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Arabic Version of the Leahy Emotional Schemas Scale-II

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Abstract

Objective: This study aimed to translate the Leahy Emotional Schemas Scale-II (LESS-II) into Arabic and validate its psychometric properties among Iraqi university students. The hypothesis was that the Arabic version would retain the original factor structure and demonstrate robustness and validity.
Method: The process involved translation, cultural adaptation, backward translation, and the bilingual method to ensure linguistic and cultural relevance. The sample consisted of 280 Iraqi university students (64% female, 36% male). Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted to assess the factor structure. Reliability was tested using Cronbach's alpha and test-retest methods.
Results: EFA identified a 14-factor structure aligned with Leahy's model, accounting for 91.83% of the total variance. CFA confirmed a good model fit (RMSEA = 0.08, CFI = 0.93, TLI = 0.90). The total scale's reliability (Cronbach's alpha) was 0.82, with test-retest reliability at 0.87. Pearson correlations indicated significant relationships between LESS-II factors, anxiety, and depression, supporting construct validity.
Conclusion: The Arabic LESS-II was established as a valid and reliable tool for assessing emotional schemas. However, the study's reliance on a nonclinical sample limits generalizability. Future research should validate the scale in diverse and clinical populations, highlighting its potential utility in Arabic-speaking contexts for both research and clinical practice.

Key words: *Emotions; Factor Analysis; Psychometrics; Questionnaire; Validity and Reliability*

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The study of emotional schemas has become increasingly important in understanding how individuals perceive, interpret, and manage their emotional experiences. Emotional schemas are cognitive structures that encompass beliefs, strategies, and interpretations individuals hold regarding their emotions, which significantly influence emotional regulation and psychological outcomes (1). Emotions play an important role in understanding thoughts, intentions, and behaviors of others; they also facilitate decision-making and stimulate immediate reactions (2). Individuals differ in their interpretation and assessment of emotion, because emotional schemes are responsible for structuring information, providing meaning, and directing behavior, and types of schemes can be distinguished by their content. Cognitive schemas focus on perception, relational schemas focus on relationships, and emotional schemas focus on emotions (3). These schemas are integrally linked, forming a comprehensive framework for understanding emotional processing. Cognitive schemas are the mental structures that shape how individuals interpret various aspects of their environment, including emotional stimuli (4). Relational schemas, on the other hand, pertain to the expectations and beliefs individuals hold about their interpersonal relationships (5). Emotional schemas intersect with these frameworks by specifically addressing how emotions are processed within these cognitive and relational contexts, making them crucial for both emotional and social functioning (6).

According to Leahy's (2002) model, individuals process emotions in two ways that align with the broader framework of emotional schemas. The first approach involves accepting and appropriately expressing negative emotions, viewing them as temporary and context-dependent. This reflects an adaptive emotional schema, which promotes healthy emotional regulation and constructive coping, contributing to positive mental health outcomes (6). For example, adaptive schemas might include the belief that emotions are manageable and can be expressed appropriately, leading to greater emotional resilience.

In contrast, the second approach, reflecting a nonadaptive emotional schema, involves perceiving negative emotions as intrinsic and enduring characteristics. This often leads to the belief that these emotions are dangerous and must be suppressed or controlled. Nonadaptive emotional schemas, characterized by maladaptive beliefs like viewing emotions as overwhelming, are associated with increased psychological distress, including anxiety and depression (3, 6-8).

This study operationalizes these concepts using the Leahy Emotional Schema Scale-II (LESS-II), which measures the extent to which individuals adopt adaptive or nonadaptive emotional schemas, providing insights into emotional regulation's role in mental health.

Recent research has deepened our understanding of emotional schemas and their impact on mental health. For example, nonadaptive emotional schemas are closely linked to psychological distress. Thirch *et al*. (2012) found that maladaptive schemas, particularly those related to avoiding emotional experiences, predict higher anxiety levels (9). Similarly, Edwards and Wupperman (2019) also emphasized that avoidance and suppression of emotions are strongly associated with anxiety and depression (10). In contrast, Faustino *et al*. (2020) highlighted that adaptive emotional schemas enhance psychological well-being and reduce depression symptoms (11).

Further research by Erfan *et al*. (2019) demonstrated that Emotional Schema Therapy (EST) significantly improves emotional regulation and quality of life in individuals with bipolar disorder by addressing maladaptive schemas (12). Furchtlehner, Schuster, and Laireiter (2019) similarly found that fostering adaptive emotional schemas enhances well-being and reduces depressive symptoms (13).

These studies underscore the importance of assessing and modifying emotional schemas in clinical practice. The current study, validating the Arabic version of the LESS-II, will extend this research to Arabic-speaking populations, broadening its applicability across cultural contexts.

The LESS was originally developed as a 50-items measure and later shortened to a 28-items version (LESS-II) to improve usability while maintaining reliability and validity (6). The LESS-II is more efficient for clinical and research purposes due to its brevity and recent studies have further validated it. Suh *et al.* (2019) confirmed the scale's validity in a Korean sample (14). Similarly, Batmaz and Özdel (2015) validated the Turkish version (15), Da Silva *et al*. (2023) found strong psychometric properties in the Portuguese adaptation of the scale (16), supporting its use in varied linguistic environments.

High scores on the LESS-II reflect the individual's negative beliefs about emotions. Studies using the LESS-II supported this and indicated that high scores on the LESS-II are associated with depression and anxiety (3, 9), post-traumatic stress disorder, and family functioning disorders (17), risk aversion (18), bipolar disorder (19), cognitive factors underlying anxiety (20). Conversely, mindfulness, self-pity, and unconditional self-acceptance are negatively related to high LESS-II scores (11).

The LESS-II has been translated into multiple languages, including Mexican Spanish, Korean, Russian, Portuguese, Turkish, and Persian (14-16, 21-24). Several researchers have supported Leahy's reduction of the scale to a 28-item format distributed over 14 factors, with Yavuz *et al.* (2011), Batmaz and Özdel (2015), and Sirota *et al.* (2013) presenting support to favor of this structure. However, some researchers have challenged this model, suggesting that the scale consists of 28 items

but with only seven factors. Additionally, Suh *et al*. (2019) argued that the scale consists of as few as 10 items across two factors. This diversity in findings reflects the ongoing evolution of research on the LESS-II, highlighting the possibility for multiple interpretations and modifications of the scale to meet varying research and clinical needs.

Translation and adaptation of psychological scales into different languages are critical to ensuring their relevance and accuracy across diverse cultural contexts. This process requires more than just a direct linguistic translation; it necessitates careful cultural adaptation to maintain the psychometric integrity of the scale (25). When translating the LESS-II into Arabic, for instance, it is crucial to account for cultural nuances, as emotional expression varies widely across societies (26). Key steps, such as forward and backward translations, cultural adaptation, bilingual method, and pilot testing, are essential to refine the scale and ensure its validity in Arabic-speaking populations (27). Cultural adaptation not only preserves the psychometric properties of the instrument but also enhances its practical applicability (28, 29). Empirical evidence suggests that adapting psychological tools for Arab populations significantly improves their reliability and validity (30).

