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Arabic Version of the Short Version of the Achievement Emotions Questionnaire (A-AEQ-S): Validation and Psychometric Characteristics

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Abstract

The current research aimed to investigate the psychometric properties of the Arabic version of the short version of the achievement emotions questionnaire (A-AEQ-S), which was originally created by Bieleke et al. (2021). The A-AEQ-S was applied for 519 university students, their ages were (M_{age}= 21.99, SD= 0.62). Results showed that the A-AEQ-S had good psychometric properties, such as internal consistency, and reliability in each setting (class, learning, and test). Similar to findings for the English version of the AEQ-S (Bieleke, et al., 2021), confirmatory factor analysis (CFA) suggested hierarchical eight-factors solution and construct validity. Our findings suggest that the A-AEQ-S has acceptable psychometric properties and is a valid instrument for the assessment of achievement emotions through learning.

Key words: *Arabic version - Short Version of The Achievement Emotions Questionnaire (AEQ-S), reliability, validity.*

1. Introduction and Thorotical Framwork

Emotions are an essential element of the learning process, serving as a foundation upon which learning is built, acting as a motivational construct for this process. These emotions are generated through previous learning experiences, and despite being acknowledged and documented effectively, they are rarely considered as explicit learning goals, such as cognitive and behavioral objectives (Ben-Eliyahu, 2019).

Learners typically experience various emotions throughout their educational journey, and these emotions are linked to the learning processes or learning outcomes. They can be either positive, leading to positive learning, or negative, resulting in negative learning. Just as emotions vary in their nature, their contribution to learning and academic achievement also varies. Positive emotions include enjoyment, enthusiasm, hope, pride, gratitude, and admiration, while negative emotions encompass sadness, anger, anxiety, shame, guilt, disappointment, boredom, envy, and contempt. Positive emotions such as enjoyment, and pride can be learning enhancers, whereas negative emotions like discomfort, and shame can act as learning inhibitors. Emotions may either facilitate or hinder academic performance (Pekrun, Elliot & Maier, 2009; Sayadian

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& Lashkariian, 2015).

Academic emotions are a comprehensive term encompassing the range of emotions that occur within an educational context. This term includes emotions directly related to the students' educational and learning processes inside the classroom, encompassing their experiences during class (Class Setting), homework assignments, tasks (Learning Setting), and examinations (Test Setting) (Pekrun, Goetz, Titz & Perry, 2002). Academic emotions play a crucial role in learning, influencing the learner's performance and motivation. They impact students' interests, engagement in learning activities, academic achievements, personal growth, and serve as the foundation for students' psychological well-being and welfare, with effects extending over an extended period (Pekrun, 2006).

Pekrun (2006) defined academic emotions as immediate, anticipated, or retrospective emotional responses directly linked to achievement activities or learning activities, whether during class attendance, studying, completing assignments, or the outcomes of learning, such as success or failure in exams, academic performance, or grades. These emotions can have a positive or negative valence (enjoyment or pride versus anger or distress) and can be classified as physiological arousal versus deactivation (enjoyment, hope, and pride versus distress, boredom, hopelessness, and anxiety) (Pekrun et al., 2007; Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011). They are also known as emotions associated with achievement situations, a psychological concept composed of various cognitive, emotional, motivational, and expressive components. These emotions depend on how learners perceive the educational context around them (Paoloni, 2014). This is consistent with what Schutz & Pekrun (2007) have indicated, that academic emotions involve complex psychological processes, including emotional, motivational, and expressive components, and rely on students' perceptions and evaluations of what is happening in their educational environment. Therefore, academic emotions refer to psychological processes that manifest in the educational context, whether inside or outside the classroom, during or after engaging in any educational tasks.

In this context, Yamac (2014) points to the significance of academic emotions in terms of their impact on learning motivation, identity formation, and performance for the learner, as well as their assistance in guiding the learner to use appropriate learning strategies and methods.

One of the most comprehensive classifications of academic emotions is provided by the Control-Value Theory introduced by Pekrun et al. (2002). This theoretical classification serves as an organizational framework for the internal structure of academic emotions, categorizing them based on several dimensions: valence, activation, object focus, duration, and intensity. This classification will be elucidated as follows:

- According to valence: emotions can be categorized into positive emotions, such as experiencing feelings of joy during study, versus negative emotions, such as feeling anxious before an upcoming test.
- According to activation: emotions can be classified into physiologically activating emotions that facilitate arousal and emotionally deactivating emotions that encourage relaxation.
- According to object focus: emotions are divided into those associated with activities and those associated with outcomes. This includes anticipated outcome emotions or retroactive outcome emotions.

