

Scrutinizing the Roles of EFL Learners' Reflection, Autonomy, Grit, and Foreign Language Engagement in their Call-based Emotional Beliefs

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ABSTRACT

Objective: This study investigated the roles of reflection, autonomy, grit, and Foreign Language Engagement (FLE) in predicting emotional beliefs (EBs) of male and female EFL learners in Computer-Assisted Language Learning (CALL) courses, as well as the role of gender differences in learners' EBs.

Method: A total of 234 intermediate-level EFL learners (109 male, 125 female) from a language institute in Urmia, Iran, participated in the study. Participants completed some standardized questionnaires over a five-week period using Google Forms as follows: The Emotional Beliefs Questionnaire (Becerra et al., 2020), Reflection Questionnaire (Kember et al., 2000), Learner Autonomy Questionnaire (Lee, 2011), Grit Questionnaire (Teimouri et al., 2020), and Foreign Language Engagement (FLE) Questionnaire (Eerdemutu et al., 2024). Their English proficiency was ensured using the Oxford Placement Test (Allan, 2004). Multiple regression analyses were conducted separately for male and female learners, and an independent samples t-test was used to explore gender differences.

Results: For male learners, reflection and grit were the strongest predictors of emotional beliefs whereas for female learners, autonomy and FLE were the main predictors. Female learners also reported significantly higher levels of EBs compared to those of males in CALL courses.

Conclusions: The findings suggest that emotional beliefs in CALL environments are shaped by distinct gender-specific factors: self-regulation and perseverance for males, and autonomy and engagement for females. These results underscore the importance of gender-sensitive pedagogical strategies and indicate that fostering reflection, grit, autonomy, and engagement can enhance learners' emotional development in technology-mediated language learning.

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Introduction

Recent developments in applied linguistics have increasingly emphasized the role of affective, cognitive, and learner-related variables in shaping successful foreign language learning outcomes. Beyond linguistic competence alone, contemporary research underscores that learners' internal dispositions, beliefs, and emotional orientations play a decisive role in how they engage with instructional content and learning environments (Jalili Shishavan, 2025). Among these constructs, learners' emotional beliefs (EBs) have emerged as a key affective dimension influencing motivation, persistence, engagement, and academic achievement in EFL contexts. Emotional beliefs refer to learners' affective evaluations, subjective interpretations, and emotional responses toward language learning experiences, instructional practices, and perceived learning demands (Mombeini et al., 2024). These beliefs function as an emotional–cognitive filter through which learners process classroom events, regulate effort, and evaluate their success or failure in language learning.

In language education, emotional beliefs are not static traits but rather dynamic and context-sensitive constructs that are shaped by instructional conditions, learner characteristics, and socio-cultural expectations. Research suggests that learners' emotional beliefs can significantly influence their willingness to participate in classroom activities, persist in challenging tasks, and adopt effective learning strategies (Booth & Gerard, 2011). Consequently, understanding the antecedents of emotional beliefs has become a central concern for researchers seeking to improve learner engagement and long-term language learning outcomes.

In parallel with this affective turn, technological advancements have profoundly transformed instructional contexts in foreign language education. One of the most influential developments in this regard is Computer-Assisted Language Learning (CALL), which refers to the systematic integration of computer technologies to support language learning processes (Xu et al., 2019). CALL has evolved from early drill-and-practice programs to sophisticated online learning environments that emphasize interaction, autonomy, learner control, and multimodal input (Levy et al., 2015). Within CALL, online language instruction delivered through Learning Management Systems (LMSs) has become increasingly prevalent, particularly in higher education contexts (Álvarez Valencia, 2016; Boers et al., 2017).

CALL-based environments provide learners with flexible access to instructional materials, opportunities for asynchronous and synchronous interaction, and tools for self-paced learning. These features may foster positive emotional experiences by reducing anxiety, enhancing perceived control, and supporting individualized learning paths (Levy & Stockwell, 2006). However, empirical evidence indicates that learners respond to CALL environments differently, suggesting that individual learner variables significantly mediate the emotional impact of

technology-enhanced instruction (Aydın & Tekin, 2023; Wei & Zheng, 2017). This variability highlights the importance of examining learner-related psychological factors alongside instructional contexts when investigating emotional beliefs in CALL-based learning.

