Musik in bayern

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com

DOI https://doi.org/10.15463/gfbm-mib-2023-237

Comparison of executive functions in children with autism with high and low performance and normal children

Adil CHasib Shabeeb[1] ,Prof. touraj hashemi[2], Ph.D. Khalil Esmaeilpour[3], Ph. D Abbas Bakhshipour[4]

[1]PhD Student of clinical Psychology, University of Tabriz, Tabriz, Iran. Email:abosarah1990@yahoo.com

[2]Educational psychology, University of Tabriz, Tabriz, Iran. Email: tourajhashemi@yahoo.com

[3]Educational Psychology, University of Tabriz, Tabriz, Iran. Email: Khalil_sma@yahoo.com

[4]General Psychology, University of Tabriz, Tabriz, Iran. Email: abbas_bakhshipour@yahoo.com

To Cite this Article

Adil CHasib Shabeeb ,Prof. touraj hashemi, Ph.D. Khalil Esmaeilpour, Ph. D Abbas Bakhshipour,'' **Comparison of executive functions in children with autism with high and low performance and normal children***", **Musik In Bayern**, Vol. 88, Issue 10,- September 2023, pp*1-17

Article Info

Received: 10-08-2023 Revised: 20-08-2023 Accepted: 2-09-2023 Published: 13-09-2023

Abstract

The current study aimed to identify the difference and similarity in executive functions between children with autism (high and low performance) and normal children, the study sample consisted of (30) children in the form of three samples, each sample consists of 10 children . One for children with autism on performance, the second for low performance and the third for normal children, and used as tools for this study to measure executive functions,

Where this scale was prepared by the researcher Fatima Ali Al-Rifai, and the scale consists of 70 items distributed on 7 sub-dimensions , To conduct statistical analyzes, the electronic statistical program was used in this study to process the data obtained by the researcher (Statistical Package for Social Science (SPSS)) , Arithmetic averages, standard deviations, statistical significance and ranks were calculated for each paragraph of the scale and each of its domains using multiple variance analysis (MANOVA) ,

The results indicate that there are apparent differences between the arithmetic averages between high-performance and low-performance autism And normal children , And those differences between the averages were for children with autism (low performance) are higher, followed by high performance and then the average of normal children. Where the results of statistical treatments showed that there are statistically significant differences between the groups.

Keywords **:** *Executive Functions - autism - high and low performance - normal children*

Musik in bayern

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

1. Introduction

The mental, psychological and physical health of the child impacts of his or her academic, social, and even professional future. When this healthiness is achieved, a clear development is observed in language, cognitive, emotional, motor, functional, and other skills, through it, he expresses his various needs and uses them in his daily life, bypassing the situations he is exposed to, yet once the member responsible for these skills suffers an injury, it would be reflected in the level, development, and performance of those skills, where it is noticed that some of them would be inhibited completely. There are many problems, and diseases that children are exposed to in their daily lives that affect their skills, including autism spectrum disorder, which usually affects them in the first three years of their life. It is found that all skills are clearly and tangibly affected by this trauma, and we noticed the disappearance or distortion of the language. Cognitive perception, attention, focus, and loss of eye contact were affected as well, leading to the inability to socially interact, maintain friends, or take initiative in playing. They also show some sensory, behavioral, and routine disorders, and there are many other symptoms.

Where the failure of the child with autism is attributed to his inability to find the appropriate solution to the problems to achieve and reach the goals and requirements, in addition to his inability to understand what is going on in the minds of others by dealing with them to solve problems and his/her loss of skills that are used to respond in specific social situations, also failing to know and interpret others feelings and dealing and interacting with them affects the executive functions of the child, which Traverso and Carmen define it as higher cognitive processes that control and modulate the cognitive, emotional and behavioral mental functions. In addition to executive functions, there is another term called the theory of mind, which means an individual's ability to infer mental states (beliefs, intentions, desires, pretending, ideas, knowledge, understanding, images, claims…etc.) whether for himself or others. In addition to the impact of the so-called social competence which means the skills that are used to respond in specific social situations.