Pekrun's Control-Value Theory stands as a comprehensive and integrated theory of emotions associated with the learning process, explaining how emotions influence learning activities and performance outcomes (Bieleke et al., 2023). The theory suggests that feelings of achievement,

linked to antecedents and specific outcomes, are crucial factors preceding achievement emotions. According to the Control-Value Theory, academic emotions are associated with students' evaluations of their ability to initiate and execute activities related to academic achievement, their expectations regarding whether these activities will lead to desired outcomes, and the characteristics related to their perceived control over the reasons behind the achieved results (Pekrun, 2006, 2018, 2021). These assessments also reflect on students' academic self-concept and self-efficacy (Arens et al., 2022)."

Concerning the outcomes associated with academic emotions, it is presumed that these feelings impact students' learning and academic performance (Pekrun, 2006; Pekrun et al., 2011). Additionally, emotions can influence intrinsic and extrinsic motivations (e.g., learning out of curiosity versus learning to achieve good grades), facilitate the use of flexible learning strategies (e.g., material preparation), and strict learning strategies (e.g., intensive material training). Furthermore, emotions can affect the balance between students' self-regulation (e.g., setting personal goals) and external regulation (e.g., seeking help from others) (Bieleke et al., 2023).

Pekrun, Goetz, and Frenzel (AEQ-M, 2005) initially created a questionnaire consisting of 8 items to measure academic emotions in mathematics. Lichtenfeld, Pekrun, Stupnisky, Reiss, and Murayama (AEQ-ES, 2012) further adapted a shorter version, comprising 2 to 5 items for each sub-dimension, to measure academic emotions in elementary school students. The validity of this version for use with pre-adolescent children was confirmed, consisting of 4 items for each sub- dimension (AEQ-PA; Peixoto, Mata, Monteiro, Sanches, & Pekrun, 2015).While these examples highlight researchers' interest in developing shorter measures for assessing academic emotions, these modifications do not achieve the same conceptual coverage as the original version of AEQ. This suggests that they have limited value compared to the original AEQ version (Bieleke et al., 2021). That was the motive for Bieleke et al. (2021) to develop a shortened version of the Academic Emotions Questionnaire (AEQ-S) in response to an urgent need.

2. Research Problem

The university stage is considered one of the most crucial phases filled with academic events and emotions, playing a significant role in the lives of students during this period. Research in the field of emotions associated with learning and achievement has been neglected for extended periods (Linnenbrink, 2006; Pekrun & Linnenbrink-Garcia, 2012). Despite its importance, academic emotions, whether positive or negative, are linked to academic achievement and motivational cognitive variables that contribute to academic success. This has been corroborated by the findings of numerous studies and research endeavors (Goetz et al., 2008; Mayring & Rhoneck, 2003; Pekrun et al., 2006).

Despite the significant importance given by foreign studies to the development of measures for assessing academic emotions, the current researchers have noticed a scarcity of Arabic studies addressing questionnaires measuring these emotions. Through reviewing previous measurements and various theoretical frameworks for academic emotions, the current researchers concluded that the AEQ-S developed by Bieleke et al. (2021) to measure academic emotions is a comprehensive and concise instrument. It was originally built on Pekrun's Questionnaire (Pekrun, 2011), prepared considering the Control-Value Theory. Other measures of academic emotions have been derived, whether through modification, translation, or adaptation from it. AEQ-S encompasses both positive and negative emotions in various

learning situations, whether during class attendance, related to the learning process, or associated with test performance. Hence, the researchers identified a need to translate the abbreviated version of the AEQ-S for university students into Arabic.

The research problem is encapsulated in the following main question: "What are the psychometric properties indicators of the A-AEQ-S among university students?". The main question branches into a set of following sub-questions:

1. Do the A-AEQ-S demonstrate internal consistency?
2. Do the A-AEQ-S has reliability?
3. Do the scores of the A-AEQ-S demonstrate construct validity according to the indications of confirmatory factor analysis?

3. Research Objectives

The current research aimed to explore the psychometric properties of the A-AEQ-S among university students and verify its alignment with the original AEQ-S version.

