs – competence and relatedness– in boosting their motivation and grit. From a pedagogical perspective, methods that offer chances for mastering skills and promote positive peer interactions can enhance the language learners' overall language learning journey.

First, the significant positive relationship between growth mindset and factors such as autonomy, competence, relatedness and motivation suggests that educators should actively promote a growth mindset within their teaching practices. This can be achieved through instructional strategies that emphasize the idea that abilities and intelligence can be developed over time. Blackwell et al. (2007) demonstrated that teaching students about the growth mindset leads to improvements in their academic performance, particularly in challenging subjects. Educators can implement activities that encourage students to embrace challenges, view mistakes as learning opportunities, and reflect on their progress. For instance, providing constructive feedback that focuses on effort and improvement rather than inherent ability can help students internalize a growth mindset and foster resilience in their language learning journeys.

Moreover, the negative impact of a fixed mindset on competence, relatedness, and grit highlights the need for interventions aimed at mitigating fixed mindset beliefs among learners. Educators should be aware of the detrimental effects that a fixed mindset can have on students' engagement and motivation. Incorporating lessons on the nature of growth and learning can help students recognize that setbacks are a normal part of the learning process. Group activities and collaborative learning opportunities can also be designed to foster a sense of community, thereby enhancing relatedness and reducing the inclination toward a fixed mindset.

The findings regarding the mediating role of basic psychological needs underscore the importance of satisfying autonomy, competence, and relatedness in the classroom. Teacher training programmes should encourage teachers to create a supportive learning context where students feel empowered to take ownership of their learning. This can involve offering choices in assignments and projects, providing opportunities for self-directed learning, and encouraging students to set their own goals. Furthermore, promoting competence can be achieved through differentiated instruction that caters to various skill levels, enabling all students to experience success and build confidence in their abilities.

The positive relationships between competence and relatedness and both motivation and grit suggest that educators should prioritize these needs in their curriculum and instructional design. Activities that foster a sense of belonging, such as peer collaboration and group discussions, can enhance students' feelings of relatedness. Additionally, strategies that provide opportunities for mastery and skill development, such as practice sessions and formative assessments, can significantly contribute to students' sense of competence and, in turn, their motivation and grit.

Lastly, the results indicate that interventions targeting these psychological needs should be integrated into the overall curriculum framework. Training teachers to recognize and address students' psychological needs can lead to more effective teaching practices. Schools might also benefit from considering professional development programs focused on mindset cultivation and need satisfaction strategies to equip educators with the tools to enhance their students' learning experience.

Conclusion

This research aimed to explore how students' growth and fixed mindsets, L2 grit, and their motivation in learning English are connected, with a particular focus on how basic

psychological needs play a mediating role in these relationships. The findings suggest that having a growth mindset positively impacts motivation, and satisfaction of the needs for autonomy, relatedness, and competence while a fixed mindset may hinder them. The study highlights the importance of promoting a growth mindset and addressing basic psychological needs to improve language learning results. However, the study's limitation also points out the need for research involving diverse populations and methodologies to validate and build on these findings. Overall, the study's insights provide valuable contributions to teaching practices and theoretical frameworks in language education.

Chapter Five

Conclusion Chapter

This chapter serves as the conclusion to the three studies that delved into the effects of implementing a growth mindset intervention, on language learning outcomes, psychological needs, and associated constructs. The studies sought to explore how a growth mindset impacts various aspects of language acquisition, such as motivation, grit, and basic psychological needs. This chapter outlines the findings from each study, explores their significance, acknowledges the encountered constraints, and offers recommendations for future research. Following this overview, findings of the three studies are presented.

Findings of the First Study

The first study sought to answer the following questions:

1. How does the implementation of growth mindset intervention influence EFL learners' growth vs. fixed language mindset?
2. How does the implementation of growth mindset intervention influence EFL learners' motivation?
3. How does the implementation of growth mindset intervention influence EFL learners' grit?
4. How does the implementation of growth mindset intervention influence EFL learners' language achievement?

