THE DEVELOPMENT OF ANALOGICAL THINKING IN CHILDREN

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ABSTRACT:

The current research aims to identify analog thinking according to the age and gender variables at ages (3, 5, 6, 7, 9, 11) years, and the significance of differences in analog thinking according to age and gender, as the sample consisted of (240) children by (40) children for every age included in the current research, equally between males and females, and the researcher adopted the test (Richland & Moreson, & Hollyoak, 2006) as a suitable tool for measuring analogical thinking in children. The stability was verified by two methods: the stability of the correction and the stability of the Alpha Cronbach method.

The results showed the following:

1. The emergence of analog thinking at the age of (6) years.
2. There are statistically significant differences according to the age variables (3, 5, 6, 7, 9, 11) years, and there are no statistically significant differences according to the gender variable.
3. Analogue thinking takes a staged evolutionary path with advancing age. This is in agreement with the epistemic theory (of Piaget), as he sees that development is staged. Each stage builds on and completes the previous one, and differs with the behavioral theory that considers that development is a continuous and continuous process.

In light of the results of the current research, the researcher presented a number of conclusions, recommendations and proposals.

CHAPTER ONE

I. RESEARCH PROBLEM:

Since coming to this world, the child faces many different situations, standing in front of them, trying once, responding again and avoiding and withdrawing a third time and the child prevails in different states of thinking, which grows with age. The age stage that the child passes through determines the characteristics of his thinking and the nature of his treatment of the problems he faces, and the nature of the mental activity that he practices when he is exposed to an experience or a situation (Qatami, 2007, 433).

The main objective of studying thinking, as Piaget sees it, is to create individuals who can do new things, not to repeat the things that previous generations have done and to form minds that do not accept everything presented to them without scrutiny and analysis (Elkind, 1970: 25).

Analogous thinking is a complex cognitive process that includes processing information using symbols, visualizations, language and concepts in order to reach outputs based on the investment of old information in cognitive structures in new learning by discovering relationships between previous knowledge and new experiences that have no apparent relationship between them and previous experience, but rather reveal Works of thought in the search for a relationship between the symmetric and the symmetrical (Rule & Furletti, 2010:155)
There is a contrast and contradiction between what each of Piaget (Piaget) in his theory and Sternberg (Sternberg, 1979) in the elemental theory. Componential Theory and Gentner (Gentner, 1992) in the theory of structural planning. Structure - Mapping Theory, 1992. At the time of the emergence of analogical thinking.

From here, the problem of the current research is determined at what age analogous thinking appears in Iraqi children, and whether analogous thinking will take an evolutionary path with the child's age. Does this path take a continuous line or through developmental stages, which may help us in dealing with our children in enhancing the process of knowledge and giving them the appropriate amount of it? Thus, the research seeks to answer questions.

II. RESEARCH IMPORTANCE:

The study of childhood and its care is one of the important criteria by which the progress and development of society is measured. Taking care of it is in fact taking care of the future of the whole nation, because children are the most receptive element to development and the most connected to civilized construction. Therefore, the study of childhood is of great importance in the scientific field. And the efforts made for them constitute a demand for planned social change, of which development is one of its forms (Ismail, 1974: 57).

Analogous thinking plays an important role in creating tension or cognitive conflict in the child, which is an essential element in learning for conceptual change, and based on one of the principles of the constructivist theory in learning, which indicates that learning is a process of forming new knowledge structures resulting from an interaction between new knowledge. And the knowledge that the learner has in the first place, which is called learning for conceptual change, we find that symmetry is one of the effective tools in this type of learning (Razuki and Muhammad, 2019: 63).

The researcher can deduce the importance of analogical thinking from the following points:

1- This aspect of analogical thinking and the current research led to an attempt to add quality in the applied aspect by translating and adopting a tool for this type of thinking.

2- The essential benefit of using analogical thinking is the learners' ability to apply the familiar structure that activates to solve analogous problems in learning.

3- Analogies are used in the interpretation of new concepts that cannot be directly perceived in order to convert them into familiar tangible fields.

4- Analogous thinking is used to predict new conclusions in light of existing experiences.

5- The study helps in understanding how analogical thinking is formed in children.

6- The importance of studying the subject of analogical thinking is to shed more light on this phenomenon, in order to follow modern trends in examining the experimental methods of Piaget's ideas in cognitive development, especially related to ways of research in deductive thinking among children in an Arab culture.

7- The results of the current research may help the stakeholders and officials in the field of education to build curricula and programs that pave the way for improving the level of (analogous thinking) ability of children.

Practical importance

1- The current study helps in providing a tool that can be useful to other researchers who may work on the study of analogical thinking.

2- What the current study provides is a tool that helps teachers in primary schools to know analogical thinking, which makes it easier for them to deal with children in the primary school stage.

Research aims:

The current research aims to know:

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1- Analogous thinking in children according to the variables of age (3, 5, 6, 7, 9, 11) years and gender (males, females).

2- Significance of statistical differences in analogical thinking in children according to the variables of age (3, 5, 6, 7, 9, 11) years and gender (males, females).

Search limits:
The current research is limited to children aged (3, 5, 6, 7, 9, 11) years of primary school students who are in public morning schools in Kirkuk governorate for the academic year (2020-2021).

Define terms
First: Development
Definition language: Webster's Dictionary (Webster, 1971):
A process or consequence of growth (Webster, 1971:227)
Defining idiomatically: Piaget (Piaget, 1986)
Gradual equilibrium from a weak state to a stronger state (Piaget, 1986: 7).

Second: Analogical thinking
Defining idiomatically:
He was known by: Kaufman & Magder, 1996)
It is a mental activity that the learner performs when he is exposed to a situation or a problem to reach the appropriate solutions, and it depends on understanding and realizing things that seem different, and this method is implemented in two ways: The first is to make the familiar strange: with the aim of stimulating and developing some thinking patterns among the learners. The other is to make the stranger familiar (Razuqi and Muhammad, 2019: 51).

Richland, L., & Morrison, R & Doumas, L, 2006)
It is a conceptual strategy that enables children to make inferences about a new phenomenon, to move learning across contexts, extract relevant information from learning experiences based on relational similarity, and children's ability to observe analog maps of simple relationships that are affected by the diversity of scattering properties and relational complexity of stimuli and to identify normative relationships in a scene. Symmetry (Richland, L., & Morrison, R & Doumas, L, 2006:246-254)

The procedural definition of analogical thinking:
It is the total score obtained by the examinee from his answers to the paragraphs of the Analogous Thinking Test

The researcher adopted the definition of Richland, Morrison, and Dumas (Richland, L., & Morrison, R & Doumas, L, 2006: 246).