4. Research Importance

The theoretical importance of the current research lies in contributing to Arabic literature by translating a brief psychological tool for measuring academic emotions among university students. The practical importance of the research is evident in providing a tool that can assist educators, administrators, and stakeholders in educational institutions in diagnosing academic emotions. Moreover, it opens avenues for researchers to explore academic emotions within a cognitive context in Arabic studies.

5. Research Terminology

Academic Emotions

These are a set of emotions that students experience during their presence within or outside the educational process. These emotions manifest as students interact with lecturers in mathematics (Class Setting), comprehend mathematics lessons (Learning Setting), or prepare for mathematics exams (Test Setting). These emotions can be positive, such as enjoyment, hope, pride, and relief, or negative, such as boredom, hopelessness, anxiety, and anger. Operationally, these emotions are determined by the scores obtained by the student on the A-AEQ-S.

6. Methods

6.1. Methodology

The researchers in the current research employed a descriptive research methodology.

6.2. Participants

Data was collected from 519 undergraduate students in King Khalid University (KKU) (176 males; 343 females) from The College of Management and Business, those who are studying the mathematics course, their ages were between 20.28 and 23.98 years with mean 21.99 years and standard deviation 0.62, while meeting in groups of no more than 20 students.

6.3. Instruments

The A-AEQ-S is an Arabic version of the AEQ-S (Bieleke, et al., 2021), traselated by the current researchers.

The AEQ-S is a self-report method, consisting of 96 items distributed across three main parts that measure academic emotions in various contexts: Class Setting, Learning Setting, and Test Setting. The first part (Class Setting) measures academic emotions inside the classroom, comprising 32 items distributed across eight main emotions: Enjoyment, Hope, Pride, Anger, Anxiety, Shame, Hopelessness, and Boredom. Each dimension includes 4 items. The second part (Learning Setting) measures academic emotions during learning, consisting of 32 items distributed across the same eight dimensions as the first part, with each dimension containing 4 items. The third part (Test Setting) measures academic emotions during exams, comprising 32 items distributed across eight main emotions: Enjoyment, Hope, Pride, Relief, Anger, Anxiety, Shame, and Hopelessness, with each dimension containing 4 items. Responses to the items are provided using a 5-point Likert scale ranging from "strongly disagree" to "strongly agree," with scores ranging from 1 to 5 in order.

The AEQ-S is considered a shortened version of the AEQ developed by Pekrun et al. (2011). The original of AEQ consisted of 232 items distributed across 24 sub- dimention, with each one containing between 6 and 12 items. It measured emotions in three different academic contexts: class-related settings, which include enjoyment, hope, pride, anger, anxiety, shame, hopelessness, and boredom. The second context is learning-related settings, which include the same emotions in class-related settings. The third context is test-related settings, which include enjoyment, hope, pride, relief, anger, anxiety, shame, and hopelessness. For the AEQ-S, the developers selected 4 items from each sub-dimention, resulting in a total of 96 items. Each sub- dimention's score ranged from 4 to 20 points. To calculate the total score for the AEQ-S, scores for negative emotion sub-dimention were recoded, added to positive emotion sub-dimention scores, and thus, the total score ranged from 96 to 480 points.

The psychometric properties of the AEQ-S were verified. Regarding emotions in Class Setting, internal consistency coefficients for the sub-dimensions ranged between .75 and .90, Cronbach's alpha values ranged from .70 to .88, and validity coefficients varied between .63 and .84. Concerning emotions in Learning Setting, internal consistency coefficients ranged from .72 to .88, Cronbach's alpha values ranged from .64 to .85, and validity coefficients varied between .68 and .83. As for emotions in Test Setting, internal consistency coefficients ranged from .71 to .88, Cronbach's alpha values ranged from .66 to .85, and validity coefficients varied between .69 and .84. All correlation coefficients for similar dimensions between the AEQ-S and AEQ were statistically significant. The AEQ-S was also confirmed to be comparable to the original AEQ through confirmatory factor analysis (CFA), demonstrating strong fit indices across multiple models.

