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Indicators of Actively Open-Minded Thinking as One of the Cognitive Learning Outcomes for Gifted Programs in Al-Ahsa Region: An Evaluation Study

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Abstract: The evaluation process of gifted care programs in the Kingdom has focused only on verifying the quality of services provided in these programs, without going beyond that to studying the different cognitive and emotional learning outcomes of these programs. To verify the quality of some of the outputs of these cognitive and emotional programs, the current research aimed to reveal the extent of the impact of gifted programs on the development of some actively open-minded thinking skills. To achieve this goal, the actively open-minded thinking scale was developed. The results showed that the gifted program led to the development of actively open-minded thinking skills for students enrolled in gifted programs. The results of the application of the scale in its four dimensions also showed the availability of indicators of actively open-minded thinking with a high degree and that the dimensions of belief identification and dogmatic thinking got a high average rating, while the dimensions of flexible thinking and constructive thinking got a medium rating. The researcher recommended the need and importance of considering the gifted in the content of these programs to determine the positive and negative of them and their opinions of those in charge of these programs to develop them according to their abilities and to try to involve the gifted in developing their own programs on various aspects of personality.

Keywords: actively open-minded thinking, indicators, cognitive learning, gifted programs.

作為時期地區資優項目認知學習成果之一的積極開放思維的指標：一項評估研究

摘要：王國對資優照護項目的評估過程僅側重於驗證這些項目提供的服務質量，而沒有超越研究這些項目的不同認知和情感學習成果。為了驗證這些認知和情感項目的一些輸出質量，當前的研究旨在揭示資優項目對一些積極開放的思維技能發展的影響程度。為了實現這一目標，開發了積極開放的思維量表。結果表明，資優項目為參加資優項目的學生培養了積極開放的思維能力。該量表在其四個維度的應用結果也表明，積極開放思維指標的可用性較高，信念認同和教條思維維度的平均評分較高，而靈活思維維度建設性思維獲得中等評價。研究人員建議在這些計劃的內容中考慮天才的必要性和重要性，以確定他們的正面和負面以及他們對負責這些計劃的人的意見，以根據他們的能力發展他們，並嘗試讓有天賦的人參與開發他們自己的關於個性各個方面的程序。



关键词：積極開拓思維、指標、認知學習、資優計劃。

1. Introduction

Gifted people are considered an essential foundation for the rise of civilization because talent constitutes a strategic depth in the development of society, which makes it keep pace with the conditions of time and place. Because of what the world has witnessed in recent decades of knowledge explosion and development in technology and communication. Because of this development, economic blocs emerged, and competition intensified between them. To overcome difficult situations and imagine new strategies and plans, gifted people must be given a distinguished position and great care in societies [1].

The Ministry of Education has given most of its attention to the gifted by establishing a general administration for the gifted to draw up policies for educational services and the mechanisms for their implementation, and the gifted centers are working to achieve and implement these policies. Gifted programs are programs held for the gifted at certain times, including evening programs during study times, summer programs during part of the summer vacation, and various programs such as: the Thursday program, morning enrichment programs, scientific trips, and school visits. Different programs have been offered at the Ministry of Education in the Kingdom of Saudi Arabia, as shown in Appendix A [2]. The school-gifted programs provide comprehensive and qualitative educational care for gifted students, through the implementation of specialized enrichment programs in the curriculum within the classroom provided by teachers, and an effective enrichment program presented in the resource room by the gifted teacher [2, 3].

Undoubtedly, this interest and support made many decision-makers and those interested in public affairs question the feasibility of these programs, the reality of their outputs, and the positive effects they could have on the personality of talented students participating in these programs [4].

The evaluation of gifted programs has been neglected from the beginning, although it is one of the main components in the design of gifted programs [5-7]. This had a negative impact on the evaluative practices used in evaluating gifted programs [5, 6]. Callahan emphasizes that we risk losing evidence of program impacts on students if good methods for evaluating the impact of programs are not designed.

A review of the reports of evaluating gifted care programs in the Kingdom shows that the evaluation processes of these programs focused only on verifying the quality of services provided in these programs, but did not reach the study of the cognitive, emotional and

social learning outcomes of these programs. This raises the question about the success of these programs in achieving their goals. Good planning for program evaluation is one of the main components of successful programs, and it is necessary to improve, assure and develop confidence in those programs, and increase support from the local community and decision-makers. Generally, the program evaluation process produces information to help make meaningful judgments about any program to improve these programs [8, 5, 6].

It appears from a review of studies evaluating the outcomes of gifted programs in the Arab environment [9] or in foreign environments [10] that most of these studies focused mainly on the impact of gifted students programs on traditional variables such as academic achievement as an indicator of cognitive learning outcomes, and motivation, self-concept and attitude toward learning as indicators of emotional learning outcomes.

Actively open-minded thinking is one of the important cognitive variables because it deals with important dimensions related to mental flexibility, acceptance of the other, developing reflective thinking and striving to address personal bias and intellectual flexibility. Actively open-mindedness assesses new evidence contrary to an individual's preferred beliefs, spending enough time thinking about problems, and paying attention to other points of view during decision-making [11].

Gifted programs focus on developing academic aspects. Additionally, these programs should also focus on developing thinking skills, which in turn contribute to highlighting some of the indicators of actively open-minded thinking in the personality of the students participating in the program.

Thinking is important to everyone in everyday life, and the way we think affects the way we plan our lives, choose personal goals and make decisions. Therefore, good thinking is not imposed on us in school, but rather what we want to do to achieve our goal [12]. An individual's personality consists of emotional dimensions, capabilities, cognitive preparations, experiences and skills acquired in his life. This, in turn, constitutes the cognitive aspects represented by perception, attention, thought processes, and the social aspects that prompt the student to interact with the external environment. When the student encounters major obstacles and problems that require finding solutions, the best way to solve a problem is to use its cognitive structure, which is open-mindedness [13].

Actively open-minded thinking is an act of fairness toward different conclusions even if they conflict with

one's preferred conclusion. The concept of actively open-minded thinking provides criteria for evaluating thinking, which apply to the thinking of all individuals, and it has three functions: a criterion for evaluating thinking, a set of individual tendencies to think according to the norm, and a criterion for evaluating the thinking of others [14]. Actively open-minded thinking is often used as an alternative to reflective thinking in research in the field of thinking and related areas, associated with less biased reasoning in many types of tasks, describes a highly intellectual type of reasoning, and predicts the ability to objectively assess the quality of an argument [15].