In his research, he adopted their tool in the Analog Thinking Scale for the children of the research sample.

CHAPTER TWO:
The current chapter includes a review of the most prominent theories that dealt with analogical thinking, as well as some previous studies obtained by the researcher, as follows:

The first axis: the theoretical framework
Analog thinking:

A thinking pattern used during problem solving or to understand ambiguous or abstract things from prior information in one field to help solve another problem. Gordon points out that symmetry is a pattern of figurative activity.

The development of the formation of the concept of symmetry between things

When two groups of things are available, each of which includes a number of things, it becomes clear to us that this numerical equivalence is independent of the organization and arrangement of things in space. Hence, it seems to us that establishing symmetry between the elements of the two groups, element by element, becomes a simple matter. But the results of studies on children revealed that establishing numerical equivalence between two groups of things and exploiting this equivalence when placing the objects that make up it in the void is not clear in the minds of children between the ages of five and seven. The results of a study conducted by (Peter, 2006) on children were revealed. Children at the age of four and five do not distinguish between the space occupied by a group of objects and the number of objects that make up the group itself, and therefore they cannot establish appropriate numerical symmetry while dealing with objects. He gave the children (Peter, 2006: 243) similar objects arranged in front of them (six bottles and ten cups) and asked them to form a first group with the same number of items as the second group of objects (five flowers and seven pots) provided that they describe the corresponding objects. Piaget also tried to exchange coins with the children for goods they received, and then asked them if the number of coins they circulated among themselves was equal to the number of goods they received. The results of the study on children revealed that children of the second level of the stage of tangible operations can establish numerical symmetry at the beginning, but when the researcher changes the placement of the elements of the group in the void, this equivalence is no longer in their minds, and even the children doubt the possibility of restoring this equivalence between the elements of the two groups again. As for the experiments based on the symmetry of each element with a certain group with a number of elements of another group, such as the symmetry of a bowl from the first group with a red rose from a second group and a yellow rose from a third group, the results were similar with the results of the previous experiments. In general, we note that during the emergence of tangible processes, the child becomes able to understand the functional dependency relationship of things on the descriptive level first and then the quantitative level secondly. Children can be trained to establish two analogies:

1- The girls and boys in the classroom.
2- Children and the pens distributed to them.
3- Girls and spoons distributed to them.
4- The animal and its type of food.
5- The type of animal or bird and the covering that covers its body.
6- Animal or bird body parts and their function.
7- The bird or the animal and its offspring.
8- The bird or animal and its sound.
9- Tools and professions that use these tools

A child can associate a pair of things that may belong to the same set of things, and it is a play group. Each of the two elements of one pair may belong to a different group than the other. The doll belongs to the play group while the girl belongs to the girls group In these activities, the performance stages for children are as follows:

The first stage: It extends until the end of the age of eight, as children at this age are unable to establish ordinal symmetry.
The second stage: It extends between the age of nine and the age of eleven, as children succeed in establishing serial symmetry and ordinal symmetry through trial and error.

The third stage: begins at the age of eleven, when the concept of symmetry is fully developed in children. (Peter, 2006: 246-248)

Theories that explain analogical thinking

Structural planning theory. Structure - Mapping Theory, 1992

The foundations of this theory were based on the assumptions proposed by Gentner in 1982, and this theory showed a set of ideas and conclusions that clarified mental treatments through which inferences are made. (Gentner, 1982, p.19). This theory aims to try to control the: (descriptive constraints), that is, the characteristics and specifications between the corresponding concepts. They are mental processes that are used in order to reach an understanding of the type of similarities when balancing those similar concepts. (Markman, and Gentner, 1994, p.37).

The central or basic idea in this theory is that the ability (analogue thinking), consists of the process (planning or delineation) of the different knowledge that exist within one field or field of knowledge. This is what is called (the rule). As well as the process (transfer or transfer) of that group of knowledge to other fields or fields of knowledge and this is what is called (the goal). (Burstein, 1983, p.17).

In this way, the (system of relations) will be preserved or maintained for each of the concepts or vocabulary (the base) as well as the concepts (the goal) and through the process of analogical inference, the individual tries to reach a state in which he can put (vocabularies or concepts) Which are specific or affiliated to (the rule) in a (gradual) manner, so that those topics can be (identical or identical) with the specific concepts (the goal). (Holyoak, & Thagard, 1989, p.295). In addition, both the (planning) process and the (transformation) process must have reached a stage in which they can achieve the highest level of (structural matching) with regard to the relationships between the different concepts. (Holyoak, and Thagard, 1989, p.335). In the sense that the process of congruence or similarity that occurs between (themes, concepts, or vocabulary) in both (the base) and (the goal) does not occur merely by reaching a state of being consistent or harmonious, but rather that (congruence or analogy) between the concepts (correspondence) It must reach a state of Matching Relational Structures. Thus, access to Analogous Thinking is a method connected to two processes: the process of paving, which means identifying a set of concepts or topics that can exist between them, i.e. A form of similarity or symmetry and the process (focusing) of relational commonalities, according to which some of those symmetrical concepts or topics that have a similarity in the structure or structure of their relationships are selected (Bransford, J. & Stein, B., 1984: 124). More specifically, these two previous processes can fall under the concept of “Systematicity” in which the individual performs a mental process (drawing a detailed map) of the network of systems related to the predictions that he appeals to or which guides his self-direction of his mind. higher), which are related to usefulness and inferential importance. Preferring that to predictions that do not have that kind of relationship and that may have been used in advance. (Reed, 1987, p.139). In the symmetry put forward by (Rutherford's Analogy), through which he tried to show the similarities, interrelationships or similarities between (the sun) and (the moving planet), that when the individual is presented with this analogy, he will initiate to retrieve some information or common knowledge regarding It belongs to (the sun) in order to be able to find a certain group or variety of common or common relations specific to (the base) i.e. (the solar system) and between (the target) i.e. (the moving planet). The individual assumes a set of relationships that can be (coherently planned) and possess, in addition, a kind of clarity and depth. Among those relationships that may appear at first glance among individuals are, for example: (the relationship of cause and attraction), (the relationship of weight and magnitude) and (the relationship of succession and rotation). (Gentner, 1982, P.56) that these and other relationships that could be (interconnected systems) will be rejected and not accepted, and a state of (relational congruence or harmony) cannot be reached, except in the event that those relations reach (congruence or structural similarity) and as follows:

