A review on Form a visual test of Torrance creativity test in Iran

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ABSTRACT

Objective: This research was done to determine the authenticity score for Form A visual test of Torrance creativity for students in Iran. **Methodology:** For this purpose, this test was performed on 585 primary school students in Sabzevar city. After excluding sheets that did not have score condition, 542 test sheets were analysed. The answers of all students were gathered in each picture, then the frequency and percentage of each response was obtained. **Results:** According to the conditions that Torrance had set for authenticity scoring, the authenticity scoring of each response was calculated. For each response in the picture construction subtest, authenticity score range was considered from zero to five. In the picture completion subtest, authenticity score range was determined from zero to two. **Conclusion:** In the subtest of parallel lines, the responses were scored from zero to three. Now, according to this research, we can score various types of students' responses can in Form A visual test of Torrance creativity test.

1. Introduction

Although human civilization is the result of the efforts of all human beings of all ages, the greatest impact is the result of creative and thoughtful people's efforts. Humans, who have shaped the path to civilization and great human progress with their great power of thought and creativity. Human civilization owes to human creative thinking and it is impossible to sustain it without using the creativity, which is the highest performance of the human mind. All experts and psychologists point out that creativity is a significant subject (Ganji et al., 2015).

The speed and acceleration of life and the emergence of amazing developments are the features of the present era and there is a new occurrence at any moment. A period in which man, in addition to living in a changing environment, must be able to think creatively and create new ideas to solve problems. One of the ways to achieve this is to train children's creativity. Torrance, (1999) believes that we need to train the creativity of our children to survive, because at this time and despite the psychological stresses, there is no weapon but creativity to deal with problems. Creativity and creative thinking are one of the most complex and finest manifestations of human thought that are at its highest level of cognitive activity and are among the most valuable educational goals.

Considering the importance of creativity issue in the field of education, creativity measurement was also regarded as an important research topic of interest to researchers. Guilford, (1968) defined creativity on the basis of divergent thinking, and believed that divergent thinking was one which consists the following eight factors and characteristics: fluidity, flexibility, authenticity, expansion, composition, analysis, organization, and complexity. Because divergent thinking is the core of creativity and the researchers are interested in it, we first introduce divergent thinking and then describe how it is measured.

1.1 Divergent thinking

Guilford, (1968) makes distinction between convergent thinking (which is the correct answer to the presented questions and is the thinking characteristic required in the common tests of intelligence) and the divergent thinking (that provides multiple answers for a single question, and is one of the essential features of creativity). For example, consider the convergent thinking question: "How many quarters is an hour?" There is only one correct answer for this

question. Conversely, there are many possible solutions to divergent questions. For example, look at the following question: What are pencil cases for? In this question, one can refer to a variety of possible responses. The usefulness of divergent thinking in solving problems is quite evident, hence its importance in the study of creativity and problem solving. When dealing with a problem, the divergent thinker has many potential solutions who statistically has a greater chance of solving the problem than those with lesser ideas. Runco, (1999) has provided the clearest and shortest definition of divergent thinking: "Divergent thinking is a kind of recognition that leads to diverse orientations". In the definition of divergent thinking, Guilford, (1968) has provided a major differentiation with convergent thinking. In the convergent thinking tests, the subject must have a correct answer. The given information is generally sufficient and structured to have only one correct answer. For example: what is the opposite of "hard"? But in divergent thinking, the thinker should search around and often a number of answers are given, for example, if the subject is asked to name the things that he or she think they are "hard". He has many answers that he can provide. Such responses are related to divergent thinking, which is useful in creative thinking and inventions. Four facets of divergent thinking that are referred commonly are: fluidity, authenticity, flexibility and expansion (Byabangard, 2007).

Fluidity: The number of responses given to a stimulus. The total number of ideas given to each divergent thinking exercise (Runco, 1999).

Authenticity: Responses' uniqueness given to each stimulus. Unusual responses by the subject (Runco, 1999).

Flexibility: The number of categories of responses given to each stimulus. Change in meaning. Use or interpretation of some things (Guilford, 1968).

Expansion: The extent to which ideas have driven a particular response. Details that have been added to ideas (Guilford, 1968).

Kaufman James et al., (2008) provided an example for four aspects of thought. If a person wants to have a party in a restaurant, he will make a list of all the possible restaurants. He may provide a list of 50 restaurants (high fluidity), a list of restaurants where their friends assume them differently (high authenticity), a list of restaurants or categories of restaurants (high flexibility), or a list of a restaurant, for example, an Indian restaurant, with more details (high expansion). In such a situation, the person needs to choose one or two restaurants, which here he or she needs convergent thinking to evaluate different types of restaurants to select the appropriate case.

One of the issues that takes the most energy and effort in creativity studies is the measurement of divergent thinking. In other words, there is not much divergence in the history of creativity measurements. In fact, in many cases, creativity measurement means the measurement of divergent thinking, and it is impossible to apply creativity measurement without divergent thinking. It is clear that the measurement of divergent thinking is the backbone of creativity measurement, which has maintained this position for decades (Kaufman James et al., 2008).