7. Research Procedures

translating and adapting the AEQ-S to Arabic were conducted according to the following steps:

1. Translation of the AEQ-S into Arabic: The AEQ-S was translated into Arabic.

2. Verification of Translation Accuracy: The translated version was reviewed by language specialists in English to verify translation accuracy.
3. Ensuring Language Soundness: The translated version was presented to psychologisits and Arabic language specialists to ensure language soundness and expression.
4. Back-Translation of the Arabic Version into English: The translated version was back-translated into English to verify the accuracy and authenticity of the translation.
5. Application of the Final Version to the Research Sample: The A-AEQ-S was applied to the targeted research sample.
6. Data Analysis:

a- Data obtained from applying the A-AEQ-S were analyzed to extract indicators of validity and reliability.
b- The psychometric properties of the A-AEQ-S were verified.

These steps confirm the accuracy and validity of translating the AEQ-S into Arabic and its reliability in the context of the current research.

8. Results

Before addressing the research questions, the normality of the distribution of A-AEQ-S scores was ensured. table 1 illustrates the results of the normality test.

Table 1: Scale Statistics of A-AEQ-S (All Settings).

	Class Settings			**Learning Settings**			**Test Settings**		
	M	*SD*	*Skewness*	*M*	*SD*	*Skewness*	*M*	*SD*	*Skewness*
Jo	3.76	.64	-.30	3.77	.69	-.259	4.19	.55	-.724
Ho	3.84	.54	-.46	4.20	.64	.217	4.35	.56	-.967
Pr	4.20	.68	-.85	4.26	.65	-.838	4.30	.61	-.888
Re	-	-	-	-	-	-	3.77	.65	-.378
An	2.93	.80	.07	3.12	.83	.110	2.86	.82	.025
Ax	3.42	.75	-.14	3.28	.74	-.112	2.93	.73	.107
Sh	2.98	.82	-.08	3.01	.90	.327	3.00	.80	.100
Hl	2.31	.75	.56	2.72	.79	.119	2.46	.75	.439
Bo	2.97	.83	.08	3.06	.77	.049	-	-	-

Note: Items were Answered on Likert Scales (1 = Strongly Disagree, 5 = Strongly Agree)., Jo = Enjoyment, Ho = Hope, Pr = Pride, Re = Relief, An = Anger, Ax = Anxiety, Sh = Shame, Hl = Hopelessness, Bo = Boredom, N = 519 for the Arabic Version of AEQ-S.

It is evident from table 1 that the students' scores on A-AEQ-S exhibit normality, and therefore, parametric statistics can be employed. The following section verifies the answers to the research questions.

9.1. To answer the first question, which stated " Do the A-AEQ-S demonstrate internal consistency?", the researchers conducted the following:

9.1.1. Calculating the correlation coefficients for the items with the corresponding sub-dimensions, and table 2 illustrates the results.

Table 2: Factor Loadings and Item-Subdimension Correlations of a-AEQ-S (All Settings).

		Class Settings		Learning Settings		Test Settings	
	Items	F-Lo	r	F-Lo	r	F-Lo	r
Jo	1	.453	.680**	.325	.616**	.525	.660**
	2	.510	.694**	.814	.746**	.523	.641**
	3	.459	.623**	.460	.531**	.199	.533**
	4	.624	.714**	.408	.710**	.682	.679**
	Average	.512	.678**	.502	.651**	.482	.628**
Ho	1	.541	.634**	.381	.503**	.586	.659**
	2	.756	.663**	.552	.739**	.510	.596**
	3	.345	.566**	.503	.656**	.418	.660**
	4	.199	.373**	.300	.569**	.469	.710**
	Average	.460	.559**	.434	.617**	.496	.656**
Pr	1	.665	.743**	.618	.725**	.324	.586**
	2	.608	.704**	.584	.745**	.569	.737**
	3	.647	.751**	.661	.725**	.596	.711**
	4	.550	.714**	.518	.672**	.700	.718**
	Average	.618	.728**	.595	.717**	.547	.688**
Re	1	-	-	-	-	.692	.732**
	2	-	-	-	-	.389	.535**
	3	-	-	-	-	.464	.689**
	4	-	-	-	-	.499	.691**
	Average	-	-	-	-	.511	.662**
An	1	.701	.758**	.568	.705**	.566	.733**
	2	.635	.756**	.521	.684**	.618	.723**
	3	.581	.711**	.661	.721**	.526	.672**
	4	.573	.713**	.621	.754**	.536	.656**
	Average	.623	.735**	.596	.716**	.561	.696**
Ax	1	.596	.720**	.343	.592**	.501	.648**
	2	.461	.658**	.649	.705**	.466	.646**
	3	.621	.696**	.461	.645**	.393	.613**
	4	.407	.613**	.420	.622**	.405	.609**
	Average	.521	.672**	.468	.641**	.441	.629**
Sh	1	.548	.681**	.399	.723**	.420	.627**
	2	.676	.729**	.610	.680**	.584	.705**
	3	.309	.565**	.446	.582**	.442	.610**
	4	.476	.668**	.638	.681**	.482	.659**
	Average	.502	.661**	.523	.667**	.482	.650**
Hl	1	.421	.641**	.459	.659**	.359	.642**
	2	.490	.649**	.461	.651**	.653	.707**
	3	.712	.741**	.628	.732**	.519	.639**
	4	.603	.734**	.624	.702**	.487	.653**
	Average	.557	.961**	.543	.686**	.505	.660**
Bo	1	.450	.668**	.642	.724**	-	-
	2	.558	.722**	.433	.644**	-	-
	3	.685	.732**	.541	.681**	-	-
	4	.700	.751**	.513	.664**	-	-
	Average	.598	.718**	.532	.678**	-	-
Overall Average		.549	.714**	.524	.672**	.503	.659**

