Elementary Education Online, 2017; 16(1): 114-128,
İlköğretim Online, 16(1), 114-128, 2017. [Online]:http://ilkogretim-online.org.tr
doi: http://dx.doi.org/10.17051/io.2017.35679

Adaptation of Awareness of Independent Learning Inventory (AILI) to Turkish: Validity and Reliability Study

Bağımsız Öğrenme Farkındalığı Envanteri'nin Türkçeye Uyarlanması: Geçerlik ve Güvenirlik Çalışması

Yavuz Sökmen, Primary Education, Atatürk University, *yavuzsokmen@atauni.edu.tr*
Yasemin Taş, Elementary Science Education, Atatürk University, *yasemintas@atauni.edu.tr*
Savaş Yeşilyurt, *English Language Education, Atatürk University*, *savasy@atauni.edu.tr*
Ahmet Nalçacı, *Primary Education, Atatürk University*, *nalcaci@atauni.edu.tr*

ABSTRACT. In this study, it was aimed to adapt the Awareness of Independent Learning Inventory to Turkish. The inventory measures university students' metacognitive knowledge, metacognitive skills, and metacognitive attitude levels. The validity and reliability of the Turkish version of the scale were investigated through three different studies. The first study was conducted with participation of 25, the second with 291, and the third with 303 pre-service teachers. In the adaptation process, language experts were brought in to judge the linguistic validity of the inventory. Confirmatory factor analyses were conducted on the data and according to the fit indices, the proposed three-factor structure was found to be consistent with the data set. Cronbach Alpha coefficients for the dimensions of the scale were found as 0.81 for the metacognitive knowledge dimension (13 items), 0.85 for the metacognitive skills dimension (13 items), and 0.79 for the metacognitive attitudes dimension (10 items). According to the findings of the study, it can be claimed that the Turkish version of the AILI, BÖFE (Bağımsız Öğrenme Farkındalığı Envanteri) is a valid and reliable measure to assess university students' metacognition.
Keywords: Metacognition, Validity, Reliability, Inventory Adaptation, University Students

ÖZ. Bu çalışmada, üniversite öğrencilerinin üst bilişsel bilgi, üst bilişsel beceri ve üst bilişsel tutumlarını ölçmek amacıyla geliştirilmiş olan Awareness of Independent Learning Inventory (AILI) (Bağımsız Öğrenme Farkındalığı Envanteri (BÖFE))'nin Türkçeye uyarlanması ve Türkçe formunun geçerlik ve güvenirlik çalışmalarının yapılması amaçlanmıştır. Bu kapsamda 3 ayrı çalışma yapılmıştır. İlk çalışma 25, ikinci çalışma 291, üçüncü çalışma ise 303 öğretmen adayı üzerinde gerçekleştirilmiştir. Türkçeye uyarlama sürecinde ölçek önce 4 uzman tarafından İngilizceden Türkçeye çevrilmiş, sonra 3 dil uzmanı tarafından Türkçeden İngilizceye geri çevrilmiştir. Veriler üzerinde doğrulayıcı faktör analizi yapılmıştır. Uyum indekslerine göre önerilen 3 faktörlü yapının veri seti ile uyum sağladığı belirlenmiştir. Ölçeğin alt boyutlara ait Cronbach Alpha güvenirlik katsayıları üst bilişsel bilgi alt boyutu için (13 madde) 0,81, üst bilişsel beceri alt boyutu için (13 madde) 0,85 ve üst bilişsel tutum alt boyutu için (10 madde) 0,79 olarak hesaplanmıştır. Araştırmada elde edilen bulgulara göre BÖFE'nin üst bilişsel bilgi, üst bilişsel beceri ve üst bilişsel tutumu ölçmede geçerli ve güvenilir bir ölçme aracı olduğu söylenebilir.
Anahtar Kelimeler: Üst biliş, Geçerlik, Güvenirlik, Ölçek Uyarlama, Üniversite Öğrencileri

INTRODUCTION

Metacognition, which is a concept first proposed by Flavell in 1976 (Baltacı and Akpınar 2011; Yore and Treagust, 2006), is widely used in the area of educational psychology (Kayashima, Inaba, and Mizoguchi, 2004). Flavell, in his research on the metamemory abilities of children in 1976 used the term metamemory for the first time and made it known in the literature (Baykara, 2011; Özsoy, 2008). Flavell (1976) describes metamemory as "one's own cognitive processes and outputs and everything related to them". Metacognition involves students' own cognitive processes and their effective use of knowledge to regulate these cognitive processes (Sungur and Senler, 2009). In other words, metacognition is individuals' knowledge and control on their own cognitive systems (Brown 1987, s. 66). Metacognition, in the broader sense, is a concept referring to thinking about thinking or cognition about cognition (Karakelle and Saraç, 2010) which can be defined as one's awareness of his own thinking processes and his ability to control these processes (Özsoy, 2008).

The number of the studies on metacognition increases day by day (Zohar and Barzilai, 2013). Accordingly, in the literature, there are studies related to metacognition for the development of inventories (Garcia and Pintrich, 1995; Schraw and Dennison, 1994; Sperling, Howard, Miller, and

Geliş tarihi: 19/10/2015, Kabul tarihi: 05/08/2016, Yayımlanma tarihi: 01/01/2017

