

TCSW Sounds and Images IIA Validity Study of the Turkish Language.docx

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“Thinking Creatively with Sounds and Words: Sounds And Images IIA” validity study in the Turkish language

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Abstract

Creativity, although it had existed since the existence of humanity, nowadays it is gaining more and more importance. In this process, creativity have been addressed in a variety of ways such as the studies of development on creativity and determination of the level of creativity. For this reason some scales or tests have been developed. Developed tests in a certain culture or language have reflect this culture and language’s understanding and qualifications. It is important to be done in a systematic way to test or scale adaptation studies in order to be applicable and meaningful in different culture or language.

The purpose of this research is to study the validity of the Turkish language of the Test of Creative Thinking with Sounds and Words: Sounds and Images IIA developed by Torrance and Cunnington.

Language validity study was conducted in the academic year 2014-2015 by Dokuz Eylül University Buca Education Faculty Department of Foreign Language Education and Literature Faculty Department of Translation and Interpreting 4. Grade students (n=55). For the reliability and validity study, the Sounds and Images IIA Turkish form was conducted in the academic year 2014-2015 by Dokuz Eylül University, Adnan Menderes University, Muğla Sıtkı Koçman University Education Faculty Department of music Education 1.- 4. Grade students (n=276).

The Sounds and Images IIA English form Cronbach’s Alpha reliability coefficient is .64, for the Sounds and Images IIA Turkish Form Cronbach’s Alpha reliability coefficient is .61[.60 ≤ α < .90]. The correlation coefficient between the Sounds and Images IIA English and Turkish form’s scores is .81 and there is a positive significant relationship between scores [$r=.81$, $p<.01$]. There isn’t statistically significant difference between the English and Turkish scores [$t=.29$, $p>.01$].

The Sounds and Images IIA Turkish Form Cronbach’s Alpha reliability coefficient is .61, Spearman-Brown split-half reliability coefficient is .59 [.60 ≤ α < .90]. This result show that the Sounds and Images IIA Turkish Form is a reliable measuring instrument for Turkish language.

Keywords: Creativity; evaluation of creativity; thinking creatively with sounds and words; the Sounds and Images IIA; scale adaptation

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6 1. Introduction

7 Creativity is not a privilege of a few elite people, but it is a very important act that every
8 person in need can refer to, that is necessary in inter-personal lives, in relationships, in many events
9 or situations (Yavuzer, 1989: 9).

10 San (2002) defines creativity as an ability that exists at all levels and can manifest itself in every
11 part of human life, a set of processes that lead to the emergence of masterpieces from everyday life
12 to scientific works or art, and also as a form of attitude or behavior (Cited by: Üstündağ, 2011: 5).

13 According to Lowenfeld (1959), creativity is a kind of characteristic that individuals have in
14 varying amounts and which is likely to emerge more or less depending on the situation (Rouquette,
15 1992: 14). Creativity, therefore, is a potential power that can be found in every person and can
16 manifest itself in the presence of appropriate conditions.

17 Sungur (1992: 19, 20) notes that systematic research on creative thinking began in the 1960s,
18 and that the literature on creativity has developed in three different directions. First of these intends
19 to describe the creative individual; and includes Guilford's (1967) studies in the cognitive domain,
20 Mac Kinnon's (1962) studies on personality and Dunnette (1976), Gough (1976), and Torrance's
21 (1972) studies on comprehension. The second set of research aims to find out which factors increase
22 or inhibit creativity, while the 42nd approach consists of studies aimed at training more creative
23 individuals led by the studies of Osborn (1963), Parnes (1969), Gordon (1956) and Prince (1970).

24 Gordon states that the creative process can be fully analyzed, and no matter what the research
25 topic is (technical, scientific, aesthetic), the creative process always activates same mechanisms and
26 that the creation processes show similarities between individuals and groups (Rouquette, 1992: 68).

