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The Analysis of the Psychometric Properties of the Persian Version of the Early Life Events Scale based on the Item Response Theory and the Classical Theory of Measurement

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Studies have shown that early life events affect physiological, psychological and social functioning and are related to a wide range of psychological problems in adulthood. The main objective of this study was to evaluate the psychometric properties of the Persian version of the Early Life Events Scale (ELES) based on the Item Response Theory (IRT) and the Classical Theory of Measurement in an Iranian population. The participants consisted of 400 students of universities in Tehran at all academic levels. Confirmatory and exploratory factor analyses were used to assess the construct validity of the ELES. Three factors were extracted from the exploratory factor analysis, and the confirmatory factor analysis confirmed the accuracy of the extracted factors. As the Cronbach's alpha coefficient always underestimates the reliability value, the ordinal theta and R software were used to assess the reliability of

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the scale and the results showed that the scale has a good reliability. To evaluate the accuracy of the items, determine their strengths and weaknesses and ultimately assess their quality and remove inappropriate items, the scale items were analyzed based on the IRT and the Classical Theory of Measurement using MULTILOG; the results showed that all the items are of a good quality in terms of threshold values (credibility), informative value and accuracy and that no items need to be changed or removed.

Keywords: The Early Life Events Scale, Validity, Reliability, Factor Analysis, Item Response Theory (IRT).

There is strong evidence on the effect of early life events (especially events related to feelings of threat or security) on physiological, psychological and social functioning and maturation (Gerhardt, 2004). Early life events including being neglected, abused and rejected are associated with anxiety, depression and trauma (Richter, Gilbert, & McEwan, 2009; Spinhoven, Elzinga, Hovens, Roelofs, Zitman et al., 2010). Also it has been shown that early experiences of victimization and submission and increased hostility from parents significantly contribute to the etiology and maintenance of auditory hallucinations (Carvalho, da Motta, Pinto-Gouveia, & Peixoto, 2015). People who have been abused in childhood show higher hypothalamic-pituitary-adrenal (HPA) activity, weaker recovery in the face of stress and unusual conditions and contractions in areas of the brain such as the amygdala, the hippocampus and the frontal cortex (Heim, Newport, Heit, Graham, Wilcox, 2000; Teicher, 2002). In fact, many studies have shown that early life events such as little warmth and high control are associated with different neurological disorders, mental disorders and depression (Gilbert, Cheung, Grandfield, Campey, & Irons, 2003). In contrast, love and intimacy, a sound upbringing and a secure

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environment are associated with the growth of self-esteem and happiness and help shape a character who is less vulnerable to psychological problems (Cheng, & Furnham, 2004; DeHart, Pelham, & Tennen, 2006; Mikulincer, & Shaver, 2004; Rohner, 2004).

There are several scales that measure the recall of early developmental events, although there is the risk that some of these memories may be affected by the person's current mood. Nevertheless Brewin, Andrews, & Gotlib, (1993) suggested that these memories are relatively reliable indicators of the individual's developmental background. These tools, which are generally derived from the attachment theory and focus more on the recall of parental behaviors rather than the individual's personal experiences and feelings, evaluate the relationship between early parenting and the damage caused by it using the recall of parenting styles (Gilbert et al., 2003). While people may be able to recall specific behaviors they have witnessed from their parents, they may have different feelings about those behaviors. For example, some people may remember their parents as neglectful or unkind but feel that they had overcome this problem relatively well, and others may remember their parents as kind and available but feel that they had formed no attachments to them and had felt fear and therefore say, "My parents loved me and took care of me, but I did not feel that I was adorable and well-liked". This paradox can be explained by the fact that feelings of threat are likely caused by subtle non-verbal communication, which is difficult to recall or may have occurred before the formation of verbal memories (Gilbert et al., 2003).

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It is therefore more helpful to review both the individual's memories about the behaviors of others toward him (the external social environment) and the personal emotional memories about the feelings he recalls from childhood. As a result, recent studies have come to more emphasize the recall of childhood feelings (Gilbert et al., 2003; Richter, Gilbert, & McEwan, 2009). Gilbert et al., (2003) suggested that people react to the behaviors of others in different ways and it is probably more important to focus on recalling the person's feelings at the time than on recalling the behaviors of others toward him; they thus showed that feelings of subordination, threat and being invaluable during childhood are significantly linked to depression and shame, while recalling the parents' negative behaviors were not associated with depression, so thay developed the Early Life Events Scale (ELES) to measure personal experiences and feelings from childhood and directly ask questions to recall feelings of threat/fear and submissiveness in the family.

