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Learner-oriented assessment matters: testing the effects of academic buoyancy, reflective thinking, and learner enjoyment in self-assessment and test-taking anxiety management of the EFL learners

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Abstract

Students may better keep tabs on their own development by engaging in self-assessment (S-A), academic buoyancy (AB) construction, and reflective thinking (RT). Although S-A, AB, and RT have been known for a long time, very little is known regarding their potential effects on test-taking anxiety (TTA) and learner enjoyment (LE). Therefore, this study aimed to present a framework depicting the dynamic interaction of AB, RT, LE, S-A, and TTA. Specifically, 394 EFL students from Turkey were given the Academic Buoyancy Scale (ABS), the Reflective Thinking Questionnaire (RTQ), the Test-Taking Anxiety Scale (TTAS), the Core of Self-Assessment Questionnaire (CSAQ), and the Foreign Language Enjoyment Scale (FLES). Higher levels of S-A, AB, RT, and LE were associated with more S-A and less TTA among EFL students, as shown by confirmatory factor analysis (CFA) and structural equation modeling (SEM). The findings of this research have important implications for the development of S-A, AB, and RT practices and the introduction of learning-oriented evaluation in educational settings.

Keywords: Learner-oriented assessment, Academic Buoyancy, Reflective thinking, Test-taking anxiety, Learner enjoyment, Self-assessment, EFL learners

Introduction

Education is a two-way process that asks the learners to participate in every activity in the class and their own self-evaluation, so it is not only about giving out one-way feedback. Productive language students engaged in dynamic evaluations of themselves and developed self-assessment procedures (Rezai et al., 2022a, 2022b; Wongdaeng, 2022). According to GuoJie (2021), S-A is an integrated personality structure that helps students forge their own distinctive routes to achievement. Students are encouraged to engage in self-reflection and improvement via the use of S-A's five pillars: observation, practice, monitoring, evaluation, and correction (Zhuoyuan, 2021). There is also evidence that S-A improves students' L2 tenacity, as well as their ability to deal with anxiety

while learning a new language, their sense of independence, and their ability to form and maintain alliances (Heydarnejad et al., 2022b; Saidi et al., 2022). More significantly, S-A encourages participants to value themselves as unique individuals.

AB is the second student-related concept investigated in this research. AB is an analogy for the abilities that help students succeed in the face of adversity (Yun et al., 2018). Like a protective covering, AB protects students from the difficulties and worries of daily life (Martin, 2014). According to Jahedizadeh et al. (2019), students who develop a sense of academic resilience by practices such as regularity adaption, positive personal eligibility, and acceptance of academic life are better able to handle challenges and failures in their studies. The intellectual and affective frame of language learning and evaluation is brought to the attention of students via RT, which acts as a zoom lens. To successfully apply S-A, it is recommended that students be provided with opportunities to develop higher-order thinking abilities (Alazemi et al., 2023a, 2023b; Aldosari et al., 2023). Problem-solving strategies like RT encourage students to pause, reflect, gauge, evaluate, integrate, and make deliberate choices.

Anxiety is a normal response to helplessness, as stated by Oteir and Al-Otaibi (2019). In the context of learning a new language, students might experience situational anxiety known as foreign language anxiety which may be extended to test-taking anxiety (TTA) (Heydarnead et al., 2022a). Learners may experience this anxiety before, during, and after various examinations, which may hinder their actual performance. Learners with TTA, characterized by a variety of physical symptoms and emotional reactions, may struggle to perform well on tests. Learners with an inner sense of autonomy may experience a brief sense of powerlessness in a testing environment if they realize they failed to prepare enough for the test; on the contrary students (Ritonga et al., 2023). In language classes, the views of learners of their own language capability, personality types, educational environments, advancement in the acquisition of languages, and interactions with instructors and other students are all potential triggers for anxiety (Alamer & Almulhim, 2021). Learner engagement (LE) is a crucial accountability that reflects students' experiences of pleasure throughout language study (Jiang & Dewaele, 2019). Encouragement and development of psychological power are two outcomes of LE (Richards, 2020). Developing a feeling of accomplishment is intimately linked to LE, and LE is a forerunner to nurturing an appreciation of achievement (Amerstorfer & Freiin von Münster-Kistner, 2021).

There was no light to shed a glimpse on the direct interaction that took place between S-A, AB, RT, TTA, and LE. The possible connection between S-A, AB, RT, LE, and TTA, which may be crucial was not explored, particularly in the context of EFL. The purpose of this study was to illustrate the influence that learners' S-A, AB, and RT have on TTA and LE, taking into consideration the causal link that exists between these variables in the context of language acquisition as well as the paucity of research on the topic. It has the ability to enhance students' levels of knowledge and awareness of language instruction and assessment, which in turn assures more efficient language learning. Taking all of these factors into consideration, the following research questions were put forward: The first research question addressed the impact of EFL learners' AB on their S-A and TTA. The second research question focused on the influence of EFL learners' RT on

their S-A and TTA. The final research question explored the effects of EFL learners' LE on their S-A and TTA.

Review of the existing literature

AB is a term in psychology that describes a student's ability to deal with the typical obstacles and problems they would face while they pursue their education (Yun et al., 2018). The concepts of AB and resilience are often confused, although their explanations differ in both methodology and application. Regarding this, Martin and Marsh (2008) argued that academic buoyancy is distinct from resilience and comparable concepts that emphasize day-to-day survival. Stress and strain owing to unsuitable performance in an educational setting are what we mean by "AB," while "resilience" is the opposite sense of tiredness and worry due to breakdown and inadequate achievement.

According to Xu and Wang (2022), learners' AB may approach when they are engaged and interested in the material. They also feel that instructors have a significant impact on the academic achievement of their students. Zhang (2021), who followed a similar line of inquiry, discovered that the buoyancy of language instructors influences the involvement of their students. Therefore, it is reasonable to deduce that buoyancy may be of assistance to both educators and students, and investments made in the implementation of helpful ways to boost levels of AB are of utmost significance in each and every environment of learning. In a different piece of research (Phan & Ngu, 2014), the researchers investigated the interrelationships that exist between the antecedents of AB and a person's mental and physiological conditions.

As Malmir and Mohammadi (2018) maintained, critical thinking and RT are intertwined since they both force people beyond of their comfort zones. Dewey (1933) argues that RT entails a continuous cycle of reflection, inquiry, analysis, and synthesis. "Active, determined, and thorough examination of any thought or suppositional form of knowledge in the light of the basis on which it rests and the outcome to which it points" (Dewey, 1933, p.9) is how RT is defined. Reading through the current literature on RT reflects the significant contributions RT has made to the classroom. Porntaweekul et al. (2016), for one, discovered that RT's tactics promote beneficial learning results. Davoudi and Heydarnejad's (2020) cross-contextual investigation of the impact of RT on student performance followed a similar line of inquiry. Students in the MA program, who were able to adopt reflective and critical thinking skills, outperformed those in the BA program, who relied on routine behavior and superficial knowledge.

Another study aimed to depict how well RT helps with metacognition awareness and reading comprehension; this one was conducted by Shirazizadeh et al. (2019). In order to achieve this goal, a quasi-experimental design was used, and a total of 63 EFL students were randomly assigned to either an experimental or control group. Their findings showed that the students in the experimental group who used RT methods in their classrooms did better than their counterparts in the control group. They found that RT had a significant impact on how students were graded. In the realm of EFL teaching, Namazi-andost et al., (20222023) highlighted that RT boosts educators' productive immunity and regulates their emotions. Furthermore, Aldosari et al. (2023) witnessed that S-A and RT were critical in learners' enjoyment and immunity development.