From a learner-centered theoretical perspective, reflection, autonomy, grit, and Foreign Language Engagement (FLE) represent interrelated yet distinct constructs that collectively shape learners' cognitive, motivational, and emotional functioning. psychology has shown that designing instructional programs based on brain-compatible principles and paying attention to psychological capital and academic emotions can significantly enhance students' engagement and learning motivation. For instance, a study by Bagheri et al. (2025) examined the development and validation of a training package based on Caine's theory and found that this package significantly increased the academic engagement of female elementary school students, with effects remaining stable three months after implementation. Furthermore, Fallahnejad et al. (2024) demonstrated that perceived parenting styles, psychological capital, quality of life, and academic emotions directly and indirectly influenced students' academic adjustment. These empirical findings from these studies emphasize that cognitive and emotional processes related to learning—including autonomy, reflection, and grit—can play a crucial role in shaping learners' emotional beliefs in technology-mediated (CALL) learning environments.

Reflection enables learners to critically analyze their learning experiences, monitor progress, and adjust strategies accordingly (Akpur, 2020). Reflective learners are more likely to develop coherent emotional beliefs, as they actively interpret learning challenges as opportunities for growth rather than threats (Aldosari et al., 2023). Autonomy, defined as learners' capacity to take responsibility for their learning through goal setting, self-monitoring, and strategic decision-making, has been consistently linked to positive affective outcomes in language learning (Xuan et al., 2018; Zimmerman, 1998).

Furthermore, grit, as a dispositional trait characterized by perseverance and sustained effort toward long-term goals, has gained increasing attention in applied linguistics research (Karlen et al., 2019). In EFL contexts, gritty learners tend to maintain motivation and emotional stability despite setbacks, which may foster more adaptive emotional beliefs toward language learning (Feng & Papi, 2020). Similarly, Foreign Language Engagement (FLE) captures learners' behavioral, cognitive, and emotional involvement in language learning activities, including enjoyment, enthusiasm, and active participation (Akbari et al., 2016; Elahi Shirvan et al., 2021). Engagement is closely linked to emotional beliefs, as emotionally engaged learners are more likely to perceive learning experiences as meaningful and rewarding.

Empirical studies have increasingly documented the role of learner-related variables in shaping emotional beliefs. Prior research indicates that motivation, self-esteem, and critical thinking skills are positively associated with more adaptive emotional beliefs in educational

settings (Booth & Gerard, 2011; Karlen et al., 2019; Li & Heydarnejad, 2024). Instructional interventions such as self-assessment practices and innovative teaching strategies have also been shown to enhance learners' emotional beliefs by promoting self-awareness and learner agency (Aldosari et al., 2023; Ariyanti et al., 2023). Furthermore, teacher support and classroom climate have been identified as significant predictors of learners' emotional beliefs (Aladini et al., 2024).

Despite these valuable contributions, several important gaps remain in the literature. First, most studies on emotional beliefs have been conducted in traditional face-to-face instructional contexts, leaving CALL-based learning environments underexplored. Second, existing research has typically examined learner-related predictors of emotional beliefs in isolation, rather than investigating the combined effects of reflection, autonomy, grit, and engagement within a single model. Third, limited attention has been paid to potential gender differences in emotional beliefs, despite evidence suggesting that affective and motivational variables may function differently across male and female EFL learners. These gaps are particularly salient in EFL contexts such as Iran, where CALL-based instruction is increasingly integrated into university-level language education.

In response to these gaps, the present study sought to scrutinize the roles of EFL learners' reflection, autonomy, grit, and foreign language engagement in predicting their emotional beliefs within CALL-based courses in the Iranian context. Additionally, the study examined whether male and female learners differ in their emotional beliefs toward CALL-based language learning. By integrating learner-related psychological variables with a technology-mediated instructional context, this research aimed to provide a more comprehensive and nuanced understanding of emotional beliefs in contemporary EFL education. Accordingly, the present study addressed three main research questions: First, it examined whether male EFL learners' reflection, autonomy, grit, and foreign language engagement predict their emotional beliefs in CALL-based courses. Second, it investigated whether female EFL learners' reflection, autonomy, grit, and foreign language engagement serve as significant predictors of their emotional beliefs in CALL-based learning environments. Finally, the study explored whether there is a significant difference between male and female EFL learners in their emotional beliefs toward CALL-based language learning.