Murphy, 2002; Wells and Cartwright-Hatton, 2004) and adaptations of them to Turkish (Akın, Abacı, and Çetin, 2007; Altun and Erden, 2006; Aydın and Ubuz, 2010; Büyüköztürk, Akgün, Özkahveci, and Demirel, 2004; Karakelle and Saraç, 2007; Sungur, 2004; Tosun and Irak, 2008; Yılmaz, Gençöz, and Wells, 2008). One of the reasons why these studies focused on metacognition was that it was found to be closely related to academic achievement and to be a strong predictor of it (Bağçeci, Döş, and Sarıca, 2011; Coutinho, 2007; Deseote and Roeyers, 2002; Dunning, Johnson, Ehrlinger, and Kruger, 2003; Kruger and Dunning, 1999; Young and Fry, 2008). In 1997, American Psychology Association, in the light of the important studies done in the recent century, revealed that cognition and metacognition are important factors for effective learning (Mok, Lung, Cheng, Cheung, and Ng, 2006). Metacognition can be regarded as a significant variable which affects the academic achievement of students because research showed that the students using their metacognitive skills learn more and have more and longer retention than the other students do (Woolfolk, 1998). Individuals' metacognitive knowledge and skills are associated with their academic achievement (Young and Fry, 2008). The students with strong metacognitive skills have better academic performances compared to those with weak metacognitive skills (Coutinho and Neuman, 2008). Senemoğlu (1997) emphasized that learners' academic achievement depends, to a great extent, on their awareness of their own styles of learning and ability to regulate their learning and stated that students should be taught learning and study strategies starting from the primary education.

Metacognition is a complicated phenomenon (Boekaerts and Cascallar, 2006; Kane, Lear, and Dube, 2014). In order to explain the complicated components of metacognition, many researchers tried to find strategies for metacognition in teaching (Schneider, 2008) and developed some models and taxonomies of it (Flavell, 1979, 1987; Brown, 1987; Nelson and Narens, 1994; Shimamura, 2008; Kuhn, 2000; Tobias and Everson, 2002). Flavell (1979) explained cognitive monitoring by grouping it in four categories. They are (*i*) metacognitive knowledge, (*ii*) metacognitive experiences, (*iii*) objectives or tasks, and (*iv*) actions or strategies. Brown (1987) and Schraw and Moshman (1995), on the other hand, divided metacognition into two categories as (*i*) knowledge on cognition and (*ii*) regulation of cognition. Similarly, Kuhn (2000) divided it into two categories as (*i*) metacognitive knowing and (*ii*) meta-strategical knowing. On the other hand, Pintrich, Wolters, and Baxter (2000) grouped the components of metacognition as (*i*) metacognitive knowledge, (*ii*) metacognitive judgements and monitoring, and (*iii*) control and regulation of cognition.

It has been evidenced that measurements of metacognition are generally grouped or modeled in two dimensions. Yet, in some studies, researchers group the components of metacognition in three categories (Efklides, 2006; Pintrich, Wolters, and Baxter, 2000). When metacognition scales in Turkish were examined, it is seen that there is a need for a more comprehensive scale to assess metacognition in Turkey. Compared to the other scales developed to assess metacognition, Awareness of Independent Learning Inventory (AILI, Meijer et al., 2013) comes into prominence because this scale is substantially comprehensive with its dimensions and sub-dimensions. It has an additional metacognitive attitudes subscale, different from other scales of metacognition. It was adapted to Dutch, English, French, German, Spanish, and Italian languages before. The inventory has three dimensions: metacognitive knowledge, metacognitive skills, and metacognitive attitude. These dimensions also have their own sub-dimensions and are divided into sub-components.

***(i)*: Metacognitive Knowledge:** This is the awareness of one's own cognition and knowledge about his cognitive goals, experiences he has obtained through his cognitive attempts, and this process (Flavell, 1979; Schraw and Moshman, 1995; Baker and Brown, 1984). Flavell (1979) explained the components of metacognitive knowledge in three categories.

Person: This is the variable which covers everything related to an individual's own and others' cognitive processes. Sample item (11): I don't think it's necessary to make a conscious effort to gain insight when you are studying. Flavell (1979) divided this factor into three categories. **a) Intra-personal**: A person's knowledge about his own cognitive processes. **b) Inter-personal:** Knowledge about others' knowledge and skills. **c) Cognitive universals:** The cognitive features of the humanity.

Strategy: One's knowledge about the strategies or ways he will use when he performs a task for a certain purpose (Flavell, 1979). Sample item (13): When students find it difficult to gain insight into the material to be studied, I know ways to solve this.

Task: A person's knowledge about the nature of a situation he has encountered and the requirements of a certain task. The nature of a situation encountered refers to a person's knowledge about the quality and quantity of knowledge and his own ability to process knowledge (Özsoy, 2007). Sample item (1): I know which assignments students really need to work at systematically.

(*ii*): Metacognitive Skills: These are the metacognitive activities that help a person control his own thinking or learning (Schraw and Moshman, 1995). There are some activities for the regulation of cognition. Schraw and Moshman (1995) grouped these activities as planning, monitoring, and assessment.

Planning: Planning refers to the selection of the right strategies for a task and the selection of the sources which affect the performance. Sample item (33): Before I begin on an assignment, I don't ask myself whether I will learn more from it by working together with others.

Monitoring: This is a person's instant cognitive awareness of a task. Sample item (7): While working on an assignment I keep a record of my learning aims.

Assessment: This refers to one's self-regulation of the learning processes and decisions about the learning outcomes (Schraw and Moshman, 1995). Sample item (29): When I've finished an assignment I don't consider whether working on it has been useful for me.

***(iii*): Metacognitive Attitude:** This is related to how sensitive and curious the students are about information themselves.

Internal feedback during learning (sensitivity to metacognitive experiences): This refers to one's provision of feedback about himself during the learning process. Flavell (1979) proposed that feedback may result in new aims in the person and a change in metacognitive knowledge or activate his cognitive strategies.

Sensitivity to external feedback on one's cognitive functioning: This refers to one's sensitivity to the feedback given by others in the cognitive activities such as his study strategies, learning objectives, comprehending or not comprehending a text given. Sample item (5): I ignore feedback from tutors on my method of work.

Curiosity with respect to one's own cognitive functioning and development: This refers to one's taking responsibility to complete the process in a problem solving or learning process by adopting efficient metacognitive attitudes (Veenman, Elshout, and Meijer, 1997). Sample item (38): If I find information difficult to understand I don't try to find a deeper reason for this.