27 While Maslow (1959) deals with creativity in two dimensions, as spontaneous, gushing and
28 playful *core creativity* and controlled, disciplined and non-playful *secondary creativity*, Taylor (1959)
29 presents five ranked levels of creativity. These are; expressive, productive, inventive, innovative, and
30 emergent creativity. Expressive creativity exists originally in the individual; the demonstration of the
31 individual is important and not the quality of the product. Productive creativity requires the activation
32 of developed and controlled skills or predispositions. Even if the product is not original compared
33 to what others have done, the individuals reach a higher behavioral stage. Inventive creativity is
34 characterized by the perception of new relationships and involves the original use of previously
35 gained experiences. Innovative creativity requires a high abstraction capacity and is a productive
36 transformation of progression. Emergent creativity contains completely new basic principles
37 (Rouquette, 1992: 14, 15; Translated by Gürbüz).

38 While Wallas (1926) addresses the process of creativity in four stages as "preparation,
39 incubation, inspiration, and validation", Harris (1959) has argued that it consists of five consecutive
40 stages, "the recognition of need, the gathering of knowledge, the thinking activity that processes this
41 knowledge, the designing of solutions, validation and application". According to Harris, "the
42 designing of solutions" is at the core of the creative process, whereas Wallas argues that it is
43 "inspiration". According to Mednick (1962), there are three basic forms or ways of achieving a
44 creative solution: "coincidence, similarity, and mediation" (Rouquette, 1992: 18, 21; Translated by
45 Gürbüz).

46 Many researchers have developed scales and tests to determine the characteristics of
47 creativity. Guilford notes that creativity and the characteristics specific to creative individuals should
48 be examined, and describes the competence qualities that characterize creativity as the ability to see
49 problems, smooth thought flow, thought flexibility, originality, redefining and processing. In order
50 to measure the properties of originality, several ways has been suggested including the counting of
51 answers that reflect intelligence, the use of ideas based on distant associations, and the evaluation of
52 rare answers in all the answers of individuals within the society (Yavuzer, 1989: 15).

53 Lowenfeld et al. (1962), who determined the criteria of creativity, express that creative
54 features in art consist of flexibility, fluency, originality, sensitivity to problems, redefinition and
55 regulation, analysis, synthesis and organizational consistency (Cited by: Yavuzer, 1989: 35).

56 Many studies have been carried out by Getzels and Kogan (1965), Torrance (1962), Wallach
57 and Kogan (1965) to reveal the relationship between intelligence and creativity. Torrance notes that
58 if talented children are identified only by classical intelligence tests, about 70 percent of the most
59 creative subjects are eliminated. The work of Wallach and Kogan also reveals that intelligence and
60 creativity are two largely independent dimensions (Rouquette, 1992: 16, Translated by Gürbüz).

61 Mc. Kinnon (1962) also notes that there is no high level of relationship between creativity
62 and intelligence, and that it is difficult to say that a more intelligent individual will be more creative
63 (Cited by: Sungur, 1992: 77).

64 At the heart of many creativity tests is the idea that each individual has a varying amount of
65 creativity. These tests attempt to take into account the potential of the individual to produce original
66 answers with a set of appropriate evidences, either by creating simulations of various creative
67 situations or by encouraging the application of a special intellectual function (Rouquette, 1992: 14;
68 Translated by Gürbüz).

69 A number of creativity tests have been developed with the aim of determining the level of
70 creativity, and creativity has been dealt with in different aspects. One of the tests developed is the
71 Thinking Creatively with Sounds and Words test, developed by Cunningham and Torrance and
72 Khatena.

73 Thinking Creatively with Sounds and Words test consists of two independent tests: "Sounds
74 and Images" and "Onomatopoeic Words and Images" where the level of creativity is assessed by
75 responses to auditory stimuli. Sounds and Images test was developed by Torrance and Cunningham,
76 whereas Onomatopoeic Words and Images test was developed by Khatena. The aim of the test is to
77 show how advanced an individual's creativity and imagination is. The main characteristic is that it
78 evaluates creative thinking through auditory stimuli, unlike the formal and verbal form of the
79 Torrance Creative Thinking test. The test is a useful and functional measurement tool that measures
80 the original thinking potential of children, adolescents, and adults (Khatena and Torrance, 1998: 1).

