

NEUROPSYCHOLOGICAL ASSESSMENT OF VISUAL MEMORY IN CHILDREN WITH AUTISM DISORDER (CLINICAL STUDY)

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ABSTRACT

The aim of the study which is entitled: neuropsychological evaluation of visual memory in children with autism disorder, aims to know the level of visual memory in children with autism spectrum disorder. The study was conducted on a sample of 4 cases between the ages of 9 and 13 years with autism disorder of medium degree, where it included both sexes, 3 boys and one girl, they were selected from the study population in an intentional and organized manner, as it was diagnosed before, in addition to our use of their health cards available with the specialist. Psychological for the purpose of collecting private information. case-specific. The study tools included the visual memory test Peanut clown scale to measure the visual working memory of space, and the study relied on choosing the appropriate clinical approach for it. After collecting and analyzing the information and subjecting the research group to testing, the results of the study resulted in the absence of a defect in spatial storage and visual perception so that they have an excellent retrieval level, which indicated their high absorption and therefore they have a good and distinct visual memory.

Keywords

Neuropsychological assessment; visual memory; autistic child; Peanut test to measure visual memory.

Introduction

Problematic introduction:

Autistic children suffer from many problems and behavioral, perceptive and cognitive disorders. These problems are often the result of a defect in the brain in autistic people and the presence of cognitive disorders affect the ability of these children to develop language: communication, learning and integration with society in a normal life and cognitive problems which are suffered by children with autism disorder difficulty in memory and the results of studies vary on the ability of autistic children to receive, store and retrieve information when needed, where Mohammed (2002) pointed out that Autistic children do not have difficulty remembering. Al-Fawzan stressed that most autistic people have a strong memory. In addition to, the study of Demenis and

James (1984) that auditory and visual memory is good and distinct when autistic while it was stated in the study of Al-Ghamdi that autistic children suffer from a lack of ability to continue for a long time in cognitive activity such as : remembering and attention as they suffer from problems in the perception of relationships and problem solving. Reigns and others (2000) saw that some people with autism have a type of memory loss despite this, they use different strategies and organizational methods during the process of coding or retrieving fragments of memory. And through many Arab and foreign studies which has found inconsistency in their results, some of which indicated the existence of memory impairment in children with autism disorder such as the study of Reigns (2000) and others which showed that those children have a strong memory as a study.¹

Visual memory is one of the most important mental processes due to its impact on the cognitive path of the individual and its great role in learning, especially in the early stages of the child's life, because of his reliance on visual stimuli in learning and the presence of any memory disorder affects various aspects of the individual's development, and in his ability to learn academically, linguistically and other areas in which memory is needed. visual memory is an important part of memory, more for autistic children, as it is known that a large percentage of autistic children are unable to speak and use visual aids which consists of real or drawn images to help them express themselves.

Where he created the program for the use of images in communication CECS Picture exchange communication system and the idea of this program originated through BonbySrost in 1994, where it is based on the use of the autistic person an image which expresses something he wants, in front of someone who can provide him with that thing.

To assess this deficit, visual memory can be evaluated through neuropsychological evaluation, in order to reach conclusions about the structural and functional characteristics of the human brain by evaluating the behavior of the individual in exciting situations and a specific and cognitive response.²

And this is what we will address in the topic that we are going to study. Where we pushed this deficit and deficiency in children with autism disorder to weaken in one of the components of working memory, which is visual memory and try to evaluate it through A test that measures visual memory in a group of children with autism disorder. Through previous studies on the subject of visual memory was our idea to study the latter about children with autism disorder, and from that, it is possible to formulate the general question :

Do children with autism disorder have visual memory problems?

Sub-questions:

- * Do children with autism disorder have a good visual memory of information?
- * Do children with autism disorder have poor visual memory of information?

Hypotheses of the study:

General hypothesis:

Children with autism disorder have problems with visual memory.

Partial hypotheses:

Children with autism disorder have a good visual memory of information.

Children with autism disorder have poor visual memory of information.

Objectives of the study:

- Knowing the level of visual memory in children with autism spectrum disorder.

- Identify the manifestations of visual memory disorders that autistic children can suffer from by conducting a neuropsychological evaluation process.
- Know the most important neuropsychological characteristics that characterize people with autism disorders.

Importance of the study:

The importance of the study is manifested in the following points:

- The importance of this study comes in dealing with an important variable, which is visual memory, because of its significant impact on the life of the individual.
- The importance of the target group in the research, which is autistic children.
- The importance of determining the level of visual memory of autistic children, which carries great importance in the education of the autistic child and the development of various skills he has, as in most of the methods used in dealing with the autistic child depends on sight, including (visual communication system Pix, Erlene lens, purification or filtering visual excitement).
- This study contributes to giving a clear picture of the role of neuropsychological assessment in the process of evaluating cognitive functions.
- The results of the current study may be useful for autistic specialists; in designing training programs in the field of visual memory.

Defining concepts and their procedural definitions:

*** Children with autism:**

They are the children enrolled in the Abu Bakr Al-Razi Hospital for Mental and Psychiatric Diseases in Annaba and the Psycho-Pedagogical Center for Mentally Handicapped Children Al-Buni and they were diagnosed as autistic children through the C.A.R scale; with a Medium degree, i.e. holders of a score ranging between (30-42) and those aged between (7-13 years old).

*** Visual Memory:**

It is the ability to recall the visual image perceived and retained by the autistic child after showing it to him once or twice, when applying the Peanut test (Peanut).

*** Neuropsychological assessment:**

Neuropsychological evaluation is the evaluation of an individual's behavior by subjecting them to standardized tests, to access information about the higher functions of the cerebral cortex.

