

Challenges in Responding to the Columbia Mental Maturity Test by Algerian Children: A Field Study in the City of Ouargla

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Abstract

This study aims to identify the difficulties of responding to the Columbia Mental Maturity Scale (CMMS) among Algerian children, a field study carried in the city of Ouargla. This is through the case study and the exploratory-descriptive approach. The sample involved 100 children who were selected by a simple random method from regular primary schools during the school year 2023/2024.

The said study attempts to answer the following questions:

-What does the Columbia Mental Maturity Scale measure?

-What cases does it apply to?

-How is it applied?

-What are the difficulties facing Algerian children aged 5-7 years in responding to the Columbia Mental Maturity Scale?

The end results were as follows:

1-The CMMS is among the tests that measure mental maturity and intelligence in children. It is applied to the age group 4-11 years, to both normal children and children who struggle with some troubles such as the mentally retarded, those who suffer from disabilities and language disorders, as well as those with cerebral palsy.

2-Most of the sample members had correct answers in the first 37 panels. As for the cards in which I faced difficulty where all of the sample members failed to answer correctly, were the panels numbered: 58, 61, 63, 64, 65, 69, 70, 75, 79, 82, 97.

Keywords: Columbia Scale -CMMS-, response difficulties, children

Introduction:

Psychological testing holds a significant position in psychological assessment and serves as a fundamental tool in the practice of a psychologist. Psychological tests have various functions, as they are used in educational and academic decision-making processes, and aim to interpret and clarify human behavior and personality (Faisal Abbas, 1996, p. 8). They are also utilized in the evaluation process through achievement tests (Farouk El-Sayed Osman, 2002, p. 47).

The French scientist Francis Galton (1822-1911) is considered the first to use the term "psychological testing," while the American scientist James McKeen Cattell was the first to use the term "mental tests" in 1890.

In 1905, Simon and Binet introduced the Binet-Simon test (Binet's intelligence scale), marking a significant step in the history of measuring intelligence. They recognized that the key to measuring intelligence lies in focusing on higher mental processes rather than simple sensory functions. In 1912, the German psychologist William Stern continued the work of Binet and Simon by incorporating chronological age and mental age, introducing the concept of intelligence quotient (IQ), which is calculated using the following equation: $IQ = \text{Mental Age} / \text{Chronological Age} \times 100$.

On this premise, knowledge of American psychologists regarding intelligence tests began based on the Binet-style tests after Henry Herbert Goddard translated the Binet test in 1910. In 1911, Yerkes and Hillie published a set of tests following this approach, which became widely popular. Moreover, David Wechsler developed the first intelligence scale for adults in 1939, known as the Wechsler Adult Intelligence Scale (WAIS), which aimed to cover the limitations of the Stanford-Binet Scale and other individual intelligence measures. The WAIS has undergone various stages and forms to address the shortcomings present in the Stanford-Binet Scale and other intelligence measures.

We also find contributions from Charles Spearman and Lewis Terman, where Spearman introduced the theory of intelligence factors in 1904. Additionally, Percy devised group tests to measure intelligence with a team of researchers. Subsequently, the Alpha and Beta tests emerged during the First and Second World Wars (Faraj, 2007). Psychological tests emerged as a result of the failure of traditional methods to measure individuals' mental abilities. In the early stages of human existence, individuals used to compare their abilities with the forces surrounding them, aiming to overcome or control them. Measurement methods then evolved, starting with intuition based on guesswork, followed by the utilization of laboratory devices and tools to measure sensory and motor aspects. Eventually, the focus shifted towards measuring higher mental processes. These attempts paved the way for the development of more objective psychological tests (Fuad El-Bahi El-Sayed, 2000, p. 99). Through this theoretical framework, we observe that most of these intelligence and mental ability tests are outdated. The presentation of techniques and criteria poses a significant problem that can potentially impact our confidence in the results. Furthermore, scientific ideas about intelligence have undergone significant changes throughout this century, but intelligence tests have remained unchanged.