(The sun is a nucleus) and (the planet has an electron) (Gentner, 1982, p.58)
As a result of the research conducted in this regard, three independent and specific results were reached regarding the analogical thinking process, which are psychological foundations for the theory of (structural planning). (Gentner, and Clement, 1988:155)

1- Adult individuals tend or tend, in their interpretation of the concept of symmetry, to include these interpretations of the (relationships) between subjects or concepts that pertain to symmetry and they neglect or ignore the reasons from their interpretations of the concept of symmetry and that this The procedure takes place when they have reached a high level of awareness of the Relational Structure System between those concepts or topics. (Gentner, and Landers, 1985:181)

2- Adult individuals, as well as children, are more accurate in the process of (analogical transfer), especially when the (system of relational structure) in the field of (Al-Qaeda) is clear and specific, and this is what helps in reaching the process of (planning). ( Gentner, 1988:59)

3- Adults are more likely to ask questions and inquiries about the use of new predictions and assumptions related to solving (analog examples) when those assumptions or predictions that are solutions to those examples are based on (structures or relational structures) common or current for the concepts or topics in the examples proposed. ( Gentner, 1989:141)

Through these results, as well as the ideas and assumptions adopted by the theory of (structural planning) with regard to the analog inference process, a set of (descriptive determinants) has been proposed that includes (six) foundations that are principles or pillars through which various examples or models can be reached. These bases are: (Gentner, and Rattermann, 1991, p.192).

1. Consistency or structural cohesion. Structural Consistency

The relationships between topics or concepts placed within analogous examples or models must be identical or parallel in terms of (relational structure) in order for the predictions made by individuals in which they are trying to reach the solution to those analogous examples or models are appropriate or correct

2. Relational focus. Relational Focus

The selection process is determined in the (structure of relational systems) that exist between concepts within analogous examples. As for the relationships between topics in general and the process of describing or defining them, they are ignored or neglected. (Collins, and Gentner, 1987:126)


Among the many predictions that try to explain or clarify the relationship in the examples or analog models, it is necessary to find one among those relationships that has the highest level of congruence or similarity in structure or structure in the type of relationship in the sense that it has the quality (regulation). The highest) is the most common and traded one, and therefore it will be preferred and chosen. (Collins, and Gentner, 1987:129)

4. There are no strange or extraneous connections. No Extraneous Associations

The common and current strong and close relationships are in themselves (symmetries) in addition to that (relationships and connections) between (the base and the goal), except that some other types are (intellectual connections) Thematic Connections. That is, (communications or relationships based mainly on ideas) cannot be considered analogous relationships by themselves.

5. Analogies cannot be mixed. No Mixed Analogies

The (relational network) that is carefully planned or drawn mentally within the (target) space is supposed to be completely and completely present within one field or field related to (the rule), but when (two rules) are used, it must be both rules have reached a high level of (a coherent or logically coherent system). (Collins, and Gentner, 1987:132)

Any two phenomena, concepts or topics that fall within analogous examples or models, it is not possible for one of these phenomena to be considered a cause for another phenomenon. (Collins, and Gentner, 1987, p.129). Those determinants or foundations can be considered as processes for producing or creating (new inferences) through which the typical form of successful (analog inference) can be reached. Therefore, the relational system must be completed with a high level of congruence, overlap, or overlapping, between different concepts and topics. (Forbus, and Gentner, 1989, P.6). In addition, these processes or procedures initially create all possible symmetries or positional correspondences between the preferred components or elements, and then attempt to reach a link between those symmetries or similarities, and then Certain systems of correspondences are established that are (structurally coherent), and that any one of those explanations or predictions with the highest level of depth will yield a solution and is determined by likelihood. (Forbus, and Gentner, 1989, p.9). And the new inference that was nominated must be compatible with (the subject of the rule) in order to be able to complete it or to complete it in the (objective subject), in other words, that these operations are a (system compatibility or congruence). (Forbus, and Gentner, 1995, p.11).

Previous studies:

Study: Morrison & Richland & Doumas & Holyoak.2006 The Development of Analogical Reasoning in Children: A Computational Account

The study aimed to reveal the extent of relational complexity and distraction, in the contrast and similarity of the scene, which affect the children's analogical thinking performance. The study sample consisted of 68 children, including (22 children) at the age of (3 and 4) years, and (21) children at the age of (6 and 8) years, and (25 children) at the age of (13 and 14) years.

Study tool: The materials for the main task included the use of scene measurement problems with all participants, and included four balanced versions that were created for each group of (20) pictures that have a relational level. Each variety is realistically located.

(a) The number of instances of the related relationship that need to be assigned (one or two).

(b) The presence of an object in the target scene that was very similar (distracting) or different from (other than the object to be mapped in the source scene. Binary relationship problems were through having one inactive object in one relationship problems involved in the binary version of the relationship For example, a woman who observes a boy chasing the girl is the one-relationship versions of the problem (boy-girl-chasing) now joined to the pursuit in the two-relationship version (woman-boy-girl-stalked).

The results showed that there is a discrepancy in the similarity of the scene of problems affecting the analogical thinking performance of children aged (3 and 4) years, and children aged (6 and 7) years, (9, 11) and (13 and 14) years. They point out that when children can identify critical structural relationships in a scene analogy problem, their ability to reason interacts symmetrically with both relational complexity and distraction (characteristic distraction). Error patterns indicate that children are more likely to identify a distracting object than to make relational error for problems that present all possibilities. This tendency decreases with age, and older children generally have fewer errors.