In the quantitative phase, the findings of the repeated measures ANOVA indicated significant changes in growth mindset, perseverance of effort (POE), motivation, language achievement, consistency of interest (COI), and fixed mindset over time. Specifically, growth mindset POE and motivation increased significantly from pre-intervention to post-

intervention. Language achievement also saw a significant improvement while COI and fixed mindset showed subtle changes. The interaction between time and group was significant for all variables suggesting that the growth mindset intervention significantly affected these variables during the intervention periods compared to the control group.

Further analysis through post hoc tests provided insights into these results. Significant differences were noted in growth mindset, POE, COI, and motivation levels across pre-intervention, during-intervention, and post-intervention. For instance, growth mindset scores showed notable improvements across all phases, with significant gains from pre-intervention to post-intervention. COI and language achievement also showed noticeable developments over time. The control group, however, had higher fixed mindset scores compared to the experimental group, which had lower fixed mindset scores but higher growth mindset scores.

The results were supported by the insights gathered from interviews. Individuals in the experimental group shared how the growth mindset intervention had positively changed their attitudes towards challenges and learning, mentioning an increase in motivation and confidence. On the other hand participants in the control group often expressed a fixed mindset, seeing language acquisition as something they had to do rather than something they enjoyed. The qualitative data emphasized that learners who embraced a growth mindset were more involved and excited about learning languages whereas those, with a fixed mindset, showed less interest and motivation.

Findings of the Second Study

The second study aimed to answer the following questions:

1. How does the implementation of growth mindset intervention influence EFL learners' autonomy?

2. How does the implementation of growth mindset intervention influence EFL learners' relatedness?
3. How does the implementation of growth mindset intervention influence EFL learners' competence?

In the quantitative phase of this study, results demonstrated that growth mindset intervention had notable effects on growth mindset, fixed mindset, and three basic psychological needs of the learners. Post-hoc analyses showed significant differences in growth mindset, competence, relatedness, and autonomy between pre-intervention, during-intervention, and post-intervention. For instance, scores for competence and relatedness saw notable improvements from pre-intervention to post-intervention, indicating the positive effects of the growth mindset intervention. However, in the control group, the scores for these two variables stayed stable, reflecting a lack of change over time.

Findings of the Third Study

The third study aimed to explore the following research questions:

1. To what extent do students' language mindsets (both fixed and growth mindsets) predict EFL learners' L2 grit, and motivation, considering the roles of autonomy, relatedness and competence? By addressing this question, the study examines the direct relationships between mindset, L2 motivation and grit, while also considering the roles of autonomy, relatedness and competence.
2. What is the mediating effect of students' basic psychological needs (autonomy, relatedness, and competence) on the relationship between growth mindsets (both fixed and growth mindsets) and L2 grit, and motivation? By addressing this question, the study examines the mediated relationships.

The third study used a Structural Equation Modelling (SEM) to investigate how language mindsets (fixed and growth) L2 grit 1and motivation are interconnected, with a focus, on the mediating role of basic psychological needs (autonomy, relatedness, and competence). The model analysis results showed a positive correlation between endorsing a growth mindset and EFL learners' motivation and the satisfaction of their three basic psychological needs. The results indicated that having a fixed mindset negatively predicted EFL learners' motivation, grit, and satisfaction of basic psychological needs.

In terms of the mediating role of the basic psychological needs in the relationship between growth mindset, motivation, and grit, it was revealed that the needs for competence and relatedness played a more significant role in this relationship than the need for autonomy. Nevertheless, further adjustments may be necessary to enhance the model's ability to capture the complexities existing in these interrelationships.

Theoretical and Pedagogical Implications

The studies' theoretical and pedagogical implications present a framework for improving language learning environments in the context of nurturing a growth mindset and addressing students' basic psychological needs.