The evaluation process is important in developing gifted programs to achieve the de-sired goals and results and supports decision-makers to determine the reality of the cognitive outcomes of the programs, and the positive effects on the student's personality and ways of thinking. Considering the interest in gifted programs, it is necessary to evaluate and know the cognitive learning outcomes of these programs for students, and their impact on the personality of gifted students. Therefore, this study aimed to identify and evaluate the outcomes of gifted programs and their impact on actively open-minded thinking to provide indicators to achieve the goals of these programs and improve their performance. From the above, the problem of the study can be determined by answering the main question:

What is the effect of the outputs of gifted programs on the actively open-minded thinking of gifted students?

The following sub-questions are derived from the main question:

1. What is the availability of indicators of actively open-minded thinking on the outcomes of gifted programs?

2. What is the degree of availability of actively open-minded thinking indicators on the results of gifted programs in the dimensions of the scale due to the gender and number of programs acquired by the gifted students?

1.1. Theoretical Framework

Actively open-minded thinking is defined as an individual's ability to meditate on his way of thinking, to search seriously for new information that contradicts his preferred beliefs and ideas, process this information deeply and without bias, and desire to change his previous thoughts and beliefs voluntarily after careful study of the contradictory ideas and beliefs [12]. Ahmad defined it as flexibility in thinking, not being biased toward one's personal opinions and beliefs when evidence contradicts these beliefs, and the ability to abandon his ideas and beliefs if they contradict the new evidence without fanaticism [13].

Baron concluded that actively open-minded thinking includes elements representing several ideas

in behavior and personal characteristics within the scope of its content, which are thinking and flexibility, openness to experience, absolute judgment, dogmatism, critical thinking, reflexivity, frequency and belief, and identification, then he added contrasting thinking, and paranormal beliefs along with actively open-minded thinking in a composite measure of open-mindedness and flexible thinking [13].

The importance of actively open-minded thinking lies in giving some indications to the behavioral practices of learners and indicates that individuals who can actively open-minded thinking can make the best decisions, determine the most goals, solve different problems, identify the most available evidence, and persevere in searching for information from various sources, the avoidance of biases of personal opinions and beliefs, and examine most of the available possibilities carefully and objectively [17].

One of the most important characteristics of highly actively open-minded thinking individuals is that they prefer meditative behavior over impulsive behavior, tendency to analyze available options and alternatives, a re-examination of available alternatives, prefer statistical evidence over anecdotal evidence during decision-making, welcoming of different beliefs and opinions that do not agree with the opinion of the individual, seek to improve expression skills and the desire to acquire knowledge and skills, obtain information and use cognitive ability [18]. In addition to the desire of individuals to search, especially the new information acquired, where these individuals are less likely to be confused in the choice by not hesitating to collect more information and make an evaluation of it to choose the appropriate one [11].

After reviewing previous studies that dealt with actively open-minded thinking, four dimensions of actively open-minded thinking were adopted, which are compatible with the Saudi environment, namely:

1. *Flexible thinking*: It is the individual's tendency to meditative thinking, the desire to study contradictory beliefs for his personal opinions, the desire to study alternative opinions and interpretations, and tolerance for ambiguity. Indicators that indicate flexible thinking include:

- The stability of the thoughts and beliefs of an individual, regardless of the circumstances.
- Acceptance of new possibilities, opinions, and interpretations.
- Self-confidence and the initiative to think into solving problems.
- Individuals' intuition and wisdom to make decisions.
- Open-mindedness, tolerance, and curiosity of the individual.

2. *Belief identification*: The individual's ability to define himself as an identity independent of his beliefs and opinions. The individual's modification of a particular belief or changing it completely does not

affect the individual's adaptation or self-concept. Indicators that indicate belief identification include:

- Feeling the value of one's personal beliefs.
- Independence of an individual's identity from his beliefs and opinions
 - A sense of an individual's uniqueness in his or her beliefs.
 - Connecting an individual's beliefs with those of special people in society.
 - Feeling the importance of establishing or instilling beliefs in a family.
 - The individual does not care to any attack on his beliefs.

3. *Dogmatic thinking*: It includes intellectual stagnation, closed-mindedness, inability to adopt alternative visions, and a tendency to sharp classification. Indicators that indicate dogmatic thinking:

- Referring to the religion when making critical decisions
- Distinguishing and comparing two categories
- Knowing people's tendencies toward the individual
- Not accepting criticism from others
- Believing that there is only one right way.

4. *Constructivist thinking*: It is an automatic way of thinking about the events of daily life that reduces stress, increases the psychological, physical, and mental safety of the individual, and helps solve daily problems with the least possible effort and tension and without harassing others. Indicators that indicate constructivist thinking:

- An individual's ability to learn from past experiences
- The ability of an individual to modify his behavior to suit the surrounding conditions
 - Focusing on problems more than results
 - Positive thinking, i.e., finding acceptable and realistic solutions to problems
 - Self-acceptance, avoidance of negativity, insensitivity, and the absence of dabbling in thinking.

Fig. 1 shows the most important indicators of actively open-minded thinking on which the main dimensions of the scale and items are constructed.

1.2. Importance of the Study

The process of program evaluation is a form of structured or systematic inquiry that produces information to help make important judgments about a particular program, to document the need for the program and document its impact on the participants. The results of studies in the field of professional development confirm that in order for any institution to ensure the continuity of its programs, it needs indicators that confirm the success of those programs [5, 8].

There is no doubt that the continued support of decision-makers for gifted programs requires an

examination of the reality of the cognitive, emotional, and social outcomes of these programs, and providing evidence that these programs have positive and valuable effects on the student's personality and ways of thinking. The importance of the current study is also that it seeks to document the results or impact of the program on the development of actively open-minded thinking skills in gifted students, which in turn will help identify the strengths and weaknesses of the program and produce information that helps in making improvements to the program.