The results indicate that changes in analogical thinking with age depend on the interaction between increases in relational knowledge, the ability to integrate multiple relationships, and inhibitory control over distraction (distinctive distraction). As well as the existence of an evolutionary path from younger ages to older ages. (Richland et al, 2006: 251)

CHAPTER THREE:

III. RESEARCH METHODOLOGY AND PROCEDURES

This chapter includes defining the research methodology and the procedures followed by the researcher to achieve the objectives of the research, from defining a community and selecting its sample, and adopting a tool to measure analogical thinking, as well as identifying the statistical methods that were used in data analysis, as follows.
First: Research Methodology

Since the current research aims to identify (analog thinking) at ages (3, 5, 6, 7, 9, 11) years, the researcher adopted the descriptive approach, which seeks to determine the current status of the phenomenon studied, and then describe it. As a result, it depends on the study of the phenomenon on what it is in reality and is interested in describing it accurately (Malhem, 324: 2006).

The current research requires following the evolutionary studies approach among the types of studies of the descriptive approach, which are concerned with changes that occur as a function of time, and the study of any phenomenon or characteristic requires, above all, a description of this phenomenon, specifically quantitatively and qualitatively (Dauod, Abdel Rahman, 163:1990). The researcher adopted cross-sectional studies, which are among the methods of evolutionary studies from the descriptive approach, as the data in this type of studies are collected from a sample drawn from the research community representing different age or class segments, information about them is collected at the same time to show the evolution in the characteristic of interest over time, and this is what happens in developmental studies in developmental psychology (Al-Batsh and Abu Zina, 245: 2007).

Second: Search Procedures:

1- Research community:

The research community means the total group with the elements that the researcher seeks to generalize the results related to the problem (Awda and Malkawi, 159:1992). The statistical community of the current research consists of children aged (3, 5, 6, 7, 9, 11) who are located in the Kirkuk governorate / Hawija district, and their number is (40,958) individuals (1), and Table (1) illustrates this.

(1) According to the statistics obtained by the researcher from the Kirkuk Education Directorate / Educational Planning Department / Statistics Department in the Ministry of Education,

| Table (1) Distribution of the research community students by age and gender |
|---|---|---|---|---|---|---|---|---|---|
| total | 11years | 9years | 7years | 6years | 5years | 3years |
| f | M | f | m | f | m | f | m | f | m |
| 40958 | 3018 | 3958 | 5983 | 6470 | 5145 | 5598 | 5054 | 5534 | 74 | 98 |
| 6965 | 12414 | 10729 | 10570 | 172 | 108 |

2- Sample research

The sample is a subset of the research community in which the elements of the community are best represented in order to facilitate generalization of the results to the community (Abbas et al., 218:2006), and the sample must be selected based on a procedure that allows us to estimate the degree to which the sample members are representatives of the selected community. From it in relation to some variables related to the research or study that we are planning to do (Al-Batsh and Abu Zina, 95: 2007). The sample was selected from the Kirkuk Education Directorate, and Table (2) shows this.

<p>| Table (2) Distribution of the research sample according to age, gender, residence and district |
|---|---|---|---|---|---|---|---|---|---|---|</p>
<table>
<thead>
<tr>
<th>Number of children by age and gender</th>
<th>location</th>
<th>School name</th>
</tr>
</thead>
<tbody>
<tr>
<td>total</td>
<td>11years</td>
<td>9years</td>
</tr>
<tr>
<td>80</td>
<td>-</td>
<td>-</td>
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<tr>
<td>40</td>
<td>5</td>
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<td>20</td>
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<td>-</td>
</tr>
<tr>
<td>40</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
2-3: Selection of the children's sample

For the purpose of selecting the research sample, the sample members were drawn by stratified random method from those who have the variables of the current research, namely: the age and gender of the child.

A- One class was randomly drawn for each of the kindergartens, nurseries and primary schools in the education of Kirkuk to include ages (3, 5, 6, 7, 9, 11) for both sexes.

B - Withdrawing the children from the people by putting the names of the children in a bag and drawing five males and five females randomly from each row.

C- Excluding children who have failed in a previous school year (in primary schools) within the ages covered by the research, and thus the researcher has excluded extraneous variables that may affect the research results.

d- Exclusion of students who do not live with their parents.

After this series of procedures, the researcher was able to obtain a sample of the current research, which included (240) children, by (120) males, and (120) females, and by (40) boys and girls from each age group of ages (3, 5, 6, 7, 9, 11) years old. The researcher used the method of individual interviews with children of this age group.

Third: the search tool

To achieve the objectives of the research, it was necessary to have a tool to measure analogical thinking in children, for ages (3, 5, 6, 7, 9, 11) years. After reviewing previous studies and literature, the researcher was able to obtain a Richland Analogous Thinking Test for Children (Richland, L., & Morrison, R & Doumas, L, 2006:2), which is based on ages (5, 6, 7, 9, 11) years The researcher adopted this test, then its vehicle and its method on the Iraqi environment. The tool consists of (20) stories, in each story there are (4) pictures. The materials for the main task included the use of scene measurement problems with all participants, and it includes four balanced versions that were created for each group of (20) pictures has a relational level. Each is realistically diverse, the presence of an object in the target scene that is very similar to or different from the object that will be set in the source scene. Note that the marks of correction that the researcher will adopt in correcting the test are (zero, 1).


* The researcher wrote to researcher Richland, L. In turn, she sent the complete tool on 11/15/2020

Validity of the tool:

Virtual validity:

Honesty is one of the basic characteristics in constructing psychological tests and scales (Admes, 1964:144), as it refers to the scale’s ability to measure the characteristic that was set up for its measurement (Faraj, 1980: 360), and it is reached through the specialist’s judgment on the degree of test measurement for the trait. Measured and since this judgment is characterized by a degree of subjectivity, so the test is given to more than one arbitrator, and the degree of apparent validity of the test can be assessed through the compatibility between the arbitrators’ assessments (Odah, 370:1998).

The tool consists of (20) stories, in each story there are (4) images, and the material for the primary task includes the use of scene-scaling problems with all participants, and includes four balanced versions created for each group of (20) images at the relational level*. In its initial form, Appendix (1) was presented to a group of experts specialized in educational and psychological sciences to take their opinions and directions on the appropriateness of the story, image, questions and procedures followed to achieve the research objectives. The experts agreed on
the validity of the questions that permeate the story in addition to their content and appropriateness to the level of understanding of the child. A percentage of agreement (100%) was obtained for the questions and content, and thus the researcher verified the validity of the tool.

The accuracy of the translation:

To verify the validity of the translation of the current research tool, the researcher performed a number of procedures, as follows:

1- The researcher translated the tool from English into Arabic (2).

2- The researcher re-translated the text from Arabic into English (3).