The significance of this study lies in its potential to address a critical gap in psychological assessment tools for Arabic-speaking populations. Mental health issues are widespread in the Middle East, exacerbated by conflicts, economic instability, and societal stressors, leading to high rates of psychological distress, including anxiety, depression, and PTSD, particularly in conflict-affected regions such as Iraq and Palestine (31-34). Despite the prevalence of these issues, validated instruments for assessing emotional schemas, which are key determinants of psychological distress, remain lacking (35).

Assessing emotional schemas is essential, as they often contribute to resistance in psychotherapy by shaping how individuals perceive and respond to emotions (3). Addressing these schemas can lead to more effective interventions, especially for clients with “difficult” emotions that hinder progress (36). The LESS-II also aids in assessing relational dynamics, offering strategies to improve communication between couples through evaluation of their emotional schemas (37).

The Arabic version of the LESS-II fills a significant gap by providing a reliable tool for assessing emotional schemas, essential for both clinical practice and research in Arabic-speaking populations. This adaptation will help psychiatrists better understand emotional processing in Arabic people, thereby improving clinical practice. As the demand for culturally sensitive mental health assessments grows in Arab societies (38, 39), the availability of the LESS-II is particularly timely. Arabic is spoken by approximately 422 million people globally (35) and is one of the world's most widely spoken languages. In spite of this, a validated Arabic version of the Leahy scale has been lacking. This new version provides Arabic-speaking researchers and clinicians with a culturally appropriate tool, enhancing both interventions and research (40).

Leahy's Model of Emotional Schemas

Leahy’s model of emotional schemas, rooted in Wells’ (1995) metacognitive model, describes the cognitive beliefs individuals hold about emotions such as fear, sadness, anxiety, loneliness, and the strategies they use to process them (41). According to Leahy (2002), these emotions are universally experienced, but individuals differ in their responses and strategies in dealing with them. These differences in emotional processing determine the extent to which these emotions become problematic for an individual (3). Leahy proposed that emotional schemas are multifaceted and include 14 distinct factors, each reflecting different ways in which emotions can be managed. These factors are crucial for understanding how individuals cope with emotional distress and how therapeutic interventions can be tailored to improve emotional regulation (3, 6).

Dimensions of Emotional Schemas

Leahy (2002, 2015) suggested that emotional schemas consist of adaptive and nonadaptive dimensions, each contributing differently to emotional regulation. The adaptive schemas (validation, values, rationality, consensus, acceptance, expression, control) are linked to positive emotional regulation strategies that reduce emotional distress, enabling individuals to manage emotional distress effectively, thereby reducing symptoms of anxiety and depression. While nonadaptive schemas (comprehensibility, guilt/shame, simplistic views, numbness, duration, rumination, blame) are associated with heightened anxiety, depression, and perpetuate emotional dysregulation and exacerbate psychological distress (3, 6, 42). Addressing nonadaptive schemas in therapy is essential for improving emotional regulation and psychological outcomes.

Validation: Validation is a belief that one's emotions are accepted and understood by others. Feeling validated provides emotional security, which reduces the likelihood of experiencing anxiety or depression. Research has shown that emotional validation is critical in fostering emotional resilience and mitigating emotional distress.

Values: Values align emotions with personal goals and provide meaning to emotional experiences, which can reduce psychological distress. By connecting emotions to larger life goals, individuals are less likely to experience prolonged anxiety or depression.

Rationality: The use of logic to control emotional responses helps individuals manage emotional states more effectively. Rationality reduces emotional impulsivity and contributes to emotional stability, thereby mitigating emotional problems.

Consensus: Recognizing that others experience similar emotions reduces feelings of isolation. This factor is important in decreasing emotional distress by fostering a sense of shared emotional experience.

Acceptance: Accepting emotions rather than avoiding or suppressing them leads to better emotional health. Acceptance helps individuals process emotions in a healthy manner, reducing the likelihood of emotional dysregulation and depressive symptoms.

Expression: The ability to express emotions openly is crucial for emotional regulation. Individuals who express their emotions effectively are less likely to internalize negative feelings, which can otherwise lead to anxiety or depression.

Control: A belief that one can manage their emotional states. A strong sense of control over emotions is associated with better mental health outcomes, as individuals are less likely to feel overwhelmed by their emotions.

Comprehensibility: An individual's understanding of their emotions. A lack of emotional comprehension is linked to increased emotional confusion, which in turn can result in higher levels of anxiety and depression.

Guilt/Shame: Individuals who feel guilt or shame about their emotions tend to internalize these feelings, leading to depression and emotional distress. These feelings prevent healthy emotional expression and contribute to a negative self-perception.

Simplistic Views: An individual's difficulty in tolerating mixed emotions. Viewing emotions in a simplistic, binary manner can limit emotional flexibility and increase the likelihood of anxiety or emotional dysregulation.

Numbness: Emotional numbness occurs when individuals become detached from their feelings, often as a result of avoidance strategies. This detachment prevents proper emotional processing and leads to prolonged emotional distress.

Duration: A belief that negative emotions will persist indefinitely. Individuals who believe their emotions will last for a long time are more likely to experience depression, as they feel trapped in their emotional state.

Rumination: The tendency to dwell on negative experiences or emotions is the hallmark of rumination. This cognitive style prolongs emotional distress and increases symptoms of anxiety and depression by preventing emotional resolution.

Blame: Individuals who attribute their emotions to external causes or blame others for their feelings tend to engage in maladaptive coping strategies. This external attribution prevents emotional accountability and resolution, leading to sustained emotional distress.

Leahy's emotional schemas model is integral to emotional schema therapy, which focuses on modifying maladaptive schemas and reinforcing adaptive ones. The LESS-II is a practical tool for assessing the presence of adaptive and nonadaptive emotional schemas. High scores on the LESS-II indicate the dominance of nonadaptive schemas, such as rumination or blame, signaling areas that require therapeutic intervention (14, 21). By identifying and addressing these maladaptive schemas, clinicians can tailor interventions that foster healthier emotional processing, thus reducing emotional distress and improving mental health outcomes (42).

The Present Study

The current research aimed to translate and adapt the LESS-II for Arabic speakers. The process includes forward and backward translations to ensure accuracy, cultural adaptation to reflect Arabic emotional nuances, and pilot testing to refine clarity and relevance. These steps ensure the scale's suitability for Arabic-speaking populations. Moreover, we assessed key properties like reliability (internal consistency, test-retest) and construct validity using Exploratory and Confirmatory Factor Analysis (EFA, CFA). The factorial structure confirms if the Arabic version aligns with the original 14-factor model. Additionally, we repeated Leahy's (2002) procedure by extracting the correlation between the Arabic LESS-II and Beck's Inventory of Depression and Anxiety to further confirm the scale's internal consistency. These psychometric evaluations are essential for establishing the scale's reliability and validity for both research and clinical applications (43).