Theoretical Implications

These research findings emphasize the significance of Self Determination Theory (SDT) in language learning settings, validating its relevance in understanding learners' motivation and engagement. The studies affirm that a growth mindset greatly influences students' persistence, grit, and overall motivation in EFL learning. This aligns with SDT's core belief that meeting basic psychological needs—autonomy, competence, and relatedness—is essential for fostering intrinsic motivation and effective learning. The results

offer empirical evidence for the interplay between learners' mindset and their basic psychological needs satisfaction, showcasing how a growth mindset can boost not only motivation but also resilience and engagement. This evidence reinforces the theoretical framework that views basic psychological needs as vital to learners' progress and achievement.

Pedagogical Implications

From a pedagogical perspective, the studies provide practical guidance for L2 instructors aiming to improve students' language learning journey. The positive influence of a growth mindset on EFL achievements indicates that educators should introduce strategies that encourage this mindset. Applying techniques such as encouraging students' efforts rather than their innate abilities showcasing examples of learners who have succeeded through perseverance and incorporating growth mindset interventions into the curriculum can greatly improve students' engagement and performance.

In addition, these studies also emphasize the significance of addressing students' basic psychological needs in the classrooms. By establishing learning environments that cater to these needs teachers can cultivate a supportive atmosphere. Methods such as granting students more control over their learning process, providing opportunities for skill development, and promoting peer interactions can enhance the quality of learning experiences. Moreover, formal workshops that promote a growth mindset can serve as valuable resources for educators. Overall, these findings indicate that by focusing on both psychological needs and growth mindset, educators can establish a more favourable environment for EFL learners thereby resulting in enhanced motivation, grit, and overall success in language acquisition.

Limitations and Future Research Suggestions

Before concluding it is crucial to consider a few limitations to each study and propose suggestions for future research. To begin with, the first study has a number of important limitations. The small sample size of 60 participants split into two groups of 30 each might restrict the generalizability of the findings to larger populations of language learners. Therefore, future research could benefit from using a larger number of participants in order to add to the generalizability of their findings. Moreover, Since the study concentrated on the short-term effects of the growth mindset intervention it would be beneficial for future studies to explore long-term impacts by utilizing delayed post-questionnaires for a more comprehensive insight.

Study number two also presents some limitations that require consideration. The specific characteristics of the sample and intervention used could limit the generalizability of the results. Hence forthcoming research should seek to replicate the study with a broader range of participants to enhance external validity. Moreover, the study's duration and extent could have impacted the outcomes emphasizing the importance of delving into the lasting effects of interventions aimed at fostering a growth mindset, competence, relatedness and autonomy in the realm of second language acquisition.

Furthermore, the third study introduces constraints that may limit the generalizability of its results. Although the sample size was sufficient it was limited to students from two universities in Iran potentially not representing a diverse group of EFL learners with different learning experiences, cultural or educational backgrounds. Relying on self-reported data might introduce biases and fail to capture all facets of students' experiences or external factors influencing language acquisition. Additionally, the study's cross-sectional design

hinders drawing conclusions about how growth mindset, L2 grit, motivation, and basic psychological needs interplay over time.

To address these limitations future studies should employ longer-term research methods to monitor changes over time with a more diverse group of individuals. Including more objective assessments like teacher evaluations and behavioural observations in conjunction with self-reports could offer a holistic perspective on the interactions involved. Furthermore, investigating how teaching strategies, growth mindset interventions and external elements such as classroom atmosphere and socioeconomic background could affect the L2 learning experience can lead to an understanding of these factors. Addressing these limitations in these studies could offer a nuanced comprehension of these variables and their influence on EFL learning.

Conclusion

In summary, this chapter combines the results of three studies that looked into how growth mindset interventions impact various aspects of language learning, such as motivation, grit and basic psychological needs. The studies collectively show that fostering a growth mindset can greatly improve EFL learners' growth mindset, motivation, grit and language achievement. Each study offers insights into the effects of growth mindset interventions on learners revealing both immediate changes and more subtle improvements in mindset and performance.