To justify the content validity and logical validity of the scale, it should be noted that the items were collected through consultation with clinical psychologists and using the experiences and statements of patients in psychotherapy; moreover, instead of preparing a long list of items to undergo factor analysis, the items were selected very purposively; in other words, the ELES is a theory-generated scale (Gilbert et al., 2003). The developers of the ELES believe that there were several other domains such as feeling adorable, secure, unwanted, ignored and special that could have been incorporated into this scale, but they wished to focus on domains that were associated with the Social Rank Theory (Gilbert, 2001; Gilbert,

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Allan, Brough, Melley, & Miles, 2002). The social rank theory suggests that the parent-child relationship is a strong bond, and although the attachment theory focuses on the lack of emotional warmth or interference and control from the parents, the social rank theory focuses more on the threats of having a low rank and and submissive behavior (Gilbert et al., 2003). According to the social rank theory, children who are afraid of their parents and forced into involuntary and unwanted submissive situations are likely to adopt submissive behaviors and defenses arising from fear, inhibited assertive behavior, withdrawal in the face of challenges, consolation of others, weak productive behavior or weak directive behavior in social encounters and a low positive affection, and are likely more prone to depression, social anxiety and shame (Gilbert, 2000a; Gilbert et al., 2002; Sloman & Atkinson, 2000; Gilbert, 2000b).

Another argument for focusing on the domains of threat and subordinate (submissive) behaviors is that subordination (submissiveness) and threats come from low-level positions, are extremely stressful and known to have various physiological consequences. There is great evidence on the exposure of mammals to subordinate (submissive) situations being associated with a higher HPA activity, changes in the metabolism of serotonin and an affected dopamine, especially D2 receptors, and ultimately psychological damage (Gilbert et al., 2003).

Based on the given explanations about the social rank theory, the ELES contains 15 items: items 4, 8, 11, 13, 14 and 15 examine the domain of ‘feeling threatened’ by examining parental anger expression and the possibility of intimidation, punishment or abuse by the parents; items 1, 2, 3, 5, 10 and 12

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evaluate the domain of 'submissiveness' by examining parental control and the parents' forcing the child to obey and rejecting him in the case of disobedience, and items 6, 7 and 9 evaluate the domain of 'feeling valued/unvalued' by examining the sense of security and safety and the feeling of equality and being an important member of the family.

The ELES focuses on the value and importance of measuring the recall of personal emotional behaviors and experiences from childhood rather than merely addressing parental behaviors during childhood; moreover, this scale focuses on the people's rank in the family rather than merely their attachment structure and style, and is therefore a unique tool that can be used in psychopathology research and in planning for treatment interventions. According to the data obtained, no tools with such distinctions have yet been developed in Iran that can measure the emotional memories and events of childhood. The present study was therefore conducted to evaluate the psychometric properties of the Early Life Events Scale and to assess the psychometric adequacy of its Persian version.

Method

The Statistical Population, Sample and Procedure

The present descriptive correlational study was conducted on the statistical population of all the students of universities in Tehran studying toward associates, bachelors, masters, and doctoral degrees and PhD. The samples consisted of 400 students selected through random multistage cluster sampling. First, five universities were randomly selected from all the universities in Tehran (State universities and Islamic Azad

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universities), and three faculties from each of the universities were then randomly selected and the questionnaires were randomly distributed among the students present in the faculties' classes.

A simple rule of thumb exists for sample size, which suggests that an acceptable analysis requires a sample that is at least 10 or 20 times larger than the number of variables entered into the correlation matrix. In addition, Camery (1973) suggested that a 100-person sample is weak, a 200-person is not bad (is relatively good), a 300-person is good, a 500-person is very good and a 1000-person sample is excellent; therefore, since the ELES consists of 15 items, a 400-person sample was considered adequate for this study.