3- The researcher presented the two texts in English, one of which is the original text of the tool, and the second text is the translated text from Arabic into English to a specialist to ensure the accuracy of the translation, and not to change the meanings (4).

4- The translated text from English to Arabic was presented to an Arabic language specialist to ensure its linguistic integrity (5).

Tool description:

The test consists of (20) stories, in each story there are (4) images, and the four images include a level of relational * among them and a dispersed error * and other errors *, each variety realistically, the presence of an object in the target scene that closely resembles or It is different from the object to be set in the source scene.

The interview with the child includes a set of questions that are asked to him while he sees the picture accompanying the questions, as follows:

* Relational means the relational similarity between the images that are known with each story.

* Relational means the relational similarity between the images that are known with each story.

* Distracted error means the distinctive distraction in each picture.

* Other errors are meant images that are not related in relational.

Are you ready? We will play a picture game. Let me show you how it works. On each page there are two pictures like this one. There is a specific pattern in the top image. The same pattern occurs in the bottom image. But it looks different. Let me explain to you what I mean. Look at the top of the picture there is an older boy and a younger boy, this is the older boy and this is the younger boy (the researcher points to each object as described).

Now in the bottom picture there is a bigger bear and a smaller bear (here the experimenter indicates) see the same pattern happens in both, but it looks different. Now in this game you have to first find out the pattern that happens in both pictures, okay? Then I'm going to point to one thing in the top picture, and your job is to tell me what's in the same part of the pattern in the bottom image. So on this first page, if we have a smaller boy and a bigger boy, and a smaller bear and a bigger bear, and if you point to The younger boy, which one looks like the younger boy in the bottom picture? Which one is in the same part of the pattern in the bottom image? (Point to each object as described).

Repeat the question until I get a correct answer. Otherwise, give the answer to the child after several attempts.

Sometimes the pattern has two parts, like the one you just saw with the older boy and the younger boy, and sometimes the pattern has three parts. Let me show you what I mean. In this top picture, there is a mother reading to a girl reading to a teddy bear (the experimenter pointed at each object) and then in the bottom picture there is a father reading to a boy reading to a doll, see the pattern is the same in both pictures, but it looks different, you can see that She has someone who reads to her and she reads to someone else. She has two things happening to her
right now. If you refer to this girl, who do they look like in the bottom picture? And what is in the same part of the bottom image pattern? (Point to each object as described) Repeat the question until I get the correct answer, otherwise give the correct answer after several attempts. (Noting that these two pictures are examples illustrating the child being examined) Appendix No. (4).

Example 1/ What looks like the youngest boy in the bottom picture?

Example 2/ If you refer to this girl, who do they look like in the bottom picture?

questions:

Q1/ What looks like the girl who kisses a doll in the bottom picture?

Q2/ What is the thing that looks like the cat running behind the mouse in the lower picture?

Q3: What is similar to the solar system in the lower picture?

Q4/ What is similar to the library in the lower pictures?

Q5: What is similar to the monkey in the bottom picture?

Q6/ What is the thing that looks like the idle car at the bottom of the picture?

Q7: What looks like the girl in the bottom picture?

Q8/ What does the child look like in the bottom picture?

Q9: What does the child look like in the bottom picture?

Q10/ What is the thing that looks like the dog in the bottom picture?

Q11/ What is the thing that looks like the portable car at the bottom of the picture?

Q12/ What is the thing that looks like the girl who is talking on the phone at the bottom of the picture?

Q13/ What is the thing that looks like the bucket in the picture below?

Q14/ What is the thing that looks like a shark in the bottom picture?

Q 15/ What is the thing that looks like the dog in the bottom picture?

Q16/ What is the thing that looks like the bowl in the bottom picture?

Q 17/ What is the thing that looks like the jug in the bottom picture?

Q18/ What is the thing that looks like the boy in the bottom picture?

Q19/ What is the thing that looks like a working car in the bottom picture?

Q20/ What is the thing that looks like the festival man in the bottom picture?

Survey application:

For the purpose of ensuring that children understand the stories, images and questions in the research tool and their clarity, and calculating the time taken to answer for each age of the research sample, and adjusting the proper application method, and to find out if there are other difficulties that the researcher may face when applying the tool, he chose a random sample consisting of (60) children of (30) males and (30) females of the age groups (3, 5, 6, 7, 9, 11) years, and the table (4) illustrates this.
Table (4) Distribution of survey respondents according to age, gender, and district

<table>
<thead>
<tr>
<th>11years</th>
<th>9years</th>
<th>7years</th>
<th>6years</th>
<th>5years</th>
<th>3years</th>
<th>Schools</th>
<th>Name of educational</th>
</tr>
</thead>
<tbody>
<tr>
<td>f</td>
<td>m</td>
<td>f</td>
<td>m</td>
<td>f</td>
<td>m</td>
<td>f</td>
<td>m</td>
</tr>
<tr>
<td>30</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>30</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>60</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Tool stability*:

The stability of the search tool was calculated in two ways, as follows:

A- The Facronbach method

Stability refers to the consistency in the scores obtained by the same people at different times (Anastasi, 1988:109, and the honest scale is considered stable while the fixed scale may not be true. It can be said that every honest test is necessarily stable. To calculate stability in this way, the researcher applied the scale on (60) boys and girls of the age groups (3, 5, 6, 7, 9, 11) years, with (30) males and (30) females.

The stability of the scale was calculated using the Facronbach method, which is characterized by its consistency and the possibility of reliability of its results, according to the correlations between the degrees of collection of the scale items, on the basis that the item is a self-contained scale, and the stability coefficient indicates the consistency of the individual’s opinions, i.e. the homogeneity between the items of the scale (return, 354:2000), and in order to extract stability in this way, the (Facronbach) equation was applied to the scores of the sample members, and the value of the scale’s stability coefficient was (0.85), which is a good stability indicator. Some measurement and evaluation literature indicates that the values of stability coefficients are good if they are more than (0.80).

* The researcher did not extract the distinction by referring to the psychometric experts:

A.P. Mohamed Anwar Mahmoud.

A.P. Khaled Jamal Jassim.