Note: Jo = Enjoyment, Ho = Hope, Pr = Pride, Re = Relief, An = Anger, Ax = Anxiety, Sh = Shame, Hl = Hopelessness, Bo = Boredom, F-Lo=Factor Loadings, *R* Indicates Item-Subdimension Correlations, **P<.01.

It is evident from table 2 that all correlation coefficients between the items and their corresponding sub-dimensions are statistically significant (p<.01).

9.1.2. Calculating the correlation coefficients for the sub-dimensions with the total score of the A-AEQ-S, and table 3 illustrates the results.

Table 3: Factor Loadings and Subdimension-Total Correlations of a-AEQ-S (All Settings).

	Class Settings				**Learning Settings**				**Test Settings**			
	F-Lo	*r*	α	S-C	F-Lo	*r*	α	S-C	F-Lo	*r*	α	S-C
Jo	.554	.464**	.702	.706	.419	.606**	.653	.748	.773	.570**	.670	.714
Ho	.287	.416**	.648	.764	.375	.550**	.644	.769	.724	.583**	.758	.754
Pr	.453	.600**	.810	.790	.307	.506**	.782	.886	.742	.579**	.833	.769
Re	-	-	-	-	-	-	-	-	.628	.563**	.778	.794
An	.717	.745**	.814	.848	.641	.689**	.780	.841	.329	.695**	.843	.817
Ax	.621	.645**	.694	.710	.639	.632**	.622	.701	.183	.598**	.691	.703
Sh	.449	.560**	.673	.756	.668	.677**	.751	.829	.124	.485**	.748	.788
Hl	.704	.754**	.735	.750	.727	.718**	.725	.770	.436	.762**	.758	.735
Bo	.678	.623**	.783	.767	.696	.733**	.708	.781	-	-	-	-

Note: Jo = Enjoyment, Ho = Hope, Pr = Pride, Re = Relief, An = Anger, Ax = Anxiety, Sh = Shame, Hl = Hopelessness, Bo = Boredom, F-Lo=Factor Loadings, R = Subdimension-Total Correlations, A = Cronbach's Alpha, S-C = Spearman-Brown Coefficient, **P<0.01.

Table 3 demonstrates that all correlation coefficients between the sub-dimensions and the total score of the A-AEQ-S are statistically significant (p<.01). The correlation coefficients ranged between .416 to .714 for in class settings, .506 to .733 for in learning settings, and .485 to .762 for in test settings.

Through tables 2 and 3, it becomes evident that the A-AEQ-S and its sub-dimensions exhibit a high level of internal consistency. Thus, the first research question has been successfully addressed.

9.2. To answer the second question, which states "Do the A-AEQ-S has reliability," the researchers did the following:

9.2.1. Calculating Cronbach's alpha coefficients for the sub-dimensions across the three contexts. As shown in table 3, the values of Cronbach's alpha coefficients ranged between .648 to .814 for in class settings, .622 to .780 for in learning settings, and .670 to .843 for in test settings.

9.2.2. Split-half reliability was calculated across the three contexts using the Spearman-Brown Coefficient. Table 3 also illustrates that the values of the Spearman-Brown Coefficient ranged from .706 to .848 for in class settings, .701 to .886 for in learning settings, and .703 to .817 for in test settings.