To prepare the Persian version of the ELES, it was translated according to the Wild, Grove, Martin, Eremenco, McElroy et al., (2005) approach. For the translation and preparation of the Persian version, first, Paul Gilbert, the developer of the scale, was contacted through e-mail for giving his permission. Direct translation and reverse translation was done. The reverse translation was sent to Mr. Gilbert and he with his research assistant confirmed the accuracy and compatibility of all the items. In a pilot study of 30 students, the psychometric properties of the scale were extracted and the translation of some of the items was reviewed and edited. Ultimately, the content and face validity of the scale were confirmed by five expert psychologists.

Instrument

The Early Life Events Scale (ELES). This 15-item scale was developed by Gilbert et al. (2003) to measure people's

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emotional memories of their family and can be used as a single construct or as three separate subscales, namely the subscales of 'feeling threatened' ('I experienced my parents as powerful and overwhelming'); 'feeling valued/unvalued' ('I felt very comfortable and relaxed around my parents); and 'submissiveness' ('I often had to give in to others at home'). This scale asks the respondent to rate how true each item is to him based on a five-point Likert scale:

Completely Untrue	Very Occasionally True	Sometimes True	Fairly True	Very True
1	2	3	4	5

Three of the items are reverse-scored in order to minimize the chances of response bias. Gilbert et al. (2003) obtained Cronbach's alpha coefficients of .89, .085, .71 and .92 for the subscales of feeling threatened, submissiveness and feeling valued/unvalued and the entire scale.

Results

The Scale Validity

This study examined the theoretical validity of the ELES, which itself consists of a face validity and a logical validity. For the face validity, five experts examined the wording of the items and their logical connection to the conceptual structure in pre-developed forms and confirmed the face validity of the final version.

Construct validity: Two methods were used to examine the construct validity of the ELES; the full-information item factor

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analysis, performed in TESTFACT, and the confirmatory factor analysis, performed in LISREL. The noteworthy point in this study is that TESTFACT was used instead of SPSS to calculate the factor analysis. In many disciplines, researchers still use SPSS, SAS, BMDP and similar software to calculate the correlation and factor analysis of items that are scored in a multi-valued form, although these software can only perform factor analyses for data that are measured continuously and their output is quite biased and incomplete when used for multi-value data (Reise, Waller, Comrey, 2000).

Three factors were extracted by the full-information item factor analysis. Table 1 shows the factor loading of the items of each factor after rotation. As shown in this table, six items were loaded on the first factor, i.e. “feeling threatened”, which included items such as “My parents exerted control by threats and punishments” or “My parents could hurt me if I did not behave in the way they wanted”. Five items were loaded on the second factor, i.e. “submissiveness”, which included items such as “I often had to give in to others at home” or “If I didn’t do what others wanted I felt I would be rejected”. Three items were also loaded on the third factor, i.e. “feeling valued/unvalued”, which included items such as “I felt an equal member of my family” or “I felt able to assert myself in my family”. One item, however, was not loaded on any of the factors.

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Table 1

A Summary of the Results of the Full-Information Item Factor Analysis of the ELES

Item	Factor		
	1	2	3
Parents being strict and intimidating	.681		
Being threatened and punished by the parents	.674		
Not facing the parents to escape potential damage	.614		
Being hurt by the parents for behaviors contrary to the their wishes	.582		
Sudden agitation in the home atmosphere	.517		
Being forced to obey others		.622	
Getting nervous in front of the parents		.575	
Being rejected if refusing to obey others' requests		.532	
Being forced to deal with others		.510	
Not having their		.501	

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beliefs taken seriously by others			
Feeling like equals to other members of the family			.631
Being able to express their opinions in the family			.604
Feeling comfortable and relaxed around the parents			.535
Feeling like an inferior in the family			.438
Being unable to control the parents' anger	.351	.380	

The first factor: Feeling threatened; The second factor: Submissiveness; The third factor: Feeling valued/unvalued

The factor structure obtained from the exploratory analysis was used for the confirmatory factor analysis in LISREL. Table 2 presents the model fit indices. The Chi-square test is a fit statistic that shows the difference between the observed matrix and the estimated matrix. Since this statistic is sensitive to sample size and usually becomes significant in large sample sizes, it should be divided by the degree of freedom for samples larger than 100, and if the result obtained is less than two, it can be considered good. As observed in Table 2, this index turned out relatively good.