Methodology

The present study adopted a comparative predictive correlational research design to address the proposed research questions. According to Creswell (2009), predictive correlational designs enable researchers to examine the extent to which a set of predictor variables explains variance in a criterion variable. In the current study, EFL learners' reflection, autonomy, grit, and foreign

language engagement were treated as predictor variables, while emotional beliefs served as the criterion variable within CALL-based language learning environments.

Given the gender-oriented nature of the research questions, predictive analyses were conducted separately for male and female EFL learners to examine whether reflection, autonomy, grit, and foreign language engagement predicted emotional beliefs within each group. In addition, a comparative analysis was conducted to investigate potential differences between male and female learners' emotional beliefs in CALL-based courses. This design was considered appropriate for exploring both predictive relationships and gender-based differences in a non-experimental and natural instructional setting.

Participants

In line with the objectives of the study, a convenience sampling method was employed to select participants from a population of 474 EFL learners enrolled in an English language institute in Urmiin in 2024. The final sample consisted of 234 intermediate-level EFL learners, including 109 males and 125 females, aged between 16 and 25 years. The participants' mother tongues were Azeri, Kurdish, or Farsi. Their intermediate level of English proficiency had been determined based on the institute's standardized placement procedures prior to course enrollment.

All participants had been attending online general English courses delivered through a CALL-based instructional format for approximately three years. They were familiar with the institute's Learning Management System (Adobe Connect), which was used for instructional delivery, interaction, assessment, and communication. Participation in the study was voluntary, and written informed consent was obtained from all participants prior to data collection. Participants were assured that their responses would remain confidential and that their anonymity would be preserved throughout the research process.

Instruments

In the present study, several standardized questionnaires were employed to measure the study variables. Prior to the main data collection, a pilot study was conducted with 20 male and 20 female intermediate-level EFL learners who shared similar characteristics with the main participants. Cronbach's alpha coefficient (α) was calculated to assess the internal consistency reliability of all instruments within the Iranian EFL context. The following instruments were used in the study:

Language Proficiency Test: To ensure the linguistic homogeneity of the participants, Allan's (2004) Oxford Placement Test (OPT) was administered. The OPT consists of three sections assessing grammar (20 items), vocabulary (20 items), and cloze test performance (20 items). The reliability analysis conducted in the pilot phase yielded a satisfactory reliability coefficient ($\alpha =$

.85), confirming the suitability of this test for determining participants' intermediate-level proficiency in the present study.

Emotional Beliefs (EB) Questionnaire: Becerra et al. (2020)'s Emotional Beliefs questionnaire was used to measure male and female EFL learners' emotional beliefs toward their CALL-based language courses. The questionnaire includes 16 items rated on a seven-point Likert scale and assesses four dimensions of emotional beliefs: positive usefulness, negative usefulness, positive controllability, and negative controllability. The reliability analysis in the pilot study indicated an acceptable internal consistency for this instrument in the Iranian context ($\alpha = .81$).

Reflection Questionnaire: Learners' reflection was measured using Kember et al. (2000)'s Reflection Questionnaire. This instrument comprises 16 items rated on a five-point Likert scale and measures four dimensions: habitual action, understanding, reflection, and critical reflection. The results of the pilot reliability analysis demonstrated a high level of internal consistency ($\alpha = .88$), supporting its applicability in the present study.

Autonomy Questionnaire: Lee's (2011) Learner Autonomy Questionnaire was employed to assess participants' autonomy in academic settings. The questionnaire includes 12 items rated on a five-point Likert scale and measures four sub-components of autonomy: cognitive, metacognitive, social, and affective autonomy. The pilot study results indicated satisfactory reliability for this instrument in the Iranian EFL context ($\alpha = .87$).

Grit Questionnaire: Participants' grit was measured using Teimouri et al.'s (2020) Grit Questionnaire, which consists of 9 items rated on a five-point Likert scale. The instrument assesses two dimensions of grit: perseverance of effort and consistency of interest. The reliability analysis yielded an acceptable Cronbach's alpha coefficient ($\alpha = .83$), indicating satisfactory internal consistency.

Foreign Language Engagement (FLE) Questionnaire: To assess learners' Foreign Language Engagement, the researchers employed Eerdemutu et al.'s (2024) FLE Questionnaire. This instrument consists of 9 items rated on a five-point Likert scale and measures emotional, cognitive, and behavioral engagement. The pilot reliability analysis demonstrated satisfactory internal consistency for this instrument ($\alpha = .84$), confirming its suitability for the present study.