Through the previous two steps (9.2.1., 9.2.2.), it can be concluded that the adapted version of the A-AEQ-S and its sub-dimensions exhibits acceptable levels of stability. Thus, the answer to the second question has been addressed.

9.3. To answer the third question, which stated "Do the A-AEQ-S has construct validity according to Confirmatory Factor Analysis", the researchers verified the A-AEQ-S validity using CFA with Amos23 software employing the Maximum Likelihood method. This resulted in the saturation of all items on the eight underlying factors (within each context separately). Additionally, CFA of the first and second orders was conducted, revealing the saturation of sub-dimensions on a single general factor.

9.3.1. For in class settings: tables 2, 3, and figure 1 illustrate the structural path model of the CFA for variables saturated with the latent factor on A-AEQ-S.

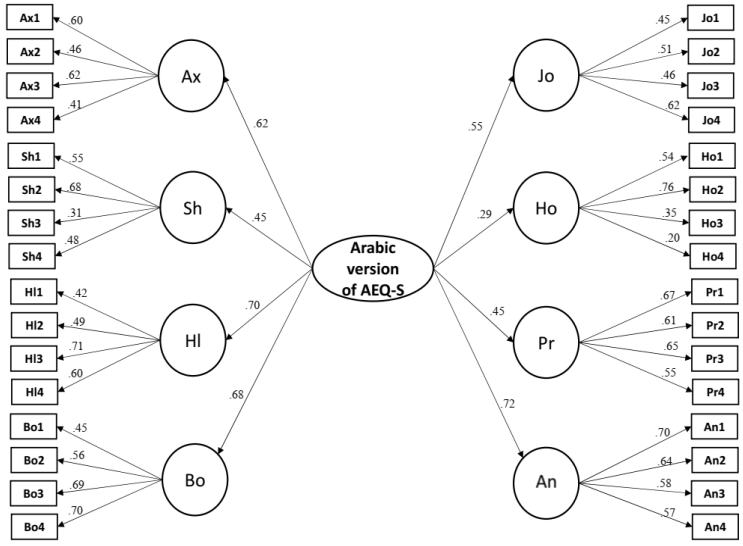

Figure 1: Factor Loadings for Items and Sub-Dimensions Of A-AEQ-S in Class Setting, Jo = Enjoyment, Ho = Hope, Pr = Pride, An = Anger, Ax = Anxiety, Sh = Shame, Hl = Hopelessness, Bo = Boredom.

The results presented in figure 1 indicated that the fit indices values were within the acceptaple range. The $\chi^2(147) = 399.19$ was statistically non-significant. Additionally, RMSEA = .061, GFI = .930, AGFI = .901, TLI = .900, and CFI = .926 indicate a good fit. Moreover, the values in table 2 and figure 1 demonstrated that all items are saturated with latent factors at a significance level ($p<.01$). Therefore, this indicates the validity of all items in A-AEQ-S. Furthermore, as shown in table 3 and figure 1, each factor is saturated with its corresponding sub-dimensions. Thus, CFA provided strong evidence for construct validity, confirming the alignment of A-AEQ-S with the original AEQ-S within the class settings.

9.3.2. For learning settings: tables 2, 3, and figure 2 illustrate the path diagram for the CFA model of variables saturated with the latent factor on A-AEQ-S.

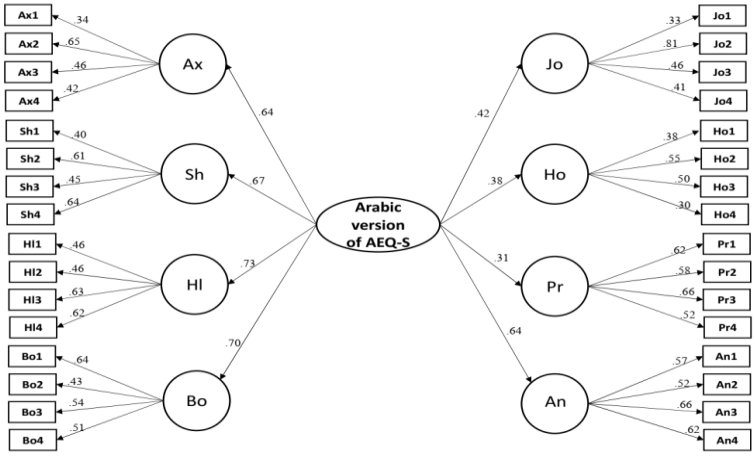

Figure 2: Factor Loadings for Items and Subdimensions of a-AEQ-S in Learning Setting, Jo = Enjoyment, Ho = Hope, Pr = Pride, An = Anger, Ax = Anxiety, Sh = Shame, Hl = Hopelessness, Bo = Boredom.