Given the importance of divergent thinking in measuring creativity, Torrance introduced powerful tests to measure divergent thinking in 1966. Forms A and B of the Torrance creativity were widely used. The Torrance Test of Creative Thinking has a long history and dates back to 1966. In 1966 Torrance published the TTCT. This test is one of the most common divergent thinking tests and is used in different countries. In a review of creativity research, Torrance and Presbury (1984) found that TTCT was used in most creativity research. Seif, (2008) also pointed out in their studies that Torrance tests are among of the most commonly used tests to identify the potential of creativity in elite training programs.

Torrance tests have been used extensively and continuously in educational environments and are part of the broadest divergent thinking tests. In the decades, the scoring and implementation of TTCT has been edited and is one of the most popular tests. The Torrance Tests of Creative Thinking includes verbal and visual tests, each of which has two parallel forms A and B, which can be used alternatively. The visual form of this test includes the following subtests:

Picture construction: The subject is asked to stick an egg - like shape (form A) or a bean-like shape (form B) on a white sheet and make a picture with this shape during 10 minutes. This shape must be an integral part of the final picture.

Picture completion: In this subtest, ten unfinished shapes are given and the subject is asked to complete each of the unfinished shapes within ten minutes.

Parallel lines/circles: A large number of parallel lines (form A) or circles (form B) are given to the subjects and they are asked to make shapes as possible as they can with these lines and circles, within ten minutes (Ahmed, 2015).

The main purpose of this research is to score the authenticity of the form a visual test of Torrance creativity based on the responses given by Iranian students. Torrance conducted his test on five hundred subjects from the United States. Then, based on the responses they gave, the more frequent answers had a lower authenticity score. Based on the research of Shakiba and Asadzadeh (2017), it was found that there is a significant difference between the responses of Torrance and the Iranian subjects. So, in order to score the authenticity of the answers, Torrance scoring is not reliable in Iran and the Torrance test should be performed on Iranian students, then, based on the frequency of students' responses, we obtain the score for the authenticity of each answer. This research seeks to obtain student responses in each image to determine the authenticity of each response, so that based on these scores, to be able to apply the Torrance creativity test to Iranian students.

2. Materials and methods

The research method in this study is descriptive and merely collects students' responses to the form a visual test of Torrance creativity. The research population includes all elementary students of Sabzevar city. Cluster sampling was used for a sample of thirty classes which were selected randomly. In total, the classes were 585 students from the first to the sixth grade. From the coordination with the education management and in collaboration with the class teachers, a Form a visual test of Torrance creativity was implemented. Before execution of the test, a session was held for 30 teachers of selected classes and test and its implementation method was discussed. Then Form a visual test of Torrance creativity was run for thirty minutes. After the implementation, the sheets that had scoring condition were 542 test sheets. Then we gathered the answers of all students to each picture and then calculated the frequency of each response. Then, in accordance with Torrance's method, we conducted authenticity scoring (Mojarad et al., 2013).

According to authenticity scoring condition, which was carried out by Torrance, (1999) the method was also used in this study. In each subtest, the authenticity scoring was different. We explain each subtest according to the scoring order.

Picture construction subtest: In the picture construction subtest, authenticity scores were taken on a scale from 0 to 5. Answers that occurred in 5 or more than 5 percent, did not receive any authenticity scores. Answers occurred in 4% to 4.99% of the cases, receive authenticity score of one. The answers that occurred in 3 to 3.99% of the cases receive authenticity score of 2. The responses that occurred in 2 to 2.99% of cases, received authenticity scores of 3. Those that occurred in 1 to 1.99% of the cases, are awarded with authenticity score of four. All responses that occurred under one percent received a score of 5.

Picture Completion subtest: In the picture completion subtest, the range of authenticity scores is from zero to two, so that responses that occurred in 5 or more than 5% of the cases received authenticity score equal to zero. Cases occurred in 2 to 4/99 percent, received authenticity score of 1 and all responses below 2 percent receive a score of 2.

Parallel Lines subtest: In the parallel lines subtest, the range of authenticity scores is from zero to three. For the answers that are reported in 20 or more of the 20% cases, the score for the authenticity is zero. The answers given in 5 to 19.19 percent of cases, authenticity score is 1. Responses that occurred in 2 to 4.99 percent of the cases receive an authenticity score of 2, and all answers below 2 percent, received authenticity score of 3.

3. Discussion and results

First, picture construction subtest scoring for images is shown in Table 1, according to the conditions mentioned by Torrance. The total number of responses were 528, in which the frequency of each response and the percentage of authenticity score are shown in Table 1. In this table and the following tables, in order to be short, answers with very low frequency are not recorded.