S-A is defined as "the assessment or evaluation of oneself or one's actions, attitudes, or performance" (Bachman et al., 2010, p.12). That is why it is important to promote and instruct students in self-evaluation. The basic tenets of S-A include skepticism, close attention, metacognition, and self-control over one's own education (Huang, 2022). Students who have strong abilities in metacognition, self-regulation, and the ability to think critically are more likely to score well on the S-A. Self-esteem, general self-efficacy, neuroticism, and locus of control were also identified as essential features of S-A by Andrade (2019). Learners are encouraged to take an active role in the evaluation and reflection of their own learning with the help of S-A.

Similarly, Jahara et al. (2022) found that coping techniques used by EFL students influence their levels of stress and S-A. Researchers have discovered that students' levels of self-evaluation are influenced by their degree of cognitive and metacognitive competence (Wei, 2020). In a related study, Heydarnejad et al. (2022) looked at the tie that exists between AB, S-A, and the emotion regulatory strategies associated with learning a foreign language. According to the findings of SEM, the amount of S-A that was produced by using emotion regulation was higher. Students that are more buoyant have an easier time self-monitoring their behavior. They are also able to handle and manage any anxiety that may be encountered when taking foreign language lessons.

Anxiety over-communicating in a foreign language is a situation-specific event, according to Rodriguez and Abreu (2003), brought on by formal language acquisition. This is particularly true for those who have a poor opinion of their own communication competence in the target language. Anxiety may be caused by a number of factors, including students' perceptions of their own language skills and abilities, their own personalities, the nature of classroom situations, and the degree of difficulty. Alternatively, Young (1991) identified three possible origins of linguistic anxiety: the student, the instructor, and the educational practice.

Eysenck et al. (2007) provide an explanation for why students' anxiety impacts their performance in the classroom using the attentional control theory (ACT). Anxious students may not succeed in school because they worry too much and do not believe in themselves, according to ACT theory (Eysenck et al, 2007). Similar to this, Horwitz et al. (1986) identified three subfactors (i.e., communication apprehension, test anxiety, and fear of negative assessment) for foreign language anxiety. The first dimension, communication apprehension, includes concerns about speaking in front of a group or understanding what others are saying. The second element, test anxiety, stems from the dread of doing poorly on an exam. The third factor is concern about receiving unfavorable feedback from other people and avoiding interactions where this can happen.

According to Cassady (2010), "academic anxiety" is a catch-all word for several forms of student worry related to schoolwork. Test worry, math anxiety, foreign language anxiety, and science anxiety, to name a few, impede pupils' ability to learn, he argues. The present study focused on TTA and some factors that may hinder it. The function of skill-based anxiety in second/foreign language acquisition has also been the subject of some research. Recent studies have investigated several forms of anxiety, including public speaking anxiety (Prentiss, 2021) and listening, reading, and writing anxiety (Zhang, 2019). These findings confirm that FLA impairs linguistic competence. Moreover, Fathi et al. (2021) used SEM to show that anxiety and perseverance predicted EFL students'

writing task completion. The results of Khajavy et al. (2021) as well as Davoudi and Heydarnejad (2020) were similar. They concluded that anxiety, willingness to communicate (WTC), and pleasure were all interconnected for EFL students. That is, although there was a positive correlation between WTC and pleasure, there was a significant inverse correlation between anxiety and WTC. It was further demonstrated that when effective strategies of emotion regulation, L2 grit, resilience, and self-assessment were applied to EFL students, students experience less TTA (Alazemi et al., 2023b).

According to Pekrun (2006), enjoyment is defined in the field of positive psychology as a representation of the sensation that is evoked as a result of successful completion. The concept of enjoyment is multifaceted and encompasses a variety of facets and components. Research has shown that enjoyment has an effect not only on learners' attitudes toward learning (motivation), but also on their social interactions with classmates and instructors, as well as their physical health. The term emotional dimension of enjoyment refers to the good emotions that are evoked in students as a result of having enjoyable experiences when studying a language (Heydarnejad et al., 2019). The productive evaluation of one's language learning experiences is what the intellectual part of language acquisition refers to (Azizi & Namaziandost, 2023; Elahi Shirvan & Taherian, 2020). According to Chen et al. (2021) and Alazemi et al. (2023a), engagement in classes is also enhanced when context-oriented qualities and the cognitive demands of the students are brought into a state of balance. Moreover, Ritonga et al. (2023) and Zeng (2021) sought to demonstrate their appreciation of LE by writing a review article. They confirmed that LE raises learners' levels of involvement and motivation for learning, which in turn ensures pupils' continued success.

The previous study that had been conducted indicated how extremely significant the aforementioned conceptual frameworks are to the success of students as a whole and learners of languages in particular. In spite of the great contributions that S-A, AB, RT, TTS, and LE have made, the potential links between these four subfields continue to be unknown frontiers, especially in the field of language acquisition. Therefore, the purpose of this research was to make a step ahead and investigate the relationship between S-A, AB, RT, TTS, and LE among students studying English as a foreign language in universities.

Method

Participants and procedures

This study was conducted on a total of 394 third-year students who were enrolled in the Bachelor of Arts program attending English classes at the various institutions that are located in Turkey. The selection of the participants was carried out using procedures that included either sampling based on the availability of opportunities or sampling based on the availability of convenient options. There was a total of 136 females and 258 males in the entire squad. There was a wide variety of ages among the participants, ranging from 17 to 31 years old.

This investigation started in March of 2022 and lasted until January of 2023. The process was implemented utilizing an internet-based, web-based technology. The questionnaires were administered using Online Questionnaires, which the participants were required to utilize. Parts of the questionnaire included the CS-AQ, ABS, RTQ, TTAS,

and FLES. The participants' command of the English language ranges between an intermediate and advanced level, and as a result, they had the necessary skills to respond to the questionnaire in English. Because of the manner the online survey was structured, there had to be tight connections between all of the survey's moving parts. This was done to make sure that no information was lost due to the survey's setup. Therefore, a vital connection is required between all of the parts. There was a 74.12% return rate, with 354 forms sent back completely filled out. The Kolmogorov–Smirnov test was performed to check for the existence of a normal distribution in the data. Since the data followed a normal distribution, it could be analyzed using CFA and SEM in LISREL 8.80.

Instruments

The Core of Self-assessments Questionnaire (CS-AQ)

The CSAQ, created and validated by Judge et al. (2003), was used to evaluate the students' foundational self-assessments. There are a total of 12 items, all of which are graded on a Likert scale from 1 to 5 (strongly disagree). The pupils' averages on this measure varied from 12 to 60. Positive self-assessment was represented in higher scores on this measure, whereas negative self-evaluation was reflected in lower ones. The current analysis found CSEQ to have a satisfactory reliability of 0.885.

The Academic Buoyancy Scale (ABS)

ABS, created and verified by Jahedizadeh et al. (2019), was used to evaluate the students' academic confidence. The instrument's 27 measures assessed four aspects of L2 buoyancy (sustainability, regularity adaptation, positive personal eligibility, and positive acceptance of academic life emerged). In addition, ABS is based on a Likert scale with five possible responses ranging from 1 (strongly disagree) to 5 (strongly agree). The reliability of this scale was explored via Cronbach's alpha, and the result was satisfactory (ranging from 0.831 to 0.910).

Reflective Thinking Questionnaire (RTQ)

Kember et al. (2000) created and validated the RTQ to examine students' perspective on assessment practices. The RTQ is comprised of 16 items, each scored on a 7-point Likert scale, which assesses four aspects of reflective thinking: habitual action, understanding, reflection, and critical reflection. A Cronbach's alpha for this study was 0.855, which is an acceptable level of dependability.

