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The validity and reliability study of Turkish version of the multiple intelligences developmental assessment scales¹

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Abstract ([Genişletilmiş Türkçe özet bu dosyanın sonundadır.](#))

The purpose of this study is to adapt Multiple Intelligences Developmental Assessment Scales (MIDAS) to Turkish. After examining and confirming equivalency between English and Turkish versions the scale was administered to a sample (1466 participant) including undergraduate, graduate students at the Cukurova University and adult in Adana, Turkey. In addition, test-retest reliability was assessed using a sample of undergraduate, graduate and adults in Adana, Turkey (N=100). In order to examine the validity and reliability properties of the scale, exploratory and confirmatory factor analysis, Cronbach Alpha correlation coefficients, corrected item-total correlations and t-tests between items' means of upper 27%-lower 27% points were used. The final analysis accounted for 41.93 % of the variance under 93 items and 7 factors. The internal consistency coefficient ($\alpha = .87$) was within ideal ranges. Also results of confirmatory factor analysis show that the model fitness indicator indexes meet the statistical standards [$\chi^2=16558.65$ (sd=4164, $p<.001$), (χ^2 /sd=3.98, NNFI= 0.95, NFI=0.93, CFI=0.95, IFI= 0.95, RMSEA=0.052, and SRMR= 0.062].

Keywords: Confirmatory factor analysis, multiple intelligences, reliability, MIDAS, validity

1. Introduction

Gardner (1993) has written that after World War I IQ-based thinking started and people were categorized as bright or not bright through a single standardized performance test. However, in Gardner's view there is no single intelligence that can account for success in life. Gardner's

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research revealed extensive evidence for the existence of eight relatively autonomous intelligences each with its own set of dedicated cerebral structures. Future research may uncover additional intelligences possessed by the human brain. In fact, the idea of multiple intelligences is not new. Many alternative, multi-faceted models of intelligence have been articulated and tested (e.g., Thurstone, 1938, cited in Shearer, 2006; Horn, 1982; Guilford, 1967; Carroll, 1993), but none have captured the attention of both the educational and scientific communities as have the theories of emotional (Goleman, 1995), triarchic (Sternberg, 1985) and multiple intelligences (Gardner, 1983).

Howard Gardner's influential book, *Frames of Mind* broke new ground in 1983 by providing a scholarly investigation into the proposition that a unitary model of intelligence was much too simplistic to describe the full potential of the human brain to perform a wide array of valued cultural roles around the world. Gardner provided in-depth information from a wide range of disciplines to support his argument for the existence of seven distinct forms of intelligence and four "higher order cognitive abilities." So Gardner is standing at a different point of view supporting multiple intelligences and proposing a different understanding of the assessment of them. Gardner claims that it is misleading and inaccurate to judge a person's intellectual potential from "short answers to short questions" on a single test but instead, it is necessary to assess each intelligence and create a richer picture of a person's full range of abilities and potential.

According to multiple intelligences research conducted to date, the human brain possesses at least eight distinct intelligences and it is possible that future research will reveal additional capacities. Each person has their own distinct profile of strengths and limitations in each of the eight intelligences. That is to say, no two people display the exact proportion and mixture of intelligences.

Thus, if we can determine the unique intellectual profile of each person, then it may be possible to maximize instruction and also to increase self-awareness and enhance existential satisfaction. Furthermore, in the last decade concepts like "life long active learning", "problem solving ability" etc. have become popular in Turkish education with the joint studies by scholars from different disciplines. Individuals who can catch up with these new ideas will be those who will have enhanced self-understanding and are adept at self-management. Traditional IQ tests measure a limited set of cognitive abilities under controlled and decontextualized conditions which neglect essential aspects of the multiple intelligences that include creative thinking and practical, context-based problem-solving. For this reason, Shearer (1996, 2006) designed the Multiple Intelligences Development Assessment Scales (MIDAS) to provide an objective measure of the multiple intelligences as reported by the person or by a knowledgeable informant. MIDAS casts a broader

net and examines how one uses her / his abilities in an array of meaningful, real-world activities. MIDAS has been used widely in the USA and in Asia (to read all of the multiple intelligences issues, go to <http://www.edutopia.org/howard-gardner-interview>. Shearer also maintains a website, at <http://www.miresearch.org>, to disseminate the MIDAS.

This study proposed to validate MIDAS in the Turkey context and to develop a localized scale for use with Turkish population.

2. Method

2.1. Participants

The MIDAS which developed by Shearer, (1996, 2006) was administered to 1466 (692 male, 774 female) participants who are undergraduates and graduate students at the Çukurova University and adults in Adana, a major urban city in Turkey. There are 545 university students, 921 graduate students and adults (ages 15-79). A wide variety of adults are included in the sample ranging from those with high academic achievement (teachers, engineers, doctoral candidates) to high school drop-outs (Adult Basic Education students). The university students are similarly diverse and representative of the different faculties (Educational, Art and Humanities, Engineering, Economy and Administration) at the University of Cukurova in Adana, Turkey. The measure was administered to the participants by the researchers according to standard procedures. The data from undergraduate students were collected in classrooms; the data from graduate students and adults were collected by the researchers one by one interaction.