Procedure

Following participant's selection and proficiency screening using the Oxford Placement Test, written informed consent was obtained from all participants. Data collection was conducted over a five-week period using Google Forms, during which the Emotional Beliefs, Reflection, Autonomy, Grit, and Foreign Language Engagement questionnaires were administered sequentially (one questionnaire per week) to minimize respondent fatigue. All questionnaires

were completed within the CALL-based instructional context in which participants were enrolled. Finally, the collected data were coded and analyzed using SPSS version 25 to address the research questions of the study.

In line with the objectives of the study, multiple regression analysis was employed to examine the predictive roles of reflection, autonomy, grit, and foreign language engagement (FLE) in explaining EFL learners' emotional beliefs (EBs) in CALL-based courses (Pallant, 2020). To address the first and second research questions, separate multiple regression analyses were conducted for male and female participants in order to identify the relative contribution of each predictor variable to emotional beliefs within each gender group.

Prior to conducting the regression analyses, the assumptions of multiple regression, including normality, linearity, homoscedasticity, and absence of multicollinearity, were examined and confirmed. Moreover, to answer the third research question regarding potential gender differences in emotional beliefs, an independent samples t-test was conducted to compare male and female EFL learners' EB scores. All statistical analyses were performed using SPSS version 25.

Results

Prior to addressing the research questions, descriptive statistics were computed for all study variables separately for male and female EFL learners.

Table 1. Descriptive Statistics of Study Variables by Gender

Variable	Gender	N	Mean	SD
Reflection	Male	109	3.84	.62
	Female	125	3.71	.58
Autonomy	Male	109	3.52	.67
	Female	125	3.89	.61
Grit	Male	109	3.76	.59
	Female	125	3.63	.56
Foreign Language Engagement (FLE)	Male	109	3.48	.64
	Female	125	3.92	.66
Emotional Beliefs (EBs)	Male	109	59.75	7.28
	Female	125	66.26	8.66

As shown in Table 1, female learners reported higher mean scores in autonomy, foreign language engagement, and emotional beliefs, whereas male learners demonstrated slightly higher levels of reflection and grit. These descriptive patterns are consistent with the subsequent regression and comparative analyses.

Analysis of Research Questions

This section examines the research questions based on the results of the statistical data analysis:

RQ1. Do male EFL learners' reflection, autonomy, grit, and FLE predict their EBs in their CALL courses?

Considering this question, the researchers used Multiple Regression Analysis to analyze the data. Accordingly, they examined the characteristics of the data to ensure that they did not violate the assumptions of this test. The first assumption was multicollinearity. The researchers examined the Tolerance (T) and VIF values to check this assumption. Table 2 provides the results:

Table 2. T and VIF Values of Male EFL Learners' EBs

Predictor	T	VIF
Reflection	.326	1.54
Autonomy	.487	2.98
Grit	.265	2.75
FLE	.375	1.25

According to Table 2, the multicollinearity assumption was not violated since all of the T values were greater than .1 and all of the VIF values were less than 10. Consequently, the researchers examined the Mahalanobis Distance (MD), and Cook's Distance (CD) values to check the remaining test assumptions including outlier, independence of residuals, normality, linearity, and homoscedasticity. (Table 3)

Table 3. MD and CD values of male EFL learners' EBs

Value	Minimum	Maximum
MD	2.78	14.25
CD	.023	.154

As shown in Table 3, the maximum MD value was 14.25. This value is less than 18.47 that constitutes the critical MD value of the models with four independent variables (Pallant, 2020). Moreover, the maximum CD value was less than 1. Therefore, the assumptions were not violated and the researchers could examine the relevant model. Table 4 provides the pertinent results:

Table 4. Model of Male EFL Learners' EBs

Model	R	R Square	ARS	SEE
1	.938	.826	.811	22.925

As shown in Table 4, this model explained 82.6 percent (R Square multiplied by 100) of the variance in male learners' EBs. Although the explained variance of the models was relatively

high, the acceptable Tolerance and VIF values indicate that the predictors contributed uniquely to the model and that multicollinearity did not pose a threat to the validity of the regression results.