Test Taking Anxiety Scale (TTAS)

To gauge the TTA of the participants, the Foreign Language Classroom Anxiety Scale (FLCAS), developed by Horwitz et al. (1986), was modified. FLCAS was designed to investigate students' levels of fear while learning a foreign language. There are 33 questions on FLCAS, each with a five-point Likert scale (from strongly agree to strongly disagree) that measures anxiety related: (1) communication anxiety, (2) fear of negative evaluation (12 items), (3) test anxiety, (12 items), and (4) anxiety of foreign language class (8 items). Based on the existing literature, some items were added to the following subscales: fear of negative evaluation and test anxiety. The TTAS

includes 40 items, which were checked by experts. Cronbach's alpha results indicated an adequate level of dependability for the TTAS ($\alpha = 0.833$ to 0.869).

Foreign Language Enjoyment Scale (FLES)

The FLES, created and verified by Dewaele and MacIntyre (2016), was used to assess EFL students' enjoyment of learning. The 21 statements included in the FLES (such as "There is a positive environment in my FL class.") are rated on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The reported value of Cronbach's alpha for FLES in this research was satisfactory ($\alpha = 0.899$).

Results and discussion

Statistical analysis was used to inquire into the link between S-A, AB, RT, TTS, and LE, and the results obtained were laid out. Descriptive data for S-A, AB, RT, TTS, and LE were provided for EFL learners in Table 1.

On the RT, the categories with the highest mean scores were reflection ($M = 16.602$, SD $= 4.081$) and critical reflection ($M = 16.589$, SD $= 4.067$). On the second instrument known as the AB, it was discovered that regularity adaptation was the most important factor ($M = 23.916$, SD $= 6.015$). Regarding FLE as well as CS-A, the results were as follows, respectively ($M = 82.929$, SD $= 13.350$). CSA was also given the following mean score: $M = 43.721$, with a standard deviation of 11.311. In addition, when looking at the individual components that make up the TTA, fear of negative evaluation came up as the clear leader with a mean value of 27.893 and a standard deviation of 6.734, respectively.

The Kolmogorov–Smirnov test was carried out after that in order to determine which approach of statistical analysis was the most effective.

Table 1 Descriptive statistics

	N	Minimum	Maximum	Mean	Std. deviation
Habitual action	394	4	24	15.391	5.697
Understanding	394	4	28	16.160	6.794
Reflection	394	4	25	16.602	4.081
Critical reflection	394	4	26	16.589	4.067
RT	394	22	87	64.741	13.268
Sustainability	394	7	35	23.332	6.122
Regularity adaptation	394	9	35	23.916	6.015
Positive personal eligibility	394	6	30	21.038	5.705
Positive acceptance of academic life emerged	394	8	35	23.475	5.932
AB	394	34	135	91.761	19.811
FLE	394	34	100	82.929	13.350
CS-A	394	15	60	43.721	11.311
Communication anxiety	394	8	40	18.977	7.507
Fear of negative evaluation	394	12	47	27.893	6.734
Test anxiety	394	16	44	27.287	6.381
Anxiety of foreign language class	394	8	34	19.282	5.776
TTA	394	46	152	93.439	23.348

According to Table 2, all of the instruments and the subscales included within them had sig values that were larger than 0.05. Since the data follow a normal distribution, it is possible to utilize parametric approaches because of this.

With the use of a Pearson product-moment correlation, the researchers in this study investigated whether or not there was a link between S-A, AB, RT, TTS, and LE.

According to the findings shown in Table 3, there were statistically significant negative correlations found between RT and components of TTS as well as CS-A. RT and communication anxiety ($r = -0.914$), fear of negative evaluation ($r = -0.872$), test anxiety ($r = -0.890$), and anxiety of foreign language class ($r = -0.815$). In other words, RT was greatly influenced all of these types of anxiety. The association between RT and CS-A ($r = 0.952$). Anxiety about communication ($r = -0.791$), fear of negative evaluation ($r = -0.733$), test anxiety ($r = -0.762$), and anxiety over foreign language class ($r = -0.824$) were all negatively connected with AB. The correlation between AB and CS-A ($r = 0.843$). In addition to this, there were significant unfavorable linkages between the different facets of TTA and FLE. These relationships were as follows: fear of negative evaluation ($r = -0.595$), fear of communication anxiety ($r = -0.608$), test anxiety ($r = -0.637$), and anxiety of foreign language class ($r = -0.695$). It was also shown that FLE and CS-A are associated ($r = 0.563$).

The next step was to undertake CAF and SEM analyses of the structural relationships between TA, AER, L2G, AR, and CSA. These analyses were carried out with the help of the statistical tool LISREL 8.80. In addition, the chi-square magnitude, the root mean squared error of approximation (RMSEA), the comparative-matched index (CFI), and the Nominal Fit Index (NFI), the Good Fit Index (GFI) were used to evaluate how well the model matched the data. The chi-square test should not provide a significant result, and the ratio of chi-square to df should be lower than three.

Table 2 The results of Kolmogorov–Smirnov test

	Kolmogorov–Smirnov *Z*	Asymp. Sig. (2-tailed)
Habitual action	0.990	0.281
Understanding	1.084	0.190
Reflection	0.844	0.475
Critical reflection	1.333	0.057
RT	0.893	0.402
Sustainability	0.886	0.412
Regularity adaptation	0.994	0.277
Positive personal eligibility	0.969	0.305
Positive acceptance of academic life emerged	0.940	0.340
AB	1.106	0.173
FLE	1.140	0.149
CS-A	1.183	0.122
Communication anxiety	0.975	0.298
Fear of negative evaluation	1.104	0.174
Test anxiety	0.770	0.593
Anxiety of foreign language class	0.970	0.304
TTA	1.179	0.124

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Table 3 The Correlation Coefficients between the S-A, AB, RT, TTS, and LE

	RT	AB	FLE	CS-A	Communication anxiety	Fear of negative evaluation	Test anxiety	Anxiety of foreign language class
RT	1.000							
AB	0.678[a]	1.000						
FLE	0.703[a]	0.741[a]	1.000					
CS-A	0.952[a]	0.843[a]	0.563[a]	1.000				
Communication anxiety	−0.914[a]	−0.791[a]	−0.672[a]	−0.712[a]	1.000			
Fear of negative evaluation	−0.872[a]	−0.733[a]	−0.608[a]	−0.756[a]	0.613[a]	1.000		
Test anxiety	−0.890[a]	−0.762[a]	−0.637[a]	−0.741[a]	0.652[a]	0.579[a]	1.000	
Anxiety of foreign language class	−0.815	−0.824[a]	−0.695[a]	−0.689[a]	0.687[a]	0.592[a]	0.632[a]	1.000

[a] Correlation is significant at the 0.01 level (2 tailed)

According to Jöreskog ([1990](#)), RMSEA values that are lower than 0.1 are typically seen as acceptable. In addition, Jöreskog ([1990](#)) recommends that the NFI, GFI, and CFI all have a cutoff value of 0.90 or higher.

As can be seen in Figs. [1](#) and [2](#), this illustration illustrates the degree to which the variables are related to one another. The influences of RT, AB, and FLE on CS-A and TTA were validated by standardized estimates and t values, which are shown in Figs. [2](#) and [3](#), respectively. The RT had a beneficial influence on both the CS-A ($\beta = 0.92$, $t = 28.78$) and TTA ($\beta = -0.87$, $t = -24.65$). There was also a statistically significant positive impact that AB and CS-A had on TTA (the respective values of AR and CS-A were -0.80 and t for 20.72, and for TTA was -0.74 and t for -16.38). There was also a statistically significant positive impact that FLE had on CS-A ($\beta = 0.52$, $t = 10.22$) and TTA ($\beta = -0.61$, $t = -12.45$).