2.2. Instrument

The MIDAS examines how one uses his/her abilities in an array of meaningful, real world activities through self-report or assessment by a knowledgeable informant (for children). The MIDAS items ask the respondent to assess the frequency or duration of time the person participates in a particular activity, or ask for a realistic evaluation of the person's performance or his/her displayed enthusiasm on that activity. There are 119 items in the MIDAS related to eight main scales and their subscales and three Intellectual Style Scales. Each of the 119 items has a 5-point Likert responses scale which is used to calculate a percentage scores for each of the scales. Each MIDAS item has six response choices (e.g., "*Are you good at finding your way around new buildings or city streets?*" *Not at all, Fairly Good, Good, Very Good, Excellent, I don't know or Does not apply*). Response anchors are uniquely written to match each question's specific content. A *Does not apply* or *I don't know* option is provided for every question so that the respondent is not forced to guess or answer beyond his or

her actual level of knowledge. These responses are treated as missing values that do not contribute to the score. Item responses on the questionnaire are labeled A through F, and response choices are uniquely written for the content of each item. Some of the items are scored on multiple scales. To compute the scale scores, the raw score values are converted to a zero to four scale.

Sample items include:

Musical

“As a child, did you have a strong liking for music or music classes?” A little, Sometimes Usually, Often, All the time, I don’t know;

“Did you ever learn to play an instrument?” No, A little, Fair, Good, Excellent, I don’t know.

Bodily-Kinesthetic

“In school, did you generally enjoy sports or gym class more than other school classes?” Not at all, A little, About the same, Enjoyed sports more, Enjoyed sports much more, I don’t know.

“As a teenager, how often did you play sports or other physical activities?” Every once in a while, Sometimes, Often, Almost always, All the time, I don’t know or does not apply.

Logical-Mathematical

“As a child, did you easily learn mathematics such as addition, multiplication and fractions?” Not at all, It was fairly hard, Pretty easy, Very easy, Learned much quicker than others, I don’t know.

“How are you at figuring numbers in your head?” Not at all, Fair, Good, Very good, Superior, I don’t know.

Spatial

“Are you good at finding yourself around new buildings or city streets” Not at all, Fairly good, Good, Very Good, Excellent, I don’t know or does not apply.

“How easily can you put things together like toys, puzzles, or electronic equipment?” Not at all, It was hard, It was fairly easy, It was easy, It was very easy, I don’t know.

Linguistic

“Do you use colorful words or phrases when talking” No, Rarely, Sometimes, Often, All the time, I don’t know

“Are you a convincing speaker?” Not at all, Every once in a while, Sometimes, Often, Almost All the time, I don’t know.

Interpersonal

“Are you good at making peace at home, at work or among friends?” Fair, Pretty Good, Good, Very Good, Excellent, I don’t know.

“Do you usually know how to make people feel comfortable and at ease?” Every once in a while, Sometimes, Usually, Almost always, Always, I don’t know

Intrapersonal

“Do you have a clear sense of who you are and what you want out of life?” Very little, A little, Usually, Most of the time, Almost all the time, I don’t know

“Are you aware of your feelings and able to control your moods” Every once in a while, Sometimes, Most of the time, Almost all the time, Always, I don’t know

Naturalist

“Have you ever raised pets or other animals?” Never or rarely, Every once in a while, Sometimes, Often, All the time, I don’t know

“Are you good at recognizing breeds of pets or kinds of animal?” Not at all, A little, Somewhat, Quite Good, Very Good, I don’t know

2.2.1.Detail Information about Development of the MIDAS:

The Multiple Intelligences Developmental Assessment Scales (MIDAS) is a self or other completed questionnaire that can be administered and interpreted by psychologists, counselors and teachers. There are five versions of the assessment for various age groups, four years through adulthood. The MIDAS inquires about developed skill, levels of participation, and enthusiasm for a wide variety of activities that are naturally encountered as a part of daily life. The MIDAS was initially developed in 1987 as a structured interview format to assess the multiple intelligences for adolescents and adults undergoing cognitive rehabilitation (Way and Shearer, 1990). A summary of research results concluded that the MIDAS provides a “reasonable estimate” of a person’s intellectual disposition in the eight designated areas (Shearer, 1996; Buros, 1999).