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The Adjusted Goodness of Fit Index (AGFI), the Goodness of Fit Index (GFI) and the Comparative Fit Index (CFI) range from zero to one in value, and the closer they are to one, the better is the model's fit (Bentler, Bonett, 1980); therefore, as observed in Table (2), the indices all became good and satisfactory. Moreover, a Root Mean Square Error of Approximation (RMSEA) ≤ .05 indicates the model's good fit, and in this study, the RMSEA showed a relatively good fit. According to the model's fit indices presented in Table 2, the model can be said to have a relatively good fit.

Table 2

The Three-Factor Model Fit Indices of the ELES

RMR	RMSEA	IFI	NFI	PGFI	AGFI	CFI	GFI	P	2/dfχ	df	χ2
.0584	.0658	.9667	.9593	.6831	.9203	.9666	.9422	.001	5.52	87	480.48

In addition, as shown in Figure 1, the items were approved for the given factors; that is, the factors extracted in the exploratory factor analysis were confirmed.

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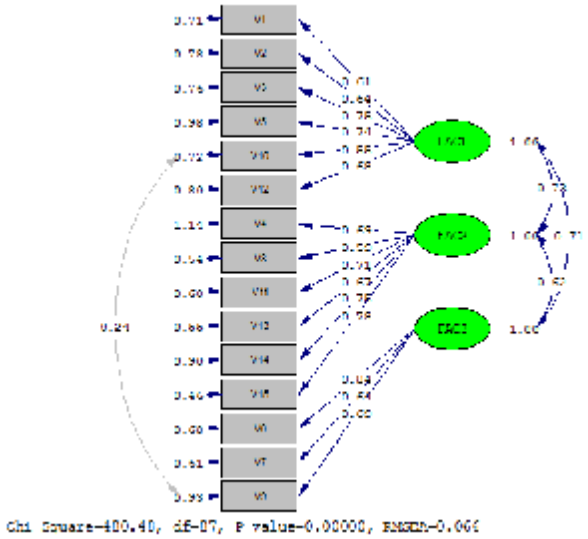

Figure 1. The Confirmatory Factor Analysis of the ELES

The Scale Reliability

Cronbach's alpha coefficient is one of the most common methods for measuring the reliability of questionnaires. Reliability indicates that nearly identical results will be obtained if the measured attributes are measured again with the same tool under the same conditions only at different times. Nonetheless, Zumbo, Gadermann, and Zeisser, (2007) have recently studied this index and used a few simulated examples to show that Cronbach's alpha coefficients always underestimate the reliability value. The ordinal theta is therefore recommended as an alternative to Cronbach's alpha when the data are ordinal. The present study also used the ordinal theta to calculate the reliability of the ELES in R software; and the results showed that none of the items disrupt the subscales' and the scale's

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overall reliability and it can therefore be concluded that the ELES has a good reliability. Tables 3 shows the reliability values for the subscales and total scale.

Table 3
The Reliability of the ELES

Subscale	Overall Reliability
Feeling valued/unvalued	.7108
Feeling threatened	.8230
Submissiveness	.7567
Total	.8724

The Analysis of the Items based on the Item Response Theory (IRT)

To evaluate the accuracy of the items, determine their strengths and weaknesses and ultimately assess their quality and remove inappropriate items, the scale items were analyzed based on modern theories of measurement and the Item-Response Theory (IRT) using MULTILOG.

As the scale in question assesses character and attitude rather than ability, the threshold or acceptability of the item indicates the probability of selecting one option over others, where β_1 is the probability of selecting option 1 over options 2, 3, 4 and 5; β_2 the probability of selecting options 1 and 2 over options 3, 4 and 5; β_3 the probability of selecting options 1, 2 and 3 over options 4 and 5; and β_4 is the probability of selecting options 1, 2, 3 and 4 over option 5, which is why the number of thresholds in this model is one unit less than the number of the response categories. Given the large volume of data, only one of the

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thresholds of the first item of each subscale is interpreted and the other thresholds of the other items can be similarly described. The coefficients of determination for the items are shown based on the α values.

The Item Information Curve (IIC) in the figure adjacent to the item's ORF is assessed to examine the informative value and the accuracy of each item, and given the high volume of information, only the information range for the first item of each subscale is reported under that subscale's ORF and IIC figure.