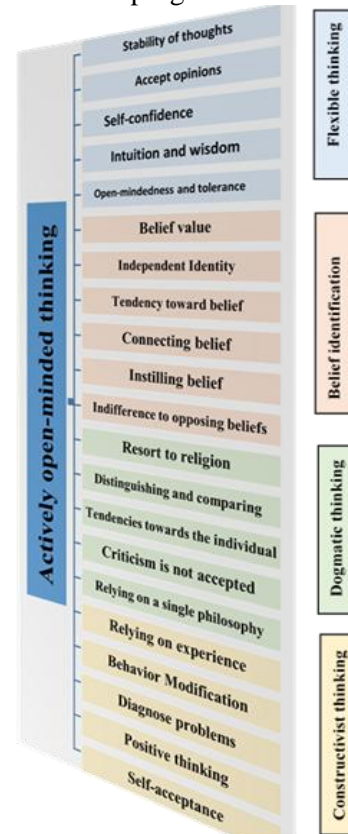


Fig. 1 Theoretical framework (Developed by the author)

2. Literature Review

The results of some studies indicated a statistically significant correlation between the need for knowledge and actively open-minded thinking [19-22, 15, 11]. Also, an impact of gender on actively open-minded thinking exists as one of the thinking tendencies [19, 22-24]. Some studies have shown a strong relationship between actively open-minded thinking and cognitive beliefs [23, 13, 25]. The importance of actively open-minded thinking also lies in its link with many variables, such as revealing the existence of a relationship between it and rational thinking in the field of logic and problem solving. This is in addition to its impact on intelligence and problem solving, which in turn leads to a high degree of intelligence and the ability to solve problems [26]. The study by West et al. found a positive relationship between active open-minded thinking with cognition, inference, and complex bias with measuring logic and biased belief [21].

[20] developed the dimensions of the actively open-minded thinking scale, which consists of 40 items distributed over six dimensions: flexible thinking, open-ness to values, intellectual openness/stagnation, categorical thinking, belief identification, and anti-factual versus pro-factual thinking. Some items of this scale were derived from previous scales in the psychological heritage. Several short, one-dimensional images of this scale have appeared, prepared by other researchers [11, 26-28].

As for the Arab environment, Ayyash and Ghareeb adopted the Stanovich and West scale and translated it into Arabic, which consisted of six areas: flexible thinking, contrasting thinking, rigid thinking, constructivist thinking, personal thinking and behavior, and categorical beliefs [29]. The study of Usama, which was conducted in the Saudi environment, concluded that the global structure of the scale [20] for open-mindedness includes three factors: flexible thinking, belief modification/identification, and intellectual openness/stagnation "dogmatism" [30]. Some studies also identified these same three dimensions of the actively open-minded thinking scale: flexible thinking, belief identification, and dogmatic thinking [13, 19, 31].

The study [32] revealed the effect of cognitive motivation and actively open-minded thinking on innovative behavior. The study found that cognitive motivation and actively open-minded thinking are positively associated with innovative creative behavior. The study [16] revealed the effect of a learning environment based on active learning in developing actively open-minded thinking among university students. The study found that there were statistically significant differences between the scores of the students of the experimental and control groups in the post-measurement of active open-mindedness in favor of the experimental group.

Through reviewing the literature and specialized studies, this study's characteristic is that it seeks to extract a set of behavioral practices among gifted students that give some indicators connected with actively open-minded thinking processes. The current research relied significantly on these practices and indicators in constructing the main dimensions of the aspects of actively open-minded thinking, intending to identify the availability of indicators of actively open-minded thinking as one of the cognitive learning outcomes for gifted programs in the Al-Ahsa region.

3. Methods

3.1. Research Model and Procedure

This study used a quantitative descriptive survey approach. This because it creates opportunities for the tools main psychometric properties which of validity and reliability to be verified. It is also used to generalizability of the findings. The descriptive

approach does not stop at describing the phenomenon, but rather includes some interpretation of these data, that is, an attempt to link the description to comparison and interpretation, which helps understand these phenomena, and the ability to predict their occurrence.

The actively open-minded thinking scale was developed, and it consists of four dimensions. Ethical approval was obtained from King Faisal University to conduct the study. The nature of the scale was explained and applied to a pilot study and then to the sample. Finally, statistical treatments, analysis, and interpretation of the results were conducted. Fig. 2 shows the main steps in conducting the study.

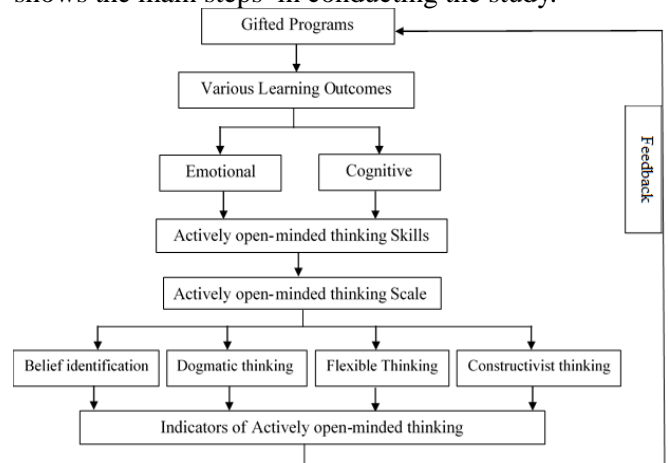


Fig. 2 Study procedures (Developed by the author)

3.2. Population and Samples

The population of this study consisted of all gifted students in Al-Ahsa region during the academic year 2022/2023. A sample of 150 gifted students was randomly selected for this study.

3.3. Instrument

To develop the instrument, the its goal was determined to identify the indicators of actively open-minded thinking in the different behavioral practices of gifted students. Then reviewed the literature and previous studies related to this topic to benefit from them in developing the dimensions and items of the instrument. After that, the actively open-minded thinking scale was developed. It consists of four dimensions, namely flexible thinking (FT) (20 items), belief identification (BI) (9 items), dogmatic thinking (DT) (12 items), and constructivist thinking (CT) (10 items). The final copy of the instrument consisted of 51 items, as shown in Appendix B.

3.4. Data Analysis

To answer the study question and verify the construct validity, the data were analyzed using SPSS version 26. Additionally, it analyzed and evaluated according to the Rasch model using Winsteps software version 3.68.2. Rasch model analysis was used to verify the validity and reliability of the instrument.

3.5. Verifying the Instrument Validity and Reliability

To verify the validity and reliability of the instrument, nine experts from the University of King Faisal examined the instrument items. Based on their opinions, ambiguous and unclear words and items were modified, and grammatical errors were corrected. Additionally, the instruments were used for a pilot study with 30 students, and the responses and feedback obtained were used to modify the final instruments. Rasch model analysis was used because it is a powerful tool for evaluating construct validity, in addition to confirmatory factor analysis (CFA). It also achieves objectivity in psychological and educational measurements [33, 34].

To judge, the study tool used the following equation: (the highest value of the alternative-minimum alternative)/number of levels; $(5-1)/5 = 0.80$. The Likert scale has five options or values: 1,2,3,4 and 5.