81 The Sounds and Images form consists of 4 different sounds that go from concrete sounds
82 to abstract sounds specifically designed to maximize your imagination. These four groups of
83 sounds are played three times at intervals of 15 seconds, and each time a sound is heard, the
84 participant is asked to imagine an original image related to that sound. The Onomatopoeic Words
85 and Images form consists of 10 reflective words whose musical qualities are different from ordinary
86 words. This group of words, which is read four times over a short period of time, is carefully listened
87 to and individuals are asked to animate an original image related to each word. Each form has a
88 separate scoring guide. The feedbacks given to the forms where scoring is done within the scope of
89 the originality dimension of creativity are scored from 0 to 4 with the scoring guide in the manual.
90 The highest score to be taken from the Sounds and Images form is 48, while the highest score that
91 can be obtained from the Onomatopoeic Words and Images form is 160 (Torrance, Khatena and
92 Cunningham, 1990: 4-8).

93 This test has been prepared for two levels; where Level I is for Grades 3-12, whereas Level
94 II is for adults. In addition, each level consists of two equal forms for the pre-test and post-test (form
95 A and B) <<http://s26.sting.com/2005giftcs.html>> (Last accessed: 17.11.2017).

96 The aim of this study is to conduct the Turkish language validity and reliability study of the
97 Creative Thinking With Sounds and Images IIA form developed by Torrance and Cunningham as
98 part of the Creative Thinking Test With Sounds and Images. Turkish language equivalence, reliability
99 and validity studies have been carried out by obtaining the necessary permissions from Scholastic
100 Testing Service, which has publishing rights for the adaptation of the form in Turkish.

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103 2. Method

104 Tests that are developed in a particular culture and language reflect a certain set of
105 understanding and qualities specific to that culture and language. It is important to perform scale
106 adaptation studies systematically so that the same test can be applied and be meaningful in different

107 cultures and languages. Öner (2012: 21, 22) states what should be done in scale adaptation study,
108 which he defines as adaptation model, as follows:

109 In the first stage of the model, the test items are translated and the language equivalence
110 of the test is tested by empirical methods to examine the psycholinguistic qualities.
111 Original test items and items of the translated form are then applied to groups consisting
112 of individuals who are bilingual or fluent in both languages (sample), and the responses
113 are compared. If the translation is done well, and the items are clear and comprehensible,
114 they constitute meaningful expressions for the participants. In this case, there are no
115 statistically significant differences between the responses given to the original and the
116 translated items. Thus the language differences hypothesis has been tested and rejected.
117 In the second stage, the psychometric properties of the translation form -for which
118 language equivalency is determined- are examined. Here, the reliability and validity of
119 the translation test items are tested. Invariance, homogeneity and internal consistency
120 tests can be performed for reliability; whereas criterion-dependent (both time,
121 procedure), structure (theory-concept, hypothesis) etc. validity techniques can be applied
122 for validity.

123 In the third stage, the culture-dependent qualities of the adapted test are examined. The
124 new (translated) language norms and the original language norms (if adapted to other
125 languages, their norms as well) are compared. In addition, questions such as "Does the
126 factor structure, and the factor load of the new test resemble the original form?", "If
127 there are differences, can they be explained with characteristics like language, culture,
128 etc.?" are answered.

129 Study group

130 Pilot application of the translation within the context of language validity study was
131 conducted with 4th grade students (n = 55) who were studying in Dokuz Eylül University Buca
132 Education Faculty Department of Foreign Language Education and Literature Faculty Department
133 of Translation and Interpreting in 2014-2015 academic year. Two weeks after the English test was
134 applied, the Turkish translation was applied on the same students. In the first application, students
135 were asked to write their images about the voices they heard in English, whereas in the second
136 application, they were asked to write their images in Turkish.

137 The reliability and validity study of the Creative Thinking With Sounds and Words "Sounds
138 and Images IIA" form, which Turkish linguistic equivalency was established, was performed on
139 data collected from 107 students from Dokuz Eylül University, Buca Faculty of Education, Fine Arts
140 Education and Department of Music Education, 86 students from Adnan Menderes University,
141 Faculty of Education, Department of Fine Arts, Department of Music Education, and 83 students
142 from Muğla Sıtkı Koçman University Faculty of Education Fine Arts Education Department Music
143 Education Department, with a total of 276 students from grades 1-4 continuing their education in
144 the 2014-2015 academic year.