Previous studies:

Previous studies are one of the most important steps that the researcher relies on to build his research. They have a relationship with the variables of the research, as they help the researcher in enriching his research and addressing what has not previously been considered, as well as making research sources diverse. And before embarking on our research, we conducted a survey of some Arab and foreign studies, and the majority of them do not directly affect our study, but they share with us the same variable, as well as some interpretations, and from these studies we have found:

*** The study of Bucher (1990):**

The study was entitled: The difference in remembering (auditory and visual) between ordinary and autistic people and mental retardation is a comparative study. Where it aimed to identify the difference between auditory and visual memory between normal, autistic and mentally retarded. This study relied on a sample of children with autism, mental retardation and normal males and females. One of its most notable tools was testing lists of linked pairs.

The results of the study: The results of the study showed that there are differences in visual and auditory memory, between the groups and this difference is in favor of the normal ones.

*** The study of Demnis & Games (1994):**

Study Title: Auditory and visual memory among individuals with autism. The study sample included 20 cases of autism of males ranging in age from 13 to 15 years old, and their IQ percentage ranged from severe retardation to high intelligence.

The results of the study: The most important findings of the study were that auditory and visual memory is good and distinct in autistic people and that the storage of vocabulary has reached a good level, but they suffer from severe weakness in expressive language.

*** Al Maldi Study (2009):**

The study aimed to reveal the diagnostic conditions between the two study groups (autism and mental retardation). In short-term memory tests and the study used the comparative descriptive approach. The total sample consisted of (16) cases, 8 cases of autism and 8 cases of mental retardation. Their ages ranged between (7-10) years old and their intelligence rates ranged between (36-75). The following tools were used: Fourth Diagnostic Statistical Manual of Mental Disorders and Stanford Scale Environment of the Fourth Image of Intelligence, Malika (1998) Panel of Hodred forms of intelligence tests of short-term memory. The validity of the hypotheses of the study was verified using the Menuytmi's nonparametric statistical method. The study showed that there were no statistically significant differences between the average grades of the two study groups autistic group and mental retardation in short-term memory tests, and in the field and compound degree in short-term memory.

*** Study of Karima Mujahid (2009-2010):**

She is an Algerian researcher who conducted a master's degree in (2009-2010), under the title: Neuropsychological evaluation of working memory disorders and cognitive mental flexibility in adults with mild and severe brain trauma. Where the study aimed

at neuropsychological evaluation of cognitive disorders in people with brain trauma in adults and their impact on two cognitive functions, namely working memory and mental flexibility. The researcher relied on a sample of 10 cases : 5 cases with mild trauma and 5 cases with severe trauma aged between 21-49 years .To achieve the objectives of the study, a case study method was adopted according to the clinical approach and to analyze and interpret neuropsychological evaluation, Badley models for working memory and Norman and Stalin for mental flexibility were used . The results of the study showed that the occurrence of a disorder in one of the cognitive functions is not necessarily associated with the disorder of the other function a, that slow treatment in this category of sufferers forms the basis of cognitive disorders that they suffers from.

*** Study of Azzaz Zuhair (2011):**

The title of the study was: The effectiveness of training programs in developing semantic memory skills and its impact on language communication among autistic children. An experimental study aimed to identify the strengths and weaknesses of memory in people with autism disorder helps and contributes to the process of diagnosis and treatment. The study sample was divided into two samples: the sample of the exploratory study and the sample of the final study. Where the test was applied to evaluate the items of semantic memory and language communication in children on the sample of the exploratory study of 50 children, females and males, randomly selected from primary school, aged from 6 to 11 years old from 5 different levels of study. It was applied in an individual manner, as for the final sample which was also randomly selected from the study population. The students who participated in the first survey were excluded, and the students who are below or above from the required age group were excluded and also for the absences which were during the day of the application of the test. The size of 434 examined was 49.40% males, 50.5% females. As for the sample for autistic people, it consisted of 30 children They have autism and are between the ages of (4-12) years old and the sample was evaluated intentionally, as the research group underwent a post-test semantic memory test and a pre-test, as well as for the language communication test for the autistic child. Its results indicated that there were statistically significant differences in both tests at the level of all their dimensions.

*** Study by Elham Mohamed Hassan (2015-2016):**

Study title: Visual memory in children with autism in special centers and normal children. The study aimed to identify the level of visual memory in autistic children. A comparative study between normal and autistic children, where the study sample consisted of all normal children aged (6-10) years old from basic learning schools, in the city of Damascus. The sample consists of 20 females and 20 males and autistic children who fall within the age of (6-10) years old and registered in special education centers, in Damascus for the academic year (2015-2016) They were randomly withdrawn. The study tools included : Visual memory test, It also used the scale of estimating autism in childhood for diagnosis, where the researcher relied on the descriptive analytical approach. The results of the study showed a deficiency in the

level of visual memory among autistic children according to the visual memory test, their average score is below the average. There is no weakness in visual memory in normal children, the average score of normal people falls within the average. There are no significant differences between females and autistic males in the level of visual memory according to the visual memory test, and there are significant differences Among ordinary children and the existence of significant differences between normal and autistic children in the level of visual memory in favor of normal ones.

*** Study of Jinan Amin (2016):**

Study Title: The importance of perception and visual memory in acquiring some concepts in an autistic child. The study aimed to identify the importance of cognitive processes in the processing of information, most notably perception and memory in the acquisition or development of some simple concepts, which is one of the most prominent basic gains in the autistic child and used in the study the clown test (Paenut) and the test of drawing shapes for (Rey) on a sample of 4 children with autism disorder from the Pedagogical Medical Center in El Harrach. The study has reached the following results:

- There is a defect in drawing the shape in both cases.
- Not remembering where to place the discs.
- Love to play with paper, pen and discs.

*** Study of Qali Suhaila and Qali Jannat (2016):**

Study title: Assessment of visual perception of shapes in an autistic child (Asperger syndrome). The main objective of the study is to evaluate the visual perception of shapes in the autistic child, using the Ray form test. The study adopted the clinical approach. The study sample was represented in 5 cases that were selected from the study population, after a number of sessions in an intentional manner organized according to the following criteria:

- Children with autism must be 6 years old.
- The cases must have oral language.
- The cases must be taken care of by any: at least 3 years.