The goal of this classification is to classify responses. The levels are as follows: very low (1.0 – 1.8), low (1.81 – 2.6), medium (2.61 – 3.41), high (3.42 – 4.22), and very high (4.23 – 5.0).

3.5.1. Construct Validity According to the Rasch Model

To find construct validity, first the value of mean square (MNSQ) should be determined. According to the Rasch model, the values are appropriate for construct validity because it lies within $0.5 < x < 1.5$. Second, the item polarity or point measure correlation (PTMEA Corr.) should be detected because it considers the early detection of construct validity. According to the Rasch model, the values of PTMEA are appropriate for construct validity because they lie within $0.2 < x < 1$. Third, the standardized fit statistic (Zstd) should also be determined. The (Zstd) value is acceptable because it lies within $-2 < ZSTD < +2$ [33,34]. Table 1 shows the values of PTMEA, MNSQ and ZSTD.

Table 1 Item fit analysis for actively open-minded thinking instrument

Items	Measure	Model S.E	Infit		Outfit		Pt-measure	CORR
			MNSQ	ZSTD	MNSQ	ZSTD		
FT17	.07	.15	1.44	1.8	1.47	1.9	0.22	
FT18	.01	.14	1.43	1.7	1.42	1.8	0.22	
CT9	.01	.14	1.29	1.5	1.28	1.6	0.24	
DT2	.27	.13	1.23	1.3	1.17	1.7	0.36	
DT12	.18	.13	1.31	1.3	1.28	1.3	0.51	
CT2	.43	.14	1.23	1	1.59	0.1	0.51	
FT2	-.12	.14	1.14	0.6	1.42	-0.7	0.55	
DT4	.04	.15	1.15	0.4	1.19	0.7	0.55	
CT5	-.60	.15	1.08	0.4	1.01	0.4	0.55	
FT19	-.60	.15	1.06	0.3	1.12	0.7	0.57	
CT10	.19	.13	1.17	0.8	1.16	0.8	0.57	
FT3	.76	.13	1.08	0.4	1.15	0.7	0.57	
CT3	.37	.13	1.12	-0.5	1.14	0.6	0.57	
DT5	.53	.13	1.13	0.6	1.16	0.7	0.59	
DT3	.66	.14	1.08	0.3	1.2	0.6	0.59	
DT8	-.09	.14	1.07	0.4	1.03	0.4	0.59	
CT7	-.25	.15	1.04	-0.3	1.06	0.3	0.59	
DT7	.37	.13	0.98	-1.1	0.93	0	0.59	
CT6	-.28	.13	1.08	1.4	1.09	0.4	0.59	
BI8	-.37	.14	1.2	-1.5	1.09	0.5	0.60	
DT10	.42	.15	0.96	1.2	0.96	-0.1	0.62	
FT4	-.19	.13	1.02	0.2	1.07	0.3	0.62	
FT20	.08	.14	1.05	0.2	1.08	0.1	0.63	
FT16	.77	.15	0.97	0.1	0.91	-0.1	0.63	
BI1	.16	.14	1.06	0.3	1.88	1.3	0.64	
FT7	-.38	.13	0.95	0	1.04	0.2	0.65	
CT1	.51	.13	1.08	0.5	1.11	0.6	0.65	
DT11	.01	.14	1.05	0.3	1.06	0.3	0.65	
FT11	.25	.14	1.01	0.1	1.01	0.1	0.66	
FT5	.17	.15	0.96	0.1	0.88	-0.1	0.66	
FT13	.23	.14	1.02	0.2	0.95	-0.1	0.66	
FT15	-.18	.13	1.05	0.3	0.90	-0.1	0.66	
CT8	-.48	.13	1.08	0.4	0.90	0.3	0.66	
FT9	.04	.14	0.95	0.1	0.73	-0.3	0.66	
BI5	-.27	.14	0.87	1.1	0.66	1	0.68	
FT1	.61	.15	1.03	0	0.75	-0.4	0.68	
BI3	-.21	.14	0.93	-0.2	0.78	-0.2	0.68	
DT1	-.33	.13	0.95	-1.2	0.77	-0.1	0.68	
CT4	.29	.13	0.94	-0.3	0.78	-0.5	0.68	
BI9	-.34	.14	0.91	-0.2	0.63	-0.2	0.68	
FT6	-.09	.14	0.79	0.1	0.83	-0.4	0.69	
BI4	-.02	.15	0.87	-0.2	0.71	-0.3	0.69	
DT9	-.02	.14	0.87	-1.4	0.71	-0.6	0.69	

Continuation of Table 1							
FT12	-.34	.13	0.81	-0.3	0.65	-0.4	0.70
FT8	-.36	.13	0.78	-0.4	0.65	-0.8	0.71
FT14	-.10	.14	0.68	-1.6	0.64	-0.6	0.72
BI6	.25	.14	0.74	-0.5	0.71	-0.5	0.73
BI2	.10	.15	0.66	-1.2	0.60	-0.5	0.74
DT6	.25	.14	0.64	-1.8	0.60	-0.7	0.77
FT10	.34	.13	0.60	-1	0.56	-0.9	0.77
BI7	.21	.15	0.64	-1.1	0.63	-1.1	0.77

Table 1 shows that the values of MNSQ for infit ranged between .60 and 1.44. Moreover, the values of PTMEA ranged between .22 and .77. According to the Rasch model, the above values are appropriate and acceptable for construct validity.

Table 2 shows a summary of the category structure on a instrument gradation and size structure of the intersection. It also showed the schedules for grading scale calibration analysis of the scale.

Table 2 Calibration scaling analysis of actively open-minded thinking instrument

Category Table	Score	Observed Count %	Observed Average	Infit MNSQ	Outfit MNSQ	Structure Calibration	Category Measure
2	2	2; 15	-.28	1.09	1.08	None	(-1.92)
3	3	9; 29	.40	1.13	1.00	-1.20	-.16
4	4	11; 31	.89	.84	.69	.01	1.29
5	5	8; 24	2.12	1.16	1.29	1.19	(3.04)

Table 2 shows that the most frequent answer is the scale of participants ranking 4 which is 11 (31%), the scale 3 of 9 (29%), then the scale 5 of 8 (24%). The last grading scale was scale 2 of 2 (15%). The column of observed averages show the pattern of respondents move from negative to positive (-.28 to 2.12), indicating a Rasch model-based normal pattern.

Table 3 shows the raw variance is 44.2%, more than 40%. The unexplained variance in 1st contrast is 5.2%, less than 15. Hence, dimensionality data result was appropriate to the Rasch model.