Considering the reality of psychological practices in Algeria regarding the application of intelligence tests, we find a lack of culturally adapted measurement tools that align with our society's cultural context. Consequently, some specialists have completely abandoned intelligence tests in the diagnostic process, deeming them unsuitable for measuring various psychological phenomena due to their design based on advanced societies that differ significantly from ours. On the other hand, some others have implemented them in a brutal manner, following their own interpretation, which introduces linguistic and methodological errors. As a result, the derived intelligence quotient becomes susceptible to criticism, leading to inaccurate assessment and flawed measurement, negatively affecting the guidance and care of children.

It is unreasonable for the assessment of mental abilities of individuals to remain tied to methods designed for individuals living in other countries and different cultural environments. This is because an individual's mental abilities are directly influenced by their educational, pedagogical, cultural, and even political environment (Ferchichi Jalal, 2000, p. 132). Therefore, the majority of intelligence tests used by Algerian specialists are tests that do not accurately reflect the intelligence levels of Algerian children. These tests are imported and saturated with Western culture. This motivated us, through our study, to explore one type of intelligence test, namely the Columbia Mental Maturity Test, with the aim of understanding this test and identifying the challenges faced by Algerian children in responding to its items. This is done by answering the following questions:

- What does the Columbia Mental Maturity Test measure?
- In what cases is it applied?
- What are the challenges faced by Algerian children in the age range of 5-7 years in responding to the Columbia Mental Maturity Test?

Definition of Research Terminology:

Columbia Test: A specialized test designed to measure mental maturity and intelligence in children aged 4 to 11 years.

Challenges: In this study, the term "challenges" refers to the inability to provide correct responses to the test items, indicating the cards in which the child faces difficulty in answering.

Child: In this study, the term "child" refers to a child aged 5 to 7 years with physical, mental, and sensory integrity, studying in regular classrooms, and residing in the city of Ouargla.

To achieve the objectives of the study, we adopted the following plan:

Firstly, the definition of the Columbia Test, its contents, application requirements, and methodology in order to answer the first research question.

Secondly, the field aspect of the study involved familiarizing ourselves with the research methodology, the study sample, and its characteristics. We also addressed the question of the study, which aimed to identify the specific cards in which Algerian children failed in the Columbia Scale. Finally, we provided a set of recommendations and suggestions.

Firstly, the definition of the Columbia Mental Maturity Test: The Columbia Mental Maturity Test is an individualized psychological test designed to assess the cognitive abilities of children within a

homogeneous test series. It does not require verbal responses and only necessitates a limited amount of motor activity.

This test was specifically designed for the psychological evaluation of children with cerebral palsy, specifically those with motor and verbal impairments who cannot undergo traditional testing methods due to their unique condition.

One of the characteristics of this test is its applicability to healthy, typical children, as well as intellectually disabled, physically disabled, deaf, and mute individuals.

The test consists of 100 sturdy panels measuring 15 x 48 cm, colored in various ways. The panels initially contain three, then four, and finally five illustrations.

Some of these illustrations are colored, while others are black and white, representing geometric shapes or objects (people, animals, plants, or everyday items) that the child can recognize, even if they have limited experience and knowledge of the external world.

Similarly, the clarity of the illustrations, their size, placement, and the colors used make them easily perceivable for the majority of children. This test requires the examinee to exert effort in differentiation, as they must identify the drawing that does not conform to the others, thereby discovering the principle of organizing the illustrations. The test focuses on discriminating formal elements such as differences in shapes, colors, sizes, and missing elements. All the drawings are identical except for one.

In the subsequent stage, the second phase, the task becomes more challenging (somewhat complex). The examinee is required to demonstrate the principle of grouping based on similarities, unitary use, belonging to the same family, and so on. This aspect also allows for the extraction of one and only one drawing. (p, Dague, Mgarelli et A, Lebetre, 1965, p;5).