Figures [3](#) and [4](#) give a graphical depiction of the route coefficient values that model 2 offers for the interactions between the RT, AB, and FLE on CS-A and TTA components. RT and CS-A are closely connected: ($\beta = 0.92$, $t = 28.84$). It is possible to make conclusions about RT and TTA components such as communication anxiety ($\beta = -0.89$, $t = -25.41$), fear of negative evaluation ($\beta = -0.83$, $t = -21.65$), test anxiety ($\beta = -0.86$, $t = -23.33$), and anxiety of foreign language class ($\beta = -0.90$, $t = -26.57$). The following is the conclusion that was reached after investigating the connections between AB and CS-A ($\beta = 0.80$, $t = 20.75$) as well as AB and TA elements: communication anxiety ($\beta = -0.75$, $t = -17.70$), fear of negative evaluation ($\beta = -0.69$, $t = -14.41$), test anxiety ($\beta = -0.72$, $t = -16.94$), and anxiety of foreign language class ($\beta = -0.78$, $t = -18.82$). In addition, anxiety about communication ($\beta = -0.77$, $t = -33.61$), fear of negative evaluation ($\beta = -0.73$, $t = -30.98$), test anxiety ($\beta = -0.70$, $t = -27.42$), and anxiety for foreign language class ($\beta = -0.82$, $t = -35.49$) were also revealed to be linked with TA. Anxiety was also shown to be
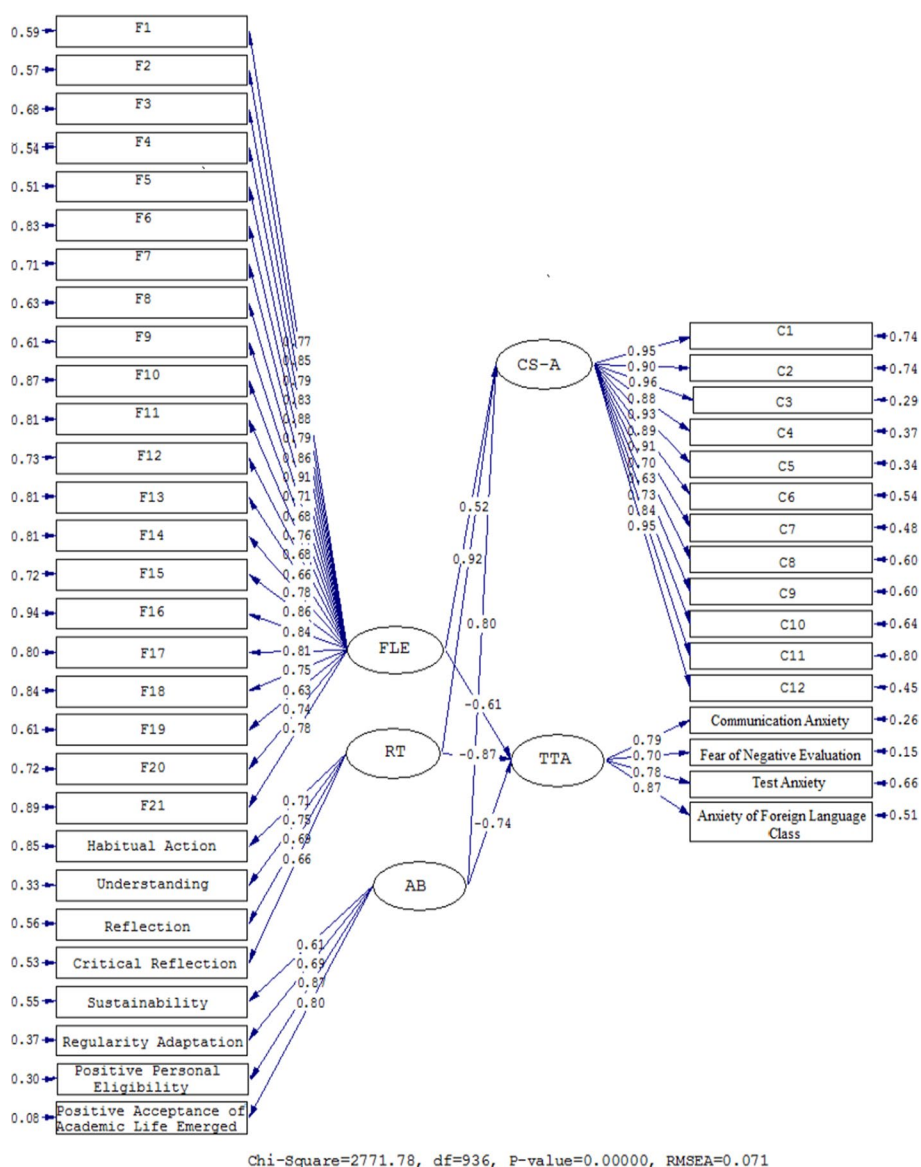
Chi-Square=2771.78, df=936, P-value=0.00000, RMSEA=0.071

Fig. 1 Schematic representation of path coefficient values (model 1)

linked with communication anxiety ($\beta = -0.94$, $t = -44.56$), fear of negative evaluation ($\beta = -0.91$, $t = -42.71$), test anxiety ($\beta = -0.89$, $t = -40.32$), and anxiety of foreign language class ($\beta = -0.86$, $t = -38.65$). The same holds true for the FLE and CS-A ($\beta = 0.52$, $t = 10.43$), as well as TA subfactors, namely communication anxiety ($\beta = -0.63$, $t = -11.55$), fear of negative evaluation ($\beta = -0.56$, $t = -10.73$), test anxiety ($\beta = -0.60$, $t = -11.16$), and anxiety of foreign language class ($\beta = -0.65$, $t = -12.46$).

The results are shown in Table 4, which shows that the acceptable fit levels were met for the chi-square/df ratio (2.961), the RMSEA (0.071), the GFI (0.934), the NFI (0.942), and the CFI (0.928). Indicators of how well the second model fits the data are also presented in Table 4. Both the RMSEA ratio (0.070) and the chi-square ratio (2.946) point to
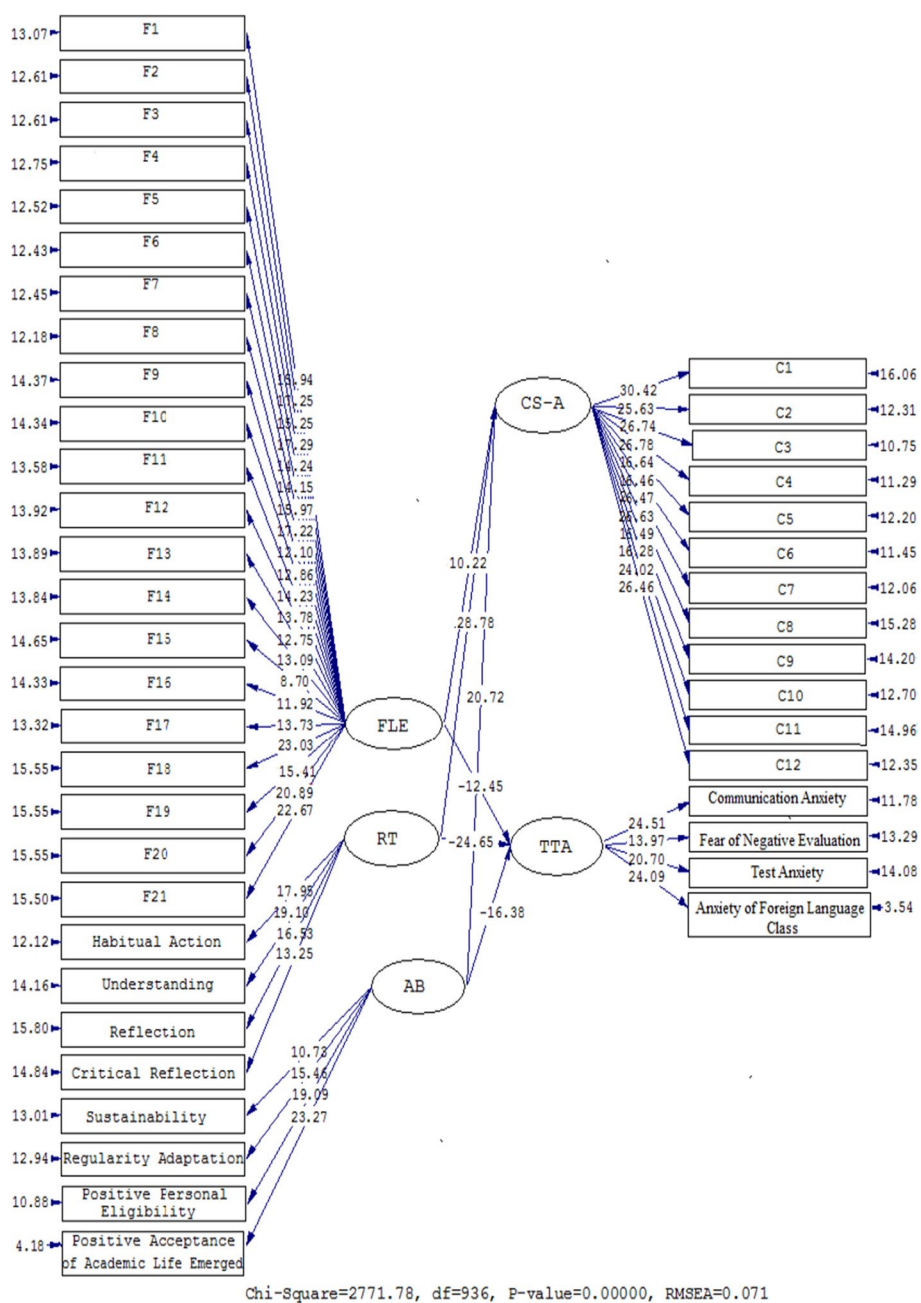
Fig. 2 *T* values for path coefficient significance (model 1)