The test results showed that there were differences between the cases in the degree of visual perception.

*** Study of Rumsa Yousfi (2017-2018):**

Study Title: Neuropsychological evaluation of working memory in a child with autism disorder. The study aimed to know the level of working memory among children with integrated autism spectrum disorders, to identify the manifestations of disorders of both working memory and its components that may be suffered by children of the autism spectrum , through conducting a neuropsychological evaluation process for it. The study sample consisted of three aged between (8-9) years old and they have autism spectrum disorder of the integrated category in the regular school. The test was from Adel Al-Shafei School. The study tools included standardized tests to test working memory divided into 3:

The following tests were used: physiological episode.

- Number memory test Wais III direct order.

- Executive position: Wais III number memory test reverse order.
- Visual-Space Memory: Peanut Clown Measurement.
- Where the researcher relied on the clinical approach and the results of the study showed that autism disorder has problems at the level of executive functions.

*** Study of Boukralf Sadiq Al-Amin and Benlimen Al-Ghali (2018-2019):**

Study Title: Visual Memory in Children with Autism Disorder A Comparative Study between Autistic Children and Normal Children Using BEC96 Battery:

This study came to find out the level of visual memory in autistic children and compare them with normal children. The study was conducted on a sample of ten cases of autism of medium degree and ten cases of normal children aged between 7 to 10 year old including both sexes through the battery of cognitive calendar BEC96 adapted to the Algerian environment, they were chosen intentionally. The study also aimed to prove that the battery can assess visual memory in the category of autistic children. The results of the study showed that children Autistic people suffer from problems at the level of cognitive functions, especially visual memory, unlike normal children. It was finally shown that the BEC96 battery can evaluate visual memory in autistic children.

Commenting on previous studies:

There have been many age stages, IQ ratios and goals that have been mentioned in previous studies, so that they have informed us after reviewing them as follows:

The current study aimed to determine the level of visual memory in children with autism disorder and to identify the manifestations of visual memory disorder that an autistic child can suffer from through a neuropsychological evaluation process. This study is consistent with the study of Romisa Yousfi (2017-2018), but it was aimed at working memory and not visual memory in particular, and differs on some studies that were aimed to identify visual memory in autistic children. A comparative study between normal children and children with a Autism disorder such as: the study of Boukralf Al-Sadiq Al-Amin (2018-2019), Benlimen Al-Ghali and the study of Elham Mohamed Hassan (2015-2016). We also found through our presentation of studies that they are similar in dealing with visual memory variables and children with autism disorder. As we do not find a study that is completely identical to the subject of the current study in all its characteristics and in terms of the goal, study tools and methodology. As some studies were interested in visual memory in the autistic child, such as : the study of Jinan Amin (2016), the study of Demenis and James (1994), as was the goal of Karima Mujahid's study (2009-2010) is similar to our study in the neuropsychological assessment variable but the working memory differs with it in the sample, as it was studied on adults and not autistic children.

As for the sample, the study sample included both sexes (males and females), which agreed with the majority of previous studies, although our study did not require sex, however, the current study sample included both sexes.

The ages of the study sample ranged between (6-13) and they agreed with some previous studies such as: the study of Ilham Muhammad Hassan (2015-2016), the

study of Al-Muaidi (2009), Karima Mujahid (2009-2010), the study of Qali Suhaila and Qali Jannat (2016) As for the approach. Our study is consistent in terms of approach with the study of A. Jinan Amin (2016) and the study of Rumissa Yousfi (2017-2018) in terms of the use of the clinical approach, as for the study tools. Previous studies have used a number of tools and measures for all data and information about their variables, according to their subject and the number of variables they study, as some of these measures were designed by the researcher himself, such as: the study of Elham Mohamed Hassan (2015-2016) and others were prepared in advance and were codified on the environments of those studies and for the tool used for the current study (visual memory test space, Peanut clown test « Peanut ») where the current study is similar in terms of Using the tool with some previous studies such as :the study of Rumissa Yousfi (2017-2018) and the study of A. Jinan Hassan (2016) as well as observation and half-guided interview.

The current study is similar in some of its steps with previous studies, while it differs from it in the population, sample and scale used. And therefore, we have benefited from these previous studies in building the theoretical framework of our current study and using some of the results of previous studies in explaining some aspects of the current research.

Theoretical Framework:

- The evaluation process generally includes the collection of information in order to make a judgment, decision or transfer. The clinical neuropsychologist makes an assessment of mental illnesses and disorders such as: anxiety, addiction, depression, and evaluates cognitive processes or higher functions of the cerebral cortex such as: intelligence, memory, abstract thinking and others.

Information is usually collected by various methods including clinical interviews, behavior monitoring and the use of neuropsychological tests. Lizac who showed that the purpose of neuropsychological evaluation to draw conclusions about the structural and functional characteristics of the human brain by evaluating an individual's behavior in situations that provoke a specific response and knowledge. In recent years, clinical psychologists have become increasingly interested in this field, and most of the interest in neuroclinical psychology is directed to assessing behavioral change.³

Neuropsychological assessment is the assessment of brain function based on an individual's performance in harmless and standardized tests, believed to be accurate and sensitive indicators of the relationships between behavior and the brain. ⁴

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Requirements for the Neuropsychological Assessment Process:

The neuropsychological evaluation is similar to any medical evaluation carried out by doctors to reach a diagnosis of pathological conditions of their disease. The examiner chooses the examination tool that suits the patient's problem, and the nature of the disorder. The internist who performs an electrocardiogram for all patients who examines them without the need for it and regardless of the nature of the complaint may doubt his abilities, because he does not use the evaluation tool - electrocardiogram - correctly. He should first analyze the patient's problem, and then determine whether this patient needs an electrocardiogram or not. This procedure of course reflects the doctor's skill, diagnostic abilities, understanding of his specialty, and skills in using his tools. Such a situation is not much different—it should be—from assessing the behavioral effects of brain injury. For example, if there is a set of symptoms that give rise to suspicion of frontal lobe injury, the neurologist should choose tests that are sensitive to frontal lobe injuries.