145

146 3. Results

147 3.1. Linguistic equivalence results

148 Within the scope of linguistic equivalence studies, the Creative Thinking With Sounds and
149 Words "Sounds and Images IIA" form and the scoring manual were translated into Turkish by three
150 experts, and a joint form and scoring manual was developed from the three translations.
151 Subsequently, the joint form and scoring manual was translated back into the original language and
152 their consistency with the original structures was examined. In this examination, it was seen that there
153 was language equivalence between the original form and the scoring manual and the translations
154 made from Turkish, and structural equality was established by making necessary corrections in the
155 Turkish form and scoring manual. In adapted tests, the primary concern is structural equality.
156 Structural equality is determined by experts who are familiar with both cultures and the measurement
157 topic (Şencan, 2005: 607, 609).

158 English and Turkish forms were applied on 33 female and 22 male (n = 55) students
159 continuing their education in Dokuz Eylül University, Buca Education Faculty, Foreign Languages
160 Education Department English Language Education Department, and Literature Faculty Translation
161 and Interpretation Department during 2014-2015 academic year.
162 The data obtained from Creative Thinking With Sounds and Words "Sounds and Images IIA"
163 English and Turkish forms were subjected to Kolmogorov-Smirnov normality test to assess the
164 distribution of the data. Normality test results are shown in Table 1.
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Table 1. Sounds and Images IIA Form normality test results

	Kolmogorov-Smirnov	sd	p
English Form	.097	55	.20*
Turkish Form	.113	55	.08
Difference between averages	.096	55	.20*

P > 0.05

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167 The Kolmogorov-Smirnov normality test, based on testing whether the data fit a normal
168 probability distribution of a defined universe, tests the hypothesis that "there is no difference between
169 the distribution of the available data and the normal probability distribution", and a P value greater
170 than 0.05 means the data is normally distributed (Can, 2013: 88,89). The P value obtained in the
171 normality test on the data is greater than 0.05, as seen in Table 1. According to this result, the data of
172 the Sounds and Images IIA English and Turkish Forms and the difference between the averages of
173 the forms show a normal distribution [P > 0.05].

174 Cronbach's alpha coefficients were calculated to test the reliability of the data obtained from
175 the Creative Thinking With Sounds and Words "Sounds and Images IIA" in English and Turkish
176 forms. Cronbach's alpha reliability coefficients for the forms are given in Table 2.
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Table 2. Reliability coefficients of English and Turkish forms

	α	Number of Items
English Form	.64	4
Turkish Form	.61	4
Overall	.81	8

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179 According to the data in Table 2, reliability coefficient of the English form is .64, and
180 reliability coefficient of the Turkish form is .61. These results indicate that the measurements are
181 highly reliable [$.60 \leq \alpha < .90$]. Reliability in measurements are expressed with the reliability
182 coefficients. The coefficient usually takes a value between 0 and +1, and the closer it is to 1, the
183 greater the reliability (Can, 2013: 340).

184 In order to determine the significance between the feedback given to Creative Thinking With
185 Sounds and Words "Sounds and Images IIA" in English and Turkish forms and the scores in the
186 forms, and form scores in general, Pearson Moment Product Correlation (Simple Linear Correlation)
187 analysis was performed. Simple Linear Correlation is used to describe the linear relationship between
188 two variables measured on a range or ratio scale. Correlation coefficient (r) is between -1 and +1, and
189 the closer the value is to 1, the higher the correlation between the variables (Büyüköztürk, Çokluk
190 and Köklü, 2013: 91, 92).

191 The correlations results between Sounds and Images IIA English and Turkish forms are shown in
192 Table 3.
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Table 3. English and Turkish Forms correlation results

8	N	r	p
Sound 1	55	.59**	.00
Sound 2	55	.69**	.00
Sound 3	55	.47**	.00
Sound 4	55	.50**	.00
Overall	55	.81**	.00

196 p<0.01

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Correlation coefficient between English and Turkish scores was found to be .81. Correlations on individual sounds were found to be .59 for Sound 1, .69 for Sound 2, .47 for Sound 3, and .50 for Sound 4. Positive and significant correlations were found between the scores of English and Turkish forms [31 0.01].

t-test was conducted to determine the significance of the difference between English and Turkish scores. For related samples, the t-test (Paired Sample t-test) is used to determine whether there is a statistically significant difference between the averages of the data obtained from two successive measurements on the same data source (Can, 2013: 132). The results of the paired sample t-test are shown in Table 4.