The following table illustrates the content of the Columbian maturity cards:

Card Content	Card Number	Card Content	Card Number
2 red squares, and a blue triangle	2	Two blue discs and a black triangle	1
2 small red triangles and a large yellow square	4	2 red triangles and a yellow rectangle	3
Two halves of a yellow circle and a red triangle .	6	2 cars without color, and a cat that is not colored	5
2 yellow shoes and yellow sauce	8	2 yellow ducks and a yellow cup of coffee	7
Large blue disc and 2 small red squares	10	2 large yellow squares, and a small red square	9
Two red pirates and a blue cube	12	2 small blue squares and a red disc	11
3 uncolored bears and an uncolored horse	14	A blue pirate and a red lozenge.	13
2 green triangle and yellow rhombus	16	3 blue umbrellas and a blue pig	15
Two chairs without coloring and an uncolored dog	18	2 blue cups and a blue knife	17
Two large red pirates, and a small red disc	20	3 children zero and yellow tree	19
Two blue houses, a blue cube.	22	2 green balloon house and green hand	21

3 uncolored houses and an uncolored horse	24	2 scoops blue and a blue fork.	23
3 small green triangles, and a green square.	26	3 cups of yellow ice cream, and a big-eared yellow hare	25
3 large red squares and a small red rhombus	28	3 plates with a yellow middle, white edge, and a green pot with a yellow base	27
3 ice cream without color, umbrella without color .	30	Four blue squares and a blue triangle	29
Four blue triangles, and a red triangle	32	4 uncolored forks, uncolored spoon	31
4 pet dogs without coloring and a cat not colored	34	4 houses without color, table without coloring	33
4 girls without coloring in a standing state, and a boy who is not colored	36	4 rectangles divided half red, half blue, half red and half striped rectangle	35
4 rabbits without color in a sitting position and a rabbit without color with bent ears sitting	38	4 bears without color, and an uncolored pig	37
2 elephants without color, 2 chairs without color and a cup without color	40	4 large non-colored cups and a handle-free cup	39
4 uncolored chairs, one without color and missing a leg	42	4 single colorless chicks and 2 double sauces	41
Two corsairs without color, two black crossing lines, and a black straight line.	44	4 green squares with 4 white small squares inside, and a green square with 3 squares inside	43
Two trees without color and cards without color and a girl standing	46	Two blue discs and two discs with a blue perimeter and the middle is white, and a red disc	45
4 persons (the drawing structure is not well detailed, and another individual has bandaged legs	48	4 longitudinally parallel lines, two long non-parallel lines	47
4 isosceles triangles	50	Four flowers of	49

hiding behind them a rectangle, and a triangle with a long rectangle on the front		different shapes, a wilted curved flower	
Two green squares, three green squares and three green tablets	52	5 faces without color, and one missing mouth	51
Two flattened red discs, a red disk and two red triangles	54	5 pairs of cherry kernels 4 similar pairs and a small pair	53
A pig and a cat and a monkey and a squirrel a rodent without color and a girl without color	56	4 kinds of shoes without color and hat without color	55
Bananas, potatoes, apple, pears, and berries without coloring	58	5 squares with green stripes with two small green squares and two small oval squares inside	57
House, burning firewood, walking train and factory	60	Two children without coloring, two old women without color, and a woman without color.	59
Baby without coloring, facial parts nose without color, ears without color and mouth without color	62	Cloth, inkwell, thread, feather, sewing needle	61
An uncolored rooster, an uncolored misguided, a cooker without color, a nest with three uncolored eggs, and a pot from which boiling steam rises	64	A pen without color, a chair without color, a patient with a mop and a desk without chalk, one of them is not colored	63
Woman, man, child, girl, toddler	66	Kite, train, ship and boat all shapes are not colored	65
Pear, tennis ball, money, small disc, wheel all shapes are not colored	68	Incomplete disk, incomplete rhombus, incomplete octal number and incomplete triangle and incomplete italic zero	67