a match that is adequate. Moreover, the CFI (0.972), the NFI (0.956), and the GFI (0.949) were all within acceptable levels.

The purpose of this study was to probe into the connections that exist between AB, RT, LE, S-A, and TTA in the context of Turkish EFL. The results of the survey that used SEM and CFA suggested that AB, RT, and LE had some degree of predictive validity with regard to S-A and TTA. This was found in relation to the findings of the survey. Both model 1 and model 2 illustrate their linkages and put a focus on the roles that AB, RT, and LE play as mediators in the process of creating student-centered
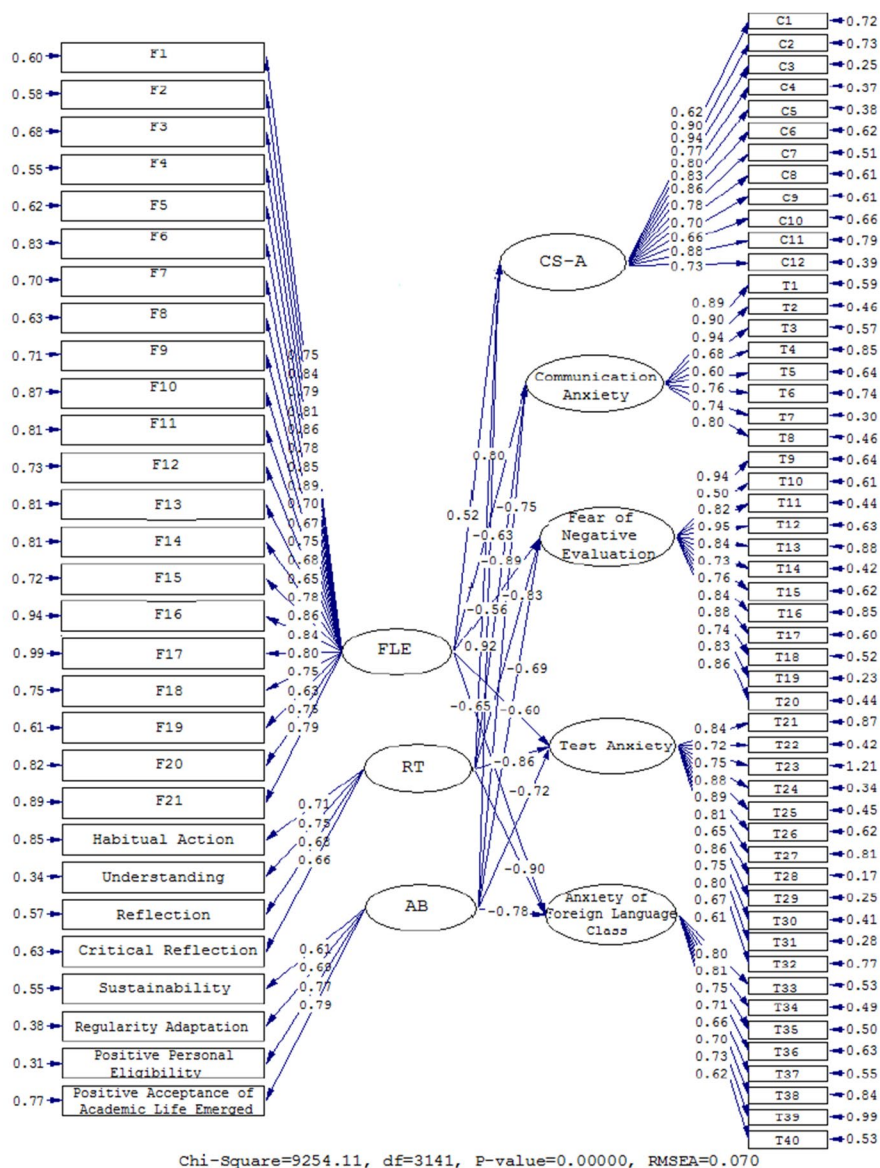
Fig. 3 Schematic representation of path coefficient values (model 2)

assessment methods within the context of the classroom environment. It was highlighted that investments in practicing and developing AB, RT, and LE might enhance S-A but limit TTA, and this is an issue that should be taken into consideration. According to Table 1, reflection and critical reflection shine in a distinct light among the components of RT that really have an effect on the self-awareness and anxiety management of EFL learners. Regularity Adaptation was the component of AB that received the highest score, which indicates that it may be of great assistance to students in their capacity to adjust to new circumstances, such as receiving education online. Fear of negative evaluation was the subscale of the TTA that had the highest number of responses, which demonstrates a clear need for teachers and policy makers to pay greater attention to this issue in order to use effective techniques to immunize
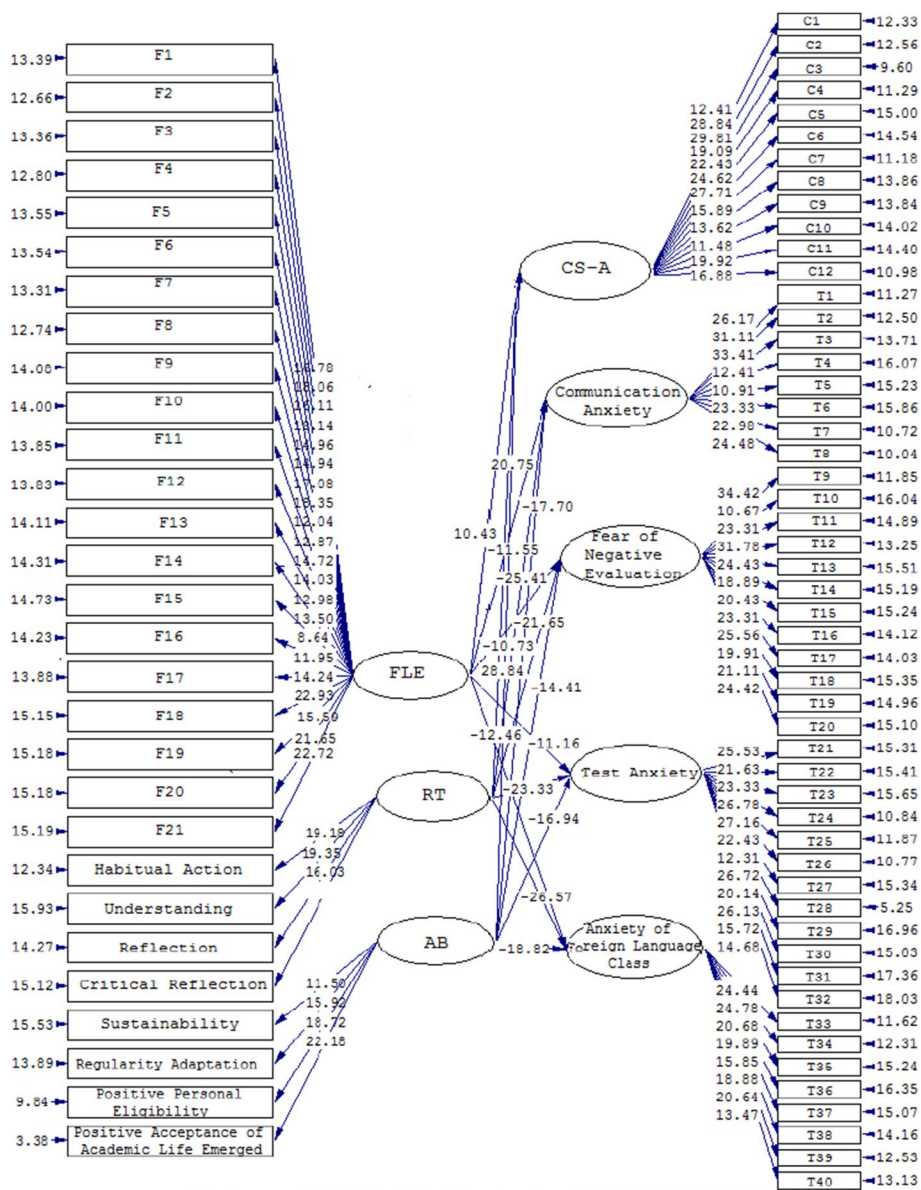
Fig. 4 *T* values for path coefficient significance (model 2)