Objectives of neuropsychological assessment:

The primary purpose of neuropsychological evaluation is to draw conclusions about the structural and functional characteristics of the human brain by evaluating the individual's behavior, in specific and cognitive stimulus and response situations.

Graham, Beaumont argues that the most important goal of neuropsychological evaluation is to find improvements in the conditions of a patient suffering from damage to the nervous system, i.e. it is not limited to describing the relationship between the brain and behavior. 5

The functions of neuropsychological evaluation are medical and psychological interventions, general management of the patient, predicting the fate of the patient, and monitoring the behavioral changes of the patient , after subjecting him to neuropsychological interventions, and also employs this type of evaluation - for legal purposes - in forensic medicine to determine the conditions of the injured work, and also includes scientific research, as it is an important reason for investigation in preventive measures and the development of individual interests.6

In summary, the objectives of neuropsychological assessment can be summarized in general as follows:

A. Describe and identify changes in psychological functions (cognitive, behavioral, emotional) in terms of the presence or absence of this change and its severity.

B. To determine the link between the results of neuropsychological evaluation and neuroanatomy and physiological processes in order to determine the degree and location of damage in the brain.

C. Determine whether these changes are related to diseases of the nervous system, developmental diseases, or not related to the nervous system.

D. Identify, evaluate and develop the disease (improvement or deterioration) over time, and identify indirect causes and progression, in order to make future plans for the patient.

E. Availability of rehabilitation, vocational training and learning plans. Provide plans for the education of the family and service providers for the patient. 7

Psychological assessment steps:

* Before embarking on any examination of a patient, the neuropsychologist must know who sent the patient and why, because the request for examination is usually accompanied by a letter or word from a neurologist or specialist in neurosurgery, through a letter indicating the purpose of the examination Post-operative memory, language difficulties, orientation disorders, assessment of cognitive damage, suggesting treatment situations (one case or another, the presence of tumors in certain areas of the brain, giving a point of view). In general, in cases of cerebral vascular accident or cerebral trauma, etc...) If these indications are available to the neuropsychologist, he should request them before the examination.

* After that, he must review the medical file, and this reading takes a few minutes in most cases, in order to obtain information about the causes of the injury, whether it is verified or doubtful, and if it is verified, you must search for information related to radiology such as magnetic resonance imaging (IRM). In general, the file can be read well if the following seven questions are answered: What are the reasons? The location of the injury? The moment of the accident or the moment of the onset of symptoms? Have there been signs of cognitive disorders? What? Since when? Are medications that are susceptible and interfere with attention, memory are taken?

* The next stage is to interview the patient and, in some cases, with a relative. During this initial contact, a good interaction with the patient is established and a supplementary information list is obtained. In which case the questions are adjusted and adapted to the condition of each patient. The main objective is to take a neutral overview of the patient's cognitive difficulties that are felt and that are obtained from talking about the effects of a problem that he faces in his daily life. Ten minutes is enough to achieve a useful interview (but it is required to tabulate answers outside of neuropsychological examination such as a broad explanation of digestive disorders caused by medications). During the interview three sets of questions are asked. If the patient is unable to answer the question, it is advisable to use a relative after the interview with the patient and in his absence, to obtain more objective answers from the patient's companion.

The first set of questions includes the following: Date of birth? Age? Are you married? Do you have a baccalaureate level, any hand used to write, cut a paper with scissors, deal playing cards, light a match, if necessary? At the end of the interview, the Edinburgh l'inventaire de la passation must be applied. The second group includes the following questions: Can you explain to me the difficulties you experience every day? A patient who says (I forget where to put my glasses) and does not mention anything else can use another meaningful question (answers should not be suggested). Can you tell me about a difficult situation you are in at the moment? What is the biggest problem for you in your current life, when, where, how? Do you feel pains somewhere in your body? Does it happen often? Are you taking medication? What?

The last group contains the following questions: What are your daily activities? Do you work? What are your hobbies ? Do you see your relatives, friends, neighbors? What current world events are you commenting on? What's currently happening in...? The answers recorded in this interview give indications about the possibility of continuing the examination. If the patient suffers from farsightedness and forgets his glasses, then no visual task (verbal or non-verbal) should be performed.

In the following cases, no knowledge disclosure is performed:

- A patient who is constantly disturbed has very difficult attention in tests.
- When the answers call for a mental examination, he would say (born on June 21, 1867, first time, then in 1900) as this last date has no significance.
- His knowledge of the language is too brief to communicate, and accompaniment does not have sufficient fluency to express. 8

Visual memory:

Neisser (1967) was the first to refer to this type of memory, and called it pictorial memory to demonstrate the visual impressions that this memory transfers to subsequent cognitive processing. The visual memory has been defined by several definitions, including :

- Definition of Sami Melhem: the ability to retrieve, distinguish and reconstruct material previously displayed or exposed visually. 9
- Definition of handsomeness of servants: It is the highest level of information organization process, and visual information is referred to as symbolic memory which is considered a temporary memory where information will remain stored in memory even with the absence of the stimulus. 10

Visual Sensory Memory:

Sensory memory varies according to its entries, and the function of sensory memory is limited by the time factor, which is fractions of a second, and then actively moves to short-term storage. 11

In 1967, Neisser, a name for short-term visual memory, is Icon, and auditory alert stored in the sensory record is called Echo, and it is assumed that Icon and Echo express an accurate version of a modern sensory recorder alert. (Khaleeji, 2004, p. 236) Nice used the concept of visual memory to denote the impressions that make the stimuli received by this memory available for processing even after the disappearance

of these stimuli, while the concept of figurative memory refers to the process of memory.