Saw, spiral, hammer, nail, radiator	70	5 forms of animals: zebra, cow, duck, pig, peacock	69
Curtain on the window, sofa, chair, table, desk	72	rhombus, pentagram, quadrilateral, triangle, disk	71
A bird, a flower, an owl over a branch, mustard, a big cat sitting.	74	car, big planet, knife, bicycle, pot	73
Ladder, chair, barrel	76	matchbox, beverage key, cigarette, beverage bottle, hammer	75
A large rectangle, a flattened circle, a disk, a rectangle, and a large square, all shapes have three black dots	78	Two smiling men, two sad children, and a child meditating and looking	77
Open bag and bucket filled with water, large filled barrel, closed wooden box, closed parcel	80	Car, warplane, fish, steamer, bird	79
Spider web, spider, butterfly, bee, beehive.	82	5 frames with similar positions, and the third frame does not resemble them	81
4 incubators {}, two incomplete hexagons, four plus signals+, four beams and four brackets ()	84	3 dogs (large, medium, small) and two sitting pumpkins, large and small	83
3 twine balloons each separately, 4 twine tied balloons, 3 cones, 4 cones, 5 cones	86	3 different length parallel tapes, 4 different length parallel tapes, 5 black mini discs, 4 small black discs, 3 small black discs	85
3 flowers, 3 stars, , one star, two stars without colors	88	Cow, ram, glove, belt, hold	87
5 similar geometric shapes that do not have a specific shape, and the first shape does not resemble them	90	envelope, postage stamp, hat, smiling man, man wearing hat	89

5 tablets in different shapes	92	Woman hat, shoes, coat, tie, skirt	91
Saw, hammer, knife, hat, ax	94	4 hexagons of different shapes and octagons	93
Arch, unfinished rose, incomplete star, incomplete triangle, 5 triangles and a triangle missing a base	96	5 straight lines at both ends of each line a given shape	95
Bell, eye, ear, closed book, hand without color	98	Two hammers different in shape, standing tiger, sitting cat, nail	97
Blue Tablet, 3 Blue Tablets, 4 Blue Discs, 5 Blue Discs, 7 Blue Tablets All Small	100	3 different dimensional squares green color (large, medium, small)	99

Conditions for Administering the Test Include:

Setting up the necessary tools: A well-lit room that is isolated, where the examiner is alone with the child. The examiner should be accustomed to working with children and be prepared accordingly (using a regular table and providing a chair for both the examiner and the child).

The child should be in a comfortable position facing the examiner.

The child should sit facing the examiner, who should present the cards one after another in such a way that the child cannot see the previously shown card or the subsequent card.

A set of 30 cards is placed on the table, with the cards initially flipped upside down. They are then presented to the child by placing the first card directly in front of them, followed immediately by the subsequent cards, and so on, until all 30 cards are presented.

Then, the second set of approximately 30 cards is administered, followed by the third set of approximately 30 cards, which marks the end of the test. (p, Dague, Mgarrelli et A, Lebetre, 1965, p;7).

Scoring the test involves recording the answers on the provided answer sheet. The number written between brackets on the answer sheet indicates the correct answer. If the answer is correct, a plus sign (+) is marked. If the answer is incorrect, the number of the answer is recorded for later analysis.

Application instructions are as follows: We start by saying to the child, "I will show you cards with drawings. Each time, there is a drawing that is different from the others. Point it out to me with your finger."

Then, we place the first card in front of the child and ask them, "Which drawing is not like the others?" If they do not understand what is being asked, we say, "Here are two blue circles" (showing them) "and they look the same. But this is a black triangle" (showing it to them). It is not like the others. Do not mark this card.

Depending on the child's needs, cards 2 and 3 are used for additional clarification, but they are not scored.

Then, we present the remaining cards in order, one after another, allowing the child ample time to think before giving each answer. (Dague, Mgarrelli et A, Lebetre, 1965, p;8)

If the child doesn't respond within a period of 20 to 25 seconds, we prompt them with the following statement:

"What is the shape? Have you found the one that is different from the others?"