The analysis of the 'feeling threatened' subscale items

Table 4 presents features of the items in the 'feeling threatened' subscale (acceptability and the coefficients of determination). According to this Table, in all the items of this subscale, α has a significant positive value and the coefficients of determination are therefore also good; that is, the items of this subscale can differentiate well between people who do possess the trait or component measured in the item and those who do not.

The third threshold of item 4 (β_3) is the possibility of selecting options 1, 2 and 3 over options 4 and 5 and has a value of .86; that is, the individual should have a theta value of .86 to respond to this item with the selection of option 1, 2 or 3 with a probability of 0.50. In the same item, the fourth threshold (β_4) is greater than the other thresholds; that is, the probability of selecting option 5 in this item is greater for those who have theta values larger than 2.13. The other thresholds can be similarly described.

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Table 4

A Summary of the Parameters of the 'Feeling Threatened' Subscale Items

Parameter	α_j	S.E. α_j	β_{1j}	S.E. β_{1j}	β_{2j}	S.E. β_{2j}	β_{3j}	S.E. β_{3j}	β_{4j}	S.E. β_{4j}
Item										
4	1.30	.1	-1.32	.11	-.08	.07	.86	.09	2.13	.17
8	1.53	.12	.29	.07	1.44	.11	2.34	.18	3.22	.29
11	1.47	.11	.04	.07	1.23	.10	2.09	.16	2.79	.23
13	1.79	.14	.46	.06	1.31	.09	1.95	.13	2.84	.23
14	1.38	.11	-.12	.07	.85	.09	1.62	.13	2.55	.20
15	2.01	.14	.10	.05	1.04	.07	1.76	.11	2.60	.18

Based on the IICs shown in Figure 2, item 4 has the best informative value at a range of 12 to 24; that is, this item has the best accuracy and highest informative value for people with a total score of 12 to 24 in the 'feeling threatened' subscale. In addition, item 8 has the best accuracy and highest informative value at the range of 18 to 30, item 11 at the range of 18 to 26, item 13 at the range of 20 to 27, item 14 at the range of 18 to 28, and item 15 at the range of 20 to 22. As observed, item 15 has the highest slope and coefficient of determination and has a high informative value as evident from its IIC. Overall, the items of the 'feeling threatened' subscale have measured this trait with a high accuracy.

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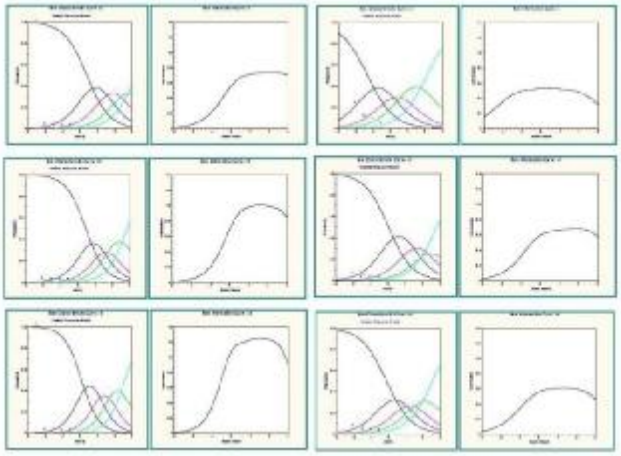

Figure 2. The ORFs and ICCs of the 'Feeling Threatened' Subscale

Table 5

The Information Range for Item 4 (the First Item from the 'Feeling Threatened' Subscale)

Theta	The information values								
-3.0 –-1.6	.154	.188	.227	.269	.269	.313	.357	.397	.432
-1.4 - .0	.460	.481	.495	.505	.505	.512	.517	.522	.525
.2 - 1.6	.522	.527	.526	.526	.524	.520	.516	.511	.504
1.8 - 3/0	.494	.480	.460	.460	.433	.398	.358	.315	

Table 6 presents the observed frequency values, the observed probability and the expected probability. As shown, the slight difference between the observed probability and the expected probability indicates that the model accurately predicts the real responses to the items.