2. Statement of Problem:

Executive functions, are essential aspects of the incapability that children with autism suffer from, as most skills and activities are affected to different levels between high and low. To help, assist and rehabilitate this segment, this deficiency had to be carefully studied to find out the degree and level of its impact on the skills of children with autism and compare that with what normal children enjoy. We can formulate this problem in the form of the following question:

(What is the relationship between children with autism (high and low performance) and normal children in terms of executive functions,?

Through the main question, the following sub-question emerges:

Is there a difference or similarity between executive functions, between high and low-functioning autism?

3 .Significance of the study:

The importance of this research is highlighted in many areas that can be clarified as follows:

Musik in bayern

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

1. This research helps to reveal the difference and similarity of executive functions, in children with autism spectrum disorder (high and low functioning) and compare them with normal children.

2. This research helps to provide some information about children with autism spectrum disorder and compare them with normal children, concerning the executive functions of parents, specialists, and teachers working in this field.

3. There are very few studies locally and globally about executive functions of autistic children, and if it is found, we find it is inadequate, so this study will contribute to open horizons for future studies for researchers in psychological and social sciences.

4. Objectives of the study:

The present study aims to:

1. Compare the similarity and difference in executive functions, for children with high and low functioning autism disorder.

2. Compare the similarity and difference in executive functions, of children with high and low functioning autism disorder with normal children.

5. Overall objective:

(What is the relationship between children with autism (high and low functioning) and normal children in terms of executive functions,)?

6. Specific objective:

Is there a difference or similarity between executive functions, between high and low-functioning autism?

Hypotheses and research questions:

1.Is there any difference between low and high autism and normal child in the executive functions?

7 .Research Variables:

1. The independent variable: autistic and normal children.

2. The dependent variable: executive function.

8 .Research terminology:

1. Autism Spectrum Disorder

Autism spectrum disorder was defined by the American Psychiatric Association in the fifth Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a state of continuous deficiency in the child's social

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

communication skills, characterized by a deviation and delay in the development of basic psychological functions associated with the development of social, linguistic and sensory skills, and the emergence of routine stereotyped behavior, in addition to multiple interests, and symptoms appear during the early stages of life.

2. Normal Child

Psychologists define a normal child as a fully-fledged human being who has not yet reached the stage of maturity and has not shown signs of puberty, no matter how much that individual possesses of mental, behavioral, and emotional capabilities and characteristics .

3. Executive Functions

Traverso and Carmen (2015) define it as the higher cognitive processes that control and modulate the cognitive, emotional, and behavioral mental functions, and it means the ability to find the appropriate solution to the problems to achieve and reach the goals and requirements .

Research design

Present study was conducted with a comparative method on executive functions, Theory of mind, and social competency.

1.Study population

The study population consisted of a community of children with autism spectrum disorder (high and low performance) who are registered in Osrati Center for Autism and normal children who are registered in Al-Murbid Primary School and kindergarten Alwan in the Republic of Iraq in Basra Governorate.

2.The research sample

The study sample consisted of three Groups, two for children with autism (one for high performance and the second for low performance) and the third group for normal children. The ages of the children of the three groups ranged between 4-8 years which consisted of 30 samples (10 samples in each group).

3. Sampling method

The non-probability method (Intentional sampling) in sample selecting for this study was used.

4. Measuring tools

Most scientific research is based on data and observations collected from the Bati community or a representative sample of that community, which is collected depending on a set of tools. This is to obtain data and information in the general scientific research study the characteristics and behaviors that characterize the target group. To achieve the objectives of this study, the researcher used measures of executive functions, and this enables him to measure the features and characteristics related to the study sample, where the use of ready-made standards, formulated By the researchers in the form of multiple questions that included most of the desired features to be measured, and the measures Executive Functions :

Musik in bayern

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

[1](American Psychiatric Association, 2013)

[2](Child", Longman.)