To ensure the reliability using the Rasch model it should verifying the person and item reliability. The criteria of reliability should be 50% and more. Furthermore, item and person separation values should be more than 2 to be acceptable [33, 34].

Table 3 Item dimensionality of actively open-minded thinking instrument

	Empirical		Modeled
Total raw variance in observations	89.7	100%	100%
Raw variance explained by measures	48.7	44.2%	43.2%
Raw variance explained by persons	19.0	21.1%	5.9%
Raw variance explained by items	19.8	23.3%	21.05%
Raw unexplained variance (total)	51.0	56.8%	100%
Unexplained variance in the 1st contrast	4.7	5.2%	9.2%
Unexplained variance in the 2nd contrast	3.6	4.0%	7.1%
Unexplained variance in the 3rd contrast	3.4	3.7%	6.6%
Unexplained variance in 4th contrast	2.9	3.3%	5.8%

The reliability of the scale was measured using person reliability. Item reliability of the scale was also calculated. The results of the study revealed that the scale has an appropriate degree of reliability (Table 4).

Table 4 Person separation and reliability for actively open-minded thinking instrument

	Score	Count	Measure	Error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Mean	201.7	51.0	.87	.21	1.08	-.1	1.05	-.2
S.D	31.3	.0	1.22	.08	.52	2.5	.49	2.3
Real rmse	.26							
Adj. sd	1.19							
Separation	4.53							
Person reliability	.95							
Mean	396.5	100.0	.00	.14	1.00	-.2	1.05	.0
S.D	17.4	.0	.35	.01	.36	2.3	.52	2.6
Real rmse	.15							
Adj. sd	.32							
Separation	2.33							
Item reliability	.84							

3.5.2. Construct Validity According to Confirmatory Factor Analysis (CFA)

The second way to verify the construct validity of the instrument, factor validity was calculated using confirmatory factor analysis (CFA) using Amos statistical software.

The adopted model was drawn for the relationship

of the instrument items consisting of (51) items and distributed over four dimensions, as shown in Fig. 3.

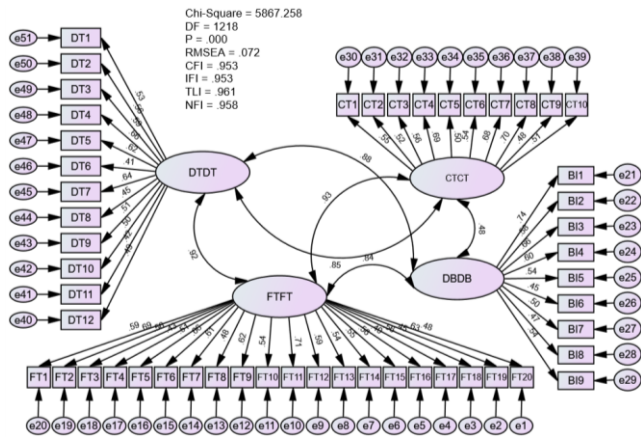


Fig. 3 Results of the confirmatory factor analysis of the model adopted for the relationship of the instrument items to its dimensions

Fig. 2 shows the degree of loading of each item in its dimension. The results showed that a high degree of loading was achieved for each item in all its dimension.

Table 5 The results of the confirmatory factor analysis of the adopted model of the relationship of the scale items and their dimensions

Name of the category	Indicators of the internal construct validity	Level of acceptance	Indexes in the proposed model
Absolute fit	ChiSq	$P > 0.05$	Significant
	RMSE	$RMSE < 0.08$.072
Incremental fit	CFI	$CFI > 0.90$.953
	TLI	$TLI > 0.90$.953
	NFI	$NFI > 0.90$.958
Parsimonious fit	Chisq/df	$Chis/df < 5.0$	$Chisq/df = 4.82 < 5.0$

4. Results

To answer the first question: What is the availability of indicators of actively open-minded thinking on the outcomes of gifted programs?, we employed the means,

The results also showed the existence of a strong correlation between the dimensions of the instrument. The results of the correlation coefficient between the four dimensions of the scale confirmed the existence of a strong and positive correlation between these dimensions.

Indicators of the internal construct validity were extracted in Table 5, which shows the values of the indicators of the validity of the internal construction of the instrument items, to confirm the results of the confirmatory factor analysis of the model adopted for the relationship between the instrument items and their dimensions.

The table also shows that the model matches the relationship between the instrument items and the data. It also confirms that all indicators match the criteria used in this study, which indicates the stability of the model for the relationships between the instrument items.

standard deviation to determine the rank and the extent to which actively open-minded thinking indicators are available on the outcomes of gifted programs.

Table 6 The means, standard deviation, rank, and degree of availability of actively open-minded thinking indicators on the results of gifted programs overall scale

Rank	Items	N	Mean	Std. deviation	Degree of availability
1	BI3	150	4.1800	1.11770	Medium
2	BI4	150	3.9267	1.37131	High
3	BI2	150	3.86667	1.139096	High
4	BI5	150	3.6067	1.32552	High
5	BI9	150	3.4000	1.36101	High
6	BI8	150	3.3133	1.19359	Medium
7	BI1	150	3.3000	1.50948	Medium
8	BI7	150	3.2467	1.44211	Medium
9	BI6	150	2.9067	1.18914	Medium
	Belief identification dimension (BI)	150	3.5280	.83587	High
1	DT6	150	3.9067	1.32780	Medium
2	DT2	150	3.8067	1.05358	High
3	DT8	150	3.7533	1.20367	High
4	DT11	150	3.6733	1.37327	High
5	DT5	150	3.5800	1.37216	High
6	DT3	150	3.4867	1.28876	High
7	DT4	150	3.4333	1.30264	Medium
8	DT7	150	3.3267	1.29271	High
9	DT12	150	3.2933	1.24538	Medium
10	DT9	150	3.2800	1.33673	Medium
11	DT1	150	3.1000	1.25184	High
12	DT10	150	3.0400	1.45113	Medium
	Dogmatic thinking dimension (DT)	150	3.4800	.75307	High
1	FT20	150	3.8800	1.14059	Medium
2	FT18	150	3.8000	1.35607	High
3	FT2	150	3.7867	1.21835	High