The current study aimed to provide a valid and reliable tool to measure university students' metacognition by the adaptation of the AILI (Meijer et al., 2013) to Turkish and provide a comprehensive inventory for relevant researchers' use in Turkey.

METHOD

AILI (Awareness of Independent Learning Inventory)

The AILI consists of 23 positive (01, 02, 06, 07, 13, 14, 15, 16, 18, 19, 22, 24, 30, 31, 32, 34, 36, 39, 40, 41, 42, 43, 45) and 22 negative (03, 04, 05, 08, 09, 10, 11, 12, 17, 20, 21, 23, 25, 26, 27, 28, 29, 33, 35, 37, 38, 44), totally 45 items. The inventory which is a seven-point Likert scale has a scoring from 1 (totally disagree) to 7 (totally agree).

In this study, the AILI was translated and adapted to Turkish. The consistency between the English and Turkish versions was investigated by Pearson product-moment correlation and construct validity of the Turkish version was examined through confirmatory factor analysis. Additionally, to determine the internal consistency of the scores obtained from the scale, Cronbach Alpha reliability coefficient was calculated.

While selecting the sample of the current study, the demographic characteristics of the sample in Meijer et al.'s (2013) study were considered. In their scale development study, the AILI was administered to 1058 students across various types of teacher training institutes in Netherlands and Belgium (Meijer et al., 2013).

Samples

This research involved three studies with participation of different samples. The study was conducted in the 2014-2015 academic year. Pre-service teachers at Kazım Karabekir Faculty of

Education in Atatürk University participated in the study and convenience sampling was used. The first sample consisted of the last year students of the Department of English Language Teaching (*n*= 25). 40% of them (*n*= 10) were male while 60% (*n*= 15) were female.

The second sample consisted of 291 students from several departments of the same faculty. Demographic characteristics of the sample are presented in Table 1. These pre-service teachers were students at the departments of primary teacher education (*n*= 191, 65.6%), science teaching (*n*= 61, 21.0%), English language teaching (*n*= 22, 7.6%) and computer teaching (*n*= 17, 5.8%). Of all these students, 45 (15.5%) were first grade, 92 (31.6%) second grade, 84 (28.9%) third grade, and 69 (23.7%) fourth grade students. 51.2% (*n*= 148) of the participants were male and 48.8% (*n*= 142) were female.

Table 1. *Demographic characteristics of the sample of the second study*

		f	**%**
Gender	Male	148	51.2
	Female	142	48.8
Grade	First	45	15.5
	Second	92	31.6
	Third	84	28.9
	Fourth	69	23.7
Program	Primary teacher education	191	65.6
	Science teaching	61	21
	English language teaching	22	7.6
	Computer teaching	17	5.8
	Total	**291**	**100**

The third sample consisted of 303 pre-service teachers (See Table 2). Of these pre-service teachers, 80 (26.4%) were students at mathematics teaching, 51 (16.8%) at guidance and psychological counselling, 48 (15.8%) at pre-school education, 47 (15.5%) at English language teaching, 46 (15.2%) at social studies teaching, and 31 (10.2%) at computer teaching. Whereas 106 (35.5%) of them were third grade students, 193 (63.7%) were fourth grade students. 34.3% (*n*= 104) of these participants were male and 65.7% (*n*= 199) of them were female.

Table 2. *Demographic characteristics of the sample of the third study*

		f	**%**
Gender	Male	104	34.3
	Female	199	65.7
Grade	Third	106	35.5
	Fourth	193	63.7
Program	Mathematics teaching	80	26.4
	Guidance and psychological counselling	51	16.8
	Pre-school education	48	15.8
	English language teaching	47	15.5
	Social studies teaching	46	15.2
	Computer teaching	31	10.2
	Total	**303**	**100**

The participants of the present study were pre-service teachers from various departments. The validity and reliability studies of the scale aimed to be adapted were conducted on pre-service teachers and interested researchers should consider these factors.

Data Analysis

In order to examine language consistency between English and Turkish versions of the scale, Pearson product-moment correlation coefficient (*r*) was calculated by using SPSS 20. Before

calculating *r*, normality of scores and linear relationship were examined and there was no violation of the assumptions. To investigate factor structure of the Turkish version of the AILI, confirmatory factor analysis was run using LISREL 8.80 (Jöreskog and Sörbom, 2007). Before conducting confirmatory factor analysis, outliers were checked and skewness and kurtosis values were examined for univariate and multivariate normality.

Findings

The three studies which were conducted through the adaptation process will be explained in the following sections.

First Study

At the beginning of the study, Dr. Meijer, one of the researchers who designed the original version of the inventory, was contacted through e-mail and the permission for the adaptation of the inventory to Turkish language was granted. Then the translation process of the original version of the scale into Turkish was started. The items of the inventory were translated from English into Turkish by the authors of the study and an English language expert. Among the authors of the study, one is also an instructor and researcher at English language teaching program. They had several meetings to discuss the same or different expressions they had used in their own translations and reached a consensus on the common expressions to be used in the final translation draft. The correspondent author of English version of the original inventory was asked for further clarification about meanings intended in the items (items 8, 12, 36, 44) that the experts were unable to reach a consensus on; and then, under the light of the feedback from the author, the experts reached a consensus on all of the items. Afterwards, three different staff at the Department of English Language Teaching back-translated the Turkish items into English. The expressions obtained through this back-translation process were found to be, to a great extent, consistent with the items of the original English version in terms of the intended meanings.

For the linguistic validity, at two-week intervals, the English version and then the Turkish version of the inventory were given to fourth grade students (n= 25) at the Department of English Language Teaching. Total scores were computed for the English and Turkish versions of the scales and Pearson product-moment correlation coefficient (r) between the scores obtained from the two versions was found .85 (p< .05). This high correlation coefficient supported the consistency between the English and Turkish versions.