Table 1. Frequency and percentage, and authenticity score for picture construction subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Butterfly	33	6.02	0	Tree	8	1.45	4
Egg	47	7.6	0	Sheep	6	1.09	4
Colored egg	41	7.48	0	Ladybird	10	1.82	4
Human body	52	9.48	0	Drop	6	1.01	4
Chick	28	5.10	0	Cat	6	1.09	4
Chicken and duck	29	5.29	0	Snowman	8	1.45	4
Egg with arms and legs	23	4.19	1	Penguin	9	1.64	4
Mouse	23	4.19	1	Dragonfly	1	0.01	5
Rabbit	18	3.28	2	Stone	3	0.54	5
Human face	18	3.28	2	Melon	1	0.01	5
Bear	19	3.46	2	Dates	1	0.01	5
Balloon	14	2.55	3	Sun	3	0.54	5
Fish	15	2.73	3	Dinosaur	1	0.01	5
Bee	13	2.55	3	Koala nose	1	0.01	5
Flower	14	2.55	3	Giraffe	1	0.01	5
Turtle	11	2.007	3	Cow's head	1	0.01	5

As noted in Table 1, responses with a high frequency have received authenticity score of zero, and the lower the frequency, the higher the authenticity score. The response which is not in the table, gets the highest authenticity score of this section that is 5.

For picture completion subtest, which contains ten unfinished picture, for each picture, we collected the responses of all subjects, and then, according to the conditions that Torrance applied in this subtest, we obtained the authenticity score of each response. In picture 1, a total of 501 responses were presented, in Table 2, the frequency and percentage, and the authenticity score of picture 1, are shown from picture completion subtest.

Table 2. Frequency, Percentage and authenticity score of picture 1 from picture completion subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Cloud	70	13.97	0	Rabbit	1	0.19	2
Eyebrow	87	17.36	0	Canopy	1	0.19	2
Eye	39	7.78	0	Skirt	1	0.19	2
Mustache	29	8.78	0	Tree	3	0.59	2
Human face	40	7.98	0	Bee	1	0.19	2
Glasses	74	14.77	0	Head of two people	2	0.39	2

Heart	68	13.57	0	Butterfly's tentacle	1	0.19	2
Apple	14	2.79	1	Camel	1	0.19	2
Flower	11	2.19	1	Book	3	0.59	2
Lip	13	2.59	1	Pumpkin	2	0.39	2
Lampshade	1	0.19	2	Worm	3	0.39	2
Sponge Bob	1	0.19	2	Crow	2	0.39	2
Balloon	1	0.19	2	Sugarloaf	1	0.19	2
Bird	3	0.59	2	Mountain	2	0.39	2
Butterfly	2	0.39	2	Ice cream	1	0.19	2
Penguin	1	0.19	2	Stove	1	0.19	2

As noted in Table 2, responses with a high frequency have received authenticity score of zero, and the lower the frequency, the higher the authenticity score. The response which is not in the table, gets the highest authenticity score of this section that is 2.

For picture 2 of picture completion subtest, just like picture 1, we collected the responses of all subjects, and then, according to the conditions that Torrance determined for this picture, we obtained the authenticity score of each response. In picture 2, a total of 485 responses were presented, in Table 3, the frequency and percentage, and the authenticity score of this picture, are shown from picture completion subtest.

Table 3. Frequency, Percentage and authenticity score of picture 2 from picture completion subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Human	38	7.85	0	Umbrella	1	0.2	2
Tree	187	38.55	0	Mary go round	1	0.2	2
Flower	91	18.76	0	Wood	8	1.64	2
Bird's leg	18	3.71	1	Letter (K, Y...)	9	1.85	2
House	16	3.29	1	Thorn	4	0.82	2
Slingshot	14	2.88	1	Chadori girl	2	0.41	2
Lampshade	2	0.41	2	Christmas tree	1	0.2	2
Snowman	3	0.61	2	Star	1	0.2	2
TV antennae	2	0.41	2	Trumpet	2	0.41	2
Kite	3	0.61	2	Pot	1	0.2	2
Hand fan	2	0.41	2	Dandelion	4	0.82	2
Balloon	3	0.61	2	Hookah	2	0.41	2
Ice cream	7	1.44	2	Crow	1	0.2	2
Speaker	1	0.2	2	Mountain	2	0.41	2
Flag	3	0.61	2	Wheat	2	0.41	2
Butterfly	7	1.44	2	Cheery	2	0.41	2
Window	4	0.82	2	Clothe	2	0.41	2
Swing	4	0.82	2	Turtle	1	0.2	2
Gun	4	0.82	2	Scarecrow	5	1.03	2
Light beam	2	0.41	2	Nail	2	0.41	2
Broom	8	1.64	2				

For picture 3 of picture completion subtest we performed as in picture 2 and 3. In picture 3, a total of 480 responses were provided, and the frequency, percentage, and authenticity score of the responses are shown in Table 4.