The MIDAS was developed over a period of six years using a combination of rational and empirical methods of test construction with MI theory as a basis to guide interpretation of empirical results. Initially, a large number of items (n = 125) were generated through a careful reading of the behavioral characteristics of each intelligence as articulated in *Frames of Mind* (Gardner, 1983, 1993). Subject area experts (including Howard Gardner) reviewed these questions. Items were then field tested via in-depth interviews, whereby interviewees provided feedback on question wording and content clarity. A series of quantitative studies were then conducted to

examine inter-informant and test-retest reliability, item response patterns, factor structure, and inter-item correlations (Way & Shearer, 1990; Shearer, 1996; Shearer & Jones, 1994).

To increase the educational utility of the assessment, within scale factor analyses were conducted to create and verify domain-specific subscales pertaining to each of the main intellectual scales (e.g., Instrumental and Vocal for Musical) (Shearer, 1996). These subscales consist of a few items each and are intended as “qualitative indicators” to be verified by the respondent rather than as precise psychometric measures.

The MIDAS Professional Manual (Shearer, 1996) reports six studies that investigated validity of the MIDAS during its development. A study, using 349 participants, was conducted to assess the construct validity of the MIDAS. Psychometric properties were assessed against standards used to evaluate objective tests. The results indicated the MIDAS was a valid tool for measuring the seven intellectual constructs. A sample of 56 participants was used to evaluate concurrent validity; analyses showed correlation values between the subscales and appropriate cognitive tests ranging from .35 to .65. A reliability study, using 224 university participants, found an 86% agreement with expert raters in one category. Four studies were conducted aimed at measuring the internal consistency of the MIDAS. A grand mean alpha coefficient of .85 was found for all seven constructs. Finally, a study using 119 college students found the MIDAS to be a culturally unbiased assessment tool (Buros, 1999).

Wiswell, Hardy and Reio (2001) concluded that their factor analytic studies of 1409 cases confirmed five of the eight scales were unique constructs, but that three of the other scales were not as clearly defined (spatial, kinesthetic and intrapersonal). Further validation studies were recommended. Yoong's (2001) factor analytic studies of a MIDAS Bahasa Malaysian translation (MIDAS-BM) found a seven factor principal components solution accounted for 65% of the variance. Using varimax rotation the kinesthetic items did not cluster on any one factor. Pizarro (2003) also confirmed the presence of seven factors using a Spanish translation with 429 high school students employing a principal components extraction followed by varimax rotation. Items expected to comprise the Intrapersonal factor instead loaded primarily on the Interpersonal factor.

Shearer, (n.d) purpose to examine the factor structure of the MIDAS assessment using a much larger and more diverse sample than has been employed in any previous investigation. Participants in this study were adults and teenagers who completed the MIDAS assessment within a period of 10 years. In this study 10,958 cases with sex identification were selected (5,558 female, 5,400 male). There are 8,497 teenagers (grades 9 – 12); 1,347 college and university students and 1,071 adults. Initially, various exploratory analyses were performed using the whole sample (N=

10,958) and then a 50% random selection of the data was subjected to exploratory analysis. Confirmatory analyses then used a different random sample of 1800 cases. Eighteen items were eliminated from analysis because they were judged to be theoretically imprecise, redundant, or poor performers in terms of reliability and scale contributions. A principal components factor analysis using SPSS v11.5 was used to evaluate the structure of the 101-item instrument. Seventeen factors had eigenvalues greater than one and accounted for 56% of the variance. The descending pattern of eigenvalues for the factors suggested simple factor solutions ranging from seven to eleven. While this initial factor structure was deemed to be theoretically meaningful, a nine-factor solution using varimax rotation accounted for 46% of the variance and clearly delineated seven of the eight constructs proposed by the MI framework. The proposed spatial construct was split between two separate factors with theoretically acceptable clusters of items. The nine-factor solution was further reaffirmed by a confirmatory factor analysis (CFA) using a second sampling of 1800 cases. The factorial structure of the MIDAS as proposed by MI theory was consistently identified both across age groups and in split samples indicating a robust and stable factor structure. The items expected to correlate highest with their proposed primary factors do so for 97 of the 101 items. Items co-loading in unexpected ways across more than one factor are few and of acceptably low magnitude (around .30). The highest item loading values for each of the factors are consistently at the .60 guideline or higher except for the intrapersonal factor with values in the .50 range. All of the items on this factor also correlate with the interpersonal factor, but at an appropriately lower level.

The MIDAS was developed and validated using factor analysis and other techniques and was shown to possess high reliability, with Cronbach alphas measures mostly above 0.80 (Shearer, 1996, <http://www.miresearch.org>).

2.3. Procedure

The MIDAS was translated into Turkish by three academics (including the author) who were competent in both written and spoken English. The translated forms were reviewed and compared with one another in terms of the content and clarity of the items. In addition the Turkish form was reviewed by two Turkish Literature instructors to assess the appropriateness of the grammatical structure of the items. However, the most critical problem faced in the translation process was to identify suitable Turkish equivalents that reflected the degree of differences in the range of responses as reflected in the Likert scale values. Nonetheless, this problem was, hopefully, overcome by brainstorming session involving a group of undergraduate, graduate and adult who participated in the pilot study. No items were dropped but the contents of some of the items had

to be altered, such as using local examples, to fit the local context without losing its original intent.