Table 4. Paired t test results for English and Turkish forms

	n	\bar{x}	S	Difference between averages	sd	t	p
English Form	55	21.85	8.63	.29	54	.40	.68
Turkish Form	55	21.56	8.58				

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p>0.01

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The difference between English and Turkish scores is .29. The p-value of the paired sample t-test was found to be .68. Therefore, there was no statistically significant difference between the English and Turkish scores, and the gap hypothesis stated as "There is no difference between the score averages of Sounds and Images IIA English and Turkish Forms" was accepted [P > 0.01].

In order to assess rater reliability, Creative Thinking With Sounds and Words "Sounds and Images IIA" English Turkish forms of 10 randomly picked students were evaluated by an external expert, and inter-rater reliability was assessed by Kendall's W coefficient (Kendall's Coefficient of Concordance).

Kendall's coefficient of concordance is a non-parametric test that assesses whether there is a significant level of concordance between the evaluations of multiple raters on a group. Kendall's Coefficient of Concordance takes a value between 0 and 1, and a value closer to 1 implies a high level of concordance (Can, 2013: 348).

Kendall's W Coefficient of Concordance Results for Sounds and Images IIA English and Turkish forms are presented in Table 5.

Table 5. Kendall's W concordance coefficient results

	n	W	x^2	sd	p
English Form	2	.98	17.61	9	.04
Turkish Form	2	.96	17.28	9	.04

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p<0.05

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There is statistically significant concordance between the evaluations made by the two evaluators for the English Form [W:.98, p<.05]. There is also a statistically significant concordance among the evaluations for the Turkish Form [W:.96, p<.05].

229 Discriminant (function) analysis was conducted to investigate the difference between the
230 groups that filled out the Creative Thinking With Sounds and Words "Sounds and Images IIA"
231 English and Turkish Forms (Dokuz Eylül University, English Language Education Department and
232 Translation and Interpreting Department).

233 Discriminant analysis is a multivariate statistical technique that serves to establish a predictive
234 model of group members. Factor analysis is the most common way of examining the similarities
235 between variables in behavioral science. Although their purposes are not the same, the three most
236 popular methods for examining the similarities between variables are clustering analysis, profile
237 analysis, and discriminant analysis. Discriminant analysis can be performed to investigate differences
238 between groups (Çokluk et al., 2012: 105, 106, 107).

239 The Wilks' lambda test results for equality of group averages performed for the discriminant
240 analysis are given in Table 6.

241

Table 6. Group average equalities test results

	λ	F	sd1	sd2	p
English Form	.93	3.79	1	53	.06
Turkish Form	.95	2.78	1	53	.10

242 $p > 0.05$

243

244 Wilks' Lambda (λ) takes a value between 0 and 1. 0 means that the group means are different,
245 and 1 means that the group means are similar or not different (Diekhoff, 1992; Garson, 2008; Cited
246 by: Çokluk et al., 2012: 12).

247 According to the Wilks' Lambda data in Table 6, the group averages for the English and
248 Turkish forms of students of the English Language Education Department and the Translation and
249 Interpretation Department are similar [$\lambda_{\text{EnglishForm}} = .93, p > .05$ and $\lambda_{\text{TurkishForm}} = .95, p > .05$].

250 In conclusion, based on the results obtained by Cronbach Alfa Reliability analyses, analyses
251 of correlation and difference between forms, concordance analysis between evaluators, and
252 difference analyses between the groups indicate that Turkish version of the Creative Thinking With
253 Sounds and Words "Sounds and Images IIA" form is a valid measurement tool.

254

255 3.2. Reliability and validity results

256 The reliability and validity study of the Creative Thinking With Sounds and Words "Sounds
257 and Images IIA Turkish" form was conducted with data obtained from a total of 276 students (157
258 female and 119 male) attending Music Education Departments of Dokuz Eylül University, Adnan
259 Menderes University and Muğla Sıtkı Koçman University.

260 Central tendency and Kolmogorov-Smirnov normality test results of the Creative Thinking
261 With Sounds and Words "Sounds and Images IIA Turkish" form are given in Table 7.