Table 4. Frequency, Percentage and authenticity score of picture 3 from picture completion subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Sound waves	26	5.41	0	Umbrella	2	0.41	2
Eye	25	5.20	0	Letter (ن and etc.)	1	0.2	2

Pot	25	5.20	0	Snail	5	1.02	2
Bowl	24	5	0	Sun	3	0.62	2
Moon	30	6.25	0	Knife	3	0.62	2
Almond	11	2.29	1	Cucumber	2	0.41	2
Egg	13	2.70	1	Role tissue paper	3	0.62	2
Tree	11	2.29	1	Path	1	0.2	2
Slide	19	3.95	1	Rainbow	6	1.25	2
Drum	13	2.70	1	River	2	0.41	2
Boat	11	2.29	1	Bee	5	1.02	2
Banana	11	2.29	1	Basket	7	1.45	2
IR Iran's logo	1	0.2	2	Trash bin	2	0.41	2
Human	7	1.45	2	Potato	1	0.2	2
Snowman	2	0.41	2	Apple/banana	4	0.83	2
Tears	1	0.2	2	Human face	4	0.83	2
Bangle	3	0.62	2	Woman face with scarf	1	0.2	2
Pomegranate	2	0.41	2	Carpet	3	0.62	2
Imam	2	0.41	2	Slice of watermelon	5	1.02	2
Kite	2	0.41	2	Heart	2	0.41	2
Pillow	5	1.04	2	Bag	4	0.83	2
Tree leaf	8	1.66	2	Backpack	2	0.41	2
Jug	2	0.41	2	Flower	7	1.45	2
Parentheses	2	0.41	2	Vase	4	0.83	2
Flag	1	0.2	2	Ear	5	1.02	2

For picture 4 of picture completion subtest we performed as in pictures above. In picture 4, a total of 481 responses were provided, and the frequency, percentage, and authenticity score of the responses are shown in Table 5.

Table 5. Frequency, Percentage and authenticity score of picture 4 from picture completion subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Wind	36	7.48	0	Nose	2	0.41	2
Snail	32	6.65	0	Bicycle	1	0.2	2
Worm or snake	110	22.86	0	Mouth	2	0.41	2
Word (we, mother and etc.)	27	5.61	0	Rainbow	1	0.2	2
Horse or donkey	15	3.11	1	Giraffe	2	0.41	2
Girl	17	3.53	1	Mustache	8	1.66	2
Glasses	14	2.91	1	Slide	5	1.03	2
Spoon	12	2.49	1	Dog	3	0.62	2
Flower	22	4.57	1	Whistle	6	1.24	2
Sheep	10	2.07	1	Cockroach	2	0.41	2
Turtle	10	2.07	1	Tentacle of butterfly or bee or etc.	2	0.41	2
Ladle			1	Camel	2	0.41	2
Lollipop	3	0.62	2	Rope	1	0.2	2
Gazelle	1	0.2	2	Stick	6	1.24	2
Mirror	2	0.41	2	Question mark	9	1.87	2

For picture 5 of picture completion subtest we performed as in pictures above. In picture 5, in total 506 responses were provided, and the frequency, percentage, and authenticity score of the responses are shown in Table 6.

Table 6. Frequency, Percentage and authenticity score of picture 5 from picture completion subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Human	35	6.9	0	Tree	3	0.59	2
House	30	5.9	0	Bouquet	2	0.39	2
Container (bowl)	31	6.09	0	Quran's rack	3	0.59	2
Bowl			0	Basket	2	0.39	2
Mountain	60	11.8	0	Star	2	0.39	2
Triangle	20	3.9	1	Haft – Sin	2	0.39	2
Square	17	3.3.	1	Camel	1	0.19	2
Kite	22	4.34	1	Hand of clock	2	0.39	2
Bird	11	2.17	1	Wifi logo	2	0.59	2
Quran's rack	12	2.37		Spider	2	0.39	2
Butterfly	13	2.5	1	Goose	1	0.19	2
Mouth	18	3.5	1	Carpet	2	0.39	2
Animal's head (cat, fox)	11	2.17	1	Angel	2	0.39	2
Fruit dish	14	2.7	1	Wheelbarrow	3	0.59	2
Number (7, 17)	11	2.17	1	Picture frame	3	0.59	2
Lampshade	3	0.59	2	Slice of watermelon	4	0.79	2
Ironman	2	0.39	2	Mushroom	3	0.59	2
Alien	3	0.59	2	Boat	2	0.39	2
Sour cherry	3	0.59	2	Heart	3	0.59	2
TV antennae	2	0.39	2	Frog	3	0.59	2
Gazelle	3	0.59	2	Scissors	4	0.79	2
Diamond	2	0.39	2	Pigeon	3	0.59	2
Hand fan	3	0.59	2	Book	3	0.59	2

For picture 6 of picture completion subtest we performed as in pictures above. In picture 5, a total of 485 responses were provided, and the frequency, percentage, and authenticity score of the responses are shown in Table 7.