[3](Traverso & Carmen . 2015 ,77)

Executive Function Scale.

This scale was prepared by the researcher Fatima Ali Al-Refai Appendix (1) The scale consists of 70 items distributed over 7 equine dimensions. The periods are as follows:

1. after the palm (Inhibit) and consists of 15 paragraphs. It means that the child moves flexibly and freely from one situation, activity, or an aspect of the problem to another, according to the requirements and solving problems in a flexible way.

2. After the transformation (Initiate) and consists of 6 paragraphs. It means the child's ability to control emotional responses appropriately.

3, after the start (Shift) and it consists of 10 ferrets. It refers to the child's ability to start an activity or task and present ideas on his own without relying on others.

4- After working memory, it consists of 11 paragraphs. It refers to the child's ability to hold information in mind in order to accomplish a task.

5. After planning, it consists of 12 paragraphs. It means that the child expects future events and sets goals or takes appropriate steps before the specified date to implement a task or activity. It also means understanding and exchanging main ideas or basic concepts.

Musik in bayern

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

6- After organizing the tools, it consists of 9 paragraphs. It is intended for the child to keep the place of his games or activities organized

7. After monitoring, it consists of 7 paragraphs. It means that the child follows up on what he performs and evaluates his performance during the task and after its completion to ensure the achievement of the goal and tracks the impact of his behavior on others.

The key to correcting the executive functions scale, as shown in the gondola (1):

It never happens	happens sometimes	happens a lot	always urges
1	2	3	4

The overall stability of the scale was calculated by the researcher Fatima Al-Rifai in three ways, namely (retest, Spearman / Brown method, Cronbach's alpha coefficient), all of which were statistically significant. The validity of the scale was also calculated by the Al-Rifai in several ways, namely (the validity of the judges and the validity of the statements). She found that all the statements are valid and the correlation coefficients are statistically significant.

Psychometric properties of the scale (validity and reliability)

In order to verify and rely on the data of the standards with a high degree of accuracy, you must be sure of the validity and reliability of the standards, although they were extracted by researchers.

1. Validity

A. Face validity (The attributers' validity)

The scale presented to a group of arbitrators at the Department of Educational and Psychological Sciences at the University of Basra in order to ensure the validity of the paragraphs of the standards and their content with the objectives for which the standards were set.

(Contents logicality of the scales and there relation to the phenomenon).

And all the arbitrators agreed on the validity of the paragraphs and their suitability for the objectives for which they were set, and those after changing some of them statments that fits with the Iraqi environment.

B. Content validity

Through the experts and arbitrators who were presented with standard , it was noted that there is consistency in the paragraphs of the standards with the axis or field to which these paragraphs belong, meaning that they express the axes and fields that were designed for selection and measurement.

2. Scale stability

Musik in bayern

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

The stability coefficient of the scale was calculated using the Cranach's Alpha Coefficient, each separately, and the result were (0.986), which are high values and indicate the stability of measures that distinguish between high and low performing autistic children and normal children.

5. Data collection methods

The date of this study was collected by using scale which consisted, executive functions.

6. Data analysis methods

The statistical program SPSS was used to conduct the analysis of data and obtain the Mean, standard deviations, Univariate analysis of variance, and multivariate analysis of variance MANOVA.

Data analysis

1. Descriptive section.

2. The inferential part of the hypothesis test.

Descriptive statistics:

Table (2) shows the initial data for the three measures after their application to the study samples, while the executive functions of the normal ranged between 80-90, the low-performers 215-232 and the high-performers 90-130.

Table No. (2) The primary data of the three samples after applying the scales.

