EXECUTIVE FUNCTIONS (INHIBITION, WORKING MEMORY) AND THEIR RELATIONSHIP TO READING PERFORMANCE DIFFICULTIES IN ADHD CHILDREN

علاقة الوظائف التنفيذية (التثبيط والذاكرة العاملة) باضطراب الأداء القرائي عند أطفال فرط النشاط الحركي المصحوب بنقص الانتباه

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Received on: 2021/03/24 **Accepted on: 2021/09/22**

Abstract:

This study aimed to reveal the disorder of executive functions (inhibition and working memory) and their relationship to reading difficulties in their performance cleft in children of hyperactivity accompanied by attention deficit, We designed and applied a hyperactivity questionnaire to select the sample, After that we applyed the pictorial intelligence test for Ahmed Zaki Saleh, the the Stroop test, the working memory test and the reading test for Saliha Ghalab.

The study sample included six children schooled in the fourth year of primary school suffering from ADHD and the results of the study showed the effective role of executive functions disorder (inhibition and working memory) in The emergence of reading performance difficulties in the ADHD children.

Key words: Executive functions – Inhibition – Working memory – Reading difficulties – Attention deficit hyperactivity disorder.

الملخص :

هدفت هذه الدراسة إلى الكشف عن اضطراب الوظائف التنفيذية (التثبيط والذاكرة العاملة) وعلاقته بصعوبات القراءة في شقها الأدائي عند أطفال فرط النشاط الحركي المصحوب بنقص الانتباه، حيث قام الباحث بتطبيق استبيان فرط النشاط الحركي مصمم من طرفه لانتقاء العينة، ثم تطبيق

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اختبار الذكاء المصور لأحمد زكي صالح، وتطبيق رائز ستروب وكذا اختبار الذاكرة العاملة، واختبار القراءة لصليحة غلاب، وقد شملت عينة الدراسة ستة أطفال متمدرسين بالسنة الرابعة ابتدائي يعانون من اضطراب فرط النشاط الحركي المصحوب بنقص الانتباه، وقد أظهرت نتائج الدراسة الدور الفعال لاضطراب الوظائف التنفيذية (التثبيط والذاكرة العاملة) في ظهور صعوبات الأداء القرائي عند أطفال فرط النشاط الحركي المصحوب بنقص الانتباه.

الكلمات المفتاحية :الوظائف التنفيذية؛ التثبيط؛ الذاكرة العاملة؛ صعوبات القراءة؛ فرط النشاط الحركي المصحوب بنقص الانتباه.

Introduction:

The Early stages of a child's life are the basic building block through which the milestones of his development are determined in terms of cognitive, psychological, social and other various aspects of development. The children's behavior at this stage is a source of fear and anxiety for parents due to their inability to know the boundary Between normal and abnormal behavior of the child for example: the increased movement of the child may be interpreted as an attempt to explore the outside world and the introduction of new cognitive structures, but it may be also an indication of the presence of a behavioral disorder known as hyperactivity accompanied by a lack of attention which is negatively reflected on the child in his family environment And school.

The ADHD disorder hinders the child's adaptation to his school environment, which results in a marked impairment in his academic achievement, especially in the most important means of cognitive achievement, which is reading, as the need for it appears in the early stages of life, which is like the other faculties needs training and refinement in order to reach The degree of an experienced reader. A group of cognitive processes such as attention, perception and memory are involved as these processes integrate with each other to give the reader an accurate understanding of the reading text. And a correct interpretation based on his

experiences, its previous and tribal gains so, any defect at the level of these processes will affect this faculty.

Some children suffer from constant reading problems whether in terms of reading performance or in terms of reading comprehension and parents often attribute this to the school environment, while teachers and educators attribute it to the family environment, and here comes the role of the specialist to highlight the cognitive aspects that cause real problems in the reading process, especially if these difficulties and problems are constant in the childhood and the child different from what his peers in the school environment, like the case of reading difficulties in children of hyperactivity accompanied by attention deficit. The study of (Cavanaugh et al. 1997) In (Badr and Syed Ali, 1999, 72), confirmed the positive correlation between learning difficulties and hyperactivity disorder accompanied by attention deficit.

Although, some studies have attributed the reason for the poor academic achievement of these children to the lack of attention, being the first gateway to entering information (Al-Zayyat, 1998, 253).

There are many cognitive processes, especially the executive functions that play an important role in the academic achievement process and the process of reading in particular because it is a "complex process which includes many operations, it is the process of interpreting symbols that the reader receives through his eyes and this process requires understanding the meaning, and the link between personal experience and meaning, and hence it is two related processes.":

- The first process relates to the physiological responses to what is written.