Second Study

In order to test the three-factor structure of the scale, a confirmatory factor analysis was employed on the data obtained from the second sample (n=291). Several types of *goodness of fit indices* are used during the evaluation of results (Hu and Bentler, 1999; Kelloway, 1998). They are Chi-square/Degrees of Freedom Ratio (χ2/df), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residuals (SRMR), Non-Normed Fit Index (NNFI), and Comparative Fit Index (CFI). Whereas chi-square/degrees of freedom ratio below 5 refers to a good fit and chi-square/degrees of freedom ratio below 2 refers to a very good fit, the RMSEA value below 0.1 refers to a good fit and the RMSEA value below 0.05 indicates a very good fit (Kelloway, 1998). While SRMR value is suggested to be below 0.05 (Kelloway, 1998), it is also reported that it can be acceptable when it is below 0.08 (Hu and Bentler, 1999). The NNFI and CFI indices above 0.90 refer to a good fit between the data set and the proposed model (Kelloway, 1998).

According to the results of analyses, goodness of fit indices obtained were χ^2/df= 2.28, RMSEA=0.080, SRMR=0.071, NNFI=0.930, and CFI=0.933. Considering these indices it can be said that the proposed three-factor structure is consistent with the data set. After the assessment of the results, it was found out that *Item 18* did not have any significant contribution to the sub-dimension, the metacognitive attitude factor, it belonged to and the factor loading for this item was very low (0.013). Therefore, it was thought it would be better to exclude it from the inventory. When the pattern coefficients corresponding to factor loadings of items (Lamda-X estimates) were examined, it was seen that most of the items had high factor loadings; yet, there were also some items (items 3, 4, 9, 10, 12, 14, and 34) with low factor loadings (0.35 and lower). When the item to total item

correlations for each item were analyzed, the same items were found to have low correlations with the other items in the same sub-dimensions. It was decided to re-arrange these items and employ the inventory in the next study with the revised items. For instance, *Item 3* "Bir şey okurken benim için anlamlı olup olmadığına çok dikkat etmem" was revised as "Bir şey okurken benim için bir anlam ifade edip etmediğine çok dikkat etmem."

Third Study

After revising the items with low factor loadings, the AILI was given to the sample (*n*= 303) of the third study. A confirmatory factor analysis was employed on the data. According to the results, there was no increase in the factor loadings of the re-designed items (items 3, 4, 9, 10, 12, 14, and 34). Since these items had high level of deviation variance, it was decided to exclude them from the scale (Çokluk, Şekercioğlu, and Büyüköztürk, 2010). This problem may arise from different reasons such as translation problems or cultural differences, which will be discussed in Discussion and Conclusion section. When modification indices were assessed, it was seen that *Item 44* should be included in the metacognitive attitude sub-dimension instead of metacognitive skill sub-dimension. A careful overview of *Item 44* ("Before I begin an assignment I don't think about how I will introduce structure into it") shows the appropriateness of this change in terms of the content. In the following stages of the third study, internal consistency of the items and their correlation with the others were analyzed. In this analysis, it was figured out that *Item 19* had an item-total item correlation of 0.24. When the correlation of an item with the other items of the factor is lower than 0.30, in this case, this item is suggested to be excluded from the scale (Field, 2009, p. 678). After *Item 19* was excluded, it was found that the result of Chi-square difference test was statistically significant [χ^2 (35) = 102.17, p< .05] and the model fit the data set better. The goodness of fit indices obtained in the last model (χ^2/df= 2.59, RMSEA= 0.085, SRMR=0.070, NNFI=0.931, CFI=0.935) support the result revealing that the consistency between the proposed model and the data is high. The factor loadings for the items (Lamda-X estimates) are given in Figure 1.

The means, standard deviations, and item-total item correlations belonging to the last version of AILI are presented in Table 3. The reliability coefficients of the sub-dimensions of the scale were calculated with Cronbach Alpha. Cronbach Alpha coefficients were 0.81 for the metacognitive knowledge sub-dimension (*n*= 13 items), 0.85 for the metacognitive skill sub-dimension (*n*= 13 items), and 0.79 for the metacognitive attitude sub-dimension (*n*= 10 items) of the scale. Turkish versions of the items are presented in Appendix A.