Seq	Groups	Executive functions
1	Normal	80
2	Normal	83
3	Normal	90
4	Normal	81
5	Normal	84
6	Normal	83
7	Normal	85
8	Normal	89
9	Normal	86
10	Normal	90

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

11	Low functioning autism	218
12	Low functioning autism	215
13	Low functioning autism	219
14	low functioning autism	209
15	low functioning autism	223
16	low functioning autism	219
17	low functioning autism	225
18	low functioning autism	230
19	low functioning autism	228
20	low functioning autism	232
21	High functioning autism	95
22	High functioning autism	102
23	High functioning autism	99
24	High functioning autism	110
25	High functioning autism	105
26	High functioning autism	115
27	High functioning autism	125
28	High functioning autism	103
29	High functioning autism	130
30	High functioning autism	92

The means and standard deviations were calculated for the results of the three samples, as shown in the table (3) .

Table (3): Mean and standard deviations of the three samples and Scales.

Variables	Group	Mean	SD	number of samples

Musik in bayern

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

Executive Functions	Normal	85.1	3.6	10
	Low functioning autism	221.8	7.16	10
	High functioning autism	107.60	12.47	10

2. Inferential statistics.

Table (4) multivariate analysis of variance shows whether there were statistically significant differences or not, between high and low functioning autism and normal children in the three dependent variables (executive functions), where the results of statistical treatments showed that the statistical significance ratio is (0.00) less than the level (0.05)

Table (4): Multivariate analysis

	Effects	Value	F-value	Hypothes DF	Error DF	Sig.
Intercept	Pillai's Trace	999	11804.159	3	25	.000
	Wilks' Lambd	.001	11804.1	3	25	.000
	Hotelling's Trace	1416.499	11804.159	3	25	.000
Groups	Roy's Largest Root	1416.499	11804.159	3	25	.000

Table (5) indicates that there were statistically significant differences between the values of the high- and low-functioning autistic child with scale (executive functions). There were also statistically significant differences

between the values of the Normal child and the scale executive functions .Table (5): Univariate analysis of variance.

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

Source	Dependent Variables Sum of squares DF		Mean	squ	F-Values	Sig
Corrected Model	Executive function	107449.267	2	53724.633	733.016	.000
Intercept	Executive function .	572700.833	1	572700.833	7813.898	000
Totals	Executive function	107449.267	2	53724.633	733.016	.000
Error	Executive function	1978.9	27	73.293		
Total	Executive function	682129	30			
Corrected Total	Executive Function	109428.167	29			

Table (6) shows the comparison between dependent variables and independent variables (autism and normal child).

Table (6): Post Hoc Tests

Multiple Comparisons							
LSD							
Depe-ndent varible	Group 1	Group 2	Mean Difference (1-2)	Std. Error	Sig	95% Confidence Interval	
						Lower Bound	Upper Bound
Execut-ive functio-ns	Normal	Low functioning	-136.70*	3.82	.000	-144.55	-128.84
		High functioning	-22.50*	3.82	.000	-30.35	-14.64
	Low functioning autism	Normal	114.20*	3.82	.000	106.34	122.05
		High functioning autism	149.2*	3.97	.000	141.05	157.34

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

	High functioning autism	Normal	68.70*	3.97	.000	60.55	76.84

1. Average normal with average autism, low functioning and high functioning.

2. Average low functioning with normal and high functioning.

3. Average high functioning with average normal and low functioning.

3. Average normal with low functioning and high functioning.

4. Medium normal with low and high functioning.

5. Average low functioning with normal and high functioning.

6. Average high functioning autism with normal and low functioning.

7. Average normal with low and high functioning.

8. Medium low functioning with normal and high functioning.

9. Average high functioning autism with normal and low functioning.

After these comparisons, there are differences between the averages and statistical significance for all variables at the level of Significance (0.000).

If the differences are positive, this means that the first totals are higher than the second ones, and if the differences are negative, it means that the second totals are higher than the first ones, and the positive signs above the mean differences mean that all of them are statistically significant .

discussion and conclusion:

Introduction:

This chapter is devoted to the interpretation and discussion of all the results and answers of the hypotheses and questions of the study. .