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Table 7. Sounds and Images IIA Turkish form central tendency and normality test results

n	276
Mean	20.36
Median	20.00
Peak Value	20.00
Skewness	.18
Standard Error of Skewness	.15
Kurtosis	-.44
Standard Error of Kurtosis	.30
Kolmogorov-Smirnov	.05
P	.20

263 $p > 0.05$

264 When the central tendency and Kolmogorov-Smirnov normality test results are examined, it
 265 is seen that the Sounds and Images IIA Turkish Form data have an ideal normal distribution [$P >$
 266 0.05].

267 The Kolmogorov-Smirnov normality test is based on testing whether the data fit a normal
 268 probability distribution of a defined universe. A P value greater than 0.05 means the data is normally
 269 distributed. In an ideal normal distribution, mean, median and peak value overlap; the closer these
 270 three values are to each other, the more normal distribution characteristics the data will exhibit (Can,
 271 2013: 8258, 89).

272 In order to determine the reliability of the measurements made for the Creative Thinking
 273 With Sounds and Words "Sounds and Images IIA Turkish" form, Cronbach Alfa and Spearman-
 274 Brown Split-Half reliability coefficient analyses were performed.

275 In the reliability tests conducted with split test scores, the items in the measurement tool are
 276 generally divided into two equal groups as single and odd numbered items, and the relationship
 277 between the groups is calculated (Karasar, 2006: 150). Therefore, split-half method divides the form
 278 into two equal pieces, allowing for the estimation of reliability by correlating the scores of participants
 279 obtained from both halves.

280 As a result of the reliability analysis, the Cronbach Alpha coefficient for the Turkish version
 281 of Sounds and Images IIA was found to be $.61$. This result indicates that the measurement is quite
 282 reliable [$.60 \leq \alpha < .90$]. The Spearman-Brown reliability coefficient was found to be $.59$. This result
 283 indicates that the measurement is reliable at an acceptable level.

284 The correlation results between the sounds taken from the Sounds and Images IIA Turkish
 285 Form and the scores obtained from the overall form are given in Table 8.

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Table 8. Sounds and Images IIA Turkish form correlation results

	Sound 1	Sound 2	Sound 3	Sound 4
Sound 2	$r=.35^{**}$ $p=.00$			
Sound 3	$r=.20^{**}$ $p=.00$	$r=.31^{**}$ $p=.00$		
Sound 4	$r=.31^{**}$ $p=.00$	$r=.28^{**}$ $p=.00$	$r=.25^{**}$ $p=.00$	
Overall	$r=.67^{**}$ $p=.00$	$r=.72^{**}$ $p=.00$	$r=.66^{**}$ $p=.00$	$r=.67^{**}$ $p=.00$

287 $p < 0.01$

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289 The correlation between the overall score obtained from the form and Sound 1 was found
 290 to be $.67$, Sound 2 was found to be $.72$, Sound 3 was found to be $.66$, and Sound 4 was found to be
 291 $.67$. These correlations are positive and significant [$P < 0.01$].

292 Discriminant (function) analysis was performed to investigate the differences between the
 293 groups according to the class levels of the students who completed the Creative Thinking With
 294 Sounds and Words "Sounds and Images IIA" form. Table 9 shows the Wilks' Lambda group
 295 averages' equality test results for the sounds in the form and the overall scores.

Table 9. Group average equalities test results

	λ	F	sd1	sd2	p
Sound 1	.99	.70	3	272	.55
Sound 2	.99	1.21	3	272	.31
Sound 3	.99	.39	3	272	.76
Sound 4	.98	1.47	3	272	.23
Overall	.99	1.10	3	272	.34

296 $p > 0.05$

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297 Since Wilks' Lambda takes a value between 0 and 1, based on the Wilks' Lambda values
298 presented in Table 9, group averages of the students in terms of class level are similar to each other
299 [$\lambda_{\text{Sound1}} = .99$, $\lambda_{\text{Sound2}} = .99$, $\lambda_{\text{Sound3}} = .99$, $\lambda_{\text{Sound4}} = .98$, $\lambda_{\text{Overall}} = .99$, $p > .05$].

300 Exploratory and confirmatory factor analysis was performed to evaluate the structural validity
301 of the Sounds and Images IIA Turkish form. Exploratory factor analysis is a process that obtains the
302 factors based on the relationship between the variables (Büyüköztürk, 2009: 123). The item factor
303 loads obtained by the exploratory factor analysis, KMO values and Bartlett Test results are presented
304 in Table 10.