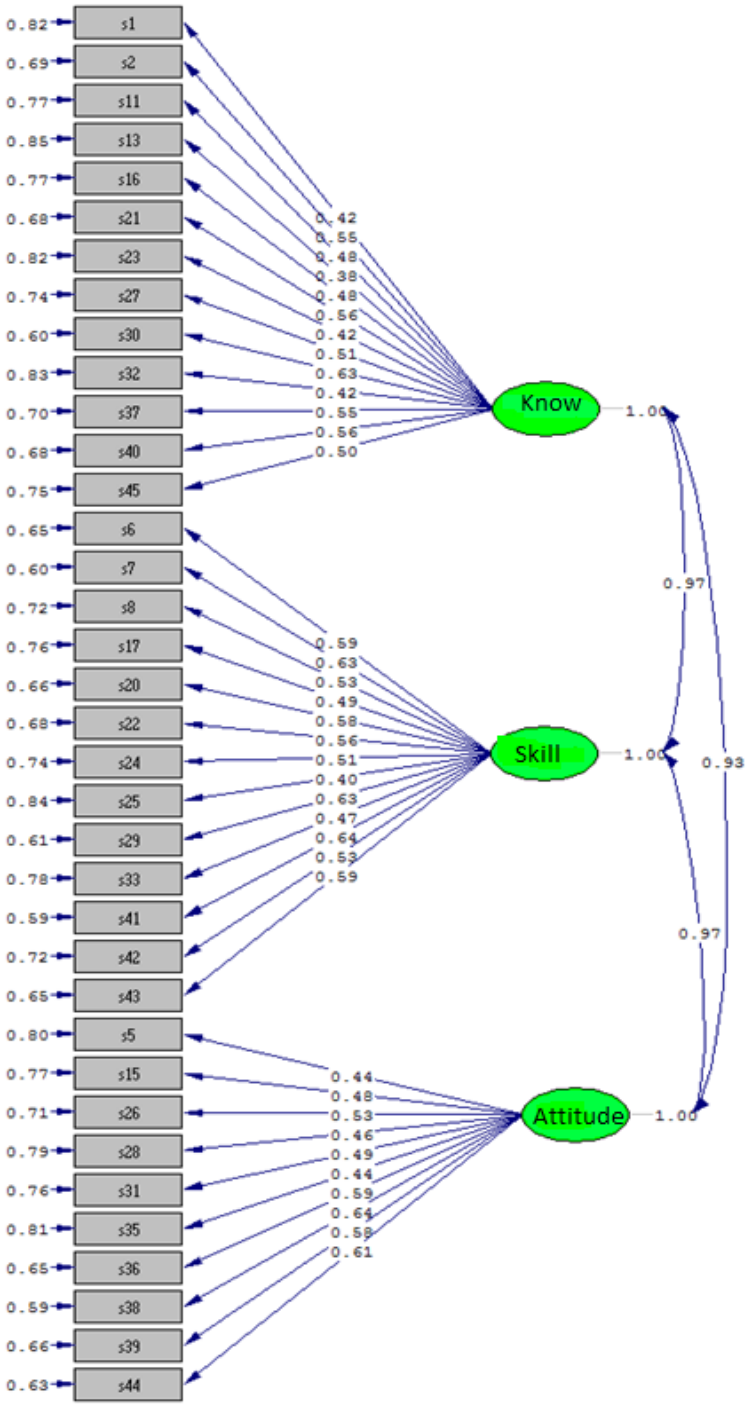

Figure 1. *The factor loadings of the items in the third study*

Table 3. *The means, standard deviations, and item-total item correlations belonging to the last version of BÖFE*

	Sub-dimensions and Items	Mean	Standard Deviation	Item-total item correlation
Metacognitive knowledge				
1	I know which assignments students really need to work at systematically.	5.27	1.61	0.42
2	I think it's necessary to make a conscious effort to work systematically when you are studying.	6.02	1.84	0.51
11	I don't think it's necessary to make a conscious effort to gain insight when you are studying.	5.45	2.16	0.42
13	When students find it difficult to gain insight into the material to be studied, I know ways to solve this.	5.29	1.63	0.38
16	I think it's important that there are also personal aims linked to assignments.	5.54	1.87	0.44
21	When the cooperation between students turns out to be unproductive I don't know any ways to solve this.	5.28	1.95	0.50
23	I can't tell whether a text to be studied will appeal to students.	5.05	1.96	0.42
27	I can't tell from a text how much effort it will take for students to understand it.	5.05	1.70	0.45
30	I think it's important that students also learn from each other while they are studying.	5.59	1.95	0.55
32	I know various ways in which students can increase their involvement in the material to be studied.	5.03	1.70	0.39
37	When students don't work systematically, I don't know any ways to solve this.	5.12	2.01	0.44
40	I can tell whether an assignment corresponds to students' learning aims.	5.26	1.83	0.47
45	I know which assignments students will learn more from by working together.	5.28	1.69	0.46
	Metacognitive skill			
6	While working on an assignment I pay attention to whether I am carrying out all parts of it.	5.68	1.78	0.55
7	While working on an assignment I keep a record of my learning aims.	5.49	1.85	0.59
8	When I've finished an assignment I don't check for myself whether I've worked at it systematically enough.	5.17	2.03	0.50
17	When I've worked together with others on an assignment I don't think about whether the co-operation was useful for me.	5.45	1.98	0.42
20	When I study information I don't pay much attention to how well I understand it.	5.26	2.03	0.53
22	When I start on a text I first ask myself what I will need to do in order to study the text thoroughly.	5.25	2.00	0.48
24	When I work together with others I regularly think about what I learn from them.	4.93	1.87	0.47
25	Before I begin an assignment I don't have a clear idea of what I want to learn from it.	4.76	2.00	0.37
29	When I've finished an assignment I don't consider whether working on it has been useful for me.	5.35	2.15	0.56
33	Before I begin an assignment, I don't ask myself whether I will learn more from it by working together with others.	4.65	2.13	0.43
41	When I've finished studying information I check for myself whether I've gone into enough depth.	5.33	1.74	0.61
42	When I've studied obligatory material I ask myself whether it aroused my interest.	5.25	1.90	0.49
43	When I have to study information I try to find out what I will find interesting about it.	5.22	1.92	0.51

Table 3

	Sub-dimensions and Items	Mean	Standard Deviation	Item-total item correlation
	Metacognitive attitude			
5	I ignore feedback from tutors on my method of work.	5.62	1.86	0.40
15	If I find an assignment pointless I try to find out why this is.	5.13	2.00	0.36
26	I think that feedback on my personal learning aims is unnecessary.	5.54	1.80	0.46
28	I see no reason to talk with others about the usefulness of working together on our studies.	4.92	2.11	0.39
31	If my personal involvement in the material to be studied were to be questioned I would think about this.	5.60	1.66	0.38
35	I am not interested in why I have an aversion to some of the texts I have to study.	4.82	2.18	0.41
36	If I can't bring any structure into an assignment, I try to find out why that is.	5.36	1.90	0.51
38	If I find information difficult to understand I don't try to find a deeper reason for this.	4.83	2.26	0.61
39	I find it helpful to talk with others about how one can gain an understanding of the texts to be studied.	5.41	1.91	0.48
44	Before I begin an assignment I don't think about how I will introduce structure into it.	5.40	2.07	0.59