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Table 6
The Observed and Expected Frequency and Probabilities in each Category of the 'Feeling Threatened' Subscale Items

Category	First: Completely Untrue			Second: Very Occasionally True			Third: Sometimes True			Fourth: Fairly True			Fifth: Very True		
Item	**Observed Frequency**	**Observed Probability**	**Expected Probability**	**Observed Frequency**	**Observed Probability**	**Expected Probability**	**Observed Frequency**	**Observed Probability**	**Expected Probability**	**Observed Frequency**	**Observed Probability**	**Expected Probability**	**Observed Frequency**	**Observed Probability**	**Expected Probability**
4	228	.218	.211	287	.274	.269	231	.222	.218	200	.191	.198	98	.093	.102
8	653	.624	.603	234	.223	.228	99	.094	.105	39	.037	.043	20	.019	.020
11	555	.531	.509	290	.277	.279	115	.110	.120	47	.045	.050	38	.036	.039
13	681	.651	.631	196	.187	.194	89	.085	.091	56	.053	.058	23	.022	.024
14	512	.490	.470	247	.236	.234	140	.134	.142	89	.085	.094	57	.054	.058
5	577	.552	.529	269	.250	.255	119	.113	.123	61	.058	.065	26	.024	.027

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The Analysis of the 'Submissiveness' Subscale Items

Table 7 presents features of the items in the 'submissiveness' subscale (acceptability and the coefficients of determination). According to this table, in all the items of this subscale, α has a significant positive value and the coefficients of determination are therefore also good; that is, the items of this subscale can differentiate well between people who do possess the trait or component measured in the item and those who do not.

Table 7
A Summary of the Parameters of the 'Submissiveness' Subscale Items

Parameter / Item	$\propto_j$	S. E. $\propto_j$	β_{1j}	S. E. β_{1j}	β_{2j}	S. E. β_{2j}	β_{3j}	S. E. β_{3j}	β_{4j}	S. E. β_{4j}
1	1.18	.09	-1.59	.14	-.06	.08	1.66	.14	3.23	.28
2	1.25	.10	-1.21	.11	.36	.08	1.72	.14	2.92	.25
3	1.51	.10	-.83	.08	.43	.07	1.39	.10	2.55	.20
5	1.20	.10	.64	.09	.49	.09	1.45	.13	2.73	.23
10	1.44	.12	.33	.07	1.26	.10	2.23	.17	3.21	.29
12	1.30	.10	-1.30	.11	.25	.08	1.40	.12	2.77	.23

Based on the IICs shown in Figure 3, item 1 has the best informative value at a range of 10 onwards; that is, this item has the best accuracy and highest informative value for people with a total score greater than 10 in the 'submissiveness' subscale. In addition, item 2 has the best accuracy and highest informative value at the range of 12 to about 26, item 3 at the range of 16 to 26, item 5 at the range of 16 to 26, item 10 at the range of 20 to 28, and item 12 at the range of 12 to 28. As observed, item 3 has the highest slope and coefficient of determination and its

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informative value is higher than the other items in this subscale as evident from its IIC. Overall, the items of the 'submissiveness' subscale have almost equally measured this trait with a high accuracy.

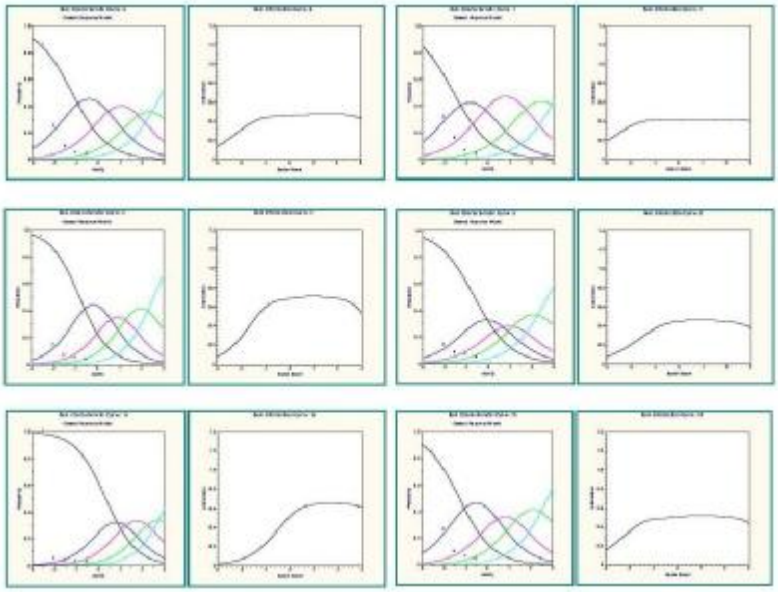

Figure 3. The ORFs and ICCs of the 'Submissiveness' Subscale

Table 8

The Information Range for Item 1 (the First Item from the 'Submissiveness' Subscale)