In this chapter, A presentation and discussion of the validity of the three hypotheses and questions of the study, which were mentioned in the first chapter, has been conducted as well as working on the interpretation of these results individually, as shown below:

First question:

1. Are there differences between high and low functioning autism and the normal child in executive functions?

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

The results indicated that there were significant differences in among groups in executive functions

the statistical mean between high functioning and low functioning autism. There were also significant differences in the mean of the high functioning and low functioning autism samples compared to the mean of the normal sample.

The researcher obtained significant differences in the mean of the three sample groups on the executive functions scale, in which children with low functioning autism recorded the highest mean, followed by high functioning autism, and then normal children. The explanation for these differences as follows:

1.The children with low functioning autism have largely failed to answer the scale statements. This failure could be a result of the injury suffered by the children of this sample that could deprived them of many important skills and cognitive processes that hindered and prevented them from getting the correct answer.

These results are consistent with a study conducted by Low (2017), in which he concluded that executive functions significantly predict adaptive behavior in children with autism spectrum disorder, as well as deficiencies in executive functions, which were significant in the elements of planning and flexibility. The study also agreed with a study conducted by Capone and Paritchad. Kalback, (2015) and the conclusion that these functions clearly and significantly affect academic achievement, social interactions, and adaptive functions. It also enables the individual to manage important mental processes to perform the correct daily life skills.

It also agrees with the results of the study conducted by (White et al., 2017), which indicated that there is a correlation between deficiencies between executive functions and a decrease in the individual's ability to adapt for both males and females. It also agreed with the results of the study conducted by Dudley and Pugliese. Anthony and Strang, Wallace (2015) in the dimensions of self-monitoring, planning, organizing, and daily life activities, and differed in the initiative dimension.

Research evidence indicates that deficits in executive function are an important feature of autism spectrum disorder (ASD). This feature varies in severity according to the severity and level of infection.

Executive function is a broad term used to describe higher-order cognitive processes such as response initiation, selection, working memory, planning, strategy formation, cognitive flexibility, response inhibition, self-monitoring, and self-regulation (1).

As children with low functioning autism suffer from many major problems in executive functions, ranging from failure to deal with others, hyperactivity, poor visual communication, flexibility and planning, difficulty in completing tasks and their inability to do personal daily work with concentration and knowledge, to not realizing everything that comes out from them and/or from those around them (2).

2. The answers from children with high functioning autism on the executive functions scale were much better than those of low performance, as it was observed that they possess skills and qualities that are considered in many times close to normal. They have the ability to adapt, communicate, pay attention and focus, but not at the required level or compared with the normal child .

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

This performance could be due to unaffected skills and cognitive processes by the injury since their injury was simple or light compared to the sample of children with low functioning autism, which had a very clear impact on them.

---

(1) Abu El-Ezz, Mai Asaad, some executive functions and the speed of information processing among a sample of autistic adolescents with attention deficit hyperactivity and healthy, a thesis submitted to Kafrel sheikh University, 2018.
(2) Abdel Hafez, Thana Abdel Wadoud, Career Attention and Executive Function, p. 134, House of Lihani Publishing, 2016

3. The normal children answers to the items of the Executive Functions Scale were better than other samples, it could be due to the fact that the children had mental powers and natural cognitive processes that enabled them to answer the items of the Executive Functions Scale, which indicates that they are free from any injury that may hindered them at the time of answering the items of the scale, as their answers were consistent with their mental, cognitive and temporal level, except for some differences and inconsistencies in the answer among the sample members, which could be seen as natural. given the existence of individual differences between children with regard to mental and cognitive processes and the percentage of intelligence, in addition to the difference in age and personal environmental experiences.

Therefore, the interpretation and analysis of the differences that appeared between the samples in the executive functions of low and high autism is due to the percentage of autism, where the higher the incidence rate, the weak or low functioning and vice versa.

. .

Conclusions:

After the study's hypotheses, questions and final results were discussed, an essential section has been reached to summaries the important remarks of the study, in which it explains the reasons for the differences between the samples that has been obtained during the study, which are as follows:

1. High-functioning autism was the mildest and simplest type of autism, because the injury did not affect their cognitive, mental, and social processes to a large degree, as the answers acquired from this sample were evidence of that through the study.
2. Low-functioning autism is one of the most severe types of autism. People having this type of autism suffer from severe defects in executive functions, theory of mind and social competence, which made them unable to adapt and live normally. This was also observed through the answers collected from the samples on the scales.