DISCUSSION and CONCLUSION

This study aimed to adapt the Awareness of Independent Learning Inventory (AILI, Meijer et al., 2013) which consists of three dimensions and 45 items to Turkish. The validity and reliability of the Turkish version of the scale were analyzed through three studies. In the first study, the English and Turkish versions of the inventory were given to English language teaching department students at two-week intervals. The high correlation (r=.85) between the means of the two versions supported the consistency between them. In the second study, the Turkish version of the inventory was given to the students at different departments of the faculty of education. After the analyses employed, some items were found to have low factor loadings and did not make statistically significant contribution to the relevant factor. Thus, it was decided to revise and carefully analyze these items in the following stage of the study. In the third study, the revised version of the AILI was given to another group of pre-service teachers. Confirmatory factor analysis revealed no increase in the factor loadings of the revised items. Since the item-total item correlations belonging to these items were low as well, they were excluded from the inventory and the analyses were re-conducted. Goodness of fit indices (χ^2/df= 2.59, RMSEA= 0.085, SRMR = 0.070, NNFI= 0.931, CFI= 0.935) obtained in the confirmatory factor analyses for the final version of the inventory show that the fit between the proposed model and the data is good. The Cronbach Alpha reliability coefficients for the sub-dimensions were calculated to be, for metacognitive knowledge (13 items), 0.81; for metacognitive skill (13 items), 0.85; and for metacognitive attitude (10 items), 0.79.

Based on the results of the present study, it can be stated that the adapted inventory has linguistic validity. The Turkish version has also three dimensions (metacognitive knowledge, metacognitive skill, and metacognitive attitude). However, due to exclusion of nine items with low factor loadings and low item-total item correlations, the Turkish version consisted of 36 items. Indeed, while adapting instruments to different languages, removing items from the original scale is not preferable. However, although the problematic items were revised in the third study, they again did not contribute to their predetermined factors. Though English language experts examined the items carefully and authors of the study contacted with the developer of the inventory to clarify meanings of the items, it is still possible that this might be due to translation problem. Another possibility is cultural differences. There may be differences between the cultures in which a scale was

developed and later adapted. Although the validity and reliability analyses were carried out in proper methods, there may be problems stemming from cultural factors. Therefore, in scale adaptation studies, the items which are not culturally suitable are either modified or completely excluded (Akbaş and Korkmaz, 2007) as it was done in this study. The readers should consider the fact that the number of items was reduced in Turkish version and thus not the same as in the original scale.

In conclusion, it was found out that the three-factor structure proposed for the inventory adapted to Turkish was consistent with the data set. With this study, it was aimed to introduce the Turkish version of the AILI, which can be used to measure university students' metacognitive knowledge, metacognitive skill, and metacognitive attitude, to the literature. The research shows that the students with higher metacognitive knowledge and skills have higher academic achievement (e.g., Coutinho and Neuman, 2008; Young and Fry, 2008). Therefore, it seems important to identify students' metacognition levels and the predictors of metacognition. Different from other inventories of metacognition, since the AILI involves also metacognitive attitudes, it will be possible to investigate students' metacognition in a more comprehensive way.

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Bağımsız Öğrenme Farkındalığı Envanteri'nin Türkçeye Uyarlanması: Geçerlik ve Güvenirlik Çalışması

Yavuz Sökmen, Primary Education, Atatürk University, yavuzsokmen@atauni.edu.tr
Yasemin Taş, Elementary Science Education, Atatürk University, yasemintas@atauni.edu.tr
Savaş Yeşilyurt, *English Language Education, Atatürk University*, savasy@atauni.edu.tr
Ahmet Nalçacı, *Primary Education, Atatürk University*, nalcaci@atauni.edu.tr

ÖZET

Araştırmanın amacı ve önemi: Bağımsız Öğrenme Farkındalığı Envanteri (BÖFE), üniversite öğrencilerinin üst bilişsel bilgi, üst bilişsel beceri ve üst bilişsel tutum düzeylerini ölçmek amacıyla geliştirilmiştir (Meijer vd., 2013). BÖFE, mevcut ölçeklere göre üst bilişi daha kapsamlı bir şekilde ele almaktadır. Envanterin Hollandaca, İngilizce, Fransızca, Almanca, İspanyolca ve İtalyanca dillerinde geçerlilik ve güvenirlik çalışmaları yapılmıştır. BÖFE'nin Türkçeye uyarlanmasıyla, konuyla ilgili araştırmalarda kullanabilecek kapsamlı bir ölçme aracının araştırmacıların kullanımına sunulabileceği düşünülmektedir. Bu bağlamda araştırmanın amacı Meijer vd. (2013) tarafından geliştirilen envanteri Türkçeye uyarlamak ve ayrıca Türkçe formunun geçerlilik ve güvenirlik çalışmalarını yapmaktır.

Yöntem: Çalışma, 2014-2015 eğitim öğretim yılında, Atatürk Üniversitesi Kazım Karabekir Eğitim Fakültesi'nde okuyan öğretmen adaylarının katılımı ile gerçekleştirilmiştir. Örneklem, uygun örnekleme (convenience sampling) ile oluşturulmuştur. Üç ayrı örneklem ile çalışılmıştır. Birinci örneklem (n= 25), İngilizce öğretmenliği son sınıf öğrencilerinden oluşmuştur. Öğrencilerin %40'ı (n= 10) erkek, %60'ı (n= 15) kadındır. Birinci çalışmada, dil geçerliliği için katılımcılara önce ölçme aracının İngilizce formu, 2 hafta sonra da Türkçe formu uygulanmıştır. Ölçeğin iki formuna verilen puanlar arasındaki ilişki, Pearson Momentler Çarpımı Korelasyon Katsayısı ile incelenmiştir. Değişkenler arasındaki ilişkiyi tespit etmek için Pearson Momentler Çarpımı Korelasyonun tercih edilmesinin sebebi, iki değişken arasında doğrusal bir ilişkinin bulunması ve değişkenlerin normal dağılım göstermesidir (Field, 2009).