Table 4 Model fit indices

Fitting indexes	χ2	df	χ2/df	RMSEA	GFI	NFI	CFI
Cut value			< 3	< 0.1	> 0.9	> 0.9	> 0.9
Model 1	2771.78	936	2.961	0.071	0.934	0.942	0.928
Model 2	9254.11	3141	2.946	0.070	0.949	0.956	0.972

learners and empower them to moderate any possible anxiety they may experience prior to and during the assessment.

The results of the study that addressed the primary research question revealed a statistically significant impact of AB on their S-A and TTA among EFL learners. Being

skilled in AB is a reliable indicator of S-A and TTA management. The foundations of positive psychology provide a solid foundation for this finding. This finding suggests that the benefits of S-A and TTA management among EFL students are maximized via the development of AB. Furthermore, a favorable association between AB on S-A and TTA's constituent parts was confirmed statistically. Improved academic perseverance, regularity of adaptability, personal eligibility, and acceptance of academic life all come from increased student participation in AB. What this implies is that EFL students with high S-A are more likely to participate in all aspects of class discussion and work. As a result, students take on a greater sense of ownership for their work and their grades. They put forth extra effort to evaluate, communicate, and collaborate with others. They are better able to handle adversity and worry less. Participation in class activities and learning-focused evaluation pique the interest of students.

The TTA subcomponents were favorably influenced by S-A, as predicted by the second model. It means S-A hiders communication anxiety, fear of negative evaluation, test anxiety, and anxiety of foreign language class. This indicates that students' perceptions of themselves are influenced by the value they place on self-evaluation and tracking oneself. The more language students engage in S-A, the more they grow to esteem and respect themselves. In the second model, it was further established and shown how S-A affected TTA's constituent parts. This result is logically arguable. The ideas of self-determination and self-identity (Bourke & Mentis, 2007) provide credence to the concept of S-A. EFL students might benefit from a more learner-centered approach to evaluation in two ways: directly and indirectly. Student interactions outside the class are also impacted. As an added bonus, this finding agrees with the findings of Huang (2022), who came to the same conclusion that self-assessment helps with self-regulation and self-efficacy.

The second inquiry focused on EFL learners' RT on their S-A and TTA. The two models discussed the possible connections and relationships. This suggests that students may ensure their own academic achievement by developing greater degrees of cognitive and metacognitive abilities. The findings suggest that S-A and learner-oriented assessments provide an environment in which students may actively participate in the assessment and learning process. This indicates that students who have been empowered with RT are better able to manage their worries about being judged negatively, doing poorly on tests, and otherwise coping with the stresses of learning a second language (model 2). This finding is consistent with the limited prior research (e.g., Wei et al., 2019) as well as Namaziandost et al. (2023) that highlighted the central function of RT on the management of feelings in general and anxiety in specific.

The last research question delved into the effects of EFL learners' LE on their S-A and TTA. Based on the outcomes, enjoyment in learning and assessment fosters S-A and hinders TTA. This outcome is in accord with those of Ritonga et al. (2023) who found that S-A and engagement in online assessment are closely tied. The critical impacts of resilience and autonomy were also highlighted in their findings. In this regard, Keleynikov et al. (2022) emphasized the importance of teachers' awareness and ways of thinking in their happiness and ability to cope with psychological suffering. The findings show that when EFL students focus on developing their cognitive and metacognitive abilities, they do better on classroom activities and tests (model 2). According to the research behind CSA and positive psychology, individuals who have a high opinion of themselves

are more likely to succeed academically (Macintyre et al., 2019). They are more prone to plan for a brighter future and to put themselves in circumstances where they can succeed. Overall, LE may improve students' behavior and performance, especially on assessments; nevertheless, the unresolved nature of the connections between LE, S-A, and TTA needs more study, particularly in the English as a foreign language (EFL) setting.

Conclusion

In a nutshell, this study provided evidence that AB, RT, and LE are predictive of S-A and TTA among EFL learners. The findings showed that AB, RT, and LE give direction in the students' learning path and shield them from the chaos and difficulties of learning. AB, RT, and LE affect how EFL students feel about their own language development, how they are evaluated, and how they interact with their instructors and classmates. The research findings also hinted to the significant impact of TTA management on S-A.

Some recommendations are made for teachers, particularly in the areas of language instruction and assessment. Both language instructors and their students benefit from acquiring the necessary and relevant information to employ AB, RT, LE, and S-A techniques. Pre-service and in-service training programs for educators are recommended in this respect. Furthermore, testing experts should pay greater attention to the learning-oriented assessment method since it probes students' actual usage of language throughout the language-learning process. Materials and exercises designed from the perspectives of S-A and RT are recommended for all language learners, but notably those in higher education. Therefore, it is essential that students, in their capacity as reflective practitioners, take center stage in educational discussions. RT practices and self-assessment seem to provide a fruitful framework for language instruction and evaluation. In order for students to become really independent learners, teachers and university professors should look for methods to empower them to take charge of their own education.

The conclusions of this research, like those of previous investigations, should be evaluated with certain limitations, including the following: In the first place, this study was quantitative in its approach. In the next studies, researchers may use qualitative or mixed method techniques to investigate the relationship between AB, RT, LE, S-A, and TTS while learning a second/foreign language. Additionally, for the sake of future research, the link between these factors and other student-related conceptions (such as identity construction, self-concept, academic well-being, and academic agency) might be taken into consideration.