Study one highlights the influence of a growth mindset on learners' attitudes and accomplishments although its small sample size and short-term focus indicate the need for further research to explore long-term effects and involve more diverse participant groups. Study two underscores enhancements in learners' autonomy, competence and sense of relatedness resulting from the growth mindset intervention but also suggests the necessity of

repeating the study with a broader sample to confirm these effects over time. Study three sheds light on how a growth mindset impacts L2 grit and motivation with basic psychological needs acting as mediators. Nevertheless, the study's limitations such as its cross-sectional design and reliance on self-reported data, call for future research to use more objective measures and longitudinal methods to capture the intricacies of these relationships.

Theoretical implications emphasize the importance of Self Determination Theory in exploring how basic psychological needs influence the motivation of language learners, while pedagogical implications suggest ways for teachers to incorporate growth mindset principles and meet learners' basic psychological needs effectively. It will be essential for future research to address the limitations identified in each study to develop a comprehensive and widely applicable understanding of how growth mindset interventions can enhance EFL learning outcomes. By delving into these interactions using long-term approaches both researchers and educators can improve the effectiveness of growth mindset interventions in language learning settings.

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Appendix A

Questionnaire of all the Three Studies

Language Mindset Inventory (LMI)

General language intelligence beliefs (GLB):

بخش اول: باورهای کلی درباره هوش زبانی

1. You have a certain amount of language intelligence, and you can't really do much to change it.

1-شما میزان مشخصی از هوش زبانی دارید و برای تغییر آن کار زیادی نمیتوانید بکنید.

2. Your language intelligence is something about you that you can't change very much.

2-هوش زبانی شما بخشی از شماست که نمیتوانید آن را به میزان قابل توجهی تغییر دهید.

3. To be honest, you can't really change your language intelligence.

3-صادقانه بگویم، نمیتوانید هوش زبانی خود را تغییر دهید.

*4. No matter who you are, you can significantly change your language intelligence level.

4- مهم نیست که چه کسی هستید، می توانید سطح هوش زبانی خود را به میزان قابل توجهی تغییر دهید.

*5. You can always substantially change your language intelligence.

5-شما همیشه می توانید هوش زبانی خود را تا حد زیادی تغییر دهید.

*6. No matter how much language intelligence you have, you can always change it quite a bit.

6-به هر اندازه هوش زبانی داشته باشید، همیشه میتوانید آن را تا حدود زیادی تغییر دهید.

Second language aptitude beliefs (L2B):

باورهایی درباره‌ی استعداد زبان دوم

1. To a large extent, a person's biological factors (e.g., brain structures) determine his or her abilities to learn new languages.

1- عوامل بیولوژیکی یک فرد (مانند ساختارهای مغزی) تا حد زیادی میزان توانایی او برای یادگیری زبانهای جدید را تعیین می‌کنند.

2. It is difficult to change how good you are at foreign languages.

2-تغییر دادن میزان مهارت شما در زبان های خارجی سخت است.

3. Many people will never do well in foreign languages even if they try hard because they lack natural language intelligence.

3-بسیاری از افراد حتی اگر تلاش زیادی کنند، هرگز در زبان های خارجی موفق نخواهند شد، زیرا هوش طبیعی زبانی ندارند.

4. You can always change your foreign language ability.

4-همیشه میتوانید توانایی خود در زبان خارجی را تغییر دهید.

5. In learning a foreign language, if you work hard at it, you will always get better.

5- در یادگیری یک زبان خارجی، اگر سخت تلاش کنید، همیشه پیشرفت خواهید کرد.

6. How good you are at using a foreign language will always improve if you really work at it.

6- اگر واقعاً تلاش کنید، توانایی شما همیشه در استفاده از یک زبان خارجی بهبود خواهد یافت.

Age sensitivity beliefs about language learning (ASB):

باورهای مرتبط با حساسیت سنی در یادگیری زبان

1.How well a person speaks a foreign language depends on how early in life he/she learned it.

1-اینکه یک فرد چقدر به خوبی یک زبان خارجی را صحبت میکند به این بستگی دارد که او چقدر زود در زندگی آن را یاد گرفته باشد.

2. People can't really learn a new language well after they reach adulthood.

2- بعد از رسیدن به سن بزرگسالی، افراد واقعا نمیتوانند یک زبان جدید را به خوبی یاد بگیرند.