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Table 10. Sounds and Images IIA Turkish form item factor loads and KMO value and Bartlett Test results

Items	Factor
8	(Sounds and Images IIA Turkish)
Sound 1	.69
Sound 2	.73
Sound 3	.62
Sound 4	.67

KMO = .68; Bartlett Test p = .00; Total Explained Variance = 46.11

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p < 0.05

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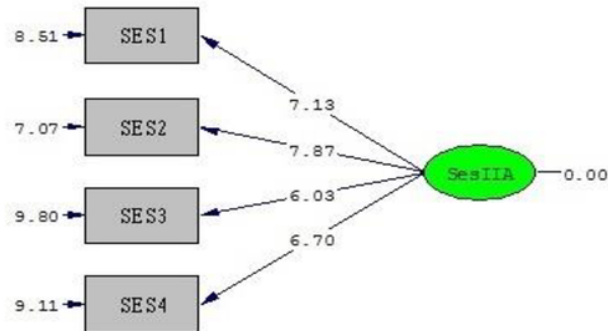
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Figure 1. t-value path diagram of the rate of observed variables explaining the latent variable



(χ^2 :3.46; sd: 2; p=.17)

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19 The researcher must first check the significance level of the t values of the observed variables. The t values of the observed variables explaining the latent variable are shown on the arrows. A t value exceeding 1.96 indicates a significance level of 0.05, and a t value exceeding 2.56 indicates a significance level of 0.01 (Çokluk et al., 2012: 304). According to Figure 1, the rates of Sounds 1-4 explaining the Sounds and Images IIA form are significant at a level of 0.01.

Concordance index values of the Sounds and Images IIA Turkish form are given in Table 11.

Table 11. Concordance index values of the Sounds and Images IIA Turkish form

Concordance Measure	Value	Concordance
χ^2 /sd	1.73	Perfect
RMSEA	.05	Perfect
NFI	.97	Perfect
NNFI	.96	Perfect
CFI	.99	Perfect
GFI	.99	Perfect
AGFI	.97	Perfect

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p>0.01

36 According to Table 11, the ratio of chi-square and degree of freedom, χ^2 /sd is 1.73, whereas p=0.17. In large samples, a χ^2 /sd ratio smaller than 3 indicates perfect concordance, while a ratio smaller 5 indicates intermediate concordance (Kline, 2005; Sümer 2000; Cited by: Çokluk et al., 2012: 307). P value is 0.17. The significance of the P value which indicates the significance of the difference between the expected covariance matrix and observed matrices (χ^2 value) may be neglected in many studies. For this reason, it is useful to evaluate alternative concordance indices to assess concordance between the two matrices (Çokluk et al., 2012: 307).

35 The values for other concordance indices as shown in Table 11 are; Root Mean Square Error of Approximation, RMSEA: .05; Normed Fit Index, NFI: .97; Non-Normed Fit Index, NNFI: .96; Comparative Fit Index, CFI: .99; Goodness of Fit Index, GFI: .99; and Adjusted Goodness of Fit Index, AGFI: .97. Çokluk et al. states that a RMSEA value lower than .05 indicates a perfect fit, and a value lower than .08 indicates a good fit; whereas NFI, NNFI, CFI, GFI and AGFI values higher than .95 indicate a perfect fit (2012: 307, 312). Based on the obtained values, it can be stated that the Sounds and Images IIA Turkish form has a perfect fit index in general.

364 4. Conclusions and discussion

365 Cronbach Alpha general reliability coefficient of the measurement related to the Sounds and
366 Images IIA English form was found to be .64, whereas that of the Turkish form was .61 [$.60 \leq \alpha$
367 $< .90$]. According to Kolmogorov-Smirnov normality test result, the data of the English and Turkish
368 forms were normally distributed [$P > 0.05$].

369 The correlation coefficient between the scores of the Sounds and Images IIA English and
370 Turkish forms was found to be .81. There **34** as a positive and significant relationship between English
371 and Turkish scores [$r = .81, p < .01$]. In addition, there was no statistically significant difference
372 between English and Turkish scores [$t = .29, p > .01$].