The high-functioning autism category is the category that is close to the normal child category in interaction, adaptation, flexibility, understanding, cognition, visual communication, attention, focus, dialogue,

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

understanding feelings, controlling tantrums, maintaining friends, initiative, and problem-solving methods, and this is because they have not completely lost skills and cognitive processes.

The category of autistic children (low functioning) is very far from the category of normal children in all skills, knowledge, and behaviors. It was noticed that they failed to respond to all measures, as they could not understand feelings, did not express them, adapt, speak, interact, or express pain as a result of their exposure. For diseases or accidents, and this low level of skills leads them to be deprived of schools and to live with adaptation, stability, and a normal life. It is unfortunate that this segment cannot live independently, far from helping others, and it is possible to remain under attention and care throughout life.

3. Although normal child has normal mental and psychological health, but this does not mean that he has the ability to answer all the items of the three scales. The study did not find a child among the sample of normal children who exceeded all the scales and obtained full marks, this could be due to the presence of many factors that affected this, including the loss of the motivating environment, the lack of early education and training of children, and others.
4. The normal children, although they were free from autism, but their answers were not at the same level, and this was the result of several factors, the most important of which were individual differences (mental, emotional and psychological) and age. It was noted that there were children whose answers were distinct, which means that they have high intelligence and vice versa. As for the age factor, it has a clear effect on the answers of a normal child. The answer of a 4-year-old child definitely differs from the answer of a 7- or 8-year-old.
5. . There is an inconsistency in the answers of the affected children to the same sample and to the items of the scales, this indicates that the symptoms of autism differ from one child to another, as there is no patient who is similar to another with all the symptoms, and the researcher explains this discrepancy by the fact that the injuries of the same category also were not at the same level.

Recommendations :

Based on the findings of the current study, the researcher suggested the following recommendations:

1. Urging governments and families to start early education for normal children in order to develop skills and speed up receiving information.
2. The necessity of educating and educating groups working with autistic children about executive functions, so that they can understand and know the cause of the symptoms appearing on autistic children.
3. The necessity of opening many centers for autistic children and taking full care of them, especially for a low functioning group.
4. Designing many modern measures that include executive functions, for children.
5. Conducting several studies on executive functions, and their impact on the behavior and skills of children with autism.
6. conduct more comparisons of executive functions, between children with autism and other disabilities.

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

Sources

1 .Malenka ،RC؛ Nestler ،EJ؛ Hyman ،SE (2009). "Chapter 13: Higher Cognitive Function and Behavioral Control".

2 .Solomon ،Marjorie (2007). "Cognitive control in autism spectrum disorders". International Journal of Developmental Neuroscience. 239–47.

3 .Alvarez ،Julie A.؛ Emory ،Eugene (2006). "Executive function and the frontal lobes: A meta-analytic review". Neuropsychology Review.. 17–

4 .Clark ،L؛ Bechara ،A؛ Damasio ،H؛ Aitken ،MRF؛ Sahakian ،BJ؛ Robbins ،TW (2008). "Differential effects of insular and ventromedial prefrontal cortex lesions on risky decision making". Brain.

5 .Lezak ،Muriel Deutsch؛ Howieson ،Diane B.؛ Loring ،David W. (2004). Neuropsychological Assessment New York: Oxford University.

6 .Allman ،John M.؛ Hakeem ،Atiya؛ Erwin ،Joseph M.؛ Nimchinsky ،Esther؛ Hof ،Patrick (2001). "The anterior cingulate cortex:

7 .Koziol LF ،Budding DE ،Chidekel D (2012). "From movement to thought: executive function, embodied cognition, and the cerebellum.