Materials and Methods

Sample

The sample size of 280 participants was determined based on the criteria provided by Nunnally & Bernstein (1995) (44), which recommends having at least 10 participants per item on the scale for reliable factor analysis. With 28 items on the LESS-II, 280 participants are sufficient to ensure robust psychometric validation, meeting current standards for scale validation in psychological research. The participants were 280 Iraqi university students, of whom 64% were female and 36% male. Their ages ranged from 18 to 25 years. Academic backgrounds varied, with 85% studying humanities and 15% enrolled in scientific fields (see Table 1). This demographic diversity helps ensure the generalizability of the findings across different fields of study and gender distributions.

Procedures

An online questionnaire was developed using Google Docs, which ensured that each participant could submit only once and required the completion of all items. Recruitment occurred over two weeks, targeting current university students, with access limited to those using academic emails to maintain sample integrity. Confidentiality and anonymity were emphasized, with data collection protocols following ethical guidelines for participant protection.

Table 1. Participant Sociodemographic and Academic Characteristics

Dimension	Mean	SD	N = 280	Frequencies
sex				
Male	101.34	14.96	102	%36
Female	103.85	19.36	178	%64
File of study				
scientific	105.33	15.00	42	%15
Humanistic	102.51	18.35	238	%85
Marital status				
married	102.40	20.00	140	%50
Single	101.13	15.77	81	%29
In relationship	104.16	15.34	42	%15
Complicated	112.88	11.53	17	%6

This study adhered to key ethical principles, including informed consent, confidentiality, and data protection. Participants were fully informed about the study's purpose, procedures, and their rights, with informed consent obtained prior to participation. Participation was voluntary, and individuals could withdraw at any time without consequences.

Although ethical approval committees are not yet widely available in Iraq, the study followed internationally recognized ethical protocols, ensuring compliance with standards related to informed consent, confidentiality, and data protection.

Measurements

Leahy Emotional Schema Scale II (LESS-II)

The Emotional Schemas Scale II is a self-report scale, which is now available in an Arabic version. It consists of 28 items evaluated on a Likert scale of six alternatives, from "1 - very untrue of me" to "6 - very true of me", which covers the 14 factors of the LESS-II, each factor consisting of two items and items 26, 25, 24, 19, 15, 14, 6, and 4 are revers-scored.

The translation and cultural adaptation of the LESS-II followed a meticulous step-by-step process to ensure that the scale retained its psychometric integrity while becoming culturally and linguistically relevant for Arabic-speaking populations. After obtaining permission from Robert Leahy (via personal correspondence) to adapt the LESS-II into Arabic, the initial translation from English to Arabic was carried out by two bilingual experts proficient in both languages and with backgrounds in psychology. Their deep understanding of emotional schemas ensured the translation was contextually accurate. They worked independently to avoid bias and any unintended influence on each other's translations. This step helped capture the nuances of the original items and address any cultural differences in the expression of emotions. Several emotional terms, often culturally sensitive in Arabic-speaking populations, were carefully adapted to fit the context without losing meaning (45, 46). For instance:

The original item “I feel emotionally numb when I am upset” was difficult to translate directly into Arabic, as the concept of "numbness" does not have a direct cultural equivalent in the context of emotional expression. The term was adapted to "I lose sensation of my emotions when I'm upset"

(افقد الإحساس بانفعالاتي عندما أكون منزعجاً)

which better resonates with Arabic speakers, capturing the essence of emotional numbness in a culturally relevant way.

Following the forward translation, two other bilingual professionals, unfamiliar with the original scale, conducted a backward translation from Arabic to English. This process, consistent with cross-cultural translation best practices (Behling & Law, 2000), was designed to identify discrepancies between the translated and original versions, ensuring that the Arabic version closely reflected the original content. By comparing both versions, this step ensured that the Arabic version accurately reflected the original content.

For further verification, a bilingual method was used. In this method, the original and translated versions of the scale are given to bilingual participants, and their responses to both versions are compared. Pearson’s correlation coefficient was then extracted between the original and translated versions. In this way, any inconsistencies or discrepancies between the two versions can be identified (47). Two versions of the LESS-II (Arabic and original) were presented to three bilingual professors from the departments of English Language, Psychology, Translation. Results showed a high correlation between the responses for both versions ($r = 0.94$, significant at $P < 0.01$), confirming that the

translation accurately preserved the intended meaning of the original scale.

The translated version of the LESS-II underwent pilot testing with 30 Iraqi university students to evaluate the clarity, relevance, and cultural appropriateness of the items. Participants were asked to provide feedback on their understanding, with special attention to ambiguous or culturally inappropriate terms, the researchers posed specific questions to participants to assess their precise understanding of certain terms that were identified as potentially ambiguous. It was observed that these terms were generally well understood by the students.

The Arabic version of the LESS-II was completed using feedback from the forward translation, backward translation, cultural adaptation, bilingual method, and pilot testing. These steps ensured the scale's linguistic accuracy, cultural relevance, and clarity, making it suitable for Arabic-speaking populations.

Beck Anxiety Inventory and Beck Depression Inventory

The Beck Anxiety Inventory (BAI) and Beck Depression Inventory (BDI) are self-report questionnaires, each composed of 21 multiple-choice items. Participants are asked to rate each item based on four response options (3, 2, 1, 0) to assess their psychological state during the past week (4, 48, 49).

The translation of the BAI and BDI into Arabic involved a structured process to maintain the tools' psychometric properties. The translation began with forward translation by two bilingual psychologists fluent in Arabic and English. The translations were then reviewed and harmonized to ensure that terms like "anxiety" and "hopelessness" were culturally relevant and accurate. Following this, a backward translation was performed by two independent translators to compare the translated version with the original, identifying any inconsistencies (25, 47).

To ensure cultural appropriateness, experts in psychology and language reviewed the translated scales. The culturally adapted version was then pilot tested with 30 participants. The pilot study focused on identifying any terms that were unclear or culturally inappropriate. Feedback led to minor revisions in wording, particularly regarding physical symptoms of anxiety and depression, to ensure clarity in the Arabic context. The coefficients of alpha in the current study for BDI and BAI were 0.86 and 0.92, respectively.

Statistical Analysis

Statistical methods employed in this study included both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), conducted using SPSS 26 and AMOS 24, to determine and verify the factor structure of the Arabic version of the LESS-II. EFA was conducted using principal component analysis with varimax rotation, and factors were retained based on eigenvalues greater than 1, accounting for 91.83% of the variance. The Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity confirmed the adequacy of the sample ($KMO = 0.67$, $P < 0.001$). CFA was then performed to validate the structure, with fit indices such as RMSEA (0.08), CFI (0.93), and χ^2/df confirming a good model fit.

Reliability was assessed using Cronbach's alpha and test-retest reliability over 28 days. Pearson correlation analysis was used to evaluate the relationships between the LESS-II factors and BAI as well as BDI, supporting the scale's construct validity.