Thirdly, the probable effect of the participants' background information on the level of AB, RT, LE, S-A, and TTS was not the focus of this particular piece of study since it was beyond the scope of the investigation. The AB, RT, LE, S-A, and TTS of language learners may be the focus of study in the future, which may concentrate on the aforementioned characteristics. The other problem that needed to be addressed in this research was the selection process for the participants. This study may not be representative since it relied on approaches such as convenience sampling or opportunity sampling due to the limitations imposed by the practical nature of the situation. To guarantee that the findings may be applied to a wider population in the future, researchers might make use of many alternative techniques for data collection. Lastly,

the potential influences of the sociocultural history of the students were not the primary focus of this analysis, which means that it has the potential to be another fruitful area of research in the future.

Abbreviations

EFL	English as a foreign language
AB	Academic buoyancy
ABS	Academic buoyancy scale
RT	Reflective thinking
RTQ	Reflective thinking questionnaire
LE	Learner enjoyment
FLES	Foreign Language Enjoyment Scale
CSA	Core of self-assessment
CSAQ	Core of Self-Assessment Questionnaire
TTS	Test-taking skills
TTAS	Test-taking anxiety scale
FLCAS	Foreign Language Classroom Anxiety Scale
WTC	Willingness to communicate
SEM	Structural equation modeling
CEA	Confirmatory factor analysis
GFI	Good Fit Index
LISREL	Linear structural relations
NFI	Normed Fit Index
RMSEA	Root-mean-square error of approximation

Authors' contributions
All authors had equal substantial contributions to the conception and design, acquisition of the data, analysis, and interpretation of the data, and writing of the manuscript.

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Declarations

References

Alamer, A., & Almulhim, F. (2021). The interrelation between language anxiety and self-determined motivation; a mixed methods approach. *Frontiers in Education, 6*, 618655. https://doi.org/10.3389/feduc.2021.618655

Alazemi, A. F. T., Heydarnejad, T., Ismail, S. M., & Gheysari, A. (2023a). A model of academic buoyancy, L2 grit, academic emotion regulation, and personal best: Evidence from EFL context. *Heliyon*. https://doi.org/10.1016/j.heliyon.2023.e13149

Alazemi, A. F. T., Jember, B., & Al-Rashidi, A. H. (2023b). How to decrease test anxiety: A focus on academic emotion regulation, L2 grit, resilience, and self-assessment. *Language Testing in Asia, 13*, 28. https://doi.org/10.1186/s40468-023-00241-5

Aldosari, M., Heydarnejad, T., Hashemifardnia, A., & Abdalgane, M. (2023). The interplay among self-assessment, using refection for assessment, classroom enjoyment, and immunity: Into prospects of effective language learning. *Language Testing in Asia, 13*, 1. https://doi.org/10.1186/s40468-022-00213-1

Amerstorfer, C. M., & Freiin von Münster-Kistner, C. (2021). Student perceptions of academic engagement and student teacher relationships in problem-based learning. *Frontiers in Psychology, 12*, 713057. https://doi.org/10.3389/fpsyg.2021.713057

Andrade, H. L. (2019). A critical review of research on student self-assessment. *Frontiers in Education, 4*, 87. https://doi.org/10.3389/feduc.2019.00087

Azizi, Z., & Namaziandost, E. (2023). Implementing peer-dynamic assessment to cultivate iranian efl learners' inter-language pragmatic competence: A mixed-methods approach. *International Journal of Language Testing, 13*(1), 18–43. https://doi.org/10.22034/ijlt.2022.345372.1171

Bachman, L. F., Palmer, A. S., & Palmer, A. S. (2010). *Language assessment in practice: Developing language assessments and justifying their use in the real world*. Oxford University Press.

Bourke, R., Mentis, M. (2007). Self-assessment as a lens for learning. In The SAGE Handbook of Special Education, (pp. 319–330). https://sk.sagepub.com/reference/hdbk_specialedu. https://sk.sagepub.com/reference/hdbk_specialedu

Cassady, J. C. (2010b). Test anxiety. Contemporary theories and implications for learning. In J. C. Cassady (Ed.), *Anxiety in schools. The causes, consequences, and solutions for academic anxieties*, (pp. 7–26). Peter Lang Publishing.

Chen, P., Bao, C., & Gao, Q. (2021). Proactive personality and academic engagement: The mediating effects of teacher student relationships and academic self-efficacy. *Frontiers in Psychology, 12*, 1824. https://doi.org/10.3389/fpsyg.2021.652994

Davoudi, M., & Heydarnejad, T. (2020). The interplay between reflective thinking and language achievement: A case of Iranian EFL learners. *Language Teaching Research Quarterly, 18*, 70–82.

Dewaele, J. -M., & MacIntyre, P. D. (2016). Foreign language enjoyment and foreign language classroom anxiety: the right and left feet of the language learner. In P. D. MacIntyre, T. Gregersen, & S. Mercer (Eds.), *Positive psychology in SLA, Multilingual Matters*, (pp. 215–236). https://doi.org/10.21832/9781783095360-010

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Heath.

Elahi Shirvan, M., Taherian, T., & Yazdanmehr, E. (2020). The dynamics of foreign language enjoyment: An ecological momentary assessment. *Frontiers in Psychology, 11*, 1391. https://doi.org/10.3389/fpsyg.2020.01391

Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: Attentional control theory. *Emotion, 7*(2), 336–353.

Fathi, J., Mohammaddokht, F., & Nourzadeh, S. (2021). Grit and foreign language anxiety as predictors of willingness to communicate in the context of foreign language learning: a structural equation modeling approach. *Issues in Language Teaching, 10*(2), 1–30. https://doi.org/10.22054/ilt.2021.63362.627

GuoJie, M. (2021). The role of athletic psychology, athlete engagement in athletic performance and athletes' sports success in China: does coaching behavior moderates? *Revista De Psicología Del Deporte (Journal of Sport Psychology), 30*(3), 191–204.https://www.rpd-online.com/index.php/rpd/article/view/485

Heydarnejad, T., Abdel Al Ibrahim, K. A., Abdelrasheed, N. S. G., & Rezvani, E. (2022b). The effect of academic emotion regulation on EFL learners' core of self-assessment and academic buoyancy: a structural equation modeling. *Language Testing in Asia, 12*, 57. https://doi.org/10.1186/s40468-022-002

Heydarnejad, T., Ebrahimi, M. R., & Adel, S. M. R. (2019). The influence of applying emotion-based language instruction in teaching oral skills to EFL learners. *International Journal of Instruction, 12*(2), 275–288.

Heydarnejad, T., Ismail, S. M., Shakibaei, G., Saeedian, A. (2022a). Modeling the impact of L2 grit on EFL learners' core of self-assessment and foreign language anxiety. Lang Testing in Asia, 12(1). https://doi.org/10.1186/s40468-022-00200-6

Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal, 70*(2), 125–132.

Huang, Q. (2022). Influence of EFL teachers' self-assessment on their self-regulation and self-efficacy. *Frontiers in Psychology, 13*, 891839. https://doi.org/10.3389/fpsyg.2022.891839

Jahara, S. F., Hussain, M., Kumar, T., Goodarzi, A., & Assefa, Y. (2022). The core of self-assessment and academic stress among EFL learners: The mediating role of coping styles. *Language Testing in Asia, 12*, 21. https://doi.org/10.1186/s40468-022-00170-9

Jahedizadeh, S., Ghonsooly, B., & Ghanizadeh, A. (2019). Academic buoyancy in higher education. *Journal of Applied Research in Higher Education, 11*, 162–177. https://doi.org/10.1108/JARHE-04-2018-0067

Jiang, Y., & Dewaele, J.-M. (2019). How unique is the foreign language classroom enjoyment and anxiety of Chinese EFL learners? *System, 82*, 13–25. https://doi.org/10.1016/j.system.2019.02.017

Jöreskog, K. G. (1990). New developments in LISREL: Analysis of ordinal variables using polychoric correlationsand weighted least squares. *Quality and Quantity, 24*(4), 387–404. https://doi.org/10.1007/BF00152012

Judge, T. A., Ereza, A., Bono, J. E., & Thoreson, C. J. (2003). The core self-evaluation scale (CSAs): Developmentof a measure. *Personnel Psychology, 56*, 303–331.