Continuation of Table 6					
4	FT10	150	3.6333	1.29748	Medium
5	FT3	150	3.5667	1.27662	High
6	FT17	150	3.5533	1.32370	High
7	FT14	150	3.5533	1.30840	Medium
8	FT15	150	3.5467	1.25097	Medium
9	FT12	150	3.4867	1.16859	High
10	FT9	150	3.4667	1.25140	High
11	FT5	150	3.4600	1.27248	Medium
12	FT6	150	3.4333	1.34322	High
13	FT8	150	3.3400	1.22518	Medium
14	FT19	150	3.3133	1.52005	High
15	FT11	150	3.2867	1.35774	High
16	FT1	150	3.0333	1.43034	Medium
17	FT7	150	3.0000	1.41421	High
18	FT4	150	2.9733	1.30022	High
19	FT13	150	2.7333	1.40310	Medium
20	FT16	150	2.6133	1.33002	High
	Flexible thinking dimension (FT)	150	3.3980	0.77386	Medium
1	CT7	150	3.7200	1.28554	High
2	CT3	150	3.5200	1.28345	Medium
3	CT6	150	3.5067	1.15710	High
4	CT9	150	3.4800	.88021	Medium
5	CT1	150	3.4800	1.24631	Medium
6	CT10	150	3.3867	.82565	High
7	CT4	150	3.2733	1.36050	High
8	CT2	150	3.2533	1.14216	Medium
9	CT5	150	3.1733	1.50501	High
10	CT8	150	3.0133	1.42832	Medium
	Constructivist thinking dimension (CT)	150	3.3807	0.77500	Medium
	Overall actively open-minded thinking instrument	150	3.4407	0.67765	High

Table 6 shows the items scores in both dimensions' belief identification and dogmatic thinking with mean of 3.5280 and 3.4800 respectively, and with a standard deviation of 0.83587 and 0.75307 respectively. Generally, the mean of both dimensions' belief identification and Dogmatic thinking indicated a high degree of availability. While the items score in both dimensions' flexible thinking and constructivist thinking with means of 3.3980 and 3.3807 respectively, and with a standard deviation of 0.77386 and 0.77500, respectively.

Generally, the mean of both dimensions' flexible thinking and constructivist thinking indicated a medium degree of availability. The belief identification dimension was ranked first, followed by the Dogmatic

thinking dimension, then the flexible thinking dimension, and finally the constructivist thinking dimension. Generally, the actively open-minded thinking instrument. Generally, the items score in overall instruments with a mean of 3.4407 and with a standard deviation of 0.67765. The mean of overall actively open-minded thinking instrument indicated a high degree of availability.

To answer the third question, T-Test and one-way analysis of variance were used. Table 7 shows the results of T-Test for the degree of availability of actively open-minded thinking indicators on the results of gifted programs in the dimensions of the scale due to the gender.

Table 7 Results of T-test for differences between means according to gender

Table 7. Results of T-test for differences between means according to gender							
Variables and dimensions		No.	Mean	Std. deviation	T-Value	Sig.	
Gender	Belief identification	Male	54	3.8422	.76777	1.309	.001
		Female	63	4.1219	.63204		
	Dogmatic thinking	Male	54	3.9155	.67041	2.106	.045
		Female	63	4.0618	.55610		
	Flexible thinking	Male	54	3.9406	.63404	.438	.007
		Female	63	4.1097	.59335		
	Constructivist thinking	Male	54	3.8971	.62071	.757	.012
		Female	63	4.0548	.55548		
	Overall average	Male	54	3.8988	.64757	.965	.016
		Female	63	4.0871	.56961		

Table 7 shows that the value of $t=0.965$ for whole dimensions indicated a statistically significant difference between the means, where the significance level was less than 0.05. In other words, there were statistically significant differences between the

responses of the sample on the degree of availability of actively open-minded thinking indicators on the results of gifted programs in the dimensions of the scale according to gender.

Table 8 shows the results of one-way analysis of

variance for the degree of availability of actively open-minded thinking indicators on the results of gifted

programs in the dimensions of the scale due to the number of programs acquired by the gifted students.

Table 8 Results of analysis of variance of differences between the means of responses of sample

Variance Source			Sum of squares	df	Mean Square	F	Sig.
Number of Programs Acquired	Belief identification	Between Groups	5.370	3	1.790	3.552	.017
		Within Groups	48.372	96	.504		
		Total	53.741	99			
	Dogmatic thinking	Between Groups	3.302	3	1.101	2.856	.041
		Within Groups	36.996	96	.385		
		Total	40.298	99			
	Flexible thinking	Between Groups	2.835	3	.945	2.543	.031
		Within Groups	35.675	96	.372		
		Total	38.510	99			
	Constructivist thinking	Between Groups	2.818	3	.939	2.718	.049
		Within Groups	33.171	96	.346		
		Total	35.988	99			
	Whole Dimensions	Between Groups	3.458	3	1.153	3.113	.030
		Within Groups	35.549	96	.370		
		Total	39.007	99			

Table 8 shows that there were statistically significant differences in all dimensions of actively open-minded thinking indicators based on the programs

acquired, where the significant level was less than 0.05. The Tukey test of the post-comparisons was used to find the five periods of programs acquired.

Table 9 Results of the Tukey test for differences between the number of programs acquired by the gifted students

Mean	(I) Program	(J) Program	Mean Difference (I-J)	Std. Error	Sig.
3.7077	1 program	2 program	.59537	.46663	.003
		3 program	.37567	.32733	.004
		4 program	-.03074	.31848	.001
		More than 5 program	.10500	.33463	.000
3.9572	2 program	1 program	-.59537	.46663	.003
		3 program	-.21970	.37182	.029
		4 program	-.62611	.36406	.018
		More than 5 program	-.49037	.37827	.000
3.9783	3 program	1 program	-.37567	.32733	.004
		2 program	.21970	.37182	.029
		4 program	-.40641	.14812	.037
		More than 5 program	-.27067	.18024	.002
4.0833	4 program	1 program	.03074	.31848	.001
		2 program	.62611	.36406	.018
		3 program	.40641	.14812	.037
		More than 5 program	.13574	.16364	.001
4.1141	More than 5 program	1 program	-.10500	.33463	.000
		2 program	.49037	.37827	.000
		3 program	.27067	.18024	.002
		4 program	-.13574	.16364	.001

Table 9 shows that there were statistically significant differences in all dimensions of actively open-minded thinking indicators on the results of gifted programs on the whole scale based on the number of programs acquired by the gifted.

5. Discussion

The current study sought to identify the availability of indicators of actively open-minded thinking in the outcomes of gifted students' programs in the Al-Ahsa region, Kingdom of Saudi Arabia. After applying the instrument to gifted students, the results of the study showed that the belief identification dimension got a high rating. This may be due to the fact that Arab societies always focus on highlighting the Arab identity and always seek to emphasize its aspects in all their cultural practices. Furthermore, the members of the

Arab community, regardless of how they modify particular belief, they see as correct or change it completely, do not affect the individual's adaptation or his concept of him-self or his identity. Thus, of course, the features of highlighting the Arab identity were reflected in the thinking practices of gifted students.