Ethical Consideration

This study was conducted with careful attention to ethical considerations, including obtaining informed consent from all participants. While there is no formal ethical approval committee in our country "Iraq", the research adhered to international ethical standards and best practices in research involving human participants.

Results

To ensure that the data were normally distributed, Kolmogorov-Smirnov and Shapiro-Wilk tests were used. Both tests indicated normal distribution ($P > 0.05$). Linearity was confirmed through scatterplot inspections, and Levene's test confirmed homogeneity of variances. No missing values were found, as all participants completed the scale fully. Totally, 36% of participants were male and 64% were female. All participants were university students at the study stage: 50% were married, 29% were single, 15% were in a relationship, and 6% had complicated relationship statuses. This demographic diversity ensures that the results are generalizable to a wide spectrum of university students in similar educational contexts across the Arab world.

Validity Analyses

Exploratory Factor Analysis

The rationale for employing Principal Component Analysis (PCA) with varimax rotation was to identify the underlying factor structure of the Arabic version of the LESS-II and to maximize the interpretability of the factor loadings. The use of varimax rotation helped achieve orthogonal factors by minimizing the number of variables that have high loadings on each factor. Before conducting PCA, the data's suitability was confirmed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, which yielded a value of 0.67, indicating that the sample was adequate for factor analysis (49). Additionally, Bartlett's test of sphericity was significant ($\chi^2 = 6739.20$, $P < 0.001$), confirming that the correlations between items were sufficient for PCA. These tests ensured that factor analysis was appropriate and that the results would be reliable and interpretable. According to Kline (2011), the item with a standardized factor loading of 0.3 or higher is considered to have better psychometric properties (50).

As a result, we use EFA to investigate the factor structure of the current data. We also employed the scree plot test to examine the factor structure of the data set. The results of using the two criteria suggested 14 factors

explaining 91.83% of the total variance in the eigenvalues (see Figure 1 and Table 2). Based on the results, the factors were: F1 = Rumination [16, 22], F2 = Guilt [2, 10], F3 = Loss of control [5, 17], F4 = Blame [8, 21], F5 = Low expression [4, 15], F6 = Low consensus [1, 25], F7 = Incomprehensibility [3, 7], F8 = Numbness [11, 20], F9 = Duration [9, 19], F10 = Devalued [14, 26], F11 = Simplistic view of emotion [23, 28], F12 = Invalidation [6, 12], F13 = Overly rational [13, 27], and F14 = Non-acceptance of feelings [18, 24].

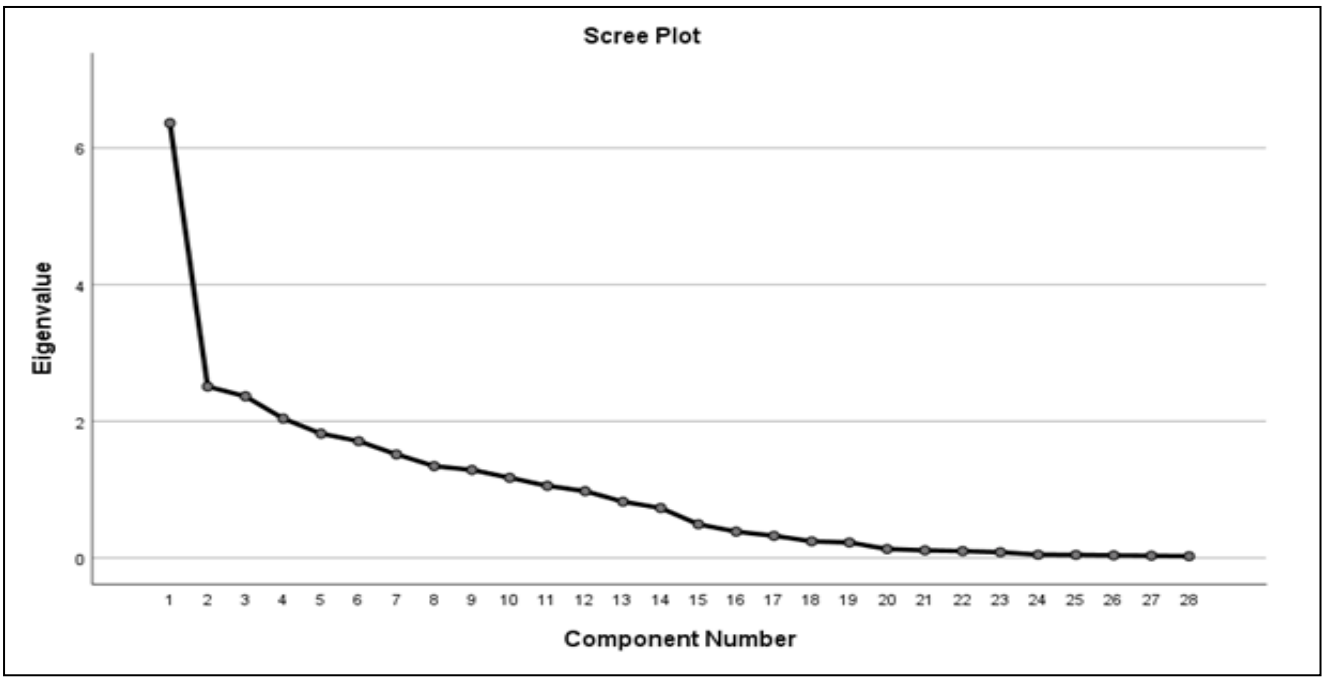

Figure 1. Scree Plot Analysis of the Factor Structure for the Arabic Version of the Leahy Emotional Schemas Scale-II

Table 2. Exploratory Factor Analysis Using Principal Components Method with Varimax Rotation

Component	Initial Eigenvalues		
	Total	% Variance	%Total
F1	6.36	22.72	22.72
F2	2.50	8.95	31.68
F3	2.36	8.44	40.12
F4	2.04	7.28	47.41
F5	1.82	6.50	53.91
F6	1.70	6.10	60.01
F7	1.51	5.41	65.43
F8	1.34	4.80	70.23
F9	1.28	4.60	74.83
F10	1.17	4.19	79.02
F11	1.05	3.76	82.79
F12	0.97	3.48	86.27
F13	0.82	2.94	89.21
F14	0.73	2.61	91.83

Table 3. Factor Loadings for Items of the Arabic Version of the Leahy Emotional Schemas Scale-II (LESS-II) Based on Exploratory Factor Analysis