3. Even if you try, the skill level you achieve in a foreign language will advance very little if you learn it when you are an adult.

3-اگر در بزرگسالی یک زبان خارجی را یاد بگیرید، حتی اگر سعی کنید، سطح مهارتی که در آن زبان خارجی به دست می آورید به میزان کمی پیشرفت می کند.

4. Everyone could do well in foreign language if they try hard, whether they are young or old.

4- چه جوان و چه پیر، تمامی افراد میتوانند در یادگیری زبان‌های خارجی موفق باشند به شرط اینکه سخت تلاش کنند.

5. How well a person learns a foreign language does not depend on age; anyone who works hard can be a fluent speaker in that language.

5-اینکه یک فرد یک زبان خارجی را چه اندازه خوب یاد میگیرد ارتباطی با سن او ندارد. هر کسی که سخت تلاش کند می تواند آن زبان خارجی را با مهارت صحبت کند.

6. Regardless of the age at which they start, people can learn another language well.

6-بدون توجه به سنی که در آن زبان آموزی را شروع میکنند، افراد می توانند یک زبان دیگر را به خوبی یاد بگیرند.

The Basic Psychological Needs Questionnaire

Autonomy

استقلال

1. I am able to freely decide my own pace of learning in English.

1-می توانم آزادانه تصمیم بگیرم که با چه سرعتی زبان انگلیسی یاد بگیرم.

2. I am able to freely choose the tasks to be done while learning English.

2- می توانم تمرین هایی که باید در حین یادگیری زبان انگلیسی انجام دهم را آزادانه انتخاب کنم.

3. My English teacher allows my class to choose how we approach English learning.

3- معلم زبان انگلیسی به کلاس ما اجازه می‌دهد که رویکردمان به یادگیری زبان انگلیسی را انتخاب کنیم.

4. My English teacher let me freely practice English in the classroom.

4- معلم زبان انگلیسی به من اجازه می‌دهد که آزادانه زبان انگلیسی را در کلاس تمرین کنم.

Competence

مهارت

1. I feel I am capable of learning English.

1- احساس می‌کنم که توانایی یادگیری زبان انگلیسی را دارم.

2. I can be a successful language learner.

2- می‌توانم یک زبان آموز موفق باشم.

3. I am competent enough to meet the challenges and tasks posed in English learning.

3-برای مواجهه با چالش‌ها و وظایفی که در یادگیری زبان انگلیسی ارائه می‌شود، توانایی کافی دارم.

4. I feel a sense of accomplishment in my English classes.

4- در کلاس‌های زبان انگلیسی خود، احساس توانمندی و موفقیت می‌کنم.

Relatedness

ارتباط با دیگران

1. My English teacher is friendly and cordial with me.

1- معلم زبان انگلیسی من با من دوستانه و مهربان است.

2. My English teacher is very understanding (puts him/herself in other people's place) about students' problems.

2- معلم زبان انگلیسی من به خوبی مشکلات دانش آموزان را درک می کند و خود را به جای آنان می‌گذارد.

3. My classmates are willing to help and cooperate with me while learning the language.

3- حین یادگیری زبان، همکلاسی‌هایم مشتاق به کمک کردن و همکاری با من هستند.

4. My English teacher cares about my progress.

4- معلم زبان انگلیسی من به پیشرفتم اهمیت می‌دهد.

L2 grit scale

1. I am a diligent English language learner.

1-در یادگیری زبان انگلیسی سخت کوش هستم.

2. My interests in learning English change from year to year.
2-علاقه ی من به یادگیری زبان انگلیسی سال به سال تغییر میکند.

3. When it comes to English, I am a hard-working learner.
3-وقتی یادگیری زبان انگلیسی در میان باشد، من یاد گیرنده ای سخت کوش هستم.

4. I think I have lost my interest in learning English.
4- فکر می‌کنم علاقه ام به یادگیری زبان انگلیسی را از دست داده‌ام.

