THE PERFORMANCES OF CHILDREN WITH ADHD OBTAINED ON NEUROPSYCHOLOGICAL ASSESSMENT OF DEVELOPMENT (NEPSY) – PILOT STUDY

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ABSTRACT:

The pilot study was realized to investigate, on a small scale, using a small sample (20 subjects – 10 children with ADHD and 10 children with other psychiatric disorders, aged 3-4 years and 5-12 years) and with a lower level of accuracy compared with large samples, performances in neuropsychological assessment of development – NEPSY. The objective of pilot study was to generate raw data, which will be used, especially, for future qualitative analysis. Setting the level of performance achieved by children with ADHD in neuropsychological assessment of development, allowed the radiography of segments which can address a change program of cognitive structures. By procedural nature of NEPSY assessment, were captured deficient levels, making a kind of map of cognitive functioning which can be a starting point in any kind of intervention on capacity line of change of cognitive structures.

Key Words: children with ADHD, Neuropsychological assessment of development (NEPSY), attention / executive functions, language, sensorimotor functions, visuospatial processing, memory, learning

REZUMAT:

Studiul pilot a fost realizat pentru a investiga, pe o scară mică, utilizând un eșantion mic (20 de subiecții - 10 copii cu ADHD si 10 copii cu alte tulburări psihice, în vârstă de 3-4 ani și 5-12 ani)

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și cu un nivel mai scăzut de precizie, comparative cu probele mari, aspecte în evaluarea neuropsihologică a dezvoltării - NEPSY. Obiectivul de studiu-pilot a fost de a genera date brute, care vor fi utilizate, în special, pentru analiza calitativă în viitor. Stabilirea nivelului de performanță atins de către copiii cu ADHD, în evaluarea neuropsihologică a dezvoltării, a permis o radiografie a segmentelor care pot aborda un program de schimbare a structurilor cognitive. Prin evaluarea NEPSY, de natură procedurală, au fost capturate nivelurile de deficit, făcând un fel de hartă a funcționării cognitive, care poate fi un punct de plecare în orice fel de intervenție pe linia capacității de schimbare a structurilor cognitive.

**Cuvinte cheie:** copiii cu ADHD, evaluarea neuropsihologică a dezvoltării (NEPSY), atenție / funcții executive, limbaj, funcțiile senzorimotoare, procesare visuospatială, memorie, învățare

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1. INTRODUCTION

Most studies on neuropsychological assessment of development in children with mental disorders from Romania have been conducted since 1998, after NEPSY validation on Romanian population. On international level run various researches which has like central object the neuropsychological assessment of development in children with mental disorders and which are increasingly being used as basis for improving the medical services quality for diagnostic and clinical evaluation.

The sample used was not representative for our study; however, the final intentions of the study were to provide an overview by conducting analysis on functional areas, after the assessment made by NEPSY.

The psychological and psychometric evaluation of children with ADHD is important to identify learning difficulties, reading skills, dyslexia or other problems as dyscalculia or non-verbal learning difficulties. This type of evaluation is useful in identifying issues for attention. May also be present general learning difficulties especially on disorder predominantly hyperkinetic type and in which is useful to evaluate the level of intelligence to make the design of the intervention process.
Is important that the cognitive deficits of memory and attention to be evaluated by clinical or educational psychologist. One of the most frequently used tools in this sense is NEPSY-neuropsychological assessment battery that includes visual and auditory attention subtests.

KID-SCID assessment: Clinical structured interview for clinical disorders of infant, child and adolescent-compatible with DSM-IV and DSM-IV-TR, according to diagnostic criteria, easily established the taxonomy symptoms divided in two categories: A1: inattention and A2: hyperactivity-impulsivity.

Being a pilot study, we tried to identify, in this first phase, some characteristic factors in terms of neuropsychological development of children with ADHD, following that in next stages to compare evaluated children with children with other psychiatric disorders, to correlate these factors with personality factors, or various other forms of assessment etc.

We tried, however, to establish if there is for the evaluated sample, a correlation between the factors outlined by NEPSY and the classification criteria of hyperkinetic disorder with attention deficit (ADHD).