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
Item1	0.06	0.07	0.04	0.10	0.05	**0.94**	0.00	0.07	0.05	-0.04	0.12	0.01	0.06	0.04
Item 2	0.12	**0.93**	0.11	0.04	0.01	0.10	0.13	0.04	0.02	-0.04	0.09	-0.01	0.12	0.07
Item 3	0.20	0.12	0.13	0.06	-0.17	0.00	**0.91**	0.10	0.06	0.02	0.07	0.08	0.04	0.04
Item 4	-0.07	0.00	-0.07	-0.00	**0.97**	0.04	-0.11	-0.03	-0.01	0.08	-0.05	0.03	0.00	-0.01
Item 5	0.09	0.12	**0.93**	0.09	-0.09	0.02	0.12	0.05	0.17	0.00	0.07	0.06	0.04	0.10
Item 6	0.01	-0.07	0.00	-0.02	0.05	-0.02	0.05	0.02	0.04	0.04	-0.18	**0.83**	0.11	-0.01
Item 7	0.17	0.15	0.11	0.06	-0.15	0.01	**0.92**	0.09	0.07	0.00	0.05	0.07	0.04	0.04
Item 8	0.09	0.02	0.08	**0.95**	-0.00	0.08	0.04	0.10	0.13	-0.01	0.08	-0.02	0.02	0.04
Item 9	0.12	0.00	0.14	0.14	-0.07	0.10	0.09	0.06	**0.91**	-0.01	0.11	0.04	0.04	0.06
Item 10	0.07	0.**94**	0.10	0.04	0.02	0.09	0.12	0.07	0.03	-0.04	0.05	-0.03	0.10	0.08
Item 11	0.02	0.04	0.05	0.11	-0.01	0.05	0.10	**0.95**	-0.00	0.04	0.05	0.06	0.03	-0.00
Item 12	0.05	0.03	0.11	0.07	-0.01	0.12	0.07	0.04	0.11	0.10	0.04	**0.84**	-0.02	0.05
Item 13	0.03	0.24	0.22	0.24	0.04	0.10	0.13	0.04	0.07	**-0.38**	**0.30**	0.10	**0.56**	-0.00
Item 14	-0.01	-0.10	-0.02	-0.05	0.02	-0.02	0.01	0.00	-0.03	**0.90**	-0.12	0.02	0.14	0.05
Item 15	-0.05	0.04	-0.09	0.00	**0.96**	0.03	-0.17	-0.02	-0.03	0.07	-0.05	0.01	0.00	-0.02
Item 16	**0.89**	0.09	0.01	0.10	-0.07	0.06	0.14	0.05	0.10	-0.04	0.11	-0.00	0.05	0.11
Item 17	0.07	0.09	**0.95**	0.06	-0.09	0.03	0.10	0.05	0.12	0.00	0.04	0.06	0.04	0.08
Item 18	0.12	0.11	0.15	0.05	-0.02	0.06	0.05	0.01	0.09	-0.01	0.19	0.04	0.05	**0.90**
Item 19	0.08	0.05	0.13	0.11	0.01	0.03	0.04	0.07	**0.92**	-0.05	0.06	0.13	0.04	0.04
Item 20	0.04	0.06	0.05	0.10	-0.04	0.08	0.06	**0.94**	0.14	-0.04	0.01	0.01	0.02	0.02
Item 21	0.07	0.05	0.06	**0.95**	0.00	0.07	0.06	0.12	0.11	-0.00	0.05	0.06	0.04	0.02
Item 22	**0.82**	0.04	0.09	0.04	-0.04	0.05	0.16	0.03	0.09	0.01	0.25	0.09	0.03	-0.10
Item 23	0.22	0.05	0.07	0.03	-0.04	0.14	0.09	0.00	0.10	-0.04	**0.87**	-0.03	0.05	0.03
Item 24	**0.74**	0.12	0.12	0.06	-0.05	0.04	0.11	-0.01	0.06	0.01	0.07	-0.00	0.00	**0.54**
Item 25	0.06	0.11	0.01	0.05	0.02	**0.95**	0.01	0.06	0.07	-0.03	0.08	0.08	0.03	0.03
Item 26	-0.00	0.03	0.04	0.05	0.12	-0.05	0.01	0.00	-0.02	**0.88**	0.00	0.14	-0.02	-0.06
Item 27	0.06	0.15	0.01	0.00	-0.00	0.06	0.03	0.04	0.05	0.20	0.07	0.05	**0.91**	0.05
Item 28	0.17	0.10	0.05	0.11	-0.08	0.09	0.03	0.08	0.08	-0.11	**0.81**	-0.14	0.12	0.22

Note: Bold statistics are higher than 0.30 and significant (P < 0.01)
F1 = Rumination, F2 = Guilt, F3 = Loss of control, F4 = Blame, F5 = Low expression, F6 = Low consensus, F7 = Incomprehensibility, F8 = Numbness, F9 = Duration, F10 = Devalued, F11 = Simplistic view of emotion, F12 = Invalidation, F13 = Overly rational, F14 = Nonacceptance of feelings.

All items loaded on their proposed factors with values greater than 0.33, ranging from 0.38 to 0.95. Two items were loaded on more than one factor: item 13 was loaded on F10, F11, and F13. We decided to keep it on F13, as its loading on this factor is the strongest. Item 24 was loaded on F1 and F14. We retained F14 even though its loading on F1 was higher, but we suggest that as long as its loading on the two factors is higher than 0.33, there is no objection to keeping it on the original factor, as Leahy (2012) suggested. This indicates that the

original 14-factor structures proposed by Leahy (2012) were consistent with the current results for the Iraqi sample (3).

Confirmatory Factor Analysis

CFA was used to determine the fit of the 14-factor model LESS-II proposed by the EFA. Results showed that Model A consisting of 14 factors was not a good fit model, and the conformity indicators were weak. After viewing the modification index in Model A, improvements were made to the model by creating more correlations between the 14 factors of the LESS-II to reduce the variance in Model B. Results showed that Model B had a good fit after the improvement ($\chi 2$ = 771.81, df = 273, $\chi 2$/df = 2.82, RMSEA = 0.08, TLI = 0.90, GFI = 0.85, IFI = 0.92 CFI = 0.93, RMR = 0.16).