Theta	The information values							
-3.0–-1.6	.188	.220	.253	.287	.318	.346	.369	.386
-1.4-0.0	.399	.407	.412	.415	.417	.418	.418	.417
0.2-1.6	.415	.413	.411	.411	.411	.413	.415	.417
1.8-3/0	.417	.417	.415	.413	.411	.406	.399	

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Table 9

The Observed and Expected Frequency and Probabilities in each Category of the 'Submissiveness' Subscale Items

Category	First: Completely Untrue			Second: Very Occasionally True			Third: Sometimes True			Fourth: Fairly True			Fifth: Very True		
Item	**Observed Frequency**	**Observed Probability**	**Expected Probability**	**Observed Frequency**	**Observed Probability**	**Expected Probability**	**Observed Frequency**	**Observed Probability**	**Expected Probability**	**Observed Frequency**	**Observed Probability**	**Expected Probability**	**Observed Frequency**	**Observed Probability**	**Expected Probability**
1	196	.187	.181	329	.314	.304	356	.340	.342	127	.121	.133	37	.035	.038
2	260	.248	.236	372	.356	.374	261	.249	.259	105	.100	.107	47	.045	.048
3	316	.302	.291	339	.324	.320	215	.205	.208	128	.122	.129	47	.045	.049
5	385	.368	.354	271	.259	.257	192	.183	.186	137	.131	.138	60	.057	.063
10	631	.603	.584	214	.204	.207	126	.120	.128	51	.048	.055	23	.022	.024
12	235	-.224	.215	371	.355	.345	247	.236	.242	141	.134	.145	51	.048	.052

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Table 9 presents the observed frequency values, the observed probability and the expected probability of the 'submissiveness' subscale. As shown, the slight difference between the observed probability and the expected probability indicates that the model accurately predicts the real responses to the items.

The Analysis of the 'Feeling Valued/Unvalued' Subscale Items

Table 10 presents features of the items in the 'feeling valued/unvalued' subscale (acceptability and the coefficients of determination). According to this table, in all the items of this subscale, α has a significant positive value and the coefficients of determination are therefore also good; that is, the items of this subscale can differentiate well between people who do possess the trait or component measured in the item and those who do not.

Table 10

A Summary of the Parameters of the 'Feeling Valued/Unvalued' Subscale Items

Parameter	α_j	S.E. α_j	β_{1j}	S.E. β_{1j}	β_{2j}	S.E. β_{2j}	β_{3j}	S.E. β_{3j}	β_{4j}	S.E. β_{4j}
Item										
6	1.36	.10	-.81	.09	.40	.08	1.43	.12	2.70	.22
7	1.27	.10	-.81	.08	1.20	.11	2.30	.19	3.54	.34
9	1.09	.09	-.63	.10	.78	.11	1.75	.17	3.06	.29

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Based on the IICs shown in Figure (4), item 6 has the best informative value at a range of 8 to 12; that is, this item has the best accuracy and highest informative value for people with a total score of 8 to 12 in the ‘feeling valued/unvalued’ subscale. In addition, item 7 has the best accuracy and highest informative value at the range of 9 onwards and item 9 at the range of 8 to 14. As observed, item 6 has the highest slope and coefficient of determination and its informative value is higher than the other items in this subscale as evident from its IIC. Overall, the items of the ‘feeling valued/unvalued’ subscale have measured this trait with a high accuracy.