The term Icon refers to a certain visual impression of the stimulus being addressed. 12 Liuri states that visual memory lasts 15 to 20 seconds. This memory means receiving real images of external stimuli as it is in reality, where they are preserved in the form of a fantasy known as an icon. Most studies conducted on this memory confirm that the information is not processed, but is retained, especially those that are paid attention to, until it is processed in working memory, and that what is encoded in this memory is superficial information about the properties of stimuli such as color, for example, while it is difficult to extract any meaning of stimuli in this memory.¹³ Through this, we can summarize a set of conclusions about visual sensory memory, the most important ones which are:

- Information is stored in the sensory visual memory, for a period of no more than a second.
- Visual information can be recalled from the visual sensory memory directly.
- The entry of new information into the visual sensory memory erases old information. 14

Characteristics of visual memory:

Visual memory has a set of characteristics that can be summarized as follows:

- 1- The processing of information in visual memory does not exceed the first comprehension.
- 2- Information is stored in visual memory for a period of no more than a second (range from 0.5 to 1 second).
3. Visual information can be recalled from the visual sensory memory directly.
- 4- The longer the information remains in the visual sensory memory, the easier it is to remember.
- 5- The entry of new sensory information into the visual sensory memory erases the old information.
6. No cognitive processing of information occurs in the visual sensory memory, as the aggregation of these processors occurs in short memory.
- 7- Memory has the ability to classify information.
- 8- Information in visual memory is prone to confusion through new information.
- 9- Information in visual memory is perceived and not processed.

Through the characteristics, we can say that the visual sensory memory is by its nature ephemeral, that is, it is temporary and transient, and its survival lasts for a very limited period, but it is accurate and is able to collect, organize and link information. They appear to be independent of the researcher's ability to control and monitor them, and after storage they amount to at least nine items, and their stock is likely to expand even more. 15

Memory in people with autism disorder:

Visual memory is the place where ideas, images, information, codes and numbers are stored, and it is one of the types of cognitive mental abilities that play an important role in the cognitive development of children in general and autistic children in

particular. This memory must be invested because of its importance and dependence on it in many aspects of their lives and through the researcher's limitation of information and research related to memory, she did not find any information related to visual memory in autistic children. There are many different types of memory, and remembering information requires a high level of processing, and it may not be required depending on the information it requires to be remembered. The evidence about memory processing in autistic people is contradictory.

At this time, some researchers are trying to prove that autistic people have excellent memory, as the results of the study of Louisa Benitou Rogers sally,¹⁶ indicated that there are no differences between autistic people and normal or people with other pathological fellows in memory. In addition to that, there are no differences between some people with autism and normal memory because visual skills or memory skills are not related to intelligence, while others believe that autism represents a memory disorder, Renner and others pointed out Renner and others ¹⁷ indicates that some people with autism have some type of memory loss, although they use different organizational strategies and methods during the process of coding and retrieving fragments of memory. Although these two theories are contradictory, both are true, autistic people have excellent memory for certain types of information, and poor memory for other types of information.

* Their ability to memorize information by heart represents one of the strengths of autistic people. They tend to have an excellent memory of songs, television commercials, music tracks, visual memory of images or things, memory of the composition of things, and facts such as history and geography. In addition to, that many of them have an accurate memory of the roads on which they traveled, and that autistic people have various degrees of mental retardation relatively accurate memory to save information that does not require processing and understanding.

* They have difficulties in storing information that requires a high level of processing such as storytelling, sequence of activities, and events that happened to them, and although they can recall events they witnessed, they find it difficult to remember events that happened to them personally as an integrated experience.

* Remembering the information they saw visually is better than remembering the information that is presented to them in an auditory way such as the way of language. These difficulties are compounded in the absence of language ability and in the presence of mental delay. In addition to, that it is difficult for autistic people to remember information that disappears from the field of vision such as words, sign and language.

Although autistic people can remember some verbal information, such as songs and TV commercials. It can be difficult for them to remember long verbal chains of information related to what they do and how they do. Their recollection of these long chains of verbal information is complex and requires a high degree of verbal information processing.

*They remember the information that matters most to them. ¹⁸

Field Study Procedures:

Study Methodology:

In our study, we relied on the clinical approach in order to understand the clinical characteristics of each case and this was by means of a case study technique - of the current situation of the studied cases as well as knowledge of their past and relationships in order to understand more deeply and better the society they represent.

Population and sample of the study:

To evaluate the neuropsychological visual memory of children with autism disorder was our selection of the sample in an intentional way and what is meant is that sometimes the researcher seeks to achieve a goal or a specific purpose of the study and selects the sample members to serve this purpose or goal (Olayyan, Anim, 2000, p. 148). We determined the number of the sample to 4 cases aged between 10 to 13 years old and have autism disorder with a moderate degree. Then, We chose a sample from the hospital institution Abu Bakr Al-Razi and 3 cases of Psycho-pedagogical center for mentally handicapped children, Annaba, Algeria.

Table 1: Representing the members of the study sample

<i>Case 1 (W.B)</i>	<i>Case2 (A.S.)</i>	<i>Case3 (H.F)</i>	<i>Case4 (J.C)</i>
<i>Male</i>	<i>Male</i>	<i>Female</i>	<i>Male</i>
<i>11 years old</i>	<i>10 years old</i>	<i>13 years old</i>	<i>13 years old</i>
<i>Autism Spectrum Disorder</i>	<i>Autism Spectrum Disorder</i>	<i>Autism Spectrum Disorder</i>	<i>Autism Spectrum Disorder</i>

Study tools:

* **Observation:** To achieve observation, we attended in the classroom and sessions with the cases to take some direct and indirect observation. In the direct observation of the four cases, we have noticed that in terms of cleanliness and dress, they were tidy and elegant, and we have also noticed their behaviors and the extent of their acceptance of dealing with us, as well as how they accepted to conduct the test, and their reactions in responses. As for indirect observation. We verified the results obtained through various activities for them to modify their behaviors and develop their skills. We also interviewed the cases to take some observations.