- The second process is a mental process through which the meaning is interpreted, and this process includes thinking and deduction. (Al-Kahali, 2011, 54). It is undoubtedly based on many cognitive processes, the most important of which

are: attention, Perception and memory, this is what forced us to overcome the idea that the reason for reading difficulties in these children is a lack of attention, and prompted us to the following question:

- Does the disorder of Executive functions (inhibition, working memory) lead to Reading performance difficulties in ADHD children?

And To answer this question, the researcher assumed the following answers ;

- Dysfunction of the inhibitory function leads to Reading performance difficulties in children with ADHD.

- Working memory disorder leads to Reading performance difficulties in children with ADHD.

By referring to previous studies, we find that some of them have been interested in To reveal the relationship of executive functions with reading difficulties, and to achieve these goals, it relied on measures of executive functions and reading difficulties, by following the descriptive approach, and some of them adopted the semi-experimental approach to study effectiveness and impact, and as for the sample, we notice differences in its type, there are those who studied students with learning difficulties of Reading as the study of (Cutting et al, 2009; Bizrawi, 2015; Tamara, 2011; Abu Ammar, 2015; Morsi, 2019). while the study of (John, 1990) was studied with learning disabilities and mentally retarded people who are able to learn. As for the study of (Karin and Dahlin, 2010), it was on primary school children with special needs, and the study of (Nevo and Breznitz, 2013) was on Ordinary students, while the study of (Ali, 2014) was on children suffering from attention deficit hyperactivity disorder with dyslexia, and the sample size in these studies ranged between (30-97), and in terms of the results, it was found that those with difficulties Learning to read has shown a marked impairment in task of executive functions (verbal and visual, working memory, cognitive flexibility,

planning, organization and self-monitoring), the same results confirmed by the study of (Cutting et al., 2009; Ali, 2014), while the results demonstrated that training programs on The tasks of executive functions have a role about influence and effectiveness in developing reading skills, comprehension, reading comprehension, and thus improving the academic performance of pupils with learning difficulties to read, and according to the study of (John, 1990; Karin and Dahlin, 2010; Nevo and Breznitz, 2013), the relationship between the two variables, as confirmed (Bizrawi, 2015; Morsi, 2019) .

1- Study concepts:

1-1- Executive functions:

It includes various concepts such as attentional observation, flexibility, inhibition, planning, working memory, problem solving, generating hypotheses, abstract thinking, cognitive assessment, programming, observing, and initiating behavior. (Pascale, 2007, 117).

1-2- Inhibition:

It is one of the executive processes most studied in neuropsychology, and it is embodied in the ability to prevent the interference of information that is irrelevant, or that is retained in the work memory due to an overload on storage capabilities, or is the ability to prevent an automatic response while That there is another type of answer. (Al-Zaghloul and Zaghloul, 2003, 108).

1-3- Working memory:

It is the element of memory in which the information is processed, it recognizes the information in the sensory recorder that you need to pay attention to, and it retains the information for a longer period of time, then it processes it after that, and it may need to recall some information from the long-term memory,

to use it To interpret the new information you receive from the environment. (Abu Allam, 2012, 58).

1-4- Reading performance difficulties:

Sorling and Sternberg (1994) indicate that learning difficulties reading refers to a level of reading below normal, regardless of an IQ score of average or above average. (Al-Azzazi, 2014, 35).

Reading performance difficulties are characterized by deleting some words or parts of the read word, adding some words not in the original text to the sentence, or some syllables or letters to the read word, replacing some words with others that may carry some of their meaning, repeating some words more than once without Any justification, inverting letters and changing them, and it is one of the most common mistakes in reading difficulties, where the child reads words or syllables inverted as if he sees them in the mirror, and sometimes makes mistakes in arranging the letters of the word, weakness in distinguishing between letters that are similar in drawing and different verbally, weakness in distinguishing between similar letters Verbal and different in drawing, and this weakness in distinguishing letters is naturally reflected in his reading of words and sentences that contain such letters, weakness in distinguishing between vowels, difficulty in tracing the place of arrival in reading, and his increased confusion and confusion when moving from the end of the line to the beginning of the next line While reading, reading the sentence in a quick and unclear way, reading the sentence in a slow way word / word. (Al-Sartawi and Al-Sartawi, 2016, 298-299).