In addition to examining Mahalanobis Distance and Cook's Distance values, visual inspection of standardized residual plots confirmed that the assumptions of normality, linearity, homoscedasticity, and independence of residuals were satisfactorily met. the result of the relevant ANOVA test was significant ($p < .05$). As a result, the researchers examined the model coefficients. Table 5 shows these results:

Table 5. Beta Values of Male EFL Learners' EBs

Predictor	Standardized Coefficients (Beta)	Sig.
Reflection	.635	.000
Autonomy	.035	.342
Grit	.538	.001
FLE	.072	.255

The scrutiny of Beta values in Table 5 indicated that male learners' reflection (.635), and grit (.538) were respectively the first and the second variables that made the strongest significant contribution to the prediction of their EBs ($p < .05$).

RQ2. Do female EFL learners' reflection, autonomy, grit, and FLE predict their EBs in their CALL courses?

To probe this question, the researchers used Multiple Regression Analysis to analyze the data. First, they examined the characteristics of the data to ensure that they did not violate the assumptions of this test. The first assumption was multicollinearity. The researchers examined the T and VIF values to check this assumption.

Table 6. T and VIF Values of Female EFL Learners' EBs

Predictor	T	VIF
Reflection	.465	2.76
Autonomy	.287	3.42
Grit	.562	1.56
FLE	.266	3.72

As shown in Table 6, the multicollinearity assumption was not violated since all of the T values were greater than .1 and all of the VIF values were less than 10. Therefore, the researchers examined MD and CD values to check the remaining test assumptions including outlier, independence of residuals, normality, linearity, and homoscedasticity. Table 7 provides these results:

Table 7. MD and CD Values of Female EFL Learners' EBs

Value	Minimum	Maximum
MD	3.21	15.57
CD	.037	.126

According to Table 7, the maximum MD value was 15.57. This value is less than 18.47 that constitutes the critical MD value of the models with four independent variables (Pallant, 2020). In addition, the maximum CD value was less than 1. Therefore, the assumptions were not violated and the researchers could examine the relevant model. Table 8 shows these results:

Table 8. Model of Female EFL Learners' EBs

Model	R	R Square	ARS	SEE
1	.926	.812	.807	23.564

As shown in Table 8, this model explained 81.2 percent (R Square multiplied by 100) of the variance in female learners' EBs. Moreover, the results of the relevant ANOVA test was significant ($p < .05$). As a result, the researchers examined the model coefficients.

Table 9. Beta Values of Female EFL Learners' EBs

Predictor	Standardized Coefficients (Beta)	Sig.
Reflection	.056	.336
Autonomy	.575	.000
Grit	.025	.578
FLE	.342	.003

The examination of Beta values in Table 9 indicated that female learners' autonomy (.575), and FLE (.342) were respectively the first and the second variables that made the strongest significant contribution to the prediction of their EBs ($p < .05$).

RQ3. Is there a significant difference between male and female EFL learners' EBs in their CALL courses?

Based on the aim of this question, the researchers examined the normality assumption of the data in order to specify the appropriate test for performing the data analysis of the study. Table 10 provide these results for the male and female learners respectively:

Table 10. Tests of Normality of Male EFL Learners' EBs

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Male EFL Learners' EBs	.157	109	.376	.984	109	.325
Female EFL Learners' EBs	.132	125	.238	.965	125	.366

As shown in Table 10, all of the p-values in the results of Kolmogorov-Smirnov Shapiro-Wilk normality tests were larger than .05. Consequently, the data were normally distributed and the researchers used parametric statistics in data analysis. Given the normal distribution of the data, an independent-samples t-test was conducted to compare male and female learners' emotional beliefs. Although sample sizes were unequal, Levene's test indicated homogeneity of variances; therefore, results from the unequal variances row are reported for robustness. Table 11 provides descriptive statistics on male and female learners' EBs:

Table 11. Descriptive Statistics on Male and Female EFL Learners' EBs

Groups	N	Mean	Std. Deviation	Std. Error Mean
Male Learners	109	59.75	7.276	.543
Female Learners	125	66.26	8.655	.245

As shown in Table 11, there was a difference between the mean value of male learners EBs ($M=59.75$) and the mean value of female learners' EBs ($M=66.26$). Table 12 shows the results of the pertinent Welch's independent-samples t-test:

Table 12. Welch's Independent-Samples t-test of Male and Female EFL Learners' EBs

	Levene's Test		t-test						
	F	Sig.	t	df	Sig. (2-tailed)	MD	SED	95% CI	
								Lower	Upper
Equal variances assumed	33.4257	.625	7.541	232	.000	6.51	.101	5.234	9.7567
Equal variances not assumed			8.254	192.26	.000	6.51	.101	5.857	9.857

Welch's t-test assumes unequal variances. The examination of the unequal variances in Table 12 showed that female learners' EBs was significantly higher than that of male learners ($p<.05$). In addition, the magnitude of the observed difference was large (Cohen's $d \approx .82$), indicating a substantial practical difference between male and female learners' emotional beliefs in CALL courses.