* **Interview:** At this stage, we interviewed the parents of the cases, as well as the psychologist and nannies, who in turn helped us to obtain all the information about the history of the cases up to the academic level of the case, and we also interviewed the cases to take some notes.

*** Penaut test to measure spatial optical working memory:**

This scale was designed by Case, 1985, where he used it in his research. It was later used in many researches such as those carried out by : Goldberg, Denis, Mckeoug, Marini, Case, and Professor Dughini, in her field research for the first time in Algeria.

*** Coding for colored discs on circles:**

We will present the structure of the models and the most important symbols that enable us to understand the order and position of the discs:

1. The two horns have two positions (2) with symbol (s).
- 2- The eyes have two positions (2) whose symbol is (p).
3. The cheeks have two (2) positions, the symbol of which is (f).
4. The arms have two positions (2) with symbol (y).
5. The two men have two positions (2) whose symbol is (t).
- 6-The nose has position (1) and its symbol (A).
7. The mouth has position (1) and its symbol (P).
- 8-The ears have two positions (2) and their symbol is (az).

Total = 14 positions.

For the sides of the body of the clown shape (right-left), it stands for the right (+) and left (-).

For colors:

The placement of the tasks in the clown Peanut varies according to the colors according to the model of Case, 1985, then the choice of (05) colors, red and its symbol (1), yellow (2), blue (3), green (4), brown (5), with these symbols we can describe the models related to each task and stage.

***How to apply the test stages:**

The scale is applied individually, in a quiet hall. The application time is estimated at about 20 minutes, and models carrying configured discs are presented during all the time period according to the order of the tasks, so that the individual cannot predict the way the discs are positioned across the entire scale.

And your critique of case 05 piles of five-colored discs (red, yellow, green, brown, blue).

The application time is estimated at 01 seconds per disc:

Model with one disc 01s per model (05 x 01s)

Model with two discs 02 sec per model (05 x 02 s)

Model with 3 discs 03 sec per model (05 x 03 sec)

Model with 4 discs 04 sec per model (05 x 04 sec)

Model with 05 discs 05 sec per model (05 x 05 sec)

*The instruction:

I will put in front of you a set of discs with different colors, and put in front of you an empty model of this clown, and in return I show you a model that carries one disc at first , it has a certain color and placed in a certain place of the clown's body, you have to store the color and position of the disc to reproduce it from memory in the empty form in your hands, but you must repeat the word without a profession, for example: Bla., bla, and every time I change the color and position of the disc, then you move to

two discs which are different in color and placed in different positions on the clown's body, and so forth, and in each task we add one disc until it reaches 05 discs, and the number of attempts in each task is estimated at 05.

***Drip method:**

It is done by giving a point for each correct color and a point for each correct position, and finally adding the points for each colors and positions to be divided by 05. To give the final mark, we collect the quotient of points obtained for each individual from color and position. Finally, we divide the overall sum by 05 for color. And so for the position.

$$\frac{100 \times \text{Obtained Answers Scores Number}}{\text{Answer Total Scores Number}}$$

Presentation and discussion of the results of the study:

Starting off:

After presenting the study tools and applying them to the sample. We will present in these tables. The results of the findings through our study to evaluate the neuropsychological visual memory of children with autism disorder ensure that hypotheses are fulfilled and answer the general question.

Introducing Case No. -1-:

Table 2: Presentation of Peanut Results for Case (B-F)

Task s	Total										Total	
	Color	position	Color	position	Color	position	Color	position	Color	position	Color	position
Task 1	1	0	0	1	1	1	1	1	1	1	4/5	4/5
Task 2	0	1	0	0	2	0	2	0	1	1	5/10	2/10
Task 3	2	0	0	0	0	1	0	0	1	0	3/15	1/15
Task 4	2	1	2	1	3	1	2	1	2	2	2/20	6/20
Task 5	4	0	0	1	1	1	1	0	4	0	10/25	2/25
Total General/5											2.5	1.44
Percentage											45.33%	20%

Case No. -1-: (b, f)

- Quantitative analysis:

Through the results obtained after applying the Peanut clown scale to measure the level of visual spatial memory, which requires each point for each correct color and point for each correct positions. The result of colors was 2.5 and 1.44 for the position out of a total of 5 points, and the percentage for colors was ranked 45.33%, which is considered an average percentage, and for positions by 20%, which is a weak percentage.

- Qualitative analysis:

After explaining the scale and training the situation well on the steps of this test and making sure that it is restored to it, we start applying it. The first task for colors did not find it difficult to remember the color only once and quickly remedied the matter and succeeded in the rest of the attempts. The situation is the same thing failed in one attempt and then completed the rest of the attempts successfully. In the second task with two discs in the colors, he found some difficulty at first and then remedied the matter somewhat he successful in Finding the color of the discs is the opposite of the positions that had difficulty finding the right place as well as a problem in determining the right and Left for the correct position. Where in the third task ,we noticed the deterioration of both colors and modes were three discs and different colors at a weak rate for all attempts, unlike the fourth and fifth tasks were to retain colors better than the positions, which had a great weakness at the level of the space record, and the result of this test for the time was 2.5 and a percentage of 45.33 TB here is an average percentage which shows us that the visual perception of the situation is in good condition and is better than judicial perception . The amount of the result The retrieval is 1.44 and 20% is weak. What we conclude is that the dual treatment of stimuli weakened the ability of the situation in spatial space storage, as well as a defect in the sideways, and here the dual treatment of stimuli led to a weakness in space storage, so that the case cannot focus on all stimuli, as it is limited in absorption.