In general, children quickly respond to cards with lower difficulty levels based on their cognitive abilities, and it is not beneficial to repeat the instruction each time.

When the difficulties increase or the child's attention decreases, the examiner says, "Remember, you need to show me the shape that is different from the others."

If the child refuses to provide an answer or seeks the examiner's voice or glance, the examiner should tell the child, "You need to answer."

If the child asks about the correctness of their answer, the examiner should say, "You are doing well, keep paying more attention."

The examiner should not tell the child that their answer is incorrect, nor should they show or explain the correct answer.

If the examiner notices that the child is not looking at all the pictures on the card, they insistently say, "It is necessary to look at all the drawings before answering."

Some children, instead of pointing out the correct drawing, may label it, for example, as "Picture 5" and say, "It's the cat that doesn't resemble the other drawings." This method of answering should not be encouraged, as the examiner states, "It is not necessary to label the drawings; you only need to show it to me with your finger."

For the closely related cards, starting from card 40 where the child needs to combine two types of drawings (elephants and chairs) and isolate the fifth one (cup), in order to prepare the child for this new task, we need to draw their attention to the new situation. The instruction should be modified starting from card 38 in the following manner: "Show me the drawing that does not resemble any other drawing, the one that remains alone and stands alone." This instruction is repeated in cards 45, 46, 54, and 55, where the matching comparison is required. The examiner should not assist the child in any way, and in the case of an incorrect response, they should not show the correct answer.

Test Termination:

The test is terminated when the child makes 12 errors in a series of 16 consecutive cards.

Technique with Investigation:

Starting from card 31, regardless of whether the answer is correct or incorrect, we ask the child, "Why does this drawing not resemble the others?"

If their explanation is unclear or confused, we insist that they refine their answer by saying, "Can you explain it to me a little better?"

We continue this process until the examiner understands what the child intends to convey.

During these procedures, we do not tell the child if their answer is correct or incorrect, nor do we inform them if their final explanation is good or not. The purpose of this technique is to understand the child's thinking. If the child provides an incorrect answer, and during the explanation, the examiner realizes this and discovers the correct answer, the child is not deprived of a point. We simply say to them, "You see, you didn't pay attention. Good."

Field Aspect of the Study:

Research Methodology: In this study, we adopted two complementary methodologies: a case study approach and a comparative methodology. The case study methodology aimed to gather information on each child participating in the test, including gender, educational institution, parents' address, examination date, date of birth, test scores, and age at the time of examination. The comparative methodology was used to analyze the overall results and compare them with the results of the French sample.

Research Sample: The research sample consisted of 100 children characterized by the following criteria: 50% males and 50% females, typically developing children without any mental disorders, aged between 5 and 7 years, with good physical and sensory-motor health. The sample was selected using simple random sampling.

Research Instrument: The Columbia Mental Maturity Scale was applied according to the previously explained instructions.

To answer the study's question regarding the difficulties encountered by the sample participants in responding to the Columbia Mental Maturity Test, we calculated the difficulty coefficient of the items using the following equation: $\text{Difficulty coefficient} = \frac{\text{Number of successes in the item}}{\text{Number of individuals in the sample}}$.

Upon reviewing the scoring sheets for each child, we found that the majority of children failed and provided incorrect answers for the test items in the following cards:

Most of the sample individuals provided correct answers for the first 37 cards.

However, the cards in which all sample participants encountered difficulty and failed to provide the correct answers were as follows:

Card 58: The drawing of the potato was poorly depicted and unclear, resembling either a pebble or an infant's head.

Card 63: The chalk was drawn in the shape of a cooled nail.

Card 61: The shape of the inkwell was ambiguous and not clear in the cards 79 and 75.

The facial features are not clear. In card number 62, it is difficult for a 5-year-old child to recognize them as they are. The glass opener and the matchbox in card 75 are challenging to identify. The paper airplane in card 65, the cooler in card 70, and the shape of the nail in card 97 are unclear. The eggshell is drawn in an unclear manner in card number 64. The shape of the pig, most children answered that it was a ram or a goat, in card number 69. The shape of the cigarette and the box of drills in card number 75 is depicted in a very old-fashioned way that a 5 to 7-year-old child would not recognize, as well as the beverage opener and the beehive in card number 82. The strawberry in card number 58.