Table 7. Frequency, Percentage and authenticity score of picture 6 from picture completion subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Tree	28	5.77	0	Rabbit	2	0.41	2
Mountain	27	5.56	0	Bat	4	0.82	2
Worm or snake	28	5.77	0	Lake	3	0.61	2
Human	23	4.74	1	Gloves	3	0.61	2
Duck	12	2.47	1	Bicycle	4	0.82	2
Chick	15	3.09	1	Fox	3	0.61	2
Wood	12	2.47	1	Slide	4	0.82	2
Boot	20	4.12	1	Hair dryer	4	0.82	2
House	17	3.50	1	Spaceship	4	0.82	2
Thunder	19	3.91	1	Apple	5	10.3	2
Chair	16	3.29	1	Hose	2	0.41	2
Flower	14	2.88	1	Armchair	5	1.03	2
Clothe	12	2.47	1	Wheelchair	3	061	2
Human profile	11	2.26	1	Astronaut	4	0.82	2
Snowman	5	10.3	2	Mushroom	3	0.61	2
Wrench	3	0.61	2	Frog	3	0.61	2
Mill	3	0.61	2	Book	4	0.82	2
Sour cherry	4	0.82	2	Shoes	4	1.03	2
Coud	5	1.03	2	Word (sphere, cloud, brother)	5	1.03	2
Eyebrow	3	0.61	2	Cat	3	0.61	2
Bus	2	0.41	2	Vase	5	1.03	2
Balloon	2	0.41	2	Sparrow	3	0.61	2

Thumbnail	2	0.41	2	Calf	2	0.41	2

For picture 7 of picture completion subtest we performed as in pictures above. In picture 7, in total 481 responses were provided, and the frequency, percentage, and authenticity score of the responses are shown in Table 8.

Table 8. Frequency, Percentage and authenticity score of picture 7 from picture completion subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Car	36	7.48	0	Ant	1	0.20	2
Tree	27	5.61	0	Lollipop	7	1.45	2
Stickle	53	11.01	0	Snake, worm	6	1.24	2
Ladle, spoon, spatula	30	6.23	0	Dinosaur	1	0.20	2
Glasses	11	2.28	1	Nose	2	0.41	2
Key	18	3.74	1	Mushroom house	2	0.41	2
Mushroom	20	4.15	1	Butterfly tour	2	0.41	2
Jug	10	2.07	1	Balloon	1	0.20	2
Cap	10	2.07	1	Centipede	2	0.41	2
Magnifier	14	2.91	1	Sheep	2	0.41	2
Human	21	4.36	1	Dull	2	0.41	2
Tennis racket	12	2.49	1	Fig	2	0.41	2
Shoes	3	0.62	2	Weight lifting weight	1	0.20	2
Hammer	6	1.24	2	Fan	2	0.41	2
Question mark	4	0.83	2	Mouse	3	0.62	2
Word (awake, etc.)	1	0.20	2	Sunflower	1	0.20	2
Tree leaf	4	0.83	2	Balloon	7	1.45	2
Lizard	2	0.41	0	Strawberry	1	0.20	2
Puddle	2	0.41	2	Pond	2	0.41	2
Crab	2	0.41	2	Sun	9	1.87	2
Human profile	2	0.41	2	Human face with hat	7	1.45	2
Tractor	2	0.41	2	Drain	1	0.20	2
Snail	3	0.62	2	Crain cramp	1	0.20	2
Cock	4	0.83	2	Eye	1	0.20	2
Mosque	5	1.03	2	Lamp	3	0.62	2
Donkey, horse	3	0.62	2	Pomegranate	2	0.41	2
Digger	2	0.41	2	Polar house	1	0.20	2
Dolphin	2	0.41	2	Glasses	1	0.20	2
Flower	5	1.03	2	Bear	9	1.87	2

For picture 8 of picture completion subtest we performed as in pictures above. In picture 8, in total 471 responses were provided, and the frequency, percentage, and authenticity score of the responses are shown in Table 9.

Table 9. Frequency, Percentage and authenticity score of picture 8 from picture completion subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Human	59	12.52	0	Letter (v. etc.)	3	0.63	2
Chick	27	5.73	0	House	8	1.69	2
Tree	27	5.73	0	Sun	3	.63	2
Human in sitting position	11	2.33	1	Skirt	2	0.42	2
A girl with manto	10	2.12	1	Role tissue paper	3	0.63	2

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Bride			1	Dinosaur	2	0.42	2
Number (9, 5, …)	15	3.18	1	Prayer girl	1	0.21	2
Bark (dog, cat, chick)	10	2.12	1	Giraffe	2	0.42	2
Worm	15	3.18	1	Slide	3	0.63	2
Cat	11	2.33	1	Whistle	3	0.63	2
Vase	13	2.76	1	Apple	1	0.21	2
Clothe	22	4.67	1	Lollipop	2	0.42	2
Snake			1	Zulfiqar Sword	3	0.63	2
Car	17	3.60	1	Candlestick	7	1.48	2
Alien	2	0.42	2	Girl face with scarf	2	0.42	2
Chef with hat	5	1.06	2	Eagle	2	0.42	2
Iron	2	0.42	2	Glasses	3	0.63	2
Octopus	2	0.42	2	Angel	1	0.21	2
Balloon	2	0.42	2	Heart	2	0.42	2

For picture 9 of picture completion subtest we performed as in pictures above. In picture 9, in total 494 responses were provided, and the frequency, percentage, and authenticity score of the responses are shown in Table 10.