The resultant Turkish version of MIDAS contained 119 items similar to the original questionnaire.

The final Turkish version was back translated into English by two academicians, then it was compared with the original scale. However, back translation did not ensure construct validity as many concepts either had no equivalent in another language or were difficult to translate without creating ambiguity. To address cultural and sub-cultural validity issues, a pilot study was conducted. According to pilot study results of internal consistency estimates (Cronbach alpha) for the MIDAS subscale scores ranged from .74 to .89 (median = .82, N=100). Considering these coefficients resulted from subscales, they were at or above the acceptable range for the study. Moreover, after that, a subsample of 33 participants agreed to complete MIDAS at Time 1 and again 4 weeks later Time 2.

After the above-mentioned language validation and pilot study were completed, the 119-item MIDAS was administered to 1475 participants. Completing the questionnaire took approximately 35 minutes. Researchers were present throughout the administration of the MIDAS. 44 participants were dropped from the study due to incomplete data, yielding a final sample of 1466 participants. Exploratory factor analysis (EFA) is performed to examine the factor structure of the scale according to the data obtained from this study sample and confirmatory factor analysis (CFA) is performed to examine the original scale's structure approved by Turkish experts in Turkish culture. The correlations between the total scores of component-factors are calculated. The data was factor-analyzed using SPSS for Windows Version 11.5.

3. Results

3.1. Factor Analyses

Exploratory Factor Analysis: Prior to conducting the EFA, we examined two indicators to determine whether the sample was appropriate for such an analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy index was .951, and Bartlett's test of sphericity was significant, $X^2(df: 7021, N=1475) = 74320,539$ $p < .0001$, indicating that the sample and correlation matrix were appropriate for such an analysis. Principal axis factoring analysis with an promax, kappa 4 was performed on the scores of the 119-item MIDAS. An promax, kappa 4 was used because we expected the factors to be correlated. This was done to determine the factor structure of the scale. We based the decision about number of factors to retain on a combination of methods (e.g., parallel analysis, eigenvalue > 1.0 , scree plots; Henson & Roberts, 2006) as well as conceptual clarity, interpretability and theoretical salience of the rotated factors, and simple structure. The results

revealed that 22 factors with Eigen values above 1.00 accounted for 56.87% of the variance. In this study, the various methods used to determine factor retention indicated that seven factors be retained for the final solution. The seven-factor solution accounted for 41.93% of the total variance. In selecting items for the final scale, minimum .20 factor loading was used a guideline for considering an item to be part of a factor (Tabachnick & Fidell, 2007). The process resulted in the elimination of 26 items from the questionnaire because of weak factor loadings or high cross loadings on more than one factor. The first factor (interpersonal-intrapersonal) accounted for 19.13%, the second factor (naturalist) accounted for 5.22%, third factor (musical) accounted for 4.77%, fourth factor (logical-mathematical) accounted for 4.31%, fifth factor (linguistic) accounted for 3.43%, sixth factor (spatial) accounted for 2.72%, and seventh factor (kinesthetic) accounted for 2.35%, of the total variance. The percentage of variance explained refers to variance accounted for postrotation. Whenever factors are correlated, structure coefficients (correlations of the measured variables with the extracted factors) are also important aids to interpretation (Thompson, 1997; Thompson & Borrello, 1985). All items loaded on the same subscales as in the original MIDAS, there were differences between the original MIDAS and this adaptation (MIDAS) result in the first factor, interpersonal and intrapersonal items loaded on (see Appendix-1 Table 1).

Next, the construct validity of MIDAS was retested with confirmatory factor analysis (CFA). CFA results show that the model fitness indicator indexes meet the statistical standards (Byrne, 1998; Jöreskog & Sörbom, 1993; Kline, 1998; Sümer, 2000; Şimşek, 2007) [$\chi^2=16558.65$ (sd=4164, $p<.001$), (χ^2 /sd=3.98, Non-Normed Fit Index (NNFI)=0.95; Normed fit index (NFI)=0.93; Comparative Fit Index (CFI)= 0.95; Incremental Fit Index (IFI)= 0.95; Root mean square error of approximation (RMSEA)=0.052; Standardized Root Mean Square Residual (SRMR)=0.062].

The corrected item-total correlations of MIDAS vary between 0.784 and 0.460. For each factor and each item, the differences between mean scores of upper 27% and lower 27% groups are significant ($p<.01$).