STAGE OF KNOWLEDGE

NEPSY battery presentation

NEPSY battery includes 27 calibrated and validated neuropsychological tests on Romanian population. Neurocognitive functions evaluated by NEPSY are: sensorimotor functions, visuospatial processing, attention/executive functions, language, memory and learning. Practically NEPSY allow assessing all neurocognitive mechanisms from the sensorimotor to the top. Battery tests are presented in two age groups: 3-4 years and 5-12 years.

Main features of NEPSY

- Is a tool of neuropsychological assessment designed especially for children (age 3-12 years), not by adapting tests for adults.
- Has a very good predictive and competitive validity.
• Is a tool that evaluates child's neuropsychological skills, essentials for the academic success and social adjustment.
• It makes differences between normal profile and the atypical profile of development.
• Is the first neuropsychological assessment battery of development adapted, calibrated and validated on the Romanian population.
• Samples are “Child-friendly”.
  The battery’s 27-th tests can be used on various combinations, according to child’ needs and investigative intent of the psycholog.

Benefits of using NEPSY

• Achieves fine detection of neuropsychological deficits, detailed on five functional areas.
• Allows identification and assessment of cortical dysfunctions, to the extent that it is reflected in operating on one of the five functional areas.
• Ensure the possibility of pursuing on long-term of development evolution to identify the dynamic of these disorders.
• Allows differentiation between normal/atypical development on preschool and small school population.

NEPSY – Interpretation

• Evaluation results are expressed in an individual profile of neuropsychological performance. This profile is the pattern of strengths and weaknesses of a person in and on all five areas.
• These patterns can be compared with standards of normal development, but also with those of atypical development.
• Additionally, most tests have additional scores that allow a detailed analysis of child’s performance.
• Diagnosis results substantiates therapeutic intervention.
KID-SCID is a clinical structured interview for clinical disorders of infant, child and adolescent – compatible with DSM-IV si DSM-IV-TR. Diagnostic criteria can easily establish that taxonomy symptoms is divided in two categories: A1: inattention and A2: hyperactivity-impulsivity.

It is codified by type:

- Hyperactivity disorder/attention deficit, combined type if both criteria A1 and A2 are satisfied for the last 6 months.
- Hyperactivity disorder/attention deficit, predominantly inattention type if A1 criterion is satisfied, and A2 criterion not, for the last 6 months.
- Hyperactivity disorder/attention deficit, predominantly hyperactivity-impulsivity type if A2 criterion is satisfied, and A1 criterion not, for the last 6 months.

Symptoms must be: chronic (present for a period of at least 6 months), bad adaptive, operating deficiencies negatively interfere with two or more contexts of life, to appear negative levels of development and be different from other mental disorders.

2. METHODS

In study that we realized on 20 children with mental disorders (ADHD, TC, ASD, ASPERGER’S) who achieved of neuropsychological assessment of development (NEPSY), we watched to see which areas are deficient in terms of neuropsychological development and how big is the deficit.

The general objective

The optimization of intellectual assessment of children with ADHD in order to ensure equal opportunities in terms of school integration.

Characteristic objectives

1. The setting level of performance on children with ADHD on neuropsychological assessment of development (NEPSY).
2. The development of some suggestions about the evaluation capacity of adaptability and school integration of children with ADHD.

WORK HYPOTHESIS
If is known the performance level achieved by children with ADHD to neuropsychological assessment of development (NEPSY), then we can set the intervention methods involved in vocational rehabilitation programs.

WORK METHODS
1. As research type we used: applied research.
2. As form of research organization we used: the cross method.
3. Between all knowledge methods of intellectual potential of children with ADHD we appeal to the next types of methods: the observation method, the tests method, the investigation method (clinical interview).
4. Methods used in information processing: qualitative analysis method, statistical method
5. Methods and techniques of information arrangement: free characterization, graphic forms of presenting information.

The arrangements for research
The research was conducted during six months (November 2010 – may 2011), with the presentation of research results embodied in the pilot study: “Performance of children with ADHD obtained on neuropsychological assessment of development (NEPSY)”.

GROUP OF SUBJECTS (GROUP OF STUDY)
Consisted in 20 children with mental disorders (ADHD, TC, TO, TDL, ASD, ASPERGER’S), aged 3-12 years, selected from children with mental disorders admitted to Child and Adolescent Psychiatry Department from “Prof. Dr. AL. OBREGIA” Psychiatry Hospital, Bucharest.