Introducing the of Case No. -2-:

Table 3: Presentation of the results of the Penut clown scale for the case (A-S)

<i>Tasks</i>	<i>Total</i>										<i>Total</i>	
	<i>Color</i>	<i>position</i>	<i>Color</i>	<i>position</i>	<i>Color</i>	<i>position</i>	<i>Color</i>	<i>position</i>	<i>Color</i>	<i>position</i>	<i>Color</i>	<i>position</i>
<i>Task1</i>	1	1	1	1	1	1	1	1	1	1	5/5	5/5
<i>Task2</i>	2	2	2	2	0	2	2	2	2	2	8/10	10/10
<i>Task3</i>	3	3	3	3	2	3	3	3	3	3	14/15	15/15
<i>Task4</i>	4	4	4	4	4	4	4	4	4	4	20/20	20/20
<i>Task5</i>	5	5	5	5	5	5	5	5	5	5	25/25	25/25
<i>Total General/5</i>											4,73	5
<i>Percentage</i>											96%	100%

Case No. 2: (A-S):

- Quantitative analysis:

The table shows the results of the test after applying it. The case (A-S) obtained a color score of 4.73 and 5 for the positions out of a total of 5 points, and it was estimated at a percentage of colors by 96% and positions by 100%, which is an excellent percentage.

- Qualitative analysis:

After explaining the scale and training the case well on the steps of this test, making sure that it is absorbed by it, in the first task of this test. The case in all five attempts did not find it difficult to recognize the colors as well as determine the positions. In the second task, we added a disc with changing the positions and colors. The case also did not find any difficulty except through one attempt that he did not recognize the color of the discs, but quickly corrected and recognized some of the colors of the discs all through task No. 2, perhaps for lack of concentration, but at first unlike the positions that the case did not find any difficulty in identifying, and for the rest of the tasks represented. In the third, fourth and fifth, the case did not find any difficulty in recognizing the color or determining the positions and succeeded in the rest of all attempts. The total colors is 4.73 and the total poses 5 out of 5 and the percentage of

colors 96% and the positions were estimated at 100%, which is a very good percentage. We conclude that visual information is retained at a very high level of the state, as optical storage is very good in retention and processing, as well as for space storage, it is excellent, which shows us that the visual perception of the state is in a very active state.

-3- Introducing the case No. -3-:

Table 4: Presentation of the results of the Peanut clown scale for case (E-F)

Tasks	Total										Total		
	Color	position	Color	position	Color	position	Color	position	Color	position	Color	position	
/													
Task1	1	0	1	1	1	0	1	1	1	1	5/5	3/5	
Task2	2	2	1	2	2	2	2	2	2	2	9/10	10/10	
Task3	2	3	2	3	3	3	3	3	3	3	13/15	15/15	
Task4	4	4	3	4	4	4	3	4	4	4	18/20	20/20	
Task5	5	5	5	5	5	4	5	5	5	5	24/25	24/25	
										Total General/5		4.62	4.56
										Percentage		92%	96%

-Case No. -3-: (E-F)

- Quantitative analysis:

The table shows the results of the test after its application. The case (E-F) obtained a color score of 4.62 and 4.56 for the positions out of a total of 5 points, and it was estimated at a percentage of 92% for the time and for the positions 96%, which is a very good percentage.

- Qualitative analysis:

After explaining the scale and training the case well on the steps of this test and making sure that it is absorbed by it. In the first task of this test, the case in all attempts did not find it difficult to identify the time, unlike the situations that failed to be determined twice, In the second task, the case did not recognize the color of a single disc, while it quickly corrected and recognized the rest of the colors, while he succeeded in identifying positions well in all attempts. As well as in the third task, the

case did not recognize them at the beginning one color out of 3 discs in the first attempt, in the rest of the attempts, he succeeded in determining the color and position. During the fourth task with the addition of the discs became 4 discs We changed once the color and location of the discs where he failed to recognize the color out of 4 colors in the second attempt as well as a color of four colors during the fourth attempt As for determining the positions he succeeded in all attempts. In the fifth task the case succeeded as well in determining the colors and positions only from the third attempt, he failed to recognize one color out of 5, and he also did not specify one position out of 5 modes. The total colors is 4.62 and the total positions 4.56 and the percentage of colors 92% and the positions estimated at 96%. This percentage is very good, which shows that the recovery of the state in this test was good, but perhaps sometimes there is a slight decline in concentration, which affects the distinction of colors and in terms of the discs through one attempt (defect in the side).

-4- Introducing the Case No. -4-

Table 5: Presentation of the results of the Penut clown scale for case (J-C)

Task s	Total										Total		
	Color	position	Color	position	Color	position	Color	position	Color	position	Color	position	
/													
Task 1	1	1	1	1	1	1	1	1	1	1	5/5	5/5	
Task 2	2	2	2	2	2	2	2	2	2	2	10/10	10/10	
Task 3	3	3	3	3	3	3	3	3	3	3	15/15	15/15	
Task 4	4	4	4	4	4	4	4	4	4	4	15/20	15/20	
Task 5	5	5	5	5	5	5	5	5	5	5	25/25	25/25	
										Total General/5		5	5
										Percentage		100%	100%

Case 4 : (J-C)

- Quantitative analysis :

The table shows the results of t after applying the test. The case (J-C) obtained a color score of 5 and 5 for the positions out of a total of 5 points, and it was estimated at a percentage of 100% for the color and for the positions 100%, which is excellent.