Table 10. Frequency, Percentage and authenticity score of picture 9 from picture completion subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Mountain	269	59.91	0	Vest	1	0.2	2
Cat	30	6.07	0	Chick	1	0.2	2
King's crown	11	2.22	1	Tent (canopy)	6	1.21	2
Grass	14	2.83	1	Umbrella	2	0.4	2
Thunder	12	2.42	1	House	5	1.01	2
Fox, dog, wolf	13	2.63	1	Crab	1	0.2	2
Camel	11	2.22	1	Tree	2	0.4	2
Snake	10	2.02	1	Giant mouth	1	0.2	2
Fish	11	2.22	1	Lion	2	0.4	2
Snowman	1	0.2	2	Bride	1	0.2	2
Fire	1	0.2	2	Spider	1	0.2	2
Chameleon	1	0.2	2	Glasses	2	0.4	2
Cloud	7	1.41	2	Giant	2	0.4	2
Eyebrow	1	0.2	2	Pigeon			2
Duck	1	0.2	2	Tie	1	0.4	2
Pomegranate	8	1.61	2	Crow(Pigeon)	6	1.21	2
Human	9	1.82	2	Hat	7	1.41	2
Human with hat	1	0.2	2	The word "Mina"	1	0.2	2
kite	4	0.80	2	Key	1	0.2	2
Balloon	1	0.2	2	Shoe	1	0.2	2
Ice cream	1	0.2	2	Tulip	2	0.4	2
Swallow	1	0.2	2	Ear	1	0.2	2
Butterfly	1	0.2	2	Turtle	1	0.2	2
Motorbike track	1	0.2	2	Lip	1	0.2	2
Eff with a crack	9	1.82	2	Lozenge	2	0.4	2
Crocodile	1	0.2	2	Sea wave	4	0.8	2

For picture 10 of picture completion subtest we performed as in pictures above. In picture 10, in total 501 responses were provided, and the frequency, percentage, and authenticity score of the responses are shown in Table 11.

Table 11. Frequency, Percentage and authenticity score of picture 10 from picture completion subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Human	65	12.97	0	Stuart	1	0.19	2
Duck	32	6.38	0	Star	5	0.99	2
Chick	26	5.18	0	Dog	8	1.59	2
Rooster (chicken)	28	5.58	0	Whistle	1	0.19	2
Tree	50	9.98	0	Sword	2	0.39	2
Goose	27	5.38	0	Candle	2	0.39	2
Flower	35	6.98	0	Man's face	1	0.19	2
Stork	26	5.18	0	Number (7, 6, etc.)	6	1.19	2
Bird	15	2.99	1	Pointing mark or arrow	1	0.19	2
Penguin	17	3.39	1	Question mark	1	0.19	2
Clothe	15	2.99	1	Angel	1	0.19	2
Snowman	1	.19	2	Elephant	7	1.39	2
Fingers	3	0.59	2	Shoe	7	1.39	2

But we collected students' responses to parallel lines subtest and then the frequency and percentage of them were obtained. Then, according to the conditions that Torrance applied in this subtest, the authenticity score of each response was obtained. In this subtest, a total of 522 subjects responded that the frequency and percentages and the authenticity score of each response are displayed in Table 12, alphabetically.

Table 12. Frequency, Percentage, and authenticity score of Parallel Line subtest

response	Frequency	Percentage	Authenticity score	response	Frequency	Percentage	Authenticity score
Human	199	38.12	0	Grater	2	0.38	3
Duck	15	2.87	2	Newspaper	7	1.34	3
Wind mill	3	0.57	3	Clothes line	1	0.19	3
Snowman	7	1.34	3	Radiator	13	2.29	2
Sprinkler	4	0.76	3	Quran's rack	1	0.19	3
Magnet	2	0.38	3	Radio	1	0.19	3
Water heater	3	0.57	3	Tennis racket	2	0.38	3
Aquarium	13	2.49	2	Rainbow	4	0.76	3
Cylinder	2	0.28	3	Bee	15	2.87	2
Mirror	39	7.47	1	Giraffe	2	0.38	3
Chewing gum	3	0.57	3	Zipper	4	0.76	3
Juicer	1	0.19	3	Clock	86	16.47	1
Bank note	4	0.76	3	Slide	21	4.02	2
Bone	15	2.87	2	Needle	4	0.76	3
Ironman (robot)	18	3.44	2	Basket	8	1.53	3
Horse or donkey	2	0.38	3	Whistle	1	0.19	3
Toy men (shaking hands)	15	2.87	2	Vegetable chopper	1	0.19	3
Lollipop	8	1.53	3	Samovar	4	0.76	3
Dragon	2	0.38	3	Cockroach	6	1.14	3
Octopus	1	0.19	3	Dog	3	0.57	3
Skate	1	0.19	3	Trash bin	40	7.66	1
Finger	1	0.19	3	Tray	19	3.63	2
Lampshade	5	0.95	3	Sausage	1	0.19	3
House bell	5	0.95	3	Kilogram stone	1	0.19	3
Swimming pool	4	0.76	3	Sandwich	1	0.19	3
Ring	1	0.19	3	Sand clock	4	0.76	3