Overall, the results revealed distinct predictive patterns for male and female EFL learners. While reflection and grit emerged as significant predictors of emotional beliefs among male learners, autonomy and foreign language engagement played a more prominent role among female learners. Moreover, female learners reported significantly higher emotional beliefs toward CALL courses than their male counterparts.

Discussion

The first research question examined the extent to which male EFL learners' reflection, autonomy, grit, and foreign language engagement (FLE) predicted their emotional beliefs (EBs)

in CALL courses. The findings indicated that reflection and grit were the strongest significant predictors of male learners' EBs. This pattern suggests that male learners' emotional beliefs in technology-mediated language learning environments are primarily shaped by internal self-regulatory and perseverance-related mechanisms.

Regarding reflection, the results are consistent with THOSE of Luo (2019) and Lou and Noels (2019), who emphasized that reflective practices enhance learners' emotional beliefs by increasing self-awareness and promoting adaptive interpretations of learning challenges. Luo (2019) argued that reflection enables learners to monitor their emotional reactions to learning difficulties and reinterpret setbacks as opportunities for growth rather than threats. Similarly, Lou and Noels (2019) highlighted that reflective learners are better able to regulate their learning strategies and sustain emotional resilience. Within CALL contexts, such reflective processes may be particularly salient for male learners, as technology-based environments require continuous self-monitoring, independent decision-making, and emotional regulation in the absence of constant teacher mediation.

In addition, the significant role of grit in predicting male learners' EBs aligns with the findings of Barcelos (2015) and Ariyanti et al. (2023). Barcelos (2015) identified grit as a key contributor to positive emotional experiences by fostering sustained effort and long-term commitment to language learning goals. Ariyanti et al. (2023) further demonstrated that learners with higher levels of grit tend to develop more positive emotional orientations toward language learning due to their persistence and tolerance of difficulty. In CALL settings, where learners often encounter technological challenges and autonomous learning demands, grit may serve as a critical psychological resource that strengthens male learners' confidence, reinforces their sense of competence, and positively shapes their emotional beliefs.

The second research question explored the predictive roles of reflection, autonomy, grit, and FLE in female EFL learners' emotional beliefs. The findings revealed that autonomy and FLE were the strongest predictors of female learners' EBs, indicating that their emotional beliefs are more strongly influenced by relational, motivational, and engagement-oriented factors within CALL environments. Concerning autonomy, the results corroborate the findings of Shao et al. (2020) and Ma (2022), who reported that autonomous learners tend to develop more positive emotional beliefs due to enhanced ownership of the learning process. Shao et al. (2020) emphasized that autonomy empowers learners to make informed decisions, increases intrinsic motivation, and fosters emotional satisfaction. Similarly, Ma (2022) noted that autonomy strengthens learners' self-efficacy by encouraging initiative and responsibility. In CALL contexts, where learners can control learning pace, access resources independently, and personalize learning pathways, such autonomy may be particularly influential for female learners, leading to heightened emotional engagement and positive beliefs about language learning.

Furthermore, the significant contribution of FLE to female learners' EBs is in line with the findings of Kisley et al. (2024) and Li and Heydarnejad (2024). Kisley et al. (2024) highlighted that engagement with linguistic, cultural, and interactive aspects of language learning enhances emotional connections to the target language. Li and Heydarnejad (2024) further demonstrated that engaged learners benefit from timely feedback, increased interaction, and a stronger sense of achievement. Within CALL environments, these features may create emotionally supportive learning spaces that resonate more strongly with female learners, thereby reinforcing their emotional beliefs and sense of meaningful participation.

The third research question addressed the difference between male and female EFL learners' emotional beliefs in CALL courses. The results indicated that female learners reported significantly higher levels of EBs than male learners. This finding aligns with Richards (2022), who argued that female learners often benefit more from collaborative and interactive learning environments that foster emotional expression and peer support. Richards (2022) further noted that female learners are more likely to process feedback constructively and to engage emotionally with learning experiences. In CALL-based courses, where communication, collaboration, and feedback are frequently mediated through digital tools, such tendencies may provide female learners with greater emotional reinforcement and a stronger sense of belonging, ultimately leading to more positive emotional beliefs.