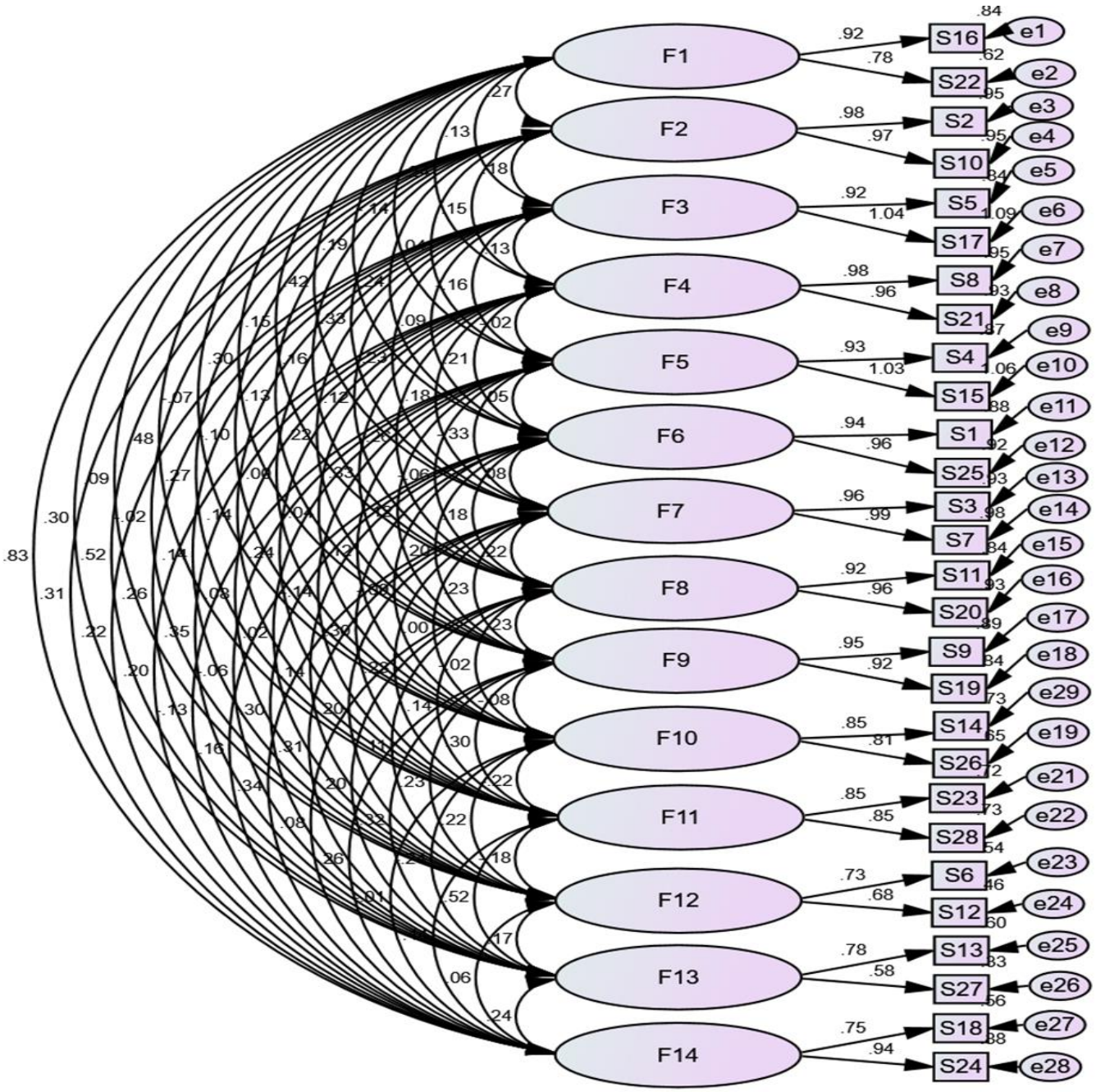

Figure 2. Confirmatory Factor Analysis of the Arabic Version of the Leahy Emotional Schemas Scale-II: Model Fit and Factor Loadings.

F1 = Rumination, F2 = Guilt, F3 = Loss of control, F4 = Blame, F5 = Low expression, F6 = Low consensus, F7 = Incomprehensibility, F8 = Numbness, F9 = Duration, F10 = Devalued, F11 = Simplistic view of emotion, F12 = Invalidation, F13 = Overly rational, F14 = Nonacceptance of feelings. 28 items (S1, S2, S3, S4, S5, S6, S7, …, S28).

All the items had loadings greater than 0.30 on each factor, ranging from 0.58 to 0.97, thereby exhibiting excellent loadings (see Figure 2). For further verification, we tested a third model (Model C), assuming that the LESS-II is a single structure. We found that this model has a very weak fit. In short, we conducted CFA on three models and found that Models C and A were weakly fit, so we neglected them, while Model B had the best fit, so we retained it (see Table 4).

Table 4. Model Fitness Indices for the Arabic Version of the Leahy Emotional Schemas Scale-II: Fit Statistics and Comparisons

Models	CMIN	df	X2\df	RMSEA	TLI	GFI	IFI	CFI	RMR
Original 14-factor model[a]	1480.33	364	4.067	0.10	0.83	0.68	0.83	0.83	0.42
modification 14-factor model[b]	771.81	273	2.82	0.08	0.90	0.85	0.92	0.93	0.16
One-factor model[c]	6110.09	376	16.25	0.23	0.13	0.50	0.13	0.13	0.43

χ2 = chi-squared index, RMSEA = Root Mean Square Error of Approximation, CFI = Comparative Fit Index, IFI = Incremental Fit Index, RMR = Root Mean Square Residual, GFI = Goodness of Fit Index.

Correlations

Relationships of LESS-II Scores with BAI and BDI Scores

Anxiety was correlated with all factors of the LESS-II, and the correlations ranged from 0.27 to 0.55, all of which were significant at $P < 0.01$, except for Overly Rational, which was significant at $P < 0.05$. On the other hand, depression was also correlated with all factors of the LESS-II, and the correlations ranged from 0.23 to 0.58, all of which were significant at $P < 0.01$, except for numbness and the overly rational factor, which were significant at $P < 0.05$ (see Table 5). This can be explained by the fact that anxiety and depression are correlated with negative emotion processing; the more negative an individual's beliefs about his emotions are, the more this contributes to his increased anxiety and depression (3).

Table 5. Correlation between the Arabic Version of the Leahy Emotional Schemas Scale-II, Beck Anxiety Inventory (BAI), and Beck Depression Inventory (BDI) for N = 78

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
BAI	0.43**	0.55**	0.48**	0.40**	0.32**	0.37**	0.36**	0.30**	0.42**	0.29**	0.39**	0.40**	0.27*	0.42**
BDI	0.43**	0.58**	0.45**	0.38**	0.28*	0.35**	0.33**	0.28*	0.40**	0.23*	0.42**	0.39**	0.27*	0.41**

F1 = Rumination, F2 = Guilt, F3 = Loss of control, F4 = Blame, F5 = Low expression, F6 = Low consensus, F7 = Incomprehensibility, F8 = Numbness, F9 = Duration, F10 = Devalued, F11 = Simplistic view of emotion, F12 = Invalidation, F13 = Overly rational, F14 = Nonacceptance of feelings. *P < 0.05, **P < 0.01.

Intercorrelations among Dimensions

We extracted the correlation between the LESS-II factors to assess the correlation of the items with the total score of the LESS-II, and the structure of the LESS-II factors together. The results showed that all the factors of the LESS-II were correlated with the total score of the LESS-II (see Table 6). The correlations ranged from 0.12 to 0.57, all of which were significant at $P < 0.05$ and $P < 0.01$, except for the low expression factor, whose correlation with the total score was very weak and not significant. The results also showed that correlations between the LESS-II factors ranging from low correlations to strong correlations (0.12 to 0.51) were all significant at $P < 0.05$ and $P < 0.01$, except for the important result that the Devalued factor had a low correlation (0.15). This result was significant at $P < 0.05$ with low expression and there were no correlations with any other factors. However, its correlation with the total score of the LESS-II was high and significant at $P < 0.01$ (0.57). The results indicate that the structure factor of the LESS-II Arabic version is correlated with the general concept of "emotional schemas," but its factors are distinct from each other; each factor measures a certain aspect of dealing with emotions.