İkinci örneklem ise farklı bölümlerde okuyan toplam 291 öğretmen adayından oluşmuştur. Bu öğretmen adayları, sınıf öğretmenliği (n= 191, %65,6), fen bilgisi öğretmenliği (n= 61, %21,0), İngilizce öğretmenliği (n= 22, %7,6) ve bilgisayar öğretmenliği (n= 17, %5,8) bölümlerinde okumaktadır. Bu öğrencilerin 46'sı (%15,8) birinci sınıf, 92'si (%31,6) ikinci sınıf, 84'ü (%28,9) üçüncü sınıf ve 69'u (%23,7) dördüncü sınıf öğrencisidir. Öğrencilerin %51,2'i (n= 149) erkek, %48,8'i (n= 142) kadındır. İkinci çalışmada, ölçeğin faktör yapısının doğruluğunu test etmek amacıyla, ikinci örneklemden toplanan veriler üzerinde doğrulayıcı faktör analizi (confirmatory factor analysis) yapılmıştır. Doğrulayıcı faktör analizi yapılmadan önce veri setinde uç skorların olup olmadığı incelenmiş, çarpıklık ve basıklık değerlerine bakılarak değişkenlerin tek değişkenli ve çok değişkenli olarak normal dağılım sergilediği görülmüştür.

Üçüncü örneklem ise 303 öğretmen adayından oluşmuştur. Bu öğretmen adaylarının 80'i (%26,4) matematik öğretmenliği, 51'i (%16,8) rehberlik ve psikolojik danışmanlık, 48'i (%15,8) okul öncesi öğretmenliği, 47'si (%15,5) İngilizce öğretmenliği, 46'sı (%15,2) sosyal bilgiler öğretmenliği, 31'i (%10,2) bilgisayar öğretmenliği bölümünde öğrenim görmektedir. Bu öğrencilerin 110'u (%36,3) üçüncü sınıf, 193'ü (%63,7) ise dördüncü sınıf öğrencisidir. Öğrencilerin %34,3'ü (n= 104) erkek, %65,7'si (n= 199) kadındır. Üçüncü çalışmada ise, BÖFE, ikinci çalışma sonucunda elde edilen veriler ışığında bazı maddeler yeniden düzenlenerek uygulanmış ve elde edilen veriler üzerinde doğrulayıcı faktör analizi yapılmıştır.

Bulgular: Birinci çalışmada, ölçme aracının İngilizce formu ve Türkçe formuna verilen yanıtların toplam puanları arasındaki Pearson Momentler Çarpımı Korelasyon Katsayısı (r) .85 (p< .05) olarak bulunmuştur. Yüksek korelasyon katsayısı, İngilizce ve Türkçe formların paralelliğini desteklemektedir. İkinci çalışmada yapılan doğrulayıcı faktör analizi sonuçlarına göre, elde edilen uyum iyiliği indeksleri; χ^2/df= 2,28, RMSEA=0,080, SRMR=0,071, NNFI=0,930, CFI=0,933 olarak

bulunmuştur. Bu uyum indekslerine bakıldığında, önerilen 3 faktörlü yapının veri seti ile uyum sağladığı söylenebilir. Ancak, bazı maddelerin düşük faktör yüküne sahip olduğu tespit edilmiştir. İkinci çalışma sonucunda düşük faktör yüküne sahip olan maddeler yeniden düzenlenerek, BÖFE üçüncü örnekleme uygulanmıştır. Doğrulayıcı faktör analizi sonuçlarına göre, yeniden düzenlenen maddelerin faktör yüklerinde bir artış olmadığı görülmüştür. Bu maddelerin hata varyansları da yüksek olduğu için ölçekten çıkarılmasına karar verilmiştir. Son modelde elde edilen uyum iyiliği indeksleri (χ^2/df= 2,59, RMSEA= 0,085, SRMR=0,070, NNFI=0,931, CFI=0,935), önerilen model ile veri uyumunun iyi olduğunu desteklemektedir.

Tartışma ve Sonuç: Araştırma sonucunda envanterin dil geçerliliğine sahip olduğu söylenebilir. Orijinali 3 faktörden ve 45 maddeden oluşan envanterin doğrulayıcı faktör analizi sonucunda Türkçe formunda da 3 faktöre (üst bilişsel bilgi, üst bilişsel beceri ve üst bilişsel tutum) sahip olduğu tespit edilmiştir. Envanterden, düşük faktör yüküne ve düşük madde-toplam madde korelasyonuna sahip olan 9 maddenin çıkartılmasıyla Türkçe form 36 maddeden oluşmuştur. Sonuç olarak, Türkçeye uyarlanan envanter için önerilen 3 faktörlü yapının veri seti ile uyum sağladığı bulunmuştur. Yapılan bu araştırmayla üniversite öğrencilerinin üst bilişsel bilgi, üst bilişsel beceri ve üst bilişsel tutumunu ölçmek için kullanılabilecek envanterin Türkçe formunun alanyazına kazandırılması amaçlanmıştır. BÖFE'nin diğer üst biliş ölçme araçlarından farklı olarak üst bilişsel tutumu da ele alması ile birlikte, öğrencilerin üst biliş düzeylerinin daha kapsamlı bir şekilde tespit edilmesi mümkün olabilecektir.