ESTABLISHMENT OF RESEARCH VARIABLES
The performance in areas: Attention/Executive functions (A/Fe), Language (L), Sensorimotor functions (S), Visuospatial processing (V), Memory and Learning (M), global Q.I.

3. RESULTS
The results showed us that aren't significant differences in terms of development level of functional areas investigated by NEPSY on children with ADHD included in the sample of pilot study that we conducted.

DATA ANALYSIS

The performed analysis had as a starting point the processing of a number of 20 neuropsychological assessments of development that have been applied to children with mental disorders (ADHD, TC, TO, TDL, ASD, ASPERGER’S). In the analysis have been included the results of children with ADHD in these functional areas: Attention/Executive functions, Language, Sensorimotor functions, Visuospatial processing, Memory and Learning. It was also analyzed the global Q.I. obtained on the basis of the average scores recorded on functional areas to each subject.

STAGES OF ANALYSIS

STAGE I: First step in this process was coding the responses recorded after applying the instruments that children with ADHD were evaluated and the elimination of those who have proved to be incorrect.

STAGE II: The second stage consisted in analyzing the frequency values of selected variables (in our case “functional areas” highlighted by NEPSY).

STAGE III: Third stage was the actual data analysis consisting of quantitative and qualitative analysis.

Figure # 1: THE PERFORMANCES OBTAINED BY CHILDREN WITH MENTAL DISORDERS (20 subjects)
The identification of children with ADHD, who face various difficulties in different areas of cognitive functioning, provides information on subsequent evolution. This evolution indicates both the need and direction for effective interventions.
4. DISCUSSIONS

THE PERFORMANCES IN FIELD

In the following will be presented the overall results of the study, possible suggestions derived from them and last but not least an overview of the performances obtained by children with ADHD on neuropsychological assessment of development (NEPSY).

But this study was conducted on a small sample of subjects and wasn’t investigated the interaction with other variables (for example the education level that they received, the family).

Further, we analyzed the variables, depending on which we evaluated a global IQ. Due to synthesis reasons, we chose the graphical representation of the performances obtained by children with ADHD.
Figure # 4: THE PERFORMANCES OBTAINED IN THE ATTENTION/EXECUTIVE FUNCTIONS (10 subjects-children with ADHD)

Figure # 5: THE PERFORMANCES OBTAINED IN THE LANGUAGE (10 subjects-children with ADHD)

Figure # 6: THE PERFORMANCES OBTAINED IN THE SENSORIMOTOR FUNCTIONS (10 subjects-children with ADHD)
Figure # 7: THE PERFORMANCES OBTAINED IN THE VISUOSPATIAL PROCESSING (10 subjects-children with ADHD)

Figure # 8: THE PERFORMANCES OBTAINED IN THE MEMORY AND LEARNING (10 subjects-children with ADHD)
THE ANALYSIS ON FUNCTIONAL AREAS

Using workloads (from the battery of NEPSY tests—the neuropsychological assessment of development) in the form of games, were taken into account the following functional areas: sensorimotor, visuospatial, attention/basic executive functions, language.

The analysis performed on the areas investigated by the NEPSY, was based on data obtained from the evaluation process. Were included in the analysis the following functional areas: attention/executive functions, language, sensorimotor functions, visuospatial processing, memory and learning.

Figure # 9: THE ANALYSIS ON THE ATTENTION/EXECUTIVE FUNCTIONS (10 subjects—children with ADHD)
Solving tasks in the field of language was possible in some children with ADHD, just by repeating instructions and their segmentation, to increase the degree of understanding. Later, their attention was distracted, so they haven't looked to the drawings, nor haven't listened instructions, they just have answered randomly, in order to move forward.
Figure # 11: THE ANALYSIS ON THE SENSORIMOTOR FUNCTIONS (10 subjects - children with ADHD)

Figure # 12: THE ANALYSIS ON THE VISUOSPATIAL PROCESSING (10 subjects - children with ADHD)
Between the difficulties in terms of visual-spatial processing, which were highlighted by solving tasks that focused on the ability of children with ADHD to determine the orientation and the placement direction, we can mention:

- lower focus attention
- poor understanding of instructions
- the orientation and movement direction is not well developed
- higher latency response

Figure # 13: THE ANALYSIS ON THE MEMORY AND LEARNING (10 subjects - children with ADHD)