5. Now that I have decided to learn English, nothing can prevent me from reaching this goal.

5-اکنون که تصمیم به یادگیری زبان انگلیسی گرفته‌ام، هیچ چیز نمی‌تواند مرا از رسیدن به این هدف باز دارد.

6. I will not allow anything to stop me from my progress in learning English.
6-به هیچ چیز اجازه نمی‌دهم مرا از پیشرفت در یادگیری زبان انگلیسی باز دارد.

7. I am not as interested in learning English as I used to be.
7-به یادگیری زبان انگلیسی به اندازه ی قبل علاقه ندارم.

8. I was obsessed with learning English in the past but have lost interest recently.
8- در گذشته عاشق یادگیری زبان انگلیسی بودم، اما اخیراً علاقه‌ام را از دست داده ام.

9. I put much time and effort into improving my English language weaknesses.
9- من وقت و انرژی زیادی را برای بهبود نقاط ضعف خود در زبان انگلیسی صرف میکنم.

The Motivated Behavior Scale

Criterion Measures : معیارهای ارزیابی

1-If an English course was offered in the future, I would like to take it.

1-اگر در آینده یک دوره انگلیسی ارائه شود، دوست دارم در آن شرکت کنم.

2-I am prepared to expend a lot of effort in learning English.

2-من آماده‌ام تا تلاش زیادی را در یادگیری انگلیسی انجام دهم.

3-I would like to spend lots of time studying English.

3-دوست دارم وقت زیادی را برای مطالعه انگلیسی صرف کنم.

4-I would like to concentrate on studying English more than any other topic.

4-دوست دارم بیشتر از هر موضوع دیگری روی مطالعه انگلیسی تمرکز کنم.

5-If my teacher would give the class an optional assignment, I would certainly volunteer to do it.

5-اگر معلم به کلاس یک تمرین اختیاری دهد، حتماً داوطلب می شوم تا آن را انجام دهم.

6-I would like to study English even if I were not required.

6-دوست دارم بصورت داوطلبانه انگلیسی را مطالعه کنم.

Integrativeness: یکپارچگی

1-I think learning English is important in order to learn more about the culture and art of its speakers.

1-فکر میکنم که یادگیری زبان به منظور شناخت بیشتر فرهنگ و هنر انگلیسی زبانان مهم است.

2-I would like to become similar to the people who speak English.

2-دوست دارم شبیه به افرادی شوم که انگلیسی صحبت میکنند.

3-I really like English.

3-زبان انگلیسی را واقعاً دوست دارم.

Appendix B

Interview Questions

A: Effectiveness of Growth Mindset Intervention

1. How has taking part in the growth mindset intervention influenced your approach to learning English?

2. Can you share instances of how your behavior or attitude, towards English learning has changed since engaging in the intervention?

3. In what ways do you believe the growth mindset intervention has boosted your confidence in facing challenges in learning English?

B: Growth vs. Fixed Mindset

4. What is your opinion on the concept that intelligence and skills in language learning can expand through effort and practice?

5. How do you address challenges or errors while studying English and how has this approach changed since embracing a growth mindset?

6. Have you ever experienced a belief that your capacity to learn English is restricted by talent? Can you describe a situation where you have experienced these emotions?

C: L2 Grit

7. To what extent do you enjoy learning English?

8. How do you sustain this enthusiasm over the time?

9. Can you tell me about a time when learning English was tough, for you but you didn't give up?

D: Motivation

10. What motivates you in language learning?

11. Do you want to become culturally similar to native speakers of English? Please explain.

Interview Questions of Study 2

A: Effectiveness of Growth Mindset Intervention

1. How has taking part in the growth mindset intervention influenced your approach to learning English?

2. Can you share instances of how your behavior or attitude, towards English learning has changed since engaging in the intervention?

3. In what ways do you believe the growth mindset intervention has boosted your confidence in facing challenges in learning English?

B: Autonomy

4. Do you feel you have control over your language learning process? Please explain.

5. Does your English teacher let you freely choose your learning approach? Please explain.

C: Relatedness

6. When you are in your English lessons, do you feel like you are part of the community with your teacher and classmates? Please explain.