The results presented in figure 2 indicated that the fit indices values were within the acceptaple range. The value of $\chi^2(147) = 420$ was statistically non-significant. Additionally, RMSEA = .023, GFI = .956, AGFI = .876, TLI = .988, and CFI = .961 indicate a good fit. As shown in table 2 and figure 2, all items are saturated with latent factors at a significance level ($p<.01$). Therefore, this indicates the validity of all items in A-AEQ-S. Moreover, table 3 and figure 2 demonstrate the saturation of each factor with its corresponding sub-dimensions at a significance level ($p<.01$). Therefore, CFA provided strong evidence for the construct validity and the alignment of A-AEQ-S with the original AEQ-S in learning setting.

9.3.3. For in test setting: tables 2, 3, and figure 3 illustrate the path diagram for the CFA model of the variables saturated by the latent factor on A-AEQ-S.

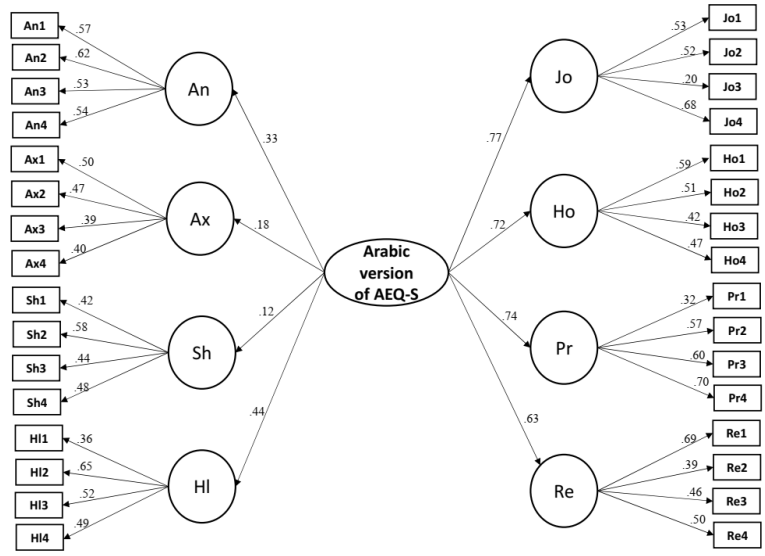

Figure 3: Factor Loadings for Items and Subdimensions of a-AEQ-S in Test Setting, Jo = Enjoyment, Ho = Hope, Pr = Pride, Re = Relief, An = Anger, Ax = Anxiety, Sh = Shame, Hl = Hopelessness.

Figure 3 shows that the fit indices were in the acceptaple range. The $\chi^2(147) = 432$ was statistically non-significant. Additionally, RMSEA = .022, the GFI = .958, AGFI = .965, TLI = .911, and CFI = .961 indicate a good fit. It is also evident from the values in table 2 and figure 3 that all items were saturated by latent factors at a significance level ($p<.01$). Therefore, this indicates the validity of all items in A-AEQ-S. Table 3 and figure 3 also showed the saturation of each factor with its respective sub-dimensions at a significance level ($p<.01$). Therefore, CFA provides strong evidence for the construct validity, confirming the alignment of A-AEQ-S with the original AEQ-S in test setting. Thus, the answer to the third question has been addressed.

9. Research Limitations

The current research is determined by its topic, which was "Arabic Version of The Short Version of The Achievement Emotions Questionnaire (A-AEQ-S)", its sample from the university students, place in The College of Management and Business at KKU in Kingdom of Saudi Arabia, its time in the first semester of the academic year 2023/2024, and its tools represented in A-AEQ-S.

10. Conclusion

Through the foregoing presentation, the alignment of the CFA results with the conceptual framework upon which A-AEQ-S was built is affirmed, demonstrating the compatibility of these results with the original AEQ-S version. Overall, the preceding results indicate that A-AEQ-S possesses good psychometric properties through internal consistency, reliability, and construct validity.

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