3.2. Internal Consistency

We computed estimates of internal consistency using Cronbach's coefficient alphas. Scores obtained from the 93-item MIDAS-Adult had a Cronbach's alpha of .96. The internal consistency estimates for the seven factors were as follows: Interpersonal-Intrapersonal Intelligence (21 items; $\alpha = .88$), Naturalist Intelligence (12 items; $\alpha = .89$), Musical Intelligence (13 items; $\alpha = .87$), Logical-Mathematical Intelligence (14 items; $\alpha = .86$), Linguistic Intelligence (13 items; $\alpha = .89$), Spatial Intelligence (12 items; $\alpha = .86$), and Bodily-Kinesthetic Intelligence (8 items; $\alpha = .81$). These

Cronbach's alpha estimates appear adequate for general research purposes (Henson, 2001; Nunnally & Bernstein, 1994).

In this application, the *interpersonal* and *intrapersonal* subscales blended to form a single subscale even though they appeared to be different subscales in MIDAS (see Appendix-1 Table 1).

3.3. Test-Retest Reliability and Internal Consistency

The 4-week test-retest reliability coefficients for the scores on the 93-items MIDAS and the scores on Interpersonal-Intrapersonal Intelligence, Naturalist Intelligence, Musical Intelligence, Logical-Mathematical Intelligence, Linguistic Intelligence, Spatial Intelligence and Bodily-Kinesthetic Intelligence subscales were 0.88, 0.89, 0.87, 0.86, 0.89, 0.86 and 0.81, respectively. The coefficient alphas for the 93-items items MIDAS, the Interpersonal-Intrapersonal Intelligence, Naturalist Intelligence, Musical Intelligence, Logical-Mathematical Intelligence, Linguistic Intelligence, Spatial Intelligence and Bodily-Kinesthetic Intelligence subscale were as follows at Time 1: 0.84, 0.82, 0.75, 0.80, 0.80, 0.77 and 0.77, respectively. At Time 2, the coefficient alphas were 0.87, 0.85, 0.87, 0.85, 0.82, 0.80 and 0.81, respectively. Taken together, these reliability estimates appear adequate for research purposes and test-retest reliability assessment are indicative of high temporal stability for of all seven subscales (Henson, 2001; Nunnally & Bernstein, 1994; Tabachnick and Fidell, 2007).

4. Discussion and Implications

In this study the factor structure of MIDAS developed by Shearer, (1996, 2006) is examined via exploratory and confirmatory factor analyses. The item loadings for factor representing Naturalist, Musical, Logical-Mathematical, Linguistic, Spatial, Bodily-Kinesthetic intelligences were fairly robust. The Intrapersonal scale loaded on the same factor as the Interpersonal scale, indication that the two constructs are not adequately distinguished from each other. Wiswell, Hardy and Reio, (2001) and Pizarro (2003) found similar result in their research. The CFA results showed that the factorial model of 7 factors of the MIDAS is at an acceptable degree of goodness of fit for undergraduate, graduate students at the Cukurova University and adult in Adana, Turkey. However, the Turkish version of MIDAS needs to be improved. Reliability coefficients of all scales were 0.81 - 0.89, greater than 0.70 are considered adequate (Kline, 1998). This was consistent with the previous research result (Shearer, (n.d); Wiswell, Hardy and Reio, 2001). The result of the item analysis of the scale showed that the items distinguished the individuals sufficiently in terms of relevant features of the items.

We recommend that additional EFA's and separate confirmatory models (CFAs) be conducted to further test the MIDAS psychometric properties and theoretical framework in different sample in Turkey are made. Additionally, construct validity studies are also needed comparing the scales to other external constructs or instruments. Finally, practitioners and users of the MIDAS should be aware that this instrument, like many others used in the human resource development arena is based on self report data.

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Appendix-1: Table 1: Factor Analysis Result

Sub-Scale Items	Factors							Mean	Standart Deviation	Item subscale correlation	%27 of Groups t-value
	1	2	3	4	5	6	7				
103	.618							3.79	.913	.623	24,586*
99	.615							3.69	1.018	.555	22,382*
98	.600							3.90	1.045	.558	21,917*
89	.588							3.99	.846	.534	19,795*
101	.587							3.59	1.000	.636	27,282*
100	.575							3.76	.996	.595	23,306*
91	.570							3.84	.919	.605	23,497*
85	.547							4.07	.882	.546	20,912*
90	.539							4.23	.788	.459	16,659*
88	.520				.195			3.71	.899	.640	26,729*
84	.476				.184			3.81	.874	.595	22,879*
92	.466							3.96	.960	.481	17,674*
81	.432				.260			3.32	.947	.638	26,033*
102	.425							3.61	1.207	.502	19,423*
97	.404				.240			3.32	.929	.611	24,539*
86	.394				.231			3.31	1.004	.564	21,163*
87	.351				.178			3.68	.864	.525	19,995*
106	.342							3.06	.933	.539	20,701*
80	.341						.152	4.02	1.114	.455	17,212*
93	.313							3.20	1.172	.498	19,473*
94	.295							3.61	1.314	.507	20,287*
111		.793						2.24	1.136	.760	36,112*
112		.784						2.41	1.247	.742	38,896*
108		.752						2.78	1.290	.728	36,406*
110		.742						1.95	1.189	.704	30,096*
109		.740						2.44	1.234	.736	34,941*
113		.655						2.72	1.145	.725	36,450*
107		.634						2.47	1.322	.636	28,407*
115		.563				.174		2.77	1.131	.637	26,308*
114		.529				.287		2.82	1.235	.672	31,382*
119		.424						3.35	1.165	.584	26,111*
117		.375						2.38	1.242	.566	22,871*
118		.334					.261	2.58	1.270	.586	25,989*
10			.698					3.33	1.086	.707	30,895*
8			.694					3.53	1.095	.713	34,492*
9			.674					3.83	.966	.653	29,270*
6			.653					3.64	1.056	.620	26,607*
11			.608					2.62	1.127	.727	33,560*
3			.603					3.14	1.117	.712	36,828*
14	.184		.551					3.65	1.062	.532	21,138*
1			.532					3.64	1.265	.592	24,414*
12			.514					3.71	1.072	.588	22,969*
4			.500				.237	2.35	1.240	.653	31,722*