Appendix A. *Bağımsız Öğrenme Farkındalığı Envanteri'nin son haline ait ortalama, standart sapma ve madde-toplam korelasyon değerleri*

	Alt Boyutlar ve Maddeler	Ortalama	Standart Sapma	Madde-toplam korelasyon
	Üst bilişsel bilgi			
1	Öğrencilerin hangi ödevler üzerinde gerçekten sistemli bir şekilde çalışması gerektiğini bilirim.	5,27	1,61	0,42
2	Sistemli bir şekilde ders çalışmak için bilinçli bir çaba harcanması gerektiğini düşünüyorum.	6,02	1,84	0,51
11	Ders çalışırken, çalışılan konuyu tam olarak anlamak için bilinçli bir çaba harcamak gerektiğini düşünmüyorum.	5,45	2,16	0,42
13	Öğrenciler çalışılacak etkinliğin anlaşılmasını zor bulduklarında, bunu nasıl çözeceğimi bilirim.	5,29	1,63	0,38
16	Ödevlerle bağlantılı kişisel hedeflerin de olmasının önemli olduğunu düşünüyorum.	5,54	1,87	0,44
21	Öğrenciler arasındaki işbirliği verimsiz bir hale dönüşünce bunu çözmek için bir yol bulamam.	5,28	1,95	0,50
23	Çalışılacak bir metnin öğrencilerin ilgisini çekip çekmeyeceğini söyleyemem.	5,05	1,96	0,42
27	Bir metne bakarak, öğrencilerin o metni anlamaları için ne kadar çaba harcamaları gerektiğini söyleyemem.	5,05	1,70	0,45
30	Öğrencilerin çalışırken birbirlerinden de öğrenmelerinin önemli olduğunu düşünüyorum.	5,59	1,95	0,55
32	Öğrencilerin çalışılacak materyale yönelik ilgilerini arttırabilecekleri çeşitli yöntemler biliyorum.	5,03	1,70	0,39
37	Öğrenciler sistemli bir şekilde çalışmadıkları zaman, bu duruma bir çözüm bulamam.	5,12	2,01	0,44
40	Bir ödevin öğrencilerin öğrenme hedeflerini karşılayıp karşılamadığını söyleyebilirim.	5,26	1,83	0,47
45	Öğrencilerin hangi ödevlerden birlikte çalışarak daha fazla şey öğreneceklerini bilirim.	5,28	1,69	0,46
	Üst bilişsel beceri			
6	Bir ödev üzerinde çalışırken bütün kısımlarını tamamlayıp tamamlamadığıma özen gösteririm.	5,68	1,78	0,55
7	Bir ödev üzerinde çalışırken öğrenme hedeflerimi göz önünde bulundururum.	5,49	1,85	0,59
8	Bir ödevi bitirdiğimde, üzerinde yeteri kadar sistemli bir şekilde çalışıp çalışmadığımı kontrol etmem.	5,17	2,03	0,50
17	Bir ödev üzerinde başkalarıyla birlikte çalıştığımda, işbirliğinin benim için faydalı olup olmadığı üzerinde düşünmem.	5,45	1,98	0,42
20	Bir bilgi üzerinde çalışırken onu ne kadar iyi anladığıma çok dikkat etmem.	5,26	2,03	0,53
22	Bir metin üzerinde çalışmaya başladığımda, öncelikle kendime onu tam olarak anlamak için ne yapmam gerektiğini sorarım.	5,25	2,00	0,48
24	Başkalarıyla birlikte çalışırken, onlardan ne öğrendiğim hakkında düzenli olarak düşünürüm.	4,93	1,87	0,47
25	Bir ödeve başlamadan önce o ödevden ne öğrenmek istediğim ile ilgili net bir fikrim yoktur.	4,76	2,00	0,37
29	Bir ödevi bitirdiğimde, o ödev üzerinde çalışmanın benim için faydalı olup olmadığını düşünmem.	5,35	2,15	0,56
33	Bir ödeve başlamadan önce, kendime başkalarıyla birlikte çalışarak bu ödevden daha fazla şey öğrenip öğrenemeyeceğimi sormam.	4,65	2,13	0,43
41	Bir bilgi üzerinde çalışmayı bitirdiğimde, onu yeterince derinlemesine ele alıp almadığımı kontrol ederim.	5,33	1,74	0,61
42	Zorunlu bir materyal üzerinde çalıştığımda, kendime o materyalin ilgimi uyandırıp uyandırmadığını sorarım.	5,25	1,90	0,49
43	Bir bilgi üzerinde çalışmak zorunda olduğumda, onunla ilgili ilginç neler bulabileceğimi anlamaya çalışırım.	5,22	1,92	0,51
	Üst bilişsel tutum			
5	Öğretmenlerimin çalışma yöntemim ile ilgili geri bildirimlerini dikkate almam.	5,62	1,86	0,40
15	Bir ödevi anlamsız bulursam niye böyle olduğunu anlamaya çalışırım.	5,13	2,00	0,36
26	Kişisel öğrenme hedeflerime yönelik geri bildirimlerin gereksiz olduğunu düşünüyorum.	5,54	1,80	0,46
28	Birlikte çalışmanın faydaları üzerine, başkalarıyla konuşmak için bir sebep görmüyorum.	4,92	2,11	0,39
31	Çalışılacak materyale yönelik kişisel ilgim dikkate alınacak olsaydı, bunun üzerinde düşünürdüm.	5,60	1,66	0,38
35	Çalışmak zorunda olduğum bazı metinlere karşı neden isteksiz olduğumu merak etmem.	4,82	2,18	0,41
36	Bir ödevi nasıl yapacağımı anlamadığımda bunun neden böyle olduğunu anlamaya çalışırım.	5,36	1,90	0,51
38	Bir bilgiyi anlamak zor gelirse, bunun asıl sebebini bulmak için uğraşmam.	4,83	2,26	0,61
39	Bir metnin nasıl anlaşılacağı konusunda başkalarıyla konuşmayı faydalı bulurum.	5,41	1,91	0,48
44	Bir ödeve başlamadan önce onu nasıl yapılandırabileceğimi düşünmem.	5,40	2,07	0,59