1-5- Attention deficit hyperactivity disorder:

It was defined by the World Health Organization (0MS) (1990): a combination of hyperactivity and maladaptive behavior, with distraction and the need to

intervene persistently in subjects, control situations, and persistent insistence on these behavioral traits (Boutros, 135).

2- Method and Tools:

In the research, we adopted the clinical approach in order to reach the truth and investigate the accuracy of the Scientific research. The clinical approach leads to the disclosure of the truth and scientifically deals with human behavior.

We have adopted a case study as a study method through which we can collect the largest number of information about the case. (Al-Hamdani and others, 2006, 247). The study tools consisted of observation, interview, questionnaire and tests.

2-1- The questionnaire:

it is the most useful tool in scientific research, as it is a simple and fast method To collect data, The researcher used a questionnaire from his design, which contains two forms (Teachers 'Form - Parents' Form), and each questionnaire contains two dimensions (Hyperactivity and Impulsivity - Attention Deficit) and each dimension contains 10 indicators, which were extracted from the theoretical literature related to the research topic and from similar tests concernng the subject of research.

The researcher studied the validity of the questionnaire through the validity of the arbitrators and the collateral validity by the correlation between the questionnaire of Dr. Fakih Al-Eid and the researcher's questionnaire

The correlation coefficient between the two questionnaires was calculated and the result confirmed a positive correlation coefficient estimated at 0.72, which is a very high validity ratio.

While the stability of the questionnaire was confirmed by test and re-retest it after one month and a half on a group of (80) children, then the correlation coefficient between the two applications was calculated, and the result of correlation was 0.83, which is a significant positive correlation at 0.01 .

2-2- Study tests:

2-2-1- the pictorial intelligence test of Ahmed Zaki Saleh: it is a test with a high degree of validity and reliability, and according to Ahmed Zaki Saleh this test has a very high stability ratio as its reliability ratio is between (0.75 and 0.85) and its validity was confirmed by Study its correlation with other tests and through a method of factor analysis.

This test is applied on children from the age of 8 years and over, and it is considered one of the non-verbal collective tests, which aim to measure the ability to perceive the similarity and difference between subjects and things. It is a test to measure the general ability of individuals, as it consists of (60) groups of pictures and shapes , And each group consists of 5 pictures or figures where four of them are similar and one picture is different from them.

2-2-2- stroop test: This test was designed by (John Reed Stroop) to measure the ability of inhibition, and selective attention.

Many studies have proven the validity and reliability of this test, including a study of Albaret J-M., Migliore L. (1999), and a study of Bayard, S., Erkes, J. & Moroni, C. (2007).

2-2-3- Working memory test: This test was designed by Miller in 1956, as it aims to measure working memory while performing simple and complex memorization tasks. It has been observed that the results obtained in this test increase with the child's cognitive development, and it contains the direct arrangement unit and the reverse arrangement unit.

2-3- The study sample: The study sample is consists of six cases of children suffering from hyperactivity accompanied by attention deficit, who were enrolled in the fourth year of primary school, and the following table explains their characteristics.

Table (1): Characteristics of the sample

Cases	Date of birth	school year	associated disabilities	family nature	cultural level	economic level	gender
01	22/11/2006	fourth year	nothing	Large	Poor	medium	Male
02	15/06/2007	fourth year	nothing	medium	final	medium	Male
03	08/09/2008	fourth year	nothing	small	university	good	Male
04	27/05/2007	fourth year	nothing	medium	final	medium	Male
05	13/07/2008	fourth year	nothing	medium	final	medium	Male
06	22/03/2007	fourth year	nothing	medium	Poor	medium	Male

We note in the above table that the sample is homogeneous in terms of cultural, economic and educational level, and that there are no disabilities associated with the sample members.

3- Results and Discussion:

3-1- View study results:

Case 1:

Table (2): Result of the ADHD Questionnaire

The result of the teacher questionnaire	48
Result of a family questionnaire	42
The overall result	45

We note in the above table that the result of the questionnaire directed to teachers is 48 points, while the questionnaire directed to the family results in 42 points, and the total result is 45 points, which is greater than 30 points, so the child suffers from hyperactivity accompanied by attention deficit.

Table (3): Result of the Intelligence Test

The overall result	30
IQ	112
IQ level	Normal intelligence

We note in the above table that the total score of the intelligence test is 30 points, which corresponds to the standard score of 112 degrees, so the child has a normal intelligence.