Taken together, the findings of the present study reveal distinct gender-specific patterns in the formation of emotional beliefs within CALL environments. While male learners' emotional beliefs appear to be shaped primarily by reflective self-regulation and perseverance, female learners' emotional beliefs are more closely associated with autonomy and engagement. These results underscore the importance of adopting gender-sensitive pedagogical approaches in CALL contexts and highlight the multifaceted psychological mechanisms through which emotional beliefs are constructed in technology-enhanced language learning.

Despite its contributions, the present study was subject to several limitations that should be acknowledged. First, the use of convenience sampling rather than random sampling restricts the generalizability of the findings. Second, the study did not examine the potential effects of learners' individual characteristics, such as age and language background, which may have influenced their emotional beliefs. In addition, the scope of the study was delimited to intermediate-level EFL learners in language institute settings, thereby excluding other proficiency levels and academic contexts. Moreover, the focus was confined to reflection, autonomy, grit, and foreign language engagement as predictors of emotional beliefs, while other relevant affective variables were not considered.

Future research is encouraged to address these limitations by employing random sampling procedures and including learners from diverse proficiency levels and educational settings, such

as schools and universities. In addition, adopting mixed-methods research designs would allow researchers to integrate quantitative findings with qualitative insights, thereby providing a more comprehensive understanding of learners' emotional beliefs and their underlying mechanisms. Finally, further studies are recommended to investigate emotional beliefs in both second and foreign language contexts and to explore a wider range of psychological and contextual predictors that may shape learners' emotional experiences in CALL environments.

Conclusion

The present study investigated the predictive roles of reflection, autonomy, grit, and foreign language engagement (FLE) in shaping male and female EFL learners' emotional beliefs (EBs) in CALL courses and examined gender differences in these beliefs. The findings revealed distinct gender-specific patterns: while reflection and grit emerged as the strongest predictors of male learners' emotional beliefs, autonomy and FLE played a more prominent role in predicting female learners' emotional beliefs. Furthermore, the results indicated that female learners reported significantly more positive emotional beliefs toward CALL courses than their male counterparts.

Taken together, these findings highlight the multidimensional and gender-sensitive nature of emotional beliefs in technology-enhanced language learning environments. They suggest that CALL contexts do not influence learners' emotions uniformly; rather, emotional beliefs are shaped through different psychological pathways depending on learners' gender and affective profiles. Accordingly, emotional beliefs should be regarded as a central component of effective CALL pedagogy rather than a peripheral outcome.

From a pedagogical perspective, the findings underscore the need for EFL teacher education programs and course developers to integrate learner-related affective components alongside technological training. Incorporating modules that address learners' emotional beliefs, reflection, autonomy, grit, and engagement can equip teachers with the knowledge required to provide targeted emotional support in CALL environments. In addition, professional development opportunities such as workshops and webinars focusing on both learner affective factors and CALL-related technologies can enhance teachers' ability to translate theory into practice.

Moreover, syllabus designers are encouraged to include explicit guidance on learner affective variables and CALL principles in teacher manuals, enabling instructors to adapt their instructional practices to learners' emotional and psychological needs. At the classroom level, EFL teachers are advised to draw on empirical research findings and to implement affective strategies that foster reflection, perseverance, autonomy, and engagement, thereby promoting more positive emotional beliefs among learners in CALL courses.

Overall, the present study contributes to the growing body of research on affective dimensions of CALL by demonstrating that emotional beliefs are shaped by distinct predictors for male and female learners. These insights may inform more inclusive, emotionally responsive, and learner-centered approaches to technology-mediated language education.

Author Contributions

All authors—Aysun Nabizade (Department of English Language and Literature, Islamic Azad University, Urmia, Iran), Farnoush Ahangaran (Department of English Language and Literature, Urmia University, Urmia, Iran), and Aram Pouyan (Department of English Language and Literature, Urmieh University, Pardis Campus, Iran)—contributed to the study's conception and design, data collection, analysis, and interpretation, as well as the drafting, reviewing, and editing of the manuscript. All authors read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Data Availability Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Conflicts of Interest

The authors declare no conflicts of interest.

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