Reliability Analyses

The reliability of the LESS-II in a sample from an Iraqi society was tested in two ways. First, through test-retest reliability: The LESS-II was re-administered to 50 respondents from the sample after 28 days. The correlation coefficients between the first test and the second test ($r = 0.65$ to $r = 0.89$, $P < 0.01$) were all significant for the 14 factors, and the total score of the LESS-II was $r = 0.78$, with $P < 0.01$. These results demonstrate that the reliability of the LESS-II Arabic version over time is acceptable. Second, we used Cronbach's alpha to determine the internal consistency between the LESS-II items. Alpha coefficients were extracted for the sample responses. The Cronbach's alpha for the total LESS-II was 0.82. For the 14 factors, Cronbach's Alpha ranged from 0.56 to 0.97. These

results show that the internal consistency of the LESS-II Arabic version is acceptable (see Table 6).

Table 6. Intercorrelations among the 14-Factors of the Arabic Version of the Leahy Emotional Schemas Scale-II

	Total	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	MD	SD	α	Re-t N = 50
Total															102.93	17.89	0.82	0.78
F1	0.57**	1													8.55	2.66	0.82	0.73
F2	0.54**	0.23**	1												7.97	3.19	0.97	0.91
F3	0.54**	0.21**	0.26**	1											7.26	3.07	0.97	0.79
F4	0.51**	0.20**	0.14*	0.21**	1										7.05	3.20	0.97	0.67
F5	0.02	-0.16**	-0.00	-0.19**	-0.02	1									5.11	3.15	0.97	0.82
F6	0.45**	0.17**	0.22**	0.10	0.20**	0.05	1								7.92	2.65	0.94	0.78
F7	0.54**	0.40**	0.31**	0.31**	0.18**	-0.31**	0.07	1							7.34	3.20	0.97	0.66
F8	0.43**	0.12*	0.15**	0.15**	0.25**	-0.07	0.17**	0.22**	1						6.56	2.92	0.93	0.73
F9	0.54**	0.26**	0.13*	0.34**	0.30**	-0.09	0.18**	0.21**	0.18**	1					7.08	2.87	0.92	0.84
F10	0.12*	-0.03	-0.08	-0.00	-0.02	0.15*	-0.07	0.01	0.00	-0.06	1				4.98	2.58	0.81	0.80
F11	0.49**	0.42**	0.24**	0.20**	0.21**	-0.15**	0.27**	0.21**	0.12*	0.25**	-0.18**	1			9.18	2.51	0.84	0.71
F12	0.35**	0.09	-0.00	0.16**	0.08	0.03	0.11	0.17**	0.10	0.20**	0.17**	-0.11*	1		7.02	2.70	0.66	0.81
F13	0.55**	0.21**	0.39**	0.24**	0.22**	-0.01	0.22**	0.22**	0.14*	0.21**	-0.02	0.34**	0.14*	1	8.71	2.62	0.56	0.79
F14	0.57**	0.51**	0.29**	0.32**	0.18**	-0.12*	0.17**	0.29**	0.07	0.24**	-0.02	0.40**	0.07	0.20**	8.14	2.59	0.74	0.88

Total = total score of Leahy Emotional Schema Scale-II, F1 = Rumination, F2 = Guilt, F3 = Loss of control, F4 = Blame, F5 = Low expression, F6 = Low consensus, F7 = Incomprehensibility, F8 = Numbness, F9 = Duration, F10 = Devalued, F11 = Simplistic view of emotion, F12 = Invalidation, F13 = Overly rational, F14 = Nonacceptance of feelings. *P < 0.05, **P < 0.01

Discussion

Findings from this study, which identified a 14-factor structure of the LESS-II among Iraqi university students, differ from the results found in other studies, such as the seven-factor model proposed by Salemi-Langroudi *et al*. (2021), the two-factor model identified by Suh *et al*. (2019), and the one-factor model proposed by Batmaz & Özdel (2015) (14, 15, 51). While these alternative models were based on non-clinical samples, Leahy's original 14-factor model was developed with clinical populations in mind (3, 6). Thus, the alignment of our findings with Leahy's 14-factor framework suggests that Iraqi university students may process emotions in ways similar to clinical populations, those who experience diagnosed psychological disorders. This finding is particularly noteworthy given the unique socio-political and economic challenges in Iraq, such as ongoing conflict and instability. These stressors may heighten emotional dysregulation, contributing to the development of nonadaptive schemas, such as rumination and blame (34). Given the high prevalence of anxiety and depression linked to maladaptive emotional schemas in Middle Eastern societies affected by conflict, these insights are important for understanding and addressing mental health issues in these societies (32, 40).

This suggests that such schemas may be present in many non-clinical individuals, or individuals who have not yet been diagnosed. Research by Al-Hadethe *et al*. (2014) found that staggeringly 84% of high school students in Baghdad exhibited symptoms of psychological disorders despite not being diagnosed or seeking psychological help (34). Similarly, Clark (2003) reported that Iraqi children are at high risk for famine, disease, and psychological trauma, highlighting the long-term impact of ongoing conflict and instability on emotional well-being (52). The findings highlight the need for further investigation into the mental health status of Iraqi university students and the implementation of mental health support systems to address potential emotional disorders before they escalate.

In terms of the scale structure, items 13 and 24 presented cross-loadings, meaning they loaded onto more than one factor during exploratory factor analysis. Item 13, which loaded onto the overly rational factor, was retained in this factor for two reasons: first, it had theoretical support from Leahy's (2002) model, and second, its saturation on the overly rational factor was higher than on the other dimensions, making it a better fit for that category. Similarly, item 24, which loaded onto the nonacceptance of feelings factor, was retained due to its alignment with Leahy's theoretical framework and its acceptable loading on the factor. The decision to retain these items, despite their cross-loadings, was made to preserve the theoretical integrity of the scale. Cross-loadings can sometimes raise concerns about factor validity (53), but in this case, their retention was supported by both the higher loadings in the target factors and their conceptual relevance to the emotional schema dimensions. This approach aligns with practices in scales development where theoretically important items are retained despite minor cross-loadings, ensuring that the scale accurately reflects the intended constructs (54, 55).

Upon conducting confirmatory factor analysis (CFA), the initial model showed poor fit. Adjustments were made by introducing correlations between certain factors to account for overlapping variance, resulting in a better-fitting model. The choice to retain the 14-factor model over alternative models was justified by the significant improvement in fit and the consistency of this structure with Leahy's theoretical propositions (6), which posit that emotional schemas are multifaceted constructs. Each factor represents a different way individuals interpret and respond to emotional experiences, such as validation, rumination, and control (3, 6). This structure allows for a comprehensive assessment of emotional regulation, offering insights into how individuals cope with emotional distress. The 14-factor model aligns with previous studies validating the scale in various cultural contexts, including Korean and Turkish populations (14, 15), confirming the robustness across diverse samples.