Table (4): Result of the Working Memory Test

The result of direct arrangement	05
Result of the reverse arrangement	02
The overall result	07

We note in the above table that the result of the working memory test in the direct arrangement dimension is 05 points and in the indirect arrangement dimension is 02 points, so the total is 07/30 points, which indicates a weakness in the working memory of the child.

Table (5): Result of the Stroop Test (Interference)

Cards	score	errors	hesitations
first card	43	0	2
second card (first app)	40	5	3
third card	38	4	5
second card (second app)	25	5	7
Interference	13		

We note in the above table that the result of interference is 13 and as it is known, the increase in the interference rate is due to the weakness of inhibition, so a child has a weakness in this mechanism.

Table (6): Result of the Reading Test

Reading time	243 Seconds
The number of words read	230
Wrong word count	145
Correct reading indicator	0.36

We note in the above table that the number of reading words in the reading test is 230, the number of incorrectly reading words is 145, and the correct reading index is 0.36. Therefore, the child suffers from poor reading performance.

Case 2:

Table (7): Result of the ADHD Questionnaire

The result of the teacher questionnaire	40
Result of a family questionnaire	44
The overall result	42

We note in the above table that the result of the questionnaire directed to teachers is 40 points, while the questionnaire directed to the family results in 44

points, and the total result is 45 points, which is greater than 42 points, so the child suffers from hyperactivity accompanied by attention deficit.

Table (8): Result of the Intelligence Test

The overall result	29
IQ	110
IQ level	Normal intelligence

We note in the above table that the total score of the intelligence test is 29 points, which corresponds to the standard score of 110 degrees, so the child has a normal intelligence.

Table (9): Result of the Working Memory Test

The result of direct arrangement	07
Result of the reverse arrangement	02
The overall result	09

We note in the above table that the result of the working memory test in the direct arrangement dimension is 07 points and in the indirect arrangement dimension is 02 points, so the total is 09/30 points, which indicates a weakness in the working memory of the child.

Table (10): Result of the Stroop Test (Interference)

Cards	score	errors	hesitations
first card	46	1	2
second card (first app)	41	3	3
third card	35	4	6
second card (second app)	25	5	5
Interference	10		

We note in the above table that the result of interference is 10 and as it is known, the increase in the interference rate is due to the weakness of inhibition, so a child has a weakness in this mechanism.

Table (11): Result of the Reading Test

Reading time	270 Seconds
The number of words read	230
Wrong word count	128
Correct reading indicator	0.44

We note in the above table that the number of reading words in the test is 230, the number of incorrectly reading words is 128 and the correct reading index is 0.44 Therefore, the child suffers from poor reading performance.

Case 3:

Table (12): Result of the ADHD Questionnaire

The result of the teacher questionnaire	38
Result of a family questionnaire	34
The overall result	36

We note in the above table that the result of the questionnaire directed to teachers is 38 points, while the questionnaire directed to the family results in 34 points, and the total result is 36 points, which is greater than 30 points, so the child suffers from hyperactivity accompanied by attention deficit.

Table (13): Result of the Intelligence Test

The overall result	31
IQ	115
IQ level	Normal intelligence

We note in the above table that the total score of the intelligence test is 31 points, which corresponds to the standard score of 115 degrees, so the child has a normal intelligence.

Table (14): Result of the Working Memory Test

The result of direct arrangement	06
Result of the reverse arrangement	03
The overall result	09

We note in the above table that the result of the working memory test in the direct arrangement dimension is 06 points and in the indirect arrangement dimension is 03 points, so the total is 09/30 points, which indicates a weakness in the working memory of the child.

Table (15): Result of the Stroop Test (Interference)

Cards	score	errors	hesitations
first card	50	1	3
second card (first app)	40	3	5
third card	33	5	8
second card (second app)	15	6	10
Interference	18		

We note in the above table that the result of interference is 18 and as it is known, the increase in the interference rate is due to the weakness of inhibition, so a child has a weakness in this mechanism.

Table (16): Result of the Reading Test

Reading time	296 Seconds
The number of words read	230
Wrong word count	115
Correct reading indicator	0.5

We note in the above table that the number of reading words in the test is 230, the number of incorrectly reading words is 115 and the correct reading index is 0.5 Therefore, the child suffers from poor reading performance.

Case 4:

Table (17): Result of the ADHD Questionnaire

The result of the teacher questionnaire	50
Result of a family questionnaire	46
The overall result	48

We note in the above table that the result of the questionnaire directed to teachers is 50 points, while the questionnaire directed to the family results in 46 points, and the total result is 48 points, which is greater than 30 points, so the child suffers from hyperactivity accompanied by attention deficit.