8 .Noroozian M (2014). "The role of the cerebellum in cognition: beyond coordination in the central nervous system

9 .Norman ،DA؛ Shallice ،T (1980). "Attention to action: Willed and automatic control of behaviour".

10 .Barkley ،Russell A.؛ Murphy ،Kevin R. (2006). Attention-Deficit Hyperactivity Disorder Workbook New York.

11 .Shiffrin ،RM؛ Schneider ،W (1977). "Controlled and automatic human information processing: II: Perceptual learning, automatic attending, and a general theory". Psychological Review.

12 .Posner ،MI؛ Snyder ،CRR (1975). "Attention and cognitive control". Information processing and cognition: the Loyola symposium. Hillsdale, NJ: L. Erlbaum Associates..

13 .Posner ،MI؛ Petersen ،SE (1990). "The attention system of the human brain". Annu Rev Neurosci. 13: 25–42.

14 .Shallice ،T (1988). From neuropsychology to mental structure. Cambridge, UK: Cambridge University.

15 .Baddeley ،Alan D. (1986). Working memory. Oxford psychology series.

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

16 .Elliott R (2003). Executive functions and their disorders. British Medical Bulletin. (65); 49–59

17 .Monsell S (2003). "Task switching". TRENDS in Cognitive Sciences: 134–140

18 .Chan, R. C. K., Shum, D., Toulopoulou, T. & Chen, E. Y. H. ‹R؛ Shum ‹D؛ Toulopoulou ‹Chen ‹E (2008). "Assessment of executive functions: Review of instruments and identification of critical issues". Archives of Clinical Neuropsychology...: 201–216.

19 .Alvarez, J. A. & Emory, E. ‹Julie A.؛ Emory ‹Eugene (2006). "Executive function and the frontal lobes: A meta-analytic review". Neuropsychology Review.

20 .Diamond ‹Adele (2013). "Executive functions". Annual Review of Psychology.: 135–168.

21 .Washburn ‹DA (2016). "The Stroop effect at 80: The competition between stimulus control and cognitive control

22 .Malenka ‹RC؛ Nestler ‹EJ؛ Hyman ‹SE (2009). "Chapter 13: Higher Cognitive Function and Behavioral Control

23.https://www.autismspeaks.org/executive-functioning

24.https://www.additudemag.com/executive-function-treatment/

25.https://autismawarenesscentre.com/executive-function-what-is-it-and-how-do-we-support-it-in-those-with-autism-part

26.Anderson, Vicki A., Peter Enderson, Elisabeth Northam, Rani Jacobs, and Cathy Catroppa. "Development of executive functions through late childhood and adolescence in an Australian sample." Developmental Neuropsychology 20, no. 1 (2001), 385–406.

27 . Bryan, Janet and Mary A. Luszcz. "Measurement of executive function: Considerations for detecting adult age differences." Journal of Clinical and Experimental Neuropsychology 22, no. 1 (2000): 40–55.

28. Morgan, Alex B. and Scott O. Lilienfeld. "A meta-analytic review of the relation between antisocial behavior and neuropsychological measures of executive function." Clinical Psychology Review 20, no. 1 (2000): 113–136.

ISSN: 0937-583x Volume 88, Issue 10 (Sep -2023)
https://musikinbayern.com
DOI https://doi.org/10.15463/gfbm-mib-2023-237

29 .N.athan, Joanna, David Wilkinson, Sue Stammers, and J. Lorraine Low. "The role of tests of frontal executive function in the detection of mild dementia." International Journal of Geriatric Psychiatry 16 (2001): 18–26.

30. Ready, Rebecca E., Laura Stierman, and Jane S. Paulsen. "Ecological validity of neuropsychological and personality measures of executive functions." The Clinical Neuropsychologist 15, no. 3 (2001), 314–323.

31.Wecker, Nancy S., Joel H. Kramer, Amy Wisniewski, Dean C. Delis, and Edith Kaplan. "Age effects on executive ability." Neuropsychology 14, no. 3 (2000): 409–41.4