7. If you need help in your English learning, are your classmates and teacher willing to help you? Please explain.

D: Competence

8. Do you think you can be a successful English learner? Please explain.

9. Can you share a time when you felt really skilled or not so skilled in using English and what caused those feelings?

Appendix C

Intervention Protocol

Sessions 1 and 2: Brains' structure and functions (both groups)

In both experimental and control groups informational cards titled "Brain Facts" and interactive tasks were used to educate students on concepts of brain structure and function. The subjects covered included the brains' anatomy and its function. These included information on regions for sensory perception, movement control, higher-level cognitive functions and memory; that it is divided into two hemispheres linked by nerve fibers; its communication with the body through the spinal cord for data transmission; and its intricate network of billions of interconnected nerve cells.

The teachers explained in simple words using pictures how nerve cells communicate via chemical signals and then asked students to participate in an activity where they role-played as neurons to simulate a piece of information. Following this, students took part in an exercise to map touch sensitivity levels across body areas (arm, hand neck) and then they examined an image depicting a "homunculus" to demonstrate the varying brain areas dedicated to different body parts.

Sessions 3 and 4: Growth Mindset Intervention (experimental group)/ Memory Unit (control group)

In the experimental group, language learners took turns reading an article called "You Can Grow Your Intelligence." The article discussed how learning affects the brain by creating stronger connections between nerve cells. It also cited studies showing that mental activity causes changes in the brain. The comparison was made to viewing the brain as a muscle that can be strengthened through practice with the conclusion that learning boosts intelligence. After reading, the teacher led a discussion where students shared skills they had

honed through practice and how this practice shaped their mastery. They delved into how their brains had adapted and improved due to learning, reinforcing the notion of increased intelligence. To reinforce this point students completed an activity where they navigated a "Neural Network Maze" spelling out the word "SMARTER " to illustrate the learning journey.

Students in the control group read an article explaining memory processes including distinctions between short and long-term memory and techniques like "chunking" information and repetition to improve recall. They discussed how they remember things and the difficulties they face. Next, they tried out a fun exercise called "Grocery List Tricks", during which they practiced using memory tricks like making visual associations to help them remember things better.

Sessions 5 and 6: Stereotypes and Study Skills (both groups)

In both experimental and control groups a lesson was included to address the common pitfalls of race and gender stereotypes. A lesson that highlighted the pitfalls of stereotyping oneself and others was included. It was reasoned that having strategies to make use of increased motivation was very important without these strategies students could face challenges. They were taught that motivation was very important and that skills alone may not bring benefits without motivation.

Over the next session, all the students delved into a lesson on stereotyping. The session kicked off with a slideshow featuring individuals prompting the students to guess their professions. This was followed by an activity where they listed occupations they thought they could or could not pursue. The teachers then revealed the professions of those individuals in the slides and led a discussion on the topic of stereotyping. They emphasized the risks associated with limiting one's and others' ambitions based on preconceived ideas. It

was emphasized that although our need to recognize and categorize our surroundings is natural and adaptive, it could lead to prejudice and inaccurate assumptions—commonly known as stereotypes. The importance of avoiding stereotypes was stressed, especially since negative perceptions about themselves could potentially impede their growth opportunities.

In the second half of the class, teachers delivered a presentation on study skills, covering various topics such as goal setting, time management techniques, and strategies for studying, retaining, understanding, and organizing information. For instance, time management methods like dividing long-term projects into smaller tasks with specific deadlines were discussed. Moreover, study techniques such as outlining chapters, creating index cards with key terms and definitions, and partnering up to quiz each other, memory tips such as writing summaries of readings they have read, visualizing content, and reading aloud were introduced and practiced. At the end of the lesson, folders containing summary notes, planner pages, and a set of basic tools, including a highlighter and index cards were distributed among the learners.