Table (18): Result of the Intelligence Test

The overall result	29
IQ	110
IQ level	Normal intelligence

We note in the above table that the total score of the intelligence test is 29 points, which corresponds to the standard score of 110 degrees, so the child has a normal intelligence.

Table (19): Result of the Working Memory Test

The result of direct arrangement	04
Result of the reverse arrangement	02
The overall result	06

We note in the above table that the result of the working memory test in the direct arrangement dimension is 04 points and in the indirect arrangement dimension is 02 points, so the total is 06/30 points, which indicates a weakness in the working memory of the child.

Table (20): Result of the Stroop Test (Interference)

Cards	score	errors	hesitations
first card	44	1	1
second card (first app)	38	4	6
third card	29	6	8
second card (second app)	13	9	13
Interference	16		

We note in the above table that the result of interference in the Stroop test is 16 and as it is known, the increase in the interference rate is due to the weakness of the mechanism of inhibition, so a child has a weakness in this mechanism.

Table (21): Result of the Reading Test

Reading time	265 Seconds
The number of words read	230
Wrong word count	150
Correct reading indicator	0.34

We note in the above table that the number of reading words in the test is 230, the number of incorrectly reading words is 150 and the correct reading index is 0.34 Therefore, the child suffers from poor reading performance.

Case 5:

Table (22): Result of the ADHD Questionnaire

The result of the teacher questionnaire	41
Result of a family questionnaire	45
The overall result	43

We note in the above table that the result of the questionnaire directed to teachers is 41 points, while the questionnaire directed to the family results in 45 points, and the total result is 43 points, which is greater than 30 points, so the child suffers from hyperactivity accompanied by attention deficit.

Table (23): Result of the Intelligence Test

The overall result	31
IQ	115
IQ level	Normal intelligence

We note in the above table that the total score of the intelligence test is 31 points, which corresponds to the standard score of 115 degrees, so the child has a normal intelligence.

Table (24): Result of the Working Memory Test

The result of direct arrangement	06
Result of the reverse arrangement	03
The overall result	09

We note in the above table that the result of the working memory test in the direct arrangement dimension is 06 points and in the indirect arrangement dimension is 03 points, so the total is 09/30 points, which indicates a weakness in the working memory of the child.

Table (25): Result of the Stroop Test (Interference)

Cards	score	errors	hesitations
first card	50	1	1
second card (first app)	44	1	2
third card	42	1	2
second card (second app)	35	2	3
Interference	07		

We note in the above table that the result of interference is 07 and as it is known, the increase in the interference rate is due to the weakness of the mechanism of inhibition, so a child has a weakness in this mechanism.

Table (26): Result of the Reading Test

Reading time	210 Seconds
The number of words read	230
Wrong word count	102
Correct reading indicator	0.55

We note in the above table that the number of reading words in the test is 230, the number of incorrectly reading words is 102 and the correct reading index is 0.55 Therefore, the child suffers from poor reading performance.

Case 6:

Table (27): Result of the ADHD Questionnaire

The result of the teacher questionnaire	39
Result of a family questionnaire	43
The overall result	41

We note in the above table that the result of the questionnaire directed to teachers is 39 points, while the questionnaire directed to the family results in 43 points, and the total result is 41 points, which is greater than 30 points, so the child suffers from hyperactivity accompanied by attention deficit.

Table (28): Result of the Intelligence Test

The overall result	30
IQ	112
IQ level	Normal intelligence

We note in the above table that the total score of the intelligence test is 30 points, which corresponds to the standard score of 112 degrees, so the child has a normal intelligence.

Table (29): Result of the Working Memory Test

The result of direct arrangement	05
Result of the reverse arrangement	03
The overall result	08

We note in the above table that the result of the working memory test in the direct arrangement dimension is 05 points and in the indirect arrangement dimension is 03 points, so the total is 08/30 points, which indicates a weakness in the working memory of the child.

Table (30): Result of the Stroop Test (Interference)

Cards	score	errors	hesitations
first card	38	02	03
second card (first app)	35	02	02
third card	30	01	03
second card (second app)	17	4	5
Interference	13		

We note in the above table that the result of interference is 13 and as it is known, the increase in the interference rate is due to the weakness of the mechanism of inhibition, so a child has a weakness in this mechanism.