Appendix-1 (continued): Table 1: Factor Analysis Result

Sub-Scale Items	Factors							Mean	Standart Deviation	Item subscale correlation	%27 of Groups t-value
	1	2	3	4	5	6	7				
3. Musical	13		.476		.194			2.05	1.228	.619	29,027*
	5		.400					2.15	1.078	.563	21,973*
	2		.308					1.98	1.492	.496	20,855*
	29			.857	-.182			3.32	1.396	.700	37,287*
	30			.775				3.52	1.328	.651	30,615*
	37			.722				3.50	.977	.700	27,982*
4. Logical-Mathematical	39		.684	.166			2.63	1.053	.731	32,489*	
	28		.676				3.51	1.095	.623	25,879*	
	42		.619				2.80	1.031	.726	32,906*	
	43		.569				2.84	1.322	.634	29,777*	
	31		.522				2.88	1.460	.599	28,322*	
	33		.408				3.29	1.072	.583	22,307*	
	32	-.165		.351			.191	2.25	1.123	.523	19,573*
	34			.325		.158		3.01	1.117	.535	19,601*
	38	.161		.296	.167			3.82	.981	.501	18,383*
	35	.177		.275		.198		3.08	1.180	.478	19,053*
	36			.251				2.99	1.159	.472	17,413*
	72				.738			2.81	1.170	.713	33,928*
	62				.716			2.88	1.133	.674	27,629*
	64	.167			.710	-.160		3.36	1.026	.705	32,454*
5. Linguistic	68			.681			2.87	.978	.725	29,609*	
	67			.629			3.12	1.163	.688	29,155*	
	73			.613			2.24	1.183	.622	25,343*	
	75			.593			2.74	1.091	.637	25,762*	
	61		.185		.556		2.95	1.254	.628	26,729*	
	66	.262			.548		3.42	.866	.653	25,561*	
	74				.537		2.55	1.067	.639	26,624*	
	63	-.223		.156	.536		2.37	1.244	.577	23,000*	
	65	.197			.514		3.10	1.086	.624	26,614*	
	78	.191			.481		3.40	.876	.605	23,290*	
	47		-.184			.786		2.89	1.186	.716	33,713*
6. Spatial	53					.728	2.19	1.218	.652	27,566*	
	46					.717	2.77	1.264	.729	36,423*	
	24					-.243	3.24	1.242	.644	29,254*	
	59					.638	2.78	1.271	.673	30,673*	
	55					.638	2.66	1.107	.649	26,582*	
	54			.166		.603	2.71	1.180	.567	21,927*	
	51			-.153		.453	.210	2.73	1.144	.561	24,125*
	58					.451		2.92	1.174	.640	27,370*
	23		-.151			.373		2.66	1.035	.503	18,836*
	50				.181	.341		2.67	1.078	.598	23,689*
56					.235	.196	3.12	1.137	.505	19,286*	

Appendix-1 (continued): Table 1: Factor Analysis Result

Sub-Scale Items	Factors								Mean	Standart Deviation	Item subscale correlation	%27 of Groups t-value
	1	2	3	4	5	6	7					
16								.812	3.18	1.174	.784	44,757*
20								.769	2.22	1.257	.756	39,477*
18								.763	2.35	1.302	.789	47,405*
15								.689	3.13	1.391	.665	34,136*
19								.511	2.17	1.559	.647	29,779*
21								.465	2.80	1.125	.605	25,222*
17			.201		.159			.311	2.22	1.175	.546	22,178*
22							.197	.252	2.07	.975	.460	16,010*
Eigen values	17.79	4.86	4.44	4.01	3.19	2.53	2.19					
% of Variance	19.13	5.22	4.77	4.31	3.43	2.72	2.35	Cumulative % 41.93				
Number of Item	21	12	13	14	13	12	8	Total 93 item				
Cronbach Alpha Scores	0.88	0.89	0.87	0.86	0.89	0.86	0.81	MIDAS (Overall) 0.95				

Note: To make sure more readable, factor loads below .15 were not included in the Table, N=1466; * significant at the level of .0001.