If they confirm the reason that the standard characteristics, including discrimination in the current study, which depends on the individual interview, discrimination is not extracted. Also, some of the previous studies in the specialization of developmental psychology that adopted the individual interview did not extract discrimination, such as the study of (Al-Soufi, 1998) and (Al-Zaydi, 2002), (Al-Saadi, 2000), (Al-Saadi, 2007), (Saleh, 2002), (Al-Moussawi, 2002), (Al-Douri, 2000), (Al-Yasiri, 2012), (Al-Tayyar, 2016) and other studies.

B- Score Reliability

The stability of the correction was calculated in two ways: the stability of the corrector with itself and the stability of the corrector with another corrector.

1- The stability of the corrector with itself (Intra Scorer)

This type of stability is important in the use of measurement tools as it relates to the degree of agreement between a person and himself in giving grades to a variable (Achenbach, 1978: 76), after the answers of the stability sample were recorded, the answers were re-corrected with an interval of three weeks, and the correction stability coefficient was used (Pearson's correlation coefficient) for the qualitative answers between the two estimates was (0.98), and this coefficient is considered very high (Odah and Al-Khalili, 146:1988).

2- The stability of the corrector with another corrector Inter Scorer
The use of this type of correction is that the degree is estimated on the basis of the apparent or implicit idea, and thus the degree becomes subject to fluctuation (Al-Ajili, Abdul Rahman and Al-Imam, 1990: 150). This method was applied by re-correcting the answers of the children of the stability sample by another corrector (*) after being trained on the method of correction, and the stability coefficient of correction with another corrector (Pearson correlation coefficient) for the qualitative answers between the two estimates was (0.95) and this coefficient is very high (return and Al-Khalili, 146:1988).

* Master Student, Harith Abdul Latif, Developmental Psychology

IV. **THE FINAL APPLICATION:**

The researcher applied the tool used on the research sample of (240) boys and girls, and the application period lasted three months from (3/1/2021) to (3/3/2021).

The researcher followed Piaget's clinical interview, which is a method of research in which the researcher uses a flexible dialogue method to verify the participants' views on a particular issue, excluding all traditional methods of studying children.

The researcher would meet the child and get to know him and exchange conversations with him to familiarize himself with the situation, and then tell him we will play the picture game; let me show you how it works? On each page there are two pictures like this one. There is a specific pattern in the top image. The same pattern occurs in the bottom image. But it looks different. Let me explain to you what I mean. Look at the top of the picture there is an older boy and a younger boy, this is the older boy and this is the younger boy (the researcher points to each object as described), and he narrates the part of the picture that embodies the present event, and the child asks the questions included in the story, and after he finishes asking questions The researcher thanks each child and returns it to his class and takes another child and so on, and the average response was recorded for all age groups and Table (5) illustrates this.

<table>
<thead>
<tr>
<th>Term</th>
<th>Average child's answer</th>
<th>ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 – 25</td>
<td>25 minutes</td>
<td>3 years</td>
</tr>
<tr>
<td>30 – 22</td>
<td>22 minutes</td>
<td>5 years</td>
</tr>
<tr>
<td>25 – 18</td>
<td>18 minutes</td>
<td>6 years</td>
</tr>
<tr>
<td>22 – 17</td>
<td>17 minutes</td>
<td>7 years</td>
</tr>
<tr>
<td>20 – 15</td>
<td>15 minutes</td>
<td>9 years</td>
</tr>
<tr>
<td>18 - 12</td>
<td>12 minutes</td>
<td>11 years</td>
</tr>
</tbody>
</table>

Statistical means:

The researcher used the statistical package for social sciences (SPSS).

1- The (Fakronbach) equation to extract the stability of the tool and its equation.

2- The equation (Pearson correlation coefficient) to calculate the stability of the correction between the corrector and himself, and between another corrector.

3- The t-test for one sample to extract the significance of the differences between the calculated averages and the theoretical average for the concept of analogical thinking in children.

4- Binary variance analysis with interaction to extract the significance of differences in analogical thinking in children according to age and gender

5- Scheffe test for dimensional comparisons to extract the significance of differences in analogical thinking among children according to age and gender.

**The fourth chapter**

First: Presentation, interpretation and discussion of the results:
This chapter includes a presentation of the results of the research, their interpretation and discussion in the light of the theoretical framework and previous studies, and then coming up with a set of conclusions, recommendations and proposals in light of those results, as follows:

The first goal: to identify analogical thinking in children according to the variables of age and gender:

First: age

To know analogical thinking according to the age variable (3, 5, 6, 7, 9, 11) years, the average degrees of symmetrical thinking in the research sample reached (4,600, 10,750, 10,800, 14,275, 18,250) degrees, respectively. With standard deviations (0.810, 1,514, 1,114, 3,054, 1,056) degrees respectively, the arithmetic mean and standard deviation of the scores of the sample members were calculated in the Analogous Thinking Test for each of the ages included in the research, in order to compare it with the theoretical average of the test, and the t-test was used for one sample to identify the significance of the difference between the arithmetic averages and the theoretical average (10). The results showed that the difference was not significant between the two averages for children of (3) years old, as the arithmetic mean for this age was (zero). The results also showed that the difference is significant between the two averages for children aged (5) years, as the calculated t-value was (42,154), which is greater than the tabulated t-value (2,021) at the significance level (0.05) and the degree of freedom (39). As shown in Table (6) and Chart (1).

In order to judge the age at which analogical thinking is formed in children at ages (3, 5, 6, 7, 9, 11) years, the researcher adopted the average score that exceeds the theoretical average with statistical significance as a criterion for judging the formation of analogical thinking. Thus, the age of (6) years is the age at which analogical thinking is formed in children, and Table (6) illustrates this. The results indicate that scores progressed as the children got older.

Second: sex

To know analogical thinking according to the gender variable (males, females). The averages of analogical thinking in the research sample reached (4,500, 11,35, 10,80, 14.05, 17.80) and females (4,700, 11,15, 10.80, 18.25, 18.25) score consecutively. With standard deviations for males (0.888, 1,30, 0.695, 2,874, 1,056) and for females (0.732, 1,34, 1,436, 1,069, 1,069), the scores were successively calculated, and the arithmetic mean and standard deviation of the scores of the sample members were calculated in the Analogous Thinking Test for each age. Which the research included, in order to compare it with the theoretical average of the test, and the t-test for one sample was used to know the significance of the difference between the arithmetic averages and the theoretical average (10). age (zero). The results also showed that the difference is significant between the two averages for children aged (5) years, as the calculated t-value was (42,154), which is greater than the tabulated t-value (2,021) at the significance level (0.05) and the degree of freedom (39). As shown in Table (7) and Chart (2) and (3).