Have been identified the acquisitions of child with ADHD on learning and also the deficits on this level and can be build from these data effective programs to cognitive optimization. These results have practical implications, because they have helped to identify variables that are important in detecting the need to include the results of research in vocational ability and rehabilitation programs of children with ADHD.
**CONCLUSIONS**

**PROPOSALS. SOME USEFUL SUGGESTIONS**

The pilot study was conducted to investigate on a small scale, using a small sample (20 subjects-10 children with ADHD and 10 children with other mental disorders) and with a lower level of accuracy compared with large representative samples, the performances obtained on neuropsychological assessment of development- NEPSY. The purpose of using the pilot study was to generate raw data that will be used mainly for future qualitative analysis. Can be said that our pilot study provided qualitative data for qualitative researches.

- The main reference to the assessment tasks that children with ADHD went through, it refers that the procedure wasn’t totally applied, according to the methodology of application. Were applied only basic tasks, without application tasks from extensive category.
- In some of the subjects it took a multiple repetition of requirements, to resume the instructions while they complete their task, the segmentation of the instructions to be as clear and accurately processed.
- Also, at applied tasks, including speed led to blocking and inhibition of the response to some of the subjects, for which children were allowed to finish work in their own pace.
Repeating instructions and more time than the average, are needed to finish tasks. This could mean that, in terms of cognitive, children with ADHD have the necessary knowledge, but in the executive functions-attention, task persistence, are some difficulties.

This observation is very important, especially during school hours, where to keep pace with other students, will need more common guidance and temporal segmentation of action sequences to remain focus in workload.

Another important aspect is the high distractibility in children with ADHD. The persistence in task is more difficult, that is why resumption of instructions is necessary for them. Focus more time on what they do is more difficult, boredom or a desire to do something new, occurring relatively quickly

- Increasing the level of difficulty for some activities, has as a consequence, the escape from task and not deep focalizations or trying to find strategies to solve the task.

Other observations noted, refers to a range of behaviors exhibited outside of task that are given, namely:

- Repeating sentences, violation of rules, new tasks to what will be required (for example we ask them to copy a draw and they color it), reverses the sequences of response although the instructions are clear, or on their learning phase they respect them.

- If they are left to work alone, they persist only for a small time in that task, often they don’t finish their task alone and need closer supervision.

- High distractibility, more time needed to complete a task, the need for repeated requests, involve targeting children with ADHD in the performance of exercises, the breaks between activities, but also in their time, if they are more complex.

The use of evaluation methods aimed at development are given by the appearance of new concepts of intelligence, development and cognitive functioning.

The neuropsychological assessment of development (NEPSY), represents a starting point for any cognitive intervention, setting on the one hand the current level of development and future development directions and levels.

The application of assessment tools to measure neuropsychological development of children with ADHD will improve services plan that is focused on their needs, put out by KID-SCID, such as:
A1: Inattention: Distraction, He don’t listen to what they say, The maintaining attention in the game, Failure to work, Difficulty in task organization, Forget about everyday activities, Loses necessary things, Doesn’t comply to instructions, Doesn’t engage in task.

A2: Hyperactivity-Impulsivity: He fusses, Move their hands, Leave the place where he sit, He move excessively, The difficulty to engage in game activities, Continuous motion, Excessive speech, Hasty responses, The difficulty of sitting in a row, Interrupting others.

*New directions for future research*

We hope this research stimulates further investigations. An improved reply of the research should take into account the possibility of highlighting significant differences in terms of personality factors correlate with factors outlined by the neuropsychological assessment of development for children with ADHD, in order to optimize the intelligence assessment.

The optimization of intelligence assessment: The performances obtained after a training phase express more accurately and more valid child's cognitive functioning than the assessment once made.

The assessment of change cognitive structures: The ability to change cognitive structures can be highlighted by the intellectual potential compared to the level reached by intelligence, plasticity and flexibility of cognitive processes related to stiffness, their lethargy reported to mobility etc.

The prediction on future purchases:

- Learning potential is a predictor of cognitive development.
- Measuring the level of development potential has more predictive value for the dynamic measurement of cognitive development than the current level of development.

The acquire of informations to guide the intervention: The directly purpose of evaluation is to propose effective programs of cognitive development. The education methods and cognitive development can be formed so, in directly involvements of the assessment.
REFERENCES