Genişletilmiş Özet

Zekânın tekil bir niteliğe sahip olmanın ötesinde bir anlam ifade ettiği ve çoğul bir yapı sergilediği düşüncesini temel alan Çoklu Zekâ Kuramı, bilmemizi ve öğrenmemizi sağlayan birden fazla zekâ türünün varlığından söz etmektedir. Gardner, 1983 yılında Çoklu Zekâ Kuramı'nı ilk ortaya koyduğunda; belirli bir zihinsel kavrayış biçimini temsil eden ve farklı toplumlarda farklı biçimde ortaya çıkan yedi tür zekâdan bahsetmiş, 1995'te sekizinci zekâ türü 'doğa zekası'nı literatüre eklemiş ve son olarak 1999'da 'varoluşçu zekâ'nın dokuzuncu zekâ türü olarak değerlendirilebileceğini belirtmiştir.

Her insanda farklı oranlarda mevcut olan ve geliştirilebilir nitelikteki söz konusu zekâ türleri; sözlü ya da yazılı olarak kelimeleri etkili kullanma yeteneğini ifade eden 'sözel/dilsel zekâ'; matematiksel işlemler yapabilmek ve mantıksal düşünme yeteneği olarak değerlendirilebilen 'mantıksal/matematiksel zekâ'; ritim, ton, melodi ve harmoniyi anlama ve kullanma yeteneği olarak tanımlanabilen 'müzikal/ritmik zekâ'; fiziksel davranışları koordine yeteneğini belirten 'bedensel/kinestetik zekâ'; başkalarının duygularını, ruh durumunu ve motivasyonlarını anlama yeteneği olarak açıklanabilen 'sosyal/kişilerarası zekâ'; kişinin kendi duygu ve düşüncelerini, tercihlerini, ilgilerini anlama ve bu anlayış doğrultusunda davranma yeteneğini simgeleyen 'kişisel/işsel zekâ'; doğadaki sayısız türdeki canlıyı tanıma ve sınıflamadaki uzmanlıkla açıklanabilecek 'doğa zekâsı' ve insanın yaşamındaki varlığı ile yaşamın anlamını sorgulama yeteneğini belirten 'varoluşçu zekâ' olarak detaylandırılabilir.

Gardner, bireylerin düşünme ve öğrenme süreçleriyle baskın zekâ alanları arasında ilişki olduğunu, bu anlamda bireyin zekâ alanının öğrenme biçimini etkilediğini ve birey için baskın zekâ alanı/alanları doğrultusunda etkili öğrenme stratejilerinin geliştirilebileceğini savunmaktadır. Bu noktada, IQ testleri zihinsel ve yeteneksel gelişim için çözüm önerileri sunmaksızın bireyleri aldıkları zekâ puanına göre kategorize ederken, Çoklu Zekâ Kuramı uyarınca geliştirilen testlerle bireyde güçlü ve zayıf zekâ alanı/alanlarına ilişkin farkındalık yaratılarak kişisel gelişim için özel çözümler geliştirilebilmektedir. Çoklu Zekâ Kuramı, kişinin kendi zekâsını tanıması ve geliştirmesine olanak tanıyan çözüme dönük bu yapıyla, zekânın sabit olduğu ve yaşam boyunca değişmeyeceği iddiasında olan klasik IQ yaklaşımından farkını ortaya koymaktadır.

Çoklu zekâ kuramına göre; insanoglu sekiz zekâ alanına ve belki de çok daha fazlasına sahiptir. İnsanların zekâ profilleri birbirinden farklıdır. Yani kalıtsal ve çevresel rastlantılar ve