The results of the study also showed that the dimension of dogmatic thinking was highly rating. This may be due to the fact that Arab societies have always tried to practice closures and put up fences to preserve their Arab identity and culture. They are societies based on religiosity, and Religion is the main vector of culture and thought. Therefore, they tend to believe that there is one correct philosophy, which is based on the principles of Islamic jurisprudence, and that right and wrong never change. It always prefers to refer to religion instead of doubt about it, and therefore

religious cultural legacies may play a major role in influencing the thinking patterns of gifted students.

The results of the study also showed that the flexible thinking dimension got an average rating. This may be due to the fact that the gifted programs may be more focused on reaching the immediate specific goals and are closer to the program. Considering that these programs are linked to specific timelines, they focus largely on reaching the achievement of a group of the objectives of the program in a way that achieves an immediate return. Thus, these programs may lack more levels of clouding and depth in the processes of inclination to reflective thinking, willingness to study beliefs, opinions, alternative interpretations, self-confidence, and initiative to think about solving problems.

The results of the study showed that the constructivist thinking dimension got an average rating. This may be due to the fact that gifted programs have focused heavily on achieving goals based on the content of these programs. Given that the constructivist process requires of the individual's rebuilding of his knowledge, and the goal of the learning process is to make adaptations compatible with the cognitive pressures exerted on the individual, all of this requires building long-term programs that seek to achieve cognitive building and linking processes. Thus, the content of these programs was relatively lacking in terms of building and linking with the previous educational experiences of the learners optimally. Additionally, the ability to learn and modify behavior to suit the surrounding conditions, to focus on problems more than results, and positive thinking to find acceptable and realistic solutions to problems are all constructive thinking practices that this program did not adequately contain and highlight.

The results of the study showed that there were statistically significant differences between the sample responses on the degree of the availability of indicators of actively open-minded thinking for gifted programs in the dimensions of the scale according to gender in favor of females. This may be due to the fact that the Kingdom of Saudi Arabia has recently been more open to the world to achieve the Kingdom's vision 2030, which is to focus on the knowledge economy, and all of this provided greater opportunities for women to express themselves and prove their abilities more than before. This increased the motivation of Saudi women to take advantage of the opportunities of openness to achieve more material and moral returns for them.

This result is consistent with the studies in [13, 20, 23, 18]. This result is inconsistent with the studies [24] and [29], which concluded that there is no direct effect of gender. Further, [22] concluded that there are differences in favor of males.

The results of the study showed that there were statistically significant differences between the sample responses on the degree of the availability of indicators

of actively open-minded thinking for gifted programs in the dimensions of the scale according to the number of programs obtained by the gifted in favor of the students who receive the most programs. This may be due to the fact that the gifted programs contain the principle of continuity of care, that is, the extent to which the program contains a plan to follow up the student's care over a relatively long period by dividing it into successive levels that guarantee the provision of service to the gifted student for relatively long periods. Where the study by Landrum, Callahan, and Chuckle indicated that providing services to gifted students once or at a one-time level is easier and more manageable, but the quality of the service provided is less beneficial and has a weaker impact [35].

This result is consistent with the study [36] on the effectiveness of the enrichment program in solving problems for gifted students, as well as the study [37] that concluded that there is a statistically significant effect of the distance training program based on the problem-solving strategy in developing the creative thinking of gifted students. Additionally, the study by Buanine et al. concluded the effectiveness of an enrichment program in developing and improving creative leadership skills for gifted female students enrolled in the Mental Excellence and Talented Program [38], and the study [39], which showed that the school-gifted program has a significant impact on developing creative thinking skills for gifted students. The results of the study [40] also revealed the impact of the dimensions of scientific knowledge, scientific research skills, creative thinking, problem-solving skills, critical thinking, leadership, motivation, and independence on students' performance. The study [41] found that there is a positive effect of the application of the enrichment partnership program on the achievement in scientific subjects for gifted students and the improvement of their performance.

Finally, the results of the study showed that the actively open-minded thinking instruments as a whole got a high rating. This means that the program of care used has a positive effect in improving and increasing the degrees of actively open-minded thinking. Generally, the results of the current study indicate that the program has succeeded in modifying the students' tendencies toward the use of actively open-minded thinking, although the effect is more clear for the student's beliefs and tendencies related to dogmatic thinking than the other two dimensions. This result is consistent with many in-direct studies that aimed at the same goal, which to evaluate gifted programs and their role in the growth of cognitive aspects, where many researchers have dealt with the cognitive outputs of many educational programs [41,42].

6. Conclusion

Many studies have confirmed that the gifted learn differently and that they have high mental abilities, and

they often suffer from the incompatibility of the curricula offered to them in general education schools with their mental potential, which has a significant impact on those preparations and abilities. Hence, there is an urgent need to provide special programs for the gifted that challenge their abilities and respond to their needs. Special programs for the gifted have been offered, which have received much attention and support. However, this interest and support made many decision-makers and those interested in public affairs question the feasibility of these programs, the truth about their outputs, and the positive effects that they could have on the personality of the gifted students participating in these programs. Hence, this research revealed the extent of the impact of gifted programs on the development of some actively open-minded thinking skills.

Considering the care services provided by the Department of Education in the Kingdom of Saudi Arabia to gifted students, this study sought to evaluate the availability of indicators of actively open-minded thinking in the outcomes of gifted students' programs. Although the results of the study show the impact of the program on the development of actively open-minded thinking skills, the researcher sees the importance of taking the opinions of talented people in the content of these programs to know the positive and negative in addition to their opinion of those responsible for these programs to develop them in proportion to the abilities and capabilities of the talented.