– Qualitative analysis:

After explaining the scale and training the case well on the steps of this test and making sure that he understands it. In all matters and through all attempts, the case was able to recognize the colors and determine the positions and he did not find any difficulty during the test. The total colors are 5 and the total modes are 5 out of 5 and the percentage of colors is 100% and the modes were also estimated at 100%. This percentage is excellent, which shows the level of retrieval of the case in this test was very excellent. He did not show any difficulties in reaching correct answers. Finally, we conclude the color retention is excellent as well as the positions, so here the case does not have a defect in spatial storage or visual perception. The case was able to focus on all the stimuli excellently and its absorption capacity was very high.

–Discuss the results in light of hypotheses:

–Partial hypotheses:

***First partial hypothesis:**

Through the results of the quantitative and qualitative analysis of the visual memory test of the clown Penut. We found that the case (B-F) has an average visual memory of information by 45.33% of visual perception, which was better than space perception, which was estimated at 20%, which was weak. This is due to the fact that the dual processing of stimuli weakened the ability of the state in spatial space storage, as well as there is a defect in the lateral and weakness here resulting from the difficulty of integrating and analyzing the ability to process information, as well as the multiplicity of stimuli due to the burden. The case (A-S) has an excellent visual memory of information, so that he did not find it difficult to determine colors and positions, as it was estimated at 96% for colors and 100% for positions, which is a good percentage, so the retention of visual information in the case at a very high level, as the optical storage and processing as well as for space storage are excellent, which showed that the visual perception of the state is in a very active state. As well as the case (E-F) has an optical memory Good for information where the percentage of colors was estimated at 92% . The positions were estimated at 96% and therefore it is considered a completely good percentage, which shows that the optical storage in general is in good condition and the visual memory is at a very good level. Finally, the fourth case (J-C) has an excellent and distinct visual memory of the information so that he did not find any difficulty during the test in determining the colors and modes, as the percentage of colors was estimated at 100% as well as the positions 100%. This percentage is excellent, which shows that the level of retrieval was very excellent, and

thus the case does not have a defect in storage. The spatial or visual perception has been very high comprehension.

It can be said that the partial hypothesis that "autistic children have a good visual memory of information" has been achieved and these results are consistent with the study (Dannis and James) 1984, which confirmed that the visual memory of children with autism disorder is good and distinct.

***Second partial hypothesis:**

Through the results of the quantitative and qualitative analysis of the visual working memory test of the clown Penut. We concluded that the first case (B-F) has an average visual memory of information, while the rest of the three cases have a good and distinct visual memory. As we explained earlier through the first partial hypothesis, and therefore it can be said that the partial hypothesis which said that: "Children with autism disorder have poor visual memory of information" has not been achieved.

Reminder of the general hypothesis:

Based on the results of the Penut Visual Memory Test on all study cases, the hypothesis which said that:

"Children with autism disorder have problems with visual memory" has not realized.

General analysis of the results:

Through our applied study in which we dealt with neuropsychological evaluation of visual memory. The results of the clinical study of cases of children with autism disorder and in the light of hypotheses, personal and family data and children's responses to the visual memory test showed the space visual clown scale Peanut and after analysis and discussion of the results and in the light of modern theories of cognitive pattern and linguistic defects of the autism spectrum, we see that dysfunction is located in the left hemisphere of the brain as well as at the level of the cerebral cortex and atrophy of the cerebellum (Ibrahim, 2006, p. 115 Since the anterior lobes of the brain are the places of the control centers of working memory and the anterior cortex of the brain is formed on the most areas of working memory through the Penut clown scale to measure the level of visual space memory, it is located in the occipital parietal areas of both hemispheres of the brain. The results of this test were represented in the first case (B-O) estimated at 45.33%, the second case (A-S) 96%, the third case (E-F) 92% and the fourth case (J-C) 100%,

The three cases (second, third and fourth) have very good results compared to the first case, which was average. The defect here was not at the level of visual perception, but at the level of spatial perception estimated at 20%, here lies the defect, which is at the level of spatial perception, so that we found it difficult to determine the positions, sideways and weakness here due to the multiplicity of stimuli led to the failure of the integration and analysis process resulted in difficulty in retrieving and processing information due to the memory burden led to weakness at the level of memory Visual Space. Thus, we conclude that the first case of autism disorder has damage to the

occipital parietal areas of both hemispheres of the brain and damage to the left hemisphere, it touches this area which leads to a disorder at the level of processing visual and spacial information, while the remaining three cases have their results between very good or excellent, so they do not suffer from any defect at the level of spatial perception or at the level of visual perception, as their visual memory is in a very active state and there is no weakness or deficiency at its level. So the general hypothesis which said that: "Children with autism disorder have memory problems" not achieved.

On the contrary, they have a good and distinct visual memory, as mentioned earlier, and thus the partial hypothesis of the study has been achieved, which says that "children with autism disorder have a good visual memory of information" as the results obtained by three cases have a good and distinct visual memory out of four cases and a case that has an average memory of information. And thus it was found that the autistic child of the intermediate degree does not suffer from problems at the level of visual memory. These results are consistent with the study of Muhammad (2002) Which says that autistic children do not suffer from difficulty in remembering as confirmed by Al-Fawzan that most autistic people have a strong memory. In addition to, the study (Darnis and James) 1984, which confirms that children with autism disorder have a good and distinct visual memory and these results remain relative to the study community.

Conclusion:

In the current work, we have studied the neuropsychological evaluation of visual memory in children with autism disorder. After subjecting them to a visual memory test space. We dealt with the measurement of the clown Peanut. The research sample consisted of 4 children, with autism with an average degree, who were selected according to the intentional method of the hospital institution specialized in mental and psychiatric diseases Abu Bakr Al-Razi Annaba and the Psycho-Pedagogical Center for Mentally Handicapped Children Boukhadra -Al-Buni-.

To conduct this study, we relied on the clinical approach and thus adopted the case study technique, which is what the study requires. We also analyzed the results obtained in our current study in the light of what we discussed in the theoretical aspect of the research. Through the data which we reached, we concluded that the visual memory of most children with autism disorder is good and distinct.

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