Sessions 7 and 8: Discussion (both groups, different content)

The experimental group engaged in two discussions facilitated by their teacher focusing on the idea that consistent practice can enhance the brain’s capabilities. During the session, students shared anecdotes about skills they had honed over time acknowledging the initial struggles they faced and how perseverance and practice led to improvement. The conversation underscored the importance of making mistakes as a part of the learning process emphasizing how these errors contribute to building neural connections, in the brain. It was highlighted that learning not only enhances intelligence but also represents a choice. In the discussion workshop leaders delved into the impact of labels such as "stupid" or "brainiac," which are often linked to performance. They elaborated on how such labels can instill a fear

of failure and discourage students from exerting their effort in school due to concerns about judgment or negative perceptions. This avoidance behaviour was identified as self-handicapping hindering students from immersing themselves in growth. The discussion concluded with a message; "Everything seems challenging until it becomes effortless."

On the other hand in the control group, students engaged in conversations about their academic journey sharing insights on their easiest and most demanding subjects as well as expressing preferences for particular classes. Workshop facilitators encouraged students to exchange tips, on study techniques.

During the session, the teachers went over memory techniques again. Delved into the topic of where memory is located in the brain and how it varies between humans and other creatures. The students participated in an exercise called "Identifying Brain Owners " where they paired images of animals with depictions of their brains and explanations of their skills. The. Conversation cantered on distinctions, in brain composition, memory functions and cognitive skills, across animal species.

Appendix D

Multiple Choice Comprehension Questions on Growth Mindset Intervention

1.What is the main goal of the growth mindset intervention created by Carol Dweck?

A) Improving students understanding of mathematics

B) Educating students, on brain development and its potential for growth

C) Enhancing students' performance in sports

D) Preparing students for exams

2. Which option best defines a "growth mindset"?

A) Holding the belief that intelligence is fixed and unchangeable

B) Believing that effort and practice can enhance intelligence and skills

C) Thinking that naturally gifted individuals can achieve success

D) Interpreting mistakes as indicators of failure

3. According to the intervention how can students enhance their brain capabilities?

A) By avoiding tasks

B) By seeking approval and praise

C) Through dedication, practice and learning from errors

D) By relying on their talents

4. What stands out as a significant contrast between a growth mindset and a fixed mindset?

A) A growth mindset perceives challenges as opportunities, for learning while a fixed mindset sees them as threats

B) While a fixed mindset encourages taking risks a growth mindset tends to avoid them

C) A growth mindset holds that abilities are innate whereas a fixed mindset believes they can be developed

D)There isn’t a distinction between the two mindsets.

5. Which statement reflects a growth mindset?

A) "I’m not good at this. I should quit."

B) "I can get better with effort and peactice."

C) " only smart people can understand this subject."

D) "If I don’t succeed, it means I don’t have talent."

6. What role does feedback play in a growth mindset according to the intervention?

A) Feedback doesn’t matter and should be disregarded.

B) Feedback is a tool for spotting errors and making improvements.

C) Feedback should only be positive to maintain self-assurance.

D) Feedback is only helpful for evaluating performance.

7. How does the growth mindset intervention suggest dealing with mistakes?

A) Ignoring mistakes to maintain positivity.

B) Seeing mistakes as opportunities for learning.

C) Blaming others for mistakes.

D) Avoiding situations where mistakes might happen.

8. Which of these actions is promoted by a growth mindset?

A) Avoiding challenges to avoid failure

B) Giving up when tasks get hard

C) Persevering through difficulties

D) Doing tasks which are easy to ensure success

9.What are the effects of complimenting intelligence versus praising effort as explained by Carol Dweck?

A) Acknowledging intelligence consistently leads to performance

B) Commending effort fosters resilience and a growth mindset

C) Encouraging effort discourages learners from taking risks

D) There is no distinction between praising intelligence and effort

10. How does the growth mindset intervention assist students in cultivating a growth mindset?

A) By presenting tasks that are beyond their abilities

B) By educating them on the brain's capacity to change and transform through effort

C) By avoiding offering any criticism or feedback

D) By highlighting the significance of talent over hard work and effort