Table (31): Result of the Reading Test

Reading time	265 Seconds
The number of words read	230
Wrong word count	147
Correct reading indicator	0.36

We note in the above table that the number of reading words in the test is 230, the number of incorrectly reading words is 147 and the correct reading index is 0.36 Therefore, the child suffers from poor reading performance.

The results of the cases:

Table (32): Results of all tests

case	ADHD Questionnaire	Intelligence Test (QI)	Stroop Test (Interference)	Working Memory Test	Reading Test
01	45	112	13	07	0.36
02	42	110	10	09	0.44
03	36	115	18	09	0.5
04	48	110	16	06	0.34
05	43	115	07	09	0.55
06	41	112	13	08	0.36

Looking at the table above, we find that all the cases suffering from hyperactivity accompanied by a lack of attention, because the results of all cases were more than 30 on the questionnaire, the smallest result is 36 in case (3), and the largest result is 48 in case (4).

With regard to the IQ test of Ahmed Zaki Saleh, we find that the IQ levels in all cases ranged between 110 and 115, and by referring to the booklet attached to the test, we find that they fall within the normal intelligence level.

As for the working memory test, we find that weakness in all cases in varying degrees, the lowest mark is 4/30 as in case (4), and the highest mark is 9/30 as in cases (2) and (3).

The same applies to the Stroop test, where we notice a weakness in the inhibition mechanism in all cases in varying proportions, so that the degree of interference was large in all cases, and it is known that the higher the degree of interference, this indicates a weak inhibition in cases.

As for the reading test, it is possible to notice the weakness of the correct reading indicator in most cases, as it did not exceed in most cases 0,5. This indicates difficulties in reading.

3-2- Discussion:

- The first hypothesis states that the disorder of working memory leads to difficulties in reading performance in ADHD children. And by reference to the results obtained as in the following table:

Table (33): Results of working memory and reading performance

case	Working memory	Reading performance
01	07	0.36
02	09	0.44
03	09	0.5
04	06	0.34
05	09	0.55
06	08	0.36

We find that the cases suffering from weakness in working memory to varying degrees, which also affected the level of their reading performance, and a study (Swanson et siegel, 2001) confirmed the link between the defect in working memory and the basic problems of children with learning difficulties.

The study (Siegal et Rayan, 1989) also confirmed that pupils with reading difficulties and children with attention disorder suffer from impaired performance on the two tasks of measuring working memory.

This is because disturbance in working memory leads to a problem in encoding and decoding words, which results in difficulties in the reading process. Difficulties learning to read and the ordinary for the benefit of the ordinary.

This confirms the validity of the hypothesis that the disorder of working memory leads to difficulties in reading performance in children of hyperactivity associated with lack of attention.

- The second hypothesis states that inhibitory disorder leads to reading performance difficulties in ADHD children. And by reference to the results obtained in the following table

Table (34): Results of Results of Interference and reading performance

case	Interference	Reading performance
01	13	0.36
02	10	0.44
03	18	0.5
04	16	0.34
05	07	0.55
06	13	0.36

we notice from the results obtained in the table, that the higher degree of overlap, is the lower the reading performance of the cases, due to the fact that the higher degree of overlap indicates that the cases cannot push external distractions from the reading process, which indicates that the discouragement function is weak compared to normal children This was confirmed by (Morsi, 2019), as the results of

her study revealed a positive correlation between learning difficulties and impaired inhibitory function.

In addition to previous study, (Ali, 2014) in his evaluation of the executive functions of children who suffer from hyperactivity accompanied by attention deficit, the results revealed that these children have impairment in executive functions, including inhibition of response.

This confirms the validity of the hypothesis that inhibition disorder leads to difficulties in reading performance in children with hyperactivity accompanied by attention deficit.

Conclusion and recommendations:

Through our case studies and through the analysis of the obtained results, the study's hypotheses were validated. The results obtained proved that working memory disorder leads to the emergence of reading performance difficulties, which is consisted of previous studies.

The results also proved that the dysfunction of the inhibition function leads to difficulties in reading performance, which is in agreement with previous studies. This leads us to answer the study's question that the disorder of executive functions (working memory, inhibition) leads to reading performance difficulties on children of hyperactivity. Is associated with inattention.

Finally, the researcher proposes to conduct the same study, but on a larger sample, and by using the comparative descriptive approach between children suffering from hyperactivity only, children with learning difficulties only, children suffering from both disorders, and normal children, in order to find out the differences in the degree of reading difficulties. They have a look at the strategies used by each group.

The researcher also suggests expanding the independent variable to include some other executive functions such as mental flexibility, planning, etc.

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