Alien	2	0.38	3	Tablecloth	6	1.14	3
Imam	2	0.38	3	Watch	2	0.38	3
Water fall	3	0.57	3	Arm	1	0.19	3
Brick	2	0.38	3	Car key	1	0.19	3
Ampule	1	0.19	3	Pillar	3	0.57	3
Ice cream	22	4.21	2	Sink	4	0.76	3
vane	2	0.38	3	Grass	1	0.19	3
Tower (apartment)	56	10.72	1	Space ship	1	0.19	3
Pack of ten	3	0.57	3	Pants	47	9.00	1
Heater	38	7.27	1	Candle	26	4.98	2
Speaker	9	1.72	3	Chocolate	10	1.91	3
Paper (A4, exam etc.)	37	7.08	1	Moth	2	0.38	3
Weekly schedule	19	3.63	2	Lion	3	0.57	3
Kite	3	0.57	3	Sweets	7	1.34	3
Sponge Bob	18	3.44	2	Stencil	5	0.95	3
Biscuit	6	1.14	3	Shampoo	1	0.19	3
Bottle (cola yogurt)	25	4.78	2	Glass	5	0.95	3
Barrel	2	0.38	3	Ostrich	2	0.38	3
Pillow	18	3.44	2	Chess	1	0.19	3
Garden	6	1.14	3	Scarf	1	0.19	3
Cement block	1	0.19	3	Tap	4	0.76	3
Balloon	3	0.57	3	Baby bottle	7	1.34	3
Bomb	1	0.19	3	Evil	1	0.19	3
Tag	3	0.57	3	Chair	34	6.51	1
Milad tower	1	0.19	3	Vote chest	6	1.14	3
Balloon	7	1.34	3	Soap	1	0.19	3
Hopscotch	1	0.19	3	Mail box	1	0.19	3
Battery	2	0.38	3	Charity box	3	0.57	3
Old letter paper	2	0.38	3	Human face	12	2.29	2
Penguin	5	0.95	3	Tape recorder	2	0.38	3
Butterfly	176	33.71	0	Food container or bowl	11	2.10	2
Window	145	27.77	0	Number (32, 12)	32	6.13	1
Eraser	96	18.39	1	Pointing mark (arrow)	12	2.29	2
Bird (pigeon, crow or etc.)	10	1.91	3	Eagle	1	0.19	3
Leg	36	6.98	1	Dull	10	1.91	3
Blanket	8	1.53	3	Daddy Long Legs	1	0.19	3
Envelope (letter or etc.)	32	6.13	1	Bride	1	0.19	3
Flag	41	7.85	1	Stick	2	0.38	3
File	7	1.34	3	Giant	1	0.19	3
Curtain	27	5.17	1	Carpet (rug and etc.)	63	12.06	1
Jug	49	9.38	1	Flask	4	0.76	3
Pedestrian	1	0.19	3	Elephant	6	1.14	3
Elephant's leg	2	0.38	3	Foosball	1	0.19	3
Fan	3	0.57	3	Flash disk	1	0.19	3

Pedestrian bridge	2	0.38	3	Mushroom	27	5.17	3
Screen	1	0.19	3	Spoon or fork	6	1.14	3
Pack (juice, milk and etc.)	15	2.17	2	Boat (ship)	8	1.53	3
Cheese	2	0.38	3	Baby wrapper	3	0.57	3
Outlet	10	1.91	3	Kettle or tea pot	9	1.72	3
Snacks, chips, popcorn	5	0.95	3	Bookshelf	38	7.27	1
Backrest	12	2.29	2	Pot (frying pan)	7	1.34	3
Overcoat	3	0.57	3	Bird cage	4	0.76	3
Teat	2	0.38	3	Can (tomato paste or juice can)	3	0.57	3
Blackboard (whiteboard)	68	13.02	1	Safety match pack	14	2.68	2
Pencil sharpener	38	7.27	1	Gas tank	1	0.19	3
Swing	24	6.51	1	Worm or snake	13	2.49	2
Bed	74	14.17	1	Remote control (TV or etc.)	11	2.10	2
TV (monitor)	57	10.91	1	Cooler duct	12	2.29	2
Picture (picture frame)	93	17.81	1	Gift	19	3.63	2
Traffic sign	5	0.95	3	Backpack	1	0.19	3
Rubber	12	2.29	2	Plastic bag	18	3.44	2
Light beam	5	0.95	3	Mountain	3	0.57	3
Arrow	3	0.57	3	Cooking hat	1	0.19	3
Plate scale	1	0.19	3	Carton box	3	0.57	3
Tank	2	0.38	3	Hat	7	1.34	3
Gun	2	0.38	3	Wallet	12	2.29	2
Iron beam	1	0.19	3	Cake	15	2.87	2
Calendar	1	0.19	3	Jar	3	0.57	3
Oven	2	0.38	3	Tree trunk	1	0.19	3
King's crown	5	0.95	3	Punching bag	1	0.19	3
Spider's web	1	0.19	3	Skate shoes	3	0.57	3
Tractor	1	0.19	3	Tile (ceramic or mosaic and etc.)	10	1.91	3
Volleyball net	1	0.19	3	Bag	83	15.90	1
Chick or chicken or rooster	13	2.49	2	Shoes	18	3.44	2
Road (street)	35	6.70	1	Book (Quran or notebook or etc.)	160	30.65	0
Pencil case	97	18.58	1	Closet	111	21.26	0
Cell phone stand	1	0.19	3	Carriage	4	0.76	3
Prayer carpet	8	1.53	3	Factory	2	0.38	3
Owl	1	0.19	3	Cooler	3	0.57	3
Sock	4	0.76	3	H cap	2	0.38	3
Colored pencil box	30	5.74	1	Computer case	2	0.38	3