Appendixes

Appendix A

Table A Gifted programs offered at the Ministry of Education in the Kingdom of Saudi Arabia

Programs	The skill aspect (thinking skills and scientific research)	Cognitive aspect (learning skills)	Personal aspect (personal traits)
Creative Problem Solving CPS	Information gathering, classification, problem identification, organization, decision making, imagination, Fluency, flexibility, originality, comparison, classification, collecting and tabulating of information from various sources	Summarize ideas, search through the Internet, notes, address issues of depth	Self-view, dealing with failure, accepting criticism, perseverance, understanding the needs of others
CORT1 Scamper	Summarizing, drawing conclusions, noting contradictions	Use of learning resources, accurate observation, challenge and fun	Speaking and listening skills, curiosity, self-view
Scientific Research Strategies and Skills	Challenge, question, inference, encode information, formulate questions, set evaluation goals	Providing multiple opportunities to research topics of the student's choice, providing areas for studying one issue from multiple scientific angles	Understand the needs of others Develop teamwork capabilities Appreciate other points of view
The first level robot	Practical application of previous level skills,	Coding, distinguishing facts, asking vertical questions	Accept criticism, take responsibility Communicate with others
independent research		It addresses deep issues and requires a longer period.	Accepting complexity and lack of clarity
The second level robot		Content related to multiple topics and diverse ideas	
Future Problem Solving Program	Planning, imagination, comparison, interview, details, questions, prediction,	Self-learning, experimentation, using previous skills in practice	Perseverance, responsibility, communication with others, boldness,
Level 1 Innovative			

This is in addition to taking the views of officials on the implementation of these programs in their development and extension of their impact to the university stage, as well as trying to involve the talented themselves to design their programs in various aspects of personality, and to develop multiple and diverse intelligence.

7. Limitations and Further Study

The application of the study was limited to gifted students in the Al-Ahsa region, Kingdom of Saudi Arabia.

One of the future directions in this regard is to research the impact of these programs on achieving mental health and satisfying the need for knowledge and understanding of the gifted, researching the impact of these programs on self-efficacy in online learning environments, researching cognitive beliefs and their relationship to actively open-minded thinking across different age stages, researching in cognitive beliefs and actively open-minded thinking and their relationship to the need for knowledge, research in actively open-minded thinking and its relationship to academic procrastination.

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Research and innovation development services	reconstruction, inference, proof, hypotheses, analysis, results, documentation Originality, challenge, comparison, imagination, developing the skills of scientific research and innovation, protecting intellectual property for students	Provide all students' innovations to develop their innovations	Directing students to protect their innovations, linking students with innovative projects to the concerned authorities
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Appendix B

Table B Actively open-minded thinking instrument

The first dimension: Belief identification (BI)		Degree of availability				
Items		Very high	High	Medium	Low	Very low
BI1	Whatever beliefs you hold will affect your personality more than the experiences you may have					
BI2	It is great to find a famous person who holds the same beliefs as I do.					
BI3	It is important to stand up for your beliefs even when the evidence goes in the opposite direction.					
BI4	Certain beliefs are critical things that cannot be abandoned no matter how good the things they do not support.					
BI5	It is very special for an individual to hold the same beliefs as his parents.					
BI6	I think the different ideas of right and wrong that people in other societies have may be valid for them.					
BI7	One should not be concerned with evidence that contradicts the ideas that have settled in him.					
BI8	A person who attacks my beliefs does not insult or demean me personally					
BI9	The beliefs held by the individual must be continually revised or modified in response to new information or evidence					
The second dimension: Dogmatic thinking (DT)		Degree of availability				
Items		Very high	High	Medium	Low	Very low
DT1	I tend to categorize people as either "with me" or "against me."					
DT2	Two types of people live in this world: right people, and others who are wrong.					
DT3	Two main types of people live in the world: good and evil.					
DT4	I think the clergy should be referred to in decisions on ethical issues.					
DT5	I think there are many wrong ways, but only one right way, in almost everything.					
DT6	I hate many people because of the things they stand for.					
DT7	No one can convince me that something is wrong if I am convinced that it is correct.					
DT8	Most people know very well the things that are in their best interest.					
DT9	Of the philosophies in the world, only one is probably correct.					
DT10	My blood boils when someone refuses to accept or admit they are wrong					
DT11	A group that tolerates extreme differences of opinion among its members cannot survive for long.					
DT12	When others criticize me, their facts or information are often not correct.					
The third dimension: Flexible Thinking (FT)		Degree of availability				
Items		Very high	High	Medium	Low	Very low
FT1	My own beliefs would not have been completely different if I had grown up in a different family environment.					
FT2	Even if my environment (family, neighbors, and schools) were different, my thoughts and beliefs would still be the same.					
FT3	Even if the freedom of speech is a right guaranteed to all groups, it is, unfortunately, necessary to restrict this freedom to some individuals and groups.					
FT4	One should always consider new possibilities					
FT5	A person's change of opinion is a sign of the weakness of his character.					
FT6	Difficulties can usually be overcome by thinking about the problem rather than waiting for good luck					
FT7	I know very well everything I should know about the important things in life.					
FT8	Studying different opinions often leads to wrong decisions.					
FT9	Reaching decisions quickly is evidence of the wisdom of the individual.					
FT10	If I spend much time thinking about a problem, I will probably find a solution to it.					

Continuation of Table B		Degree of availability				
Items		Very high	High	Medium	Low	Very low
FT11	There is no fault or defect in not taking a specific decision or position on many issues					
FT12	Intuition is the best guide when making decisions.					
FT13	People should always consider the evidence that does not support their beliefs or ideas.					
FT14	Letting go of previous belief is a sign of a strength of character					
FT15	I consider myself open-minded and tolerant of other people's different lifestyles					
FT16	I believe that one's devotion to one's ideas and principles is more important than open-mindedness.					
FT17	I believe that social laws and policies must change to meet the needs of global change					
FT18	I think the modern ethics of tolerance is not ethics at all.					
FT19	I think that if a person reaches the age of 25 and he does not have a fixed value system, then he has a problem or a mistake.					
FT20	I think allowing students to listen to opposing speakers will only confuse and mislead them.					
The fourth dimension: Constructivist thinking (CT)		Degree of availability				
Items		Very high	High	Medium	Low	Very low
CT1	I think some people can read other people's thoughts					
CT2	When I feel that the person I love reciprocates the same feelings for me, I feel that I am a wonderful person and that I can achieve everything I want.					
CT3	When faced with a challenging situation, I try visualizing the best outcome and avoid focusing on unpleasant consequences					
CT4	I am the kind of person who takes action to solve problems rather than just thinking about them or complaining about them.					
CT5	I take my mistakes naturally, because I feel that they are necessary to learn.					
CT6	I tend to focus more on the good things that happened in the past than on the unpleasant ones.					
CT7	I think in most cases, it is best to focus on the positive side of things.					
CT8	When faced, I try to think of the worst possible outcome of this situation.					
CT9	When someone succeeds in gaining the love of another who loves them, I feel that he is a wonderful person and that he can achieve what he wants.					
CT10	I think it is always better to make firm decisions than to make concessions					

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