373 In order to measure the reliability of the evaluators, the forms of 10 students randomly
374 selected from the participating students were scored by another expert and the inter-rater reliability
375 was assessed. There is statistically significant concordance between the two evaluators' evaluations of
376 the Sounds and Images IIA English Form [$W: .97, p < .05$]. There is also a statistically significant level
377 of concordance for Sounds and Images IIA Turkish Form [$W: .96, p < .05$].

378 The central tendency and Kolmogorov-Smirnov normality test values for the data obtained
379 from the Sounds and Images IIA Turkish Form indicate that the data have an ideal normal
380 distribution [$P > 0.05$].

381 Cronbach Alpha coefficient for the Sounds and Images IIA Turkish form was found to be
382 .61. This result indicates that the measurement is quite reliable [$.60 \leq \alpha < .90$]. The Spearman-Brown
383 half-split reliability coefficient was .59. This result indicates that the measurement is reliable at an
384 acceptable level.

385 In the study of Batıbay and **7**i (2006: 59) conducted on 187 university students, the
386 Cronbach's alpha reliability coefficient of the Creative Thinking With Sounds and Words Test was
387 calculated to be .66.

388 Studies conducted on the reliability of the Creative Thinking With Sounds and Words
389 "Sounds and Images IIA" original form are as follows:

390 The Cronbach Alpha coefficient for the reliability study conducted by the answers of summer
391 school students of **28**e Texas Women's University ($n = 201$) was found to be .82, and the Spearman-
392 Brown Split-Half reliability coefficient was found to be .79. In the reliability study conducted on the
393 students of the Mississippi State University ($n = 183$), Cronbach's alpha coefficient was .55, and
394 Spearman-Brown Split-Half reliability coefficient was .47 (Khatena and Torrance, 1998: 14).

395 KMO and Bartlett Test results showed that the scale was suitable for exploratory factor
396 analysis [$.68 > .50$], and a high correlation existed between variables [$P < 0.05$]. According to the
397 components matrix, the factor loadings of the items took values between .62 and .73, and were
398 collected under one factor. According to the confirmatory factor analysis results, which is performed
399 to test a pre-determined hypothesis or theory for a relationship between variables, the Turkish Form
400 appears to have a perfect fit index in general [$\chi^2/df: 1.73; p = .17; RMSEA: .05$].

401 In the item discrimination analyses performed by Batıbay and Piji (2006: 59) in their study
402 conducted on 187 university students, significant results at a level of 0.01 were obtained [$p < .01$].

403 The validity study of the original form was conducted by looking at the correlation of the
404 Sounds and Images IIA with various scales (Khatena and Torrance, 1998: 24).

405 In a study conducted on 41 students graduated from Geor**27** University, a significant
406 relationship was found between the Sounds and Images IIA form and Guglielmino's Self-Directed
407 Learning Readiness Scale [$r = .52; p < .01$].

408 In a study conducted on 38 students from Georgia University using the Musical Aptitude
409 Profile of Gordon, a significant relationship was found between the Musical Sentence and Musical
410 Style factors within the test and the Sounds and Images IIA form [$r = .32$ and $r = .31; p < .05$]. In
411 addition, the musical compositions of each student were scored in terms of originality from 1 to 5 by
412 the instructors, and a significant relationship was found between the scores obtained and the Sounds
413 and Images IIA form [$r = .34; p < .05$].

414 In a study on 188 students attending the summer seminars in Texas Women's University, a
415 significant correlation of .20 was found between the Sounds and Images IIA and Kirton's Adaption-
416 Innovation Inventory, a significant correlation of .28 and .21 was found with the Something About
417 Myself? And What Kind of Person Are you? factors of Khatena and Torrance's Creative Perception
418 Inventory, and a significant correlation of .40 was found with the Onomatopoeia and Images [$p < .01$].

419 In conclusion; based on the results obtained by Cronbach Alfa and Spearman-Brown Split-
420 Half Reliability analyses, correlation analyses between sounds, analyses of difference between the
421 groups, and exploratory and confirmatory factor analyses, it can be said that the Creative Thinking
422 With Sounds and Words "Sounds and Images IIA Turkish" form is a valid and reliable measurement
423 tool.

424

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