Therefore, we can conclude that the difficulties in providing correct answers to the test items can be attributed to their saturation with cultural factors and the language element, rather than the child's cognitive level. The inability to recognize shapes and drawings accurately is due to the formal factors of the card content, especially poorly drawn and unclear cards such as the shape of the potato, the sewing needle, and the piece of fabric in card number 61, etc. Additionally, the facial features that are difficult to identify in the manner they are drawn in card number 62, and the cultural factors such as the inkwell, which is not currently present in this form, and the hammer in an American model in cards 70, 75, 79, and the shape of the pig.

Therefore, we conclude that the original form of the Columbia Mental Maturity Test cannot provide an accurate diagnosis of Algerian children due to the cultural and formal factors that characterize it. Consequently, directing and caring for children based on this test would be based on flawed foundations. According to Henry Walloo, relying on age as a criterion to determine a child's intelligence implicitly assumes that chronological age is the sole influential factor in intelligence. It assumes that education and environment are secondary contributions, which is incorrect. It is widely recognized that any battery of tests is only valid and effective under conditions or circumstances similar to the environment in which it was designed. The belief in the existence of tests free from cultural effects or culturally balanced tests is a mistaken belief. Intelligence tests reflect the cognitive level of individuals within their societies. These tests are constructed and standardized for the specific society in which they were designed. Therefore, the results of these tests vary according to the individual's upbringing and their affiliation with a particular cultural environment. The individual's cognitive abilities are influenced by their educational, pedagogical, and cultural environment in which they were raised.

Culture has a significant impact and role in cognitive abilities. When discussing the mind as an individual's mental activity, it is essential to consider the social framework and its elements and components, or rather, culture and its potential contribution to the process of shaping and forming individuals' minds. The sources and origins of mental programming can be traced back to the social environment in which a child grows, from which they receive and form their experiences and knowledge.

The process of mental programming begins at home and encompasses the neighborhood, school, and the overall social environment. Therefore, imported tests that are not adapted to our Algerian environment are developed and designed in an environment different from ours. They aim to measure cognitive abilities that are products of Western culture. Consequently, using the same tests on individuals from different cultures leads to shortcomings, incorrect results, and misjudgments. Caution must be exercised when approaching such tests.

Therefore, we can say that there is a significant difference in the difficulty levels of the Columbia Mental Maturity Test when administered to French children and its susceptibility to French cultural factors. The age group is influenced by cultural factors to a greater extent compared to other stages, especially external cultural factors such as education and the child's school experience. Additionally, the social and cultural environment in which a child is raised further contributes to their cultural fulfillment.

Some studies have confirmed that cultural factors affect the validity and objectivity of intelligence tests. These studies have revealed that children from affluent social classes tend to obtain higher

intelligence scores on average compared to their counterparts from lower socio-economic backgrounds (Dwidar, 1997).

Another important point to note is that the failure of individuals in the previously mentioned tasks may be attributed to the fact that those figures were drawn in a very old-fashioned style, given that the test was developed between 1947 and 1959. It is challenging for a child born in 2018, 2017, or 2016 to recognize those figures.

Recommendations and Suggestions:

Efforts should be directed towards adapting imported intelligence tests to provide accurate diagnosis and guidance for Algerian children. This is because most imported intelligence tests are very old, and scientific ideas about intelligence have changed significantly during this century, yet intelligence tests have not evolved.

There is a need to develop and design Algerian intelligence tests that align with our cultural reality, encompassing all its specificities.

Efforts should be made to provide quality training for students in Algerian universities in the field of measurement and test construction.

Students in universities should be trained to apply intelligence tests in various settings, such as medical-pedagogical centers for mentally challenged children and mainstream children.

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