Table (6) Arithmetic averages of children's scores on the Analogous Thinking Test and the T-value calculated according to the age variable

<table>
<thead>
<tr>
<th>Sign</th>
<th>Table T-value</th>
<th>Calculated T-value</th>
<th>standard deviations</th>
<th>Grade Averages</th>
<th>The number of sample members</th>
<th>age in years</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,05</td>
<td>2,021</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>0,05</td>
<td>2,021</td>
<td>*42.154</td>
<td>0.810</td>
<td>4.600</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>0,05</td>
<td>2,021</td>
<td>*3.131</td>
<td>1.514</td>
<td>10.750</td>
<td>40</td>
<td>6</td>
</tr>
<tr>
<td>0,05</td>
<td>2,021</td>
<td>*4.542</td>
<td>1.114</td>
<td>10.800</td>
<td>40</td>
<td>7</td>
</tr>
<tr>
<td>0,05</td>
<td>2,021</td>
<td>*8.850</td>
<td>3.054</td>
<td>14.275</td>
<td>40</td>
<td>9</td>
</tr>
<tr>
<td>0,05</td>
<td>2,021</td>
<td>*49.405</td>
<td>1.056</td>
<td>18.250</td>
<td>40</td>
<td>11</td>
</tr>
</tbody>
</table>

Tabular T-value at significance level: *(0.05) and degree of freedom (39) = 2,021
Figure (1) Average scores of children on the Analogous Thinking Test by age

Table 7 Analogous thinking in children according to the gender variable

<table>
<thead>
<tr>
<th>T value</th>
<th>calculated</th>
<th>standard deviation</th>
<th>SMA</th>
<th>No.</th>
<th>sex</th>
<th>age</th>
</tr>
</thead>
<tbody>
<tr>
<td>tabular</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>m</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.683</td>
<td>0.888</td>
<td>4.500</td>
<td>20</td>
<td>m</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>32.350</td>
<td>0.732</td>
<td>4.700</td>
<td>20</td>
<td>f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.613</td>
<td>1.30</td>
<td>11.35</td>
<td>20</td>
<td>m</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3.814</td>
<td>1.34</td>
<td>11.15</td>
<td>20</td>
<td>f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.141</td>
<td>0.695</td>
<td>10.80</td>
<td>20</td>
<td>m</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>2.491</td>
<td>1.436</td>
<td>10.80</td>
<td>20</td>
<td>f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.302</td>
<td>2.874</td>
<td>14.05</td>
<td>20</td>
<td>m</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>34.484</td>
<td>10.69</td>
<td>18.25</td>
<td>20</td>
<td>f</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33.023</td>
<td>1.056</td>
<td>17.80</td>
<td>20</td>
<td>m</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>34.484</td>
<td>1.069</td>
<td>18.25</td>
<td>20</td>
<td>f</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 2: Average scores of females on the Analogous Thinking Test
The second objective: To know the existence of statistically significant differences in analogical thinking according to the variables of age and gender:

a. Age:

For the purpose of verifying whether analog thinking takes an evolutionary path across the ages covered by the research (3, 5, 6, 7, 9, 11) years, which requires knowing the effect of age and investigating the effect of gender on analogical thinking, the researcher used a binary variance analysis (age × age). gender, as well as to know whether there is an interaction between the variables of age and gender, as shown in Table (8). The results were as follows:

Table (8) Binary variance analysis with the interaction of analogical reasoning according to the variables of age and gender

<table>
<thead>
<tr>
<th>Contrast source</th>
<th>sum of squares</th>
<th>degrees of freedom</th>
<th>average squares</th>
<th>calculated f value</th>
<th>Contrasts source</th>
</tr>
</thead>
<tbody>
<tr>
<td>age (a)</td>
<td>9775.764</td>
<td>3</td>
<td>4783.587</td>
<td>797.737</td>
<td></td>
</tr>
<tr>
<td>gender (b)</td>
<td>7.329</td>
<td>4</td>
<td>7.329</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction between (A×B)</td>
<td>3.829</td>
<td>3</td>
<td>5.399</td>
<td>5.329</td>
<td></td>
</tr>
<tr>
<td>The error</td>
<td>374.935</td>
<td>339</td>
<td>3.777</td>
<td></td>
<td>total</td>
</tr>
</tbody>
</table>

Tabular f value at the level of significance:

(0.05) and degrees of freedom (1, 228) = 3.84

(0.05) and degrees of freedom (5, 228) = 2.21

The results showed that there was an effect of the age variable on analogical thinking, as the calculated t value (686.656) was greater than the tabular t value of (2.21) at a significance level of (0.05) and with two degrees of freedom (5, 228), which indicates the existence of an evolutionary path for analogue thinking.

Given that the sample members constitute six different age groups, which mean that there is at least one average that differs from another average. When looking at Table (9) that presents the values of the average scores of children in analogical reasoning for the six age groups, it appears that they are unequal and their values tend to increase with advancing age. For the purpose of knowing which averages differ from others in statistical significance and in favor of any of the ages, Scheffe’s test for comparisons was used. There are fourteen comparisons that are statistically significant out of a total of fifteen comparisons.

Table (9) Average scores of children and standard deviations on the Analogous Thinking Test according to the age variable

<table>
<thead>
<tr>
<th>The number of sample members</th>
<th>standard deviation</th>
<th>average</th>
<th>age</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
It is between the average scores of children (3) years old and the average scores of children ages (3, 5, 6, 7, 9, 11) in favor of the older age, as the calculated Scheffe values were greater than the critical Scheffe value (1.166). As shown in Table (10) this in detail.