Keychain	1	0.19	3	Kitchen cabinet	9	1.72	3
Box	6	1.14	3	Shark	1	0.19	3
Hook (hanger)	7	1.34	3	Cradle	1	0.19	3
The lead box of Mechanical pencil	2	0.38	3	Telephone	20	3.38	2
Vacuum cleaner	2	0.38	3	Flower	135	25.86	0
Shoe box	5	0.95	3	Vase	116	22.22	0
Spices container	1	0.19	3	Cat	4	0.76	3
Safety match container	1	0.19	3	Cow	4	0.76	3
Multiplication table	12	2.29	2	Lighter	2	0.38	3
Hedgehog	2	0.38	3	Safe	5	0.95	3
Box of shoe	1	0.19	3	Stove	31	5.93	1
Broom	1	0.19	3	Sheep	4	0.76	3
Tape dispenser	1	0.19	3	Glass	170	32.56	0
Tally	1	0.19	3	Clothe (manto, blouse, shirt and etc.)	92	17.62	1
Wood	7	1.34	3	Lamp	3	0.57	3
Boot	14	2.68	2	Water pipe	5	0.95	3
Layer	1	0.19	3	Bird's nest	7	1.34	2
Traffic light	33	6.32	1	Laptop	5	0.95	3
Umbrella	5	0.95	3	Heater pipe	4	0.76	3
Ice cream stick	5	0.95	3	Stork	2	0.38	3
Matchwood	11	2.10	2	Squirrel nest	1	0.19	3
Torch	2	0.38	3	Logo	1	0.19	3
Agricultural horns	2	0.38	3	Fruit leather	2	0.38	3
band aids	5	0.95	3	Turtle	1	0.19	3
Suitcase	4	0.76	3	Pencil	165	31.60	0

4. Conclusion

This study was conducted to determine the authenticity score for the responses given to the form a visual test of Torrance creativity. According to Guilford's (1968) definition, the authenticity includes responses which are new and innovative, and the majority of people do not refer to that response. Answer which few people express, are more authentic. So, to determine the authenticity score for each response, a test must be performed among a large number, then responses that are referenced by fewer individuals are considered to be high-level responses. In form A visual test of Torrance Creativity, the authenticity score has been determined for a number of responses, but since these responses have been extracted from the American community, based on the research of Shakiba and Asadzadeh (2017), these responses have significant differences with responses of Iranian community; therefore, we cannot apply the authenticity scores in the Torrance creativity test in Iran. In this research, the test was performed among five hundred elementary students, and then the responses of each picture were analyzed and according to Torrance scoring conditions, the scores for each response were identified. Now, according to these scoring tables, the scores of the students can be scored in terms of degree of authenticity.

Torrance, (1966) argues that TTCT should be updated with respect to culture and education and social change. Different cultures should create different norms for themselves. According to Torrance's description, the Persian version of Torrance creativity test, which has been conducted in Iran since 1999, ignores at least two important factors. 1) Cultural and religious changes, and 2) The factor of social changes (Shakiba and Asadzadeh, 2017) that occur over time. Responses of American and Iranian participants will be very significant. The responses of Iranian students are derived from Iranian and Islamic culture and religion. Responses such as Mosque, Imam Zadeh, Mehrab, Chadori girl and etc. are very frequent in Iranian students' responses, while these answers are not mentioned in the Torrance score list. In addition, in Shaziba and Asadzadeh (under printing), the subjects of the study drew the pictures of cell phones or Tablets which, according to the scoring conditions, take the authenticity score of score of originality, while according to the Torrance score list, the score should be 3. Therefore, social change over time factor is one of the most important and influential factors in the scoring of the Torrance creativity test that this test should be revised at its various times in its scoring system in order to adapt to the circumstances of that period. This research

seeks to cover these two factors that cultural and religious changes and social changes over time affect students' responses, so with the results of this research the Torrance creativity test can be used in Iran without any concern of the two factors above (Kim, 2006).

In this research, the authenticity score of responses was determined for each test picture. In addition to authenticity, Torrance creativity test also measures three other aspects of divergent thinking: fluidity, flexibility, and expansion. According to Torrance, (1966) fluidity is the number of responses given and the flexibility refers to the number of categories of responses given and the expansion also is the amount of detail given to each answer. In a research, it is suggested that the Form a visual test of Torrance Creativity to be applied in the society of Iran, then scored according to the authenticity scores determined in this research, and the scoring of fluidity, flexibility and expansion are done in accordance with the Torrance Creativity Guide. Then, the normative scores for the four aspects of divergent thinking are calculated to serve as a test with high validity and reliability for researchers in the field of creativity and education in Iranian society.

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