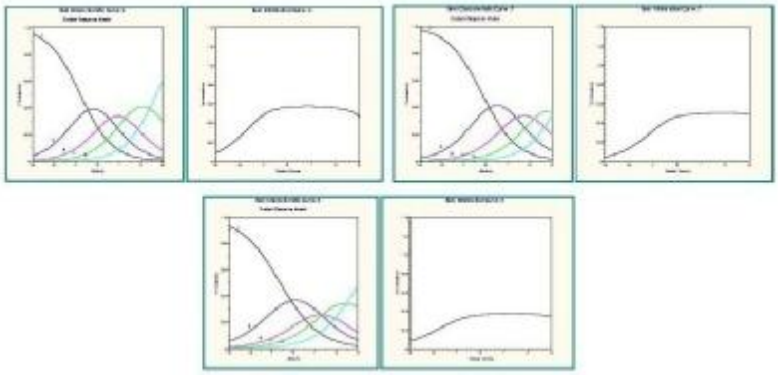

Figure 4. The ORFs and ICCs of the ‘Feeling Valued/Unvalued’ Subscale

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Table 11

The Information Range for Item 1 (the First Item from the 'Feeling Valued/Unvalued' Subscale)

Theta	The information values							
-3.0–-1.6	.085	.010	.137	.171	.211	.256	.305	.355
-1.4- .0	.405	.449	.486	.514	.534	.547	.555	.561
.2-1.6	.566	.569	.571	.572	.572	.570	.568	.564
1.8-3/0	.559	.554	.547	.537	.522	.499	.466	

Table 12 presents the observed frequency values, the observed probability and the expected probability of the 'feeling valued/unvalued' subscale. As shown, the slight difference between the observed probability and the expected probability indicates that the model accurately predicts the real responses to the items.

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Table 12

The Observed and Expected Frequency and Probabilities in each Category of the 'Feeling Valued/Unvalued' Subscale Items

Category	First: Completely Untrue					Second: Very Occasionally True					Third: Sometimes True					Fourth: Fairly True					Fifth: Very True				
Item	Observed Frequency	Observed Probability	Expected Probability			Observed Frequency	Observed Probability	Expected Probability			Observed Frequency	Observed Probability	Expected Probability			Observed Frequency	Observed Probability	Expected Probability			Observed Frequency	Observed Probability	Expected Probability		
6	196	.187	.181			329	.314	.403			356	.340	.342			127	.121	.133			37	.035	.038		
7	260	.248	.236			372	.356	.347			261	.249	.259			105	.100	.107			47	.045	.048		
9	316	.302	.291			339	.324	.320			215	.205	.208			128	.122	.129			47	.045	.049		

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Discussion

The present study was conducted to evaluate the psychometric properties of the Persian version of the Early Life Events Scale based on the Item Response Theory and the Classical Theory of Measurement in an Iranian population. The findings confirmed the psychometric properties of this scale in a sample Iranian population.

The validity of this scale was examined using the full-information item factor analysis and the results led to the extraction of three factors, including feeling threatened, submissiveness and feeling valued/unvalued, which were also found in the original form of the scale. Except for item 4 that could not be placed under any of the factors, the other factors extracted in this study and the study by Gilbert et al., (2003) were matching and the items of each factor were also mutual. The confirmatory factor analysis was used to confirm the factor structure obtained, and the fit indices of the confirmatory factor analysis also confirmed the factors obtained.

The ordinal theta was calculated to evaluate the reliability of the scale; the results show that none of the items disrupt the subscales' and the scale's overall reliability and the ELES can therefore be said to have a good reliability.

To evaluate the accuracy of the items, determine their strengths and weaknesses and ultimately assess their quality and remove inappropriate items, the scale items were analyzed based on the IRT. The results showed that all the items of the subscales have good coefficients of determination; that is, the items of each subscale can differentiate well between people who possess the trait or component measured in the item and

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those who do not. The threshold values of the items were also analyzed.

In addition, the analysis of the IICs of each subscale showed that the items of all the subscales have measured the intended trait with a high accuracy. The observed frequency values, the observed probability and the expected probability of the items in each subscale were also examined and the slight difference between the observed probability and the expected probability was taken to indicate that the model accurately predicts the real responses to the items.

Based on the findings, the ELES has a high reliability and validity among Iranians and its items are compatible with the Iranian culture; therefore, it can be used as a valid tool in research on the pathology of mental health problems in adulthood. Although the analysis of these psychometric properties based on a new theory (i.e. IRT) is one of the strengths of the present study that distinguishes it from other psychometric assessments, it should be noted that the study population is limited to a non-clinical sample of students in Tehran and therefore has a very restricted generalizability. Further studies with larger sample populations are therefore recommended for completing the process of the psychometric assessment of the ELES.

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