**Table (10)** Scheffe values computed between the mean scores of children in the age groups in analogical reasoning

<table>
<thead>
<tr>
<th>11</th>
<th>9</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>3</th>
<th>ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>*8.150</td>
<td>*4.400</td>
<td>0.925</td>
<td></td>
<td></td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>*7.225</td>
<td>*3.475</td>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>*3.750</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

* The calculated Scheffe value is statistically significant when compared with the critical Scheffe value = 1.166

It appears from the above table that there are (14) statistically significant comparisons out of a total of (15) comparisons in favor of the oldest age, which is between each of the age group (3) years with the age groups (3, 5, 6, 7, 9, 11), and the age group (3, 5, 6, 7, 9, 11) years. The age group is (5) years with age groups (6, 7, 9, 11) years, and the age group is (6) years with age groups (11, 9) years, and the age group is (7) years with age groups (9, 11) years, which indicates that children of older ages are more developed in analogical thinking than younger ones.

b. Gender:

Table (8) shows that there are no statistically significant differences according to the variable of sex, as the results of the analysis of variance reached that there is no effect of the gender variable in analogical thinking, as the calculated quantitative value (1.841) was smaller than the tabular value of (3.84) at the level of (0.05) and two degrees of freedom (1,228) (see Table 7). Note that the average degrees of males reached (9.750) degrees and the average degrees of females reached (10.525) degrees. We conclude from this that the apparent difference is not a real and essential difference, but rather is caused by a factor Coincidence, as shown in Figure (4).

c. Interaction between age and gender:

Know the relational error, the dispersed error and other errors in analogical reasoning according to the variables of age and gender.

**V. DISCUSS AND INTERPRET THE RESULTS:**

The current research aimed to know the analogical thinking of children and to know the age at which they form analogical thinking. Does analogical thinking take an evolutionary path? As well as knowing the impact of gender on the development of analogical thinking. The researcher will try to discuss and interpret the results of his research in the light of the indicators that the research reached according to the goals set for him, as follows:

First: the age at which analogical thinking is formed in children:

The results indicated that analogical thinking is only formed at the age of (6) years (according to the criterion adopted by the researcher) among the children of the sample included in the research. The researcher adopted the average score that exceeds the theoretical average in statistical significance as a criterion for judging the formation of analogical thinking.

The results of this study agree with what Gentner, Goswami, & Brown (Gentner, 1982; Goswami, & Brown, 1989) put forward in the hypothesis of a precedence that analogical thinking is available mainly as an ability from
early childhood, which are mental processes that are used in order to reach an understanding of the type of similarities when Making balances between these concepts, and that the ability of analogical thinking consists of a planning process for the different knowledge that exist within one field of knowledge. It may lie in the essence of growth when children mentally imagine the world around them through mental models that are structurally similar to the real world.

The results of this study conflict with the study (Richland, 2006), which indicated that analogical thinking has its beginnings at the age of (3) years, and the results of this study also differed with Piaget's theory, which indicated that analogical thinking is a skill that develops late due to its dependence on the development of cognitive structures.

Second: The evolutionary path in analogical thinking in children

The results of the research showed that analogical thinking takes a developmental path in children, and this is consistent with what was reported by studies (Sternberg & Rifkin, 1979; Richland & Morrison & Doumas & Holyoak, 2006; Thibaut, 2010;) and the literature indicated that age is very important in thinking. Analog and dependent interaction increases knowledge and the ability to integrate relationships and control distractions.

As it became clear when observing the evolutionary path of analogical thinking for the ages included in the research, and despite the gradual increase from young ages to large ages, the significance of the differences did not appear except between the degrees of children at the age of (6) years upwards, and from the researcher’s point of view may support what came It is based on Piaget's theory that growth is a cumulative process, as each stage depends on the previous one.

Third: The effect of gender on the development of analogical thinking

No effect was shown for gender in the development of analogical thinking. This is consistent with what was stated in Gentner's theory adopted by the researcher, who pointed out that children between the ages of 4 and 5 interpret symmetry, analogy, and metaphor in terms of object similarity and then in terms of relational similarity. Children between 3 and 4 years old can reach symmetrical thinking, and the current study is not consistent with what was stated by Piaget's theory that children are not able to solve symmetries before the stage of formal operations. I agreed with the study of Antonietti (Antonietti, 2000), the study of Richland et al, 2006, and also agreed with the study of Ratterman and Gentner (Ratterman & Gentner, 2014), and this may be due to the availability of equal opportunities for males and females to enter Riyadh and schools, As well as encouraging boys and girls without discrimination to continue studying, whether at home and school, and to satisfy their needs and requirements, in addition to the technological and cognitive acceleration that has become accessible to everyone.

VI. CONCLUSIONS:

In light of the results of the current research, the researcher can conclude:

1- Analogous thinking represents an important way to reveal that children have the ability to know similarities in relationships.

2- That children's thinking about tangible material things begins before children realize intangible mental entities that actually occur within the mind and mind, that is, they are mental representations.

3- The results of the study showed that children who are 6 years old have analogical thinking, and this helps them to classify and compare different concepts.

4- Analogous thinking takes a developmental path in children of ages (3, 5, 6, 7, 9, 11) and takes a phased and discontinuous form. Thus, it is consistent with the cognitive evolutionary theories.

RECOMMENDATIONS:

Through the foregoing results and conclusions, the researcher submits the following recommendations to the Ministry of Education and the specialized authorities in Kirkuk Governorate:
1- Designing programs for children of nurseries and kindergartens to develop analogical thinking.

2- Training nursery school teachers to use methods that develop analogical thinking in children.

3- It is possible to design educational activities with the aim of enhancing the tools of students of all educational levels regarding problem solving, through the use of lessons on the Internet, which creates wide educational opportunities for the development of analogical thinking.

SUGGESTIONS:
The researcher suggests conducting subsequent studies such as:

1- A comparative study in the development of analogical thinking between gifted and normal children.

2- Studying some variables that affect analogous thinking, such as: parental treatment methods (democratic - dictatorship), family environment, economic level (high - low), and parents' achievement.

3- Conducting a study of the relationship of analogical thinking with learning patterns associated with the right and left hemispheres of the brain.

Margins:

(1) According to the statistic obtained by the researcher from the Kirkuk Education Directorate / Educational Planning Department / Statistics Department in the Ministry of Education, based on the book facilitating the task issued by the College of Education / Ibn Rushd.

(2) A.D. Shaima Abdul-Baqi Ibrahim / College of Education Ibn Rushd for Human Sciences / University of Baghdad / I-T English Language.

(3) A.D. Salam Hamed Abbas/ College of Education Ibn Rushd for Human Sciences/ University of Baghdad/ i-T English

(4) A.M.D. Flowers of Fajr Nuri / Ibn Rushd College of Education for Human Sciences / University of Baghdad / Literature.

(5) A.M.D. Sama Turki inside / College of Education Ibn Rushd for Human Sciences / University of Baghdad / I-T Arabic Language

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