Keleynikov, M., Benatov, J., & Berger, R. (2022). Preschool teachers' psychological distress and work engagement during COVID-19 outbreak: The protective role of mindfulness and emotion regulation. *International Journal of Environmental Research and Public Health., 19*(5), 2645. https://doi.org/10.3390/ijerph19052645

Kember, D., Leung, D. Y. P., Jones, A., Loke, A. Y., McKay, J., Sinclair, K., … Yeung, E. (2000). Development of a questionnaire to measure the level of reflective thinking. *Assessment & Evaluation in Higher Education*, 25(4), 381–395. https://doi.org/10.1080/713611442

Khajavy, G. H., MacIntyre, P. D., Taherian, T., & Ross, J. (2021). Examining the dynamic relationships between willingness to communicate, anxiety and enjoyment using the experience sampling method. In N. Zarrinabadi, & M. Pawlak (Eds.), *New perspectives on willingness to communicate in a second language*, (pp. 169–197). Springer. https://doi.org/10.1007/978-3-030-67634-6_9

Macintyre, P. D., Gregersen, T., & Mercer, S. (2019). Setting an agenda for positive psychology in SLA: Theory, practice, and research. *The Modern Language Journal, 103*, 262–274. https://doi.org/10.1111/modl.12544

Malmir, A., & Mohammadi, P. (2018). Teachers' reflective teaching and self-efficacy as predicators of their professional success: a case of Iranian EFL teachers. *Research in English Language Pedagogy, 6*(1), 117–138. https://doi.org/10.30486/relp.2018.538818

Martin, A. J., & Marsh, H. W. (2008). Academic buoyancy: Towards an understanding of students' everyday academic resilience. *Journal of School Psychology, 46*, 53–83.

Martin, A. J. (2014). Academic buoyancy and academic resilience: Exploring "everyday" and "classic" resilience in the face of academic adversity. *School Psychology International, 34*(5), 488–500. https://doi.org/10.1177/0143034312472759

Namaziandost, E., Heydarnejad, T., Rahmani Doqaruni, V., & Aziai, Z. (2022). Modeling the contributions of EFL university professors' emotion regulation to self-efficacy, work engagement, and anger. *Current Psychology*. https://doi.org/10.1007/s12144-022-04041-7

Namaziandost, E., Heydarnejad, T., & Azizi, Z. (2023). The impacts of reflective teaching and emotion regulation on work engagement: into prospect of effective teaching in higher education. *Teaching English Language Journal, 17*(1), 139–170. https://doi.org/10.22132/tel.2022.164264

Oteir, I. N., & Al-Otaibi, A. N. (2019). Foreign language anxiety: a systematic review. *Arab World. English Journal, 10*, 309–317. https://doi.org/10.24093/awej/vol10no3.21

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review, 18*(4), 315–341. https://doi.org/10.1007/s10648-006-9029-9

Phan, H. P., & Ngu, B. H. (2014). Longitudinal examination of personal self-efficacy and engagement-related attributes: how do they relate. *American Journal of Applied Psychology, 3*(4), 80–91. https://doi.org/10.11648/j.ajap.20140304.11

Porntaweekul, S., Raksasataya, S., & Nethanomsak, T. (2016). Developing reflective thinking instructional model for enhancing students desirable learning outcomes. *Educational Research and Reviews, 11*(6), 238–251. https://doi.org/10.5897/err2015.2380

Prentiss, S. (2021). Speech anxiety in the communication classroom during the covid-19 pandemic: supporting student success. *Frontiers in Communication, 6*, 642109. https://doi.org/10.3389/fcomm.2021.642109

Rezai, A., Namaziandost, E., Miri, M., & Kumar, T. (2022a). Demographic biases and assessment fairness in classroom: insights from Iranian university teachers. *Language Testing in Asia, 12*(1), 8. https://doi.org/10.1186/s40468-022-00157-6

Rezai, A., Namaziandost, E., & Rahimi, S. (2022b). Developmental potential of self-assessment reports for high school students' writing skills: A qualitative study. *Teaching English as a Second Language Quarterly (formerly Journal of Teaching Language Skills), 41*(2), 163–203. https://doi.org/10.22099/tesl.2022.42670.3082

Richards, J. C. (2020). Exploring emotions in language teaching. *RELC Journal, 53*(1), 225–239. https://doi.org/10.1177/0033688220927531

Ritonga, M., Shaban, A. A., Al-Rashidi, A. H., & Chilani, N. (2023). Engagement in on-line language assessment: Are test-taking skills, self-assessment, resilience, and autonomy critical? *Language Testing in Asia, 13*, 25. https://doi.org/10.1186/s40468-023-00236-2

Rodriguez, M., & Abreu, O. (2003). The stability of general foreign language classroom anxiety across English and French. *Modern Language Journal, 87*, 365–374. https://doi.org/10.1111/1540-4781.00195

Saidi, M., Karami, N., & Namaziandost, E. (2022). Two sides of the same coin? Exploring persuasive discursive practices in academic and popularized texts in psychology. *Applied Research on English Language, 11*(1), 111–134. https://doi.org/10.22108/are.2021.130846.1788

Shirazizadeh, M., Tajik, L., & Amanzadeh, H. (2019). Refection, resilience and role stress among Iranian EFL teachers: a mixed methods study. *Issues in Language Teaching, 8*(2), 1–24. https://doi.org/10.22054/ilt.2020.48955.448

Wei, H., Boland, J. E., Cai, Z. G. G., Yuan, F., & Wang, M. (2019). Persistent structural priming during online second-language comprehension. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 45*(2), 349–359. https://doi.org/10.1037/xlm0000584

Wei, X. (2020). Assessing the metacognitive awareness relevant to L1-to-L2 rhetorical transfer in L2 writing: The cases of Chinese EFL writers across proficiency levels. *Assessing Writing, 44*, 100452.

Wongdaeng, M. (2022). The role of metacognition in the learning of English as a foreign language. In N. Siddiqui, & S. Gorard (Eds.), *Making your doctoral research project ambitious: Developing Large-Scale Studies with Real-World Impact*. Routledge.

Xu, X., & Wang, B. (2022). EFL students' academic buoyancy: does academic motivation and interest matter? *Frontiers in Psychology, 13*, 858054. https://doi.org/10.3389/fpsyg.2022.858054

Young, D. J. (1991). Creating a low-anxiety classroom environment: What does language anxiety research suggest? *The Modern Language Journal, 75*(4), 426–437. https://doi.org/10.1111/j.1540-4781.1991.tb05378.x

Yun, S., Hiver, P., & Al-Hoorie, A. H. (2018). Academic buoyancy: Exploring learners' everyday resilience in the language classroom. *Studies in Second Language Acquisition, 40*(4), 805–830. https://doi.org/10.1017/S0272263118000037

Zeng, Y. A. (2021). Review of foreign language enjoyment and engagement. *Frontiers in Psychology, 12*, 737613. https://doi.org/10.3389/fpsyg.2021.737613

Zhang, M. (2021). EFL/ESL teacher's resilience, academic buoyancy, care, and their impact on students' engagement: A theoretical review. *Frontiers in Psychology, 12*, 1895. https://doi.org/10.3389/fpsyg.2021.731859

Zhang, X. (2019). Exploring the relationship between college students' writing anxiety and the pedagogical use of online resources. *International Journal of Educational Technology in Higher Education, 16*, 18. https://doi.org/10.1186/s41239-019-0149-y

Zhuoyuan, Y. (2021). Analysis of public management, psychological work attention, and athletes' performance in sports industries. *Revista De Psicología Del Deporte (Journal of Sport Psychology), 30*(3), 168–178. https://www.rpd-online.com/index.php/rpd/article/view/483.

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