Internal correlations among the 14 factors of the LESS-II in the Iraqi university student sample, ranging from weak to acceptable, provide significant insights into the distinctiveness of emotional schemas within this population. These findings suggest that, although the emotional schemas are interconnected, they function as distinct cognitive and emotional dimensions, each contributing uniquely to the individual's emotional experience and regulation strategies (3).

Weak to acceptable correlations highlight that, while factors such as validation, control, and acceptance share some common variance in emotional regulation, they operate largely independently. This independence suggests that students may rely on different emotional strategies depending on the context or type of emotional challenge they face. For instance, an individual might display high levels of validation (feeling their emotions are acknowledged by others) but still experience challenges in accepting or controlling those emotions in difficult situations. This pattern aligns with Leahy's model, which emphasizes the multifaceted nature of emotional schemas and how individuals draw on varied strategies to manage emotional experiences (6).

When comparing these results to similar studies conducted in Middle Eastern countries, interesting cultural nuances in emotional processing emerge. For instance, a study by Salemi Langroudi *et al*. (2021), conducted on an Iranian student population, found stronger intercorrelations between certain emotional schema factors. Specifically, emotional regulation strategies like rumination and guilt were more strongly correlated, suggesting a closer relationship between maladaptive schemas. This could indicate that emotional responses in Iran may be more intertwined (51).

Rahabarian *et al*. (2016) found that nonadaptive schemas like rumination and blame were more prevalent in patients with bipolar disorder and major depressive disorder compared to a nonclinical population in Iran (56). Likewise, the Iraqi students in this study displayed nonadaptive schemas akin to clinical populations, likely due to the ongoing socio-political stressors they faced. Ongoing conflict, economic instability, and exposure to trauma may shape more distinct emotional responses. Al-Hadethe *et al*. (2014) highlighted how war-related trauma in Iraq significantly impacts emotional processing, with individuals developing more compartmentalized emotional schemas as a coping mechanism (34). This could explain why certain emotional dimensions in the Iraqi sample are more distinct, as students may rely on specific strategies to manage their emotions in response to chronic stressors like conflict and instability.

Distinctiveness of emotional schemas among Iraqi university students may also reflect their attempts to adapt to multiple external pressures, including academic stress, societal expectations, and historical trauma. The weak correlations between certain emotional schema factors could indicate a strategic compartmentalization of emotional processing, where students consciously or unconsciously use different schemas depending on the emotional context. For instance, an Iraqi student might experience high levels of rumination during periods of academic stress but might not necessarily feel guilt or blame in the same emotional situations. This compartmentalization supports Leahy's framework, which emphasizes that emotional schemas are flexible and can vary depending on the situation and individual experience (42).

In a related study, Sharifi *et al*. (2023) showed that maladaptive schemas such as guilt and rumination were prevalent, particularly among students facing academic and social pressures (57), a pattern also seen in the Iraqi sample. Furthermore, Kamali *et al*. (2013) identified that nonadaptive schemas such as non-acceptance and over-control predicted pathological worry in Iranian students (58). This aligns with the current findings in Iraq, where non-acceptance of emotions was linked to anxiety and depression. Mazloom *et al*. (2016) further reinforced the connection between emotional schemas and post-traumatic stress, suggesting that exposure to stress and trauma (59), as experienced by both Iraqi and Iranian students, exacerbates the development of maladaptive schemas like rumination and blame.

In a Turkish study, Batmaz and Özdel (2015) demonstrated that validation and control were highly correlated in Turkish students (15). The Iraqi sample, however, showed weaker correlations between these schemas, possibly due to a fragmented social structure caused by prolonged conflict. Similarly, Farhood *et al*. (2016) studied Lebanese students exposed to war-related trauma and found strong correlations between rumination, blame, and psychological symptoms like anxiety and depression (60). This resonates with the findings of this study, where Iraqi students exhibited significant levels of nonadaptive emotional schemas, further underscoring the impact of trauma on emotional processing across the Middle East.

The reliability of the LESS-II was assessed using test-retest reliability by administering the scale twice to the same participants with a 28-day interval. The results demonstrated strong correlations between the two administrations, indicating that the Arabic LESS-II maintains consistency over time in measuring emotional schemas. For internal consistency, the scale was analyzed using Cronbach's alpha, which showed good reliability overall. While a few individual factors displayed lower internal consistency, the scale as a whole met established reliability standards, confirming its suitability for both research and clinical applications. These findings indicate that the Arabic LESS-II is a reliable instrument, offering consistent and dependable assessments of emotional schemas in Arabic-speaking populations.

Future Directions

Future research should focus on testing the Arabic LESS-II in clinical populations to further confirm its validity and reliability. Expanding the assessment of cross-cultural applicability of the scale will further validate its use in other Middle Eastern countries, such as Palestine and Syria, providing comparative data on emotional processing in similar cultural contexts. Additionally, employing longitudinal designs could help establish the scale's predictive power in relation to mental health outcomes.

Limitation

The current study, while providing valuable insights into the psychometric properties of the Arabic version of the LESS-II, has several limitations that should be noted. First, the sample consisted of 280 university students, while sufficient based on Nunnally & Bernstein's (1995) criteria for factor analysis, may not be large enough to fully generalize the findings to broader populations.

Another limitation concerns the reliance on a nonclinical sample. Although the study successfully validated the LESS-II for university students, it remains unclear how well the scale performs in individuals with diagnosed psychological disorders. Emotional schemas may manifest differently in clinical populations, potentially requiring adjustments to the scale to ensure its utility in clinical settings. Additionally, the correlational nature of the study limits the ability to infer causality between emotional schemas and psychological outcomes such as anxiety and depression. Lastly, while the study followed a rigorous translation and cultural adaptation process, cross-cultural differences between Arabic-speaking populations should be further explored. Emotional expression and regulation may vary significantly across

different Arabic-speaking regions, which could affect the scale's performance in other cultural contexts.

Conclusion

This study validates the Arabic version of the Leahy Emotional Schema Scale-II (LESS-II) among Iraqi university students, identifying a 14-factor structure consistent with Leahy's original model. The results suggest that these students process emotions similarly to clinical populations, likely due to the socio-political and economic challenges in Iraq, such as conflict and instability, which contribute to the development of nonadaptive schemas like rumination and blame, emphasizing the need for mental health interventions. Despite cross-loadings, items 13 and 24 were retained based on theoretical support and acceptable saturation. Adjustments made during Confirmatory Factor Analysis (CFA) improved the model fit, confirming the 14-factor structure, aligning with findings from Turkey and Korea. The study also revealed weak to acceptable internal correlations, indicating distinct emotional schemas in Iraqi students. Compared to countries from the Middle East, this distinctiveness highlights the impact of conflict on emotional regulation in Iraq. The reliability of the Arabic LESS-II was confirmed through test-retest and internal consistency measures, validating it as a reliable tool for assessing emotional schemas in nonclinical settings. We conclude that the LESS-II Arabic version, comprising 28 items across 14 factors, is valid for use among Iraqi university students and nonclinical samples.

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Conflict of Interest

None.

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