bunların etkileşimine bağlı olarak aramızda tam olarak aynı oran ve karışımında bir zeka bileşimi sergileyen iki kişi bulunmamaktadır. Bu nedenle çoklu zeka kuramıyla bireylerin çoklu zeka alanlarını belirleyebilirsek, daha çok kişiye ulaşılma ve bu kişilere zeka alanları temelinde bir ortam oluşturma ya da kendilerini tanımalarına yardımcı olarak kendileri ile barışık bireyler olmaları konusunda bir farkındalık oluşturma fırsatımız olacaktır. Bu bağlamda ayrıca; son yıllarda farklı uzmanlık alanlarından bilim adamlarının ortak çalışmaları ile eğitim sürecinde “yaşam boyu aktif öğrenme”, “problem çözme yeteneği” gibi olguların gittikçe daha önemli hale geldiği görülmektedir. Bu değişime ayak uydurabilecek bireyler kendilerinin farkında olan bireyler olacaktır. Bireylerin kendileri hakkındaki farkındalıklarını arttırmak amacıyla Shearer (1996) tarafından geliştirilmiş “Çoklu Zeka Alanları Gelişimsel Değerlendirme Ölçeği (MIDAS), uygulanabilir. MIDAS uygulaması sonucunda ulaşılabilecek bilgiler ışığında bireylerin güçlü ve zayıf yönlerine dikkatleri çekilerek özelliklerine uygun eğitilmeleri ve yönlendirilmeleri sağlanabilir. Bu araştırmada Shearer (1996, 2006) tarafından geliştirilmiş sekiz zeka alanını içeren toplam 119 maddeden oluşan “Çoklu Zeka Alanları Gelişimsel Değerlendirme Ölçeği”nin (MIDAS) uyarlamasını yapmak amaçlanmıştır. Bu araştırmanın örneklemini, Çukurova üniversitesinin farklı bölümlerine devam eden, bir üniversiteden mezun olup Çukurova üniversitesinde yüksek lisans/doktora programlarına devam eden ve Adana’da yaşayan toplam 1466 (774 kadın, 692 erkek) birey oluşturmuştur. Test tekrar test güvenilirliği için ölçek 100 katılımcıya yeniden uygulanmıştır. Araştırmaya katılanların yaşları 15 ila 79 yıl arasında bir dağılım göstermektedir.

Bu araştırma kapsamında uyarlaması yapılan Çoklu Zekâ Alanları Gelişimsel Değerlendirme Ölçeği (Multiple Intelligence Developmental Assessment Scales-MIDAS) bireylerin zekâ alanlarına ilişkin profillerini belirlemek amacıyla Shearer (1996, 2006) geliştirilmiştir. Ölçek sekiz zeka alanına hitap eden 119 maddeden oluşmaktadır. Bireyler ölçekte yer alan her bir ifadeye ilişkin katılma düzeylerini A dan F ye kadar her bir ifadeye göre biçimlendirilen seçeneklerden kendilerine uygun olanı işaretleyerek belirtmektedirler. Ölçekte “bilmiyorum”, “bilmiyorum, hiç denemedim”, “bilmiyorum, hatırlamıyorum” seçenekleri boş bırakılmış varsayılarak değerlendirmeye alınmamaktadır. Diğer seçeneklere verilen puanlar 0 ile 4 arasında değişen Likert tipi beşli derecelendirme ölçeğine dönüştürülerek hesaplamalar yapılabilmektedir.

Örnek: Çocukken müziği ya da müzik derslerini sever miydiniz?

- A) Hayır (0) B) Çok nadir (1) C) Bazen (2) D) Hemen hemen her zaman (3)
E) Her zaman (4) F) Bilmiyorum, hatırlamıyorum (boş)

Ölçeğin yapı geçerliği için açımlayıcı ve doğrulayıcı faktör analizi yöntemleri, güvenilirliğin belirlenmesi için de Cronbach alfa iç tutarlılık katsayısı, düzeltilmiş madde-toplam korelasyonu ve t-testi kullanılarak üst %27 ile alt %27 gruplarının madde ortalamaları arasındaki farklılığın anlamlılığı incelenmiştir.

Yapılan analizler sonucunda toplam varyansın %41.93’ünü açıklayan yedi boyut ve 93 maddenin yer aldığı bir çözüme ulaşılmıştır. Cronbach Alpha iç tutarlılık katsayısı ortalama 0.87 yeterli düzeydedir. Yapılan doğrulayıcı faktör analizi sonucunda incelenen uyum belirteçleri de modelin verilere iyi uyum göstermesi bakımından tatminkar sonuçlar vermiştir [$\chi^2=16558.65$ (sd=4164, $p<.001$), ($\chi^2/sd=3.98$, NNFI= 0.95, NFI=0.93, CFI=0.95, IFI= 0.95, RMSEA=0.052, ve SRMR= 0.062].

Sonuç olarak, hem açımlayıcı hem doğrulayıcı faktör analizleri ile güvenilirlik analizlerinden elde edilen değerlere bakılarak, Çoklu Zekâ Alanları Gelişimsel Değerlendirme Ölçeği’nin bireylerin zekâ alanlarına ilişkin profillerini belirlemede kullanılabilir geçerli ve güvenilir bir araç olduğu söylenebilir. Ancak ölçeğin benzer ölçek geçerlik çalışmaları yapılmalı ve Daha büyük örneklerde (Türkiye evreninde) bir çalışmanın projelendirilerek gerçekleştirilmesi önerilmektedir.

Anahtar Kelimeler: çoklu zeka, doğrulayıcı faktör analizi, geçerlik, güvenilirlik, MIDAS