DIAGNOSIS OF ATTENTION DEFICIT HIPERACTIVITY DISORDER (ADHD) IN GIFTED CHILDREN

EMPIRICAL STUDY ABOUT USING BRICKENKAMP´S D2 TEST AND CONNERS´ CONTINUOUS PERFORMANCE TEST II (CPTII V.5) ON DIAGNOSIS

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Abstract

ADHD diagnosis is different in normal intelligent students from gifted students. It is important to know that ADHD is not a problem of inattention but it is a problem with the self-control of attention.

Results got by gifted students with ADHD in Brickenkamp´ d2 test and in Conners' Continuous Performance Test II (CPT II V.5) are different from results got by non-gifted students with ADHD. Frequently results got by gifted students with ADHD in these tests disguise the attention problem and difficult to make a right diagnosis. To avoid this, gifted students identification and ADHD diagnosis must be made by well-trained professionals with a wide knowledge about this double exceptionality.

Keywords: gifted student, ADHD, identification, diagnosis, test, well-trained professionals, double exceptionality.

INTRODUCTION

ADHD is an attention disorder, included in DSM-IV-TR (American Psychiatric Association, 2000) and in CIE-10 (World Health Organization, 1992). This disorder is characterized by a persistent pattern of attention lack and/or hyperactivity-impulsivity, more frequent and severe that the pattern usually observed in children with a similar level of development. According to the DSM-IV-TR, the incidence of ADHD in students is from 3 to 7%,

and it is more frequent in males (80%). The disorder begins to be evident in children between 3 and 5 years old, and it is easier to be detected after children are 6/7 years old because children are in Primary Education where the school level is higher. But, there are also some cases where the disorder stars in adolescence.

The treatment of this disorder must include a multimodal perspective: pharmacology treatment (if were necessary), psychological and pedagogical assessment, counseling and training for teachers and parents.

ADHD may appear in every child, independently the intelligence level: children with mental deficiency, normal intelligence or gifted children.

Because of the relevance of this disorder, we made, in 2007, an empirical study about the ADHD diagnosis in children with normal intelligence versus gifted children, using the same tests: Brickenkamp's d2 test and the Conners´ Continuous Performance Test II (CPTII v.5). The results of this empirical study, made by PhD J. Antonio Alonso, PhD Jesús Moro and PhD Yolanda Benito, were presented in the World Conference, organized by World Council for gifted and talented children, hold in 2007 August.

OBJETIVES

Firstly we wanted to know if the attention tests usually used for ADHD diagnosis in children with normal intelligence, d2 Test and CPTII V.5 and Kiddie Continuous Performance Test (for children 4 and 5 years old), are also useful for ADHD diagnosis in gifted children. If so we also wanted to know if the results got by gifted children in these tests are similar or different from the results got by non-gifted children in the same tests.

RESEARCH HYPOTHESIS

1) Results got by gifted children with ADHD will be significantly different from results got by gifted children without ADHD in d2 and CPTII tests.
2) Results got by gifted children with ADHD will be significantly different from results got by non-gifted children with ADHD in d2 and CPTII tests.

METHOD

INSTRUMENTS

To diagnose ADHD no specific instrument is either necessary or sufficient, whatever the data it obtains or however sophisticated is when we measure a process. But many instruments provide reliable, valid and valuable information, which is useful to take into consideration together the observations about the students made by themselves or by other people close to them.

The categories of the existing tests, which are useful for valuating ADHD, include structures and semi-structured interviews, inventories and psychometric tests of attention, memory, organization, planning, attitudinal, learning disables and other functions often affected by ADHD.

In this empirical study we are going to focus on two specific tools usually used for valuating ADHD: Brickenkamp's d2 test and Conners´ Continuous Performance Test.

D2 Test, Aufmerksamkkeits – Belastungs-Test originally named, was created by Rolf Brickenkamp and published by first time in Germany, 1962. Later it was translated into Spanish.

This test has been revised 8 times in the last 35 years, and so its empirical and clinical applications have been made secure. This test has a high acknowledgement in fiability and validity (content, criteria and construct).

In Europe, it is known as concentration test o selective attention test, while in E.E.U.U. it is known as test of breadth attentional or test of sustained attention. This test can be used in several specialties of psychology: neuro-psychology, pharmacology, clinical, applied psychology, schoolar and industrial psychology.

D2 Test is a concise measure of the selective attention and the mental concentration in children (after 8) and in adults. A good concentration requires a right performance of the motivation and the concentration of attention. These two factors, applied into d2 test, are reflected in three components of the attentional behavior: speed or quantity of work, quality of work and the relationship between velocity and accuracy of performance.

Conners´ Continuous Performance Test (CPTII V.5) has been created by Dr. C. Keith Conners, one of the more well-known professionals in ADHD at world. This test is based on a sample of 2686 people and it is a concise measure of attention problems in children after 6. There is a version for kids under 6: Conners´ Kiddie Continuous Performance Test (K-CPT V.5).

CPT II can be used in different ways: in clinical contexts as part of assessment process, but its results can not be used as unique for diagnosis; as a quickly and valuable screening method; as a tool in pharmacology treatments because it is sensible to effects of a pharmacy (several studies have shown a reduction of errors in the CPT test when children are treated principally with methylphenidate) and in the research field because it offers an rich amount of statistic data.

A large number of studies, principally carried out with children, have shown that subjects with ADHD perform worse in the CPT measurements. In a meta-analytical study of 26 children with ADHD and with children without ADHD, Losier et al., 1996, found that, in general, children with ADHD had more errors by omission and commission, but they showed few answers in the reply bias (tendency to respond or not respond).

So, we must be prudent when we apply the test because it is known that some subjects with ADHD show normal scores in CPT (false negatives) and some subjects without ADHD show irregularities in the test (false positives).

SUBJECTS

In order to realize the empirical study, a sample of students, aged between 4 and 20 years, from different spanish cities, and from media and high-class, was selected.

For the first research hypothesis the number of students selected was 47 gifted students with ADHD and 17 gifted students without ADHD. For the second research hypothesis 41 gifted students with ADHD and 15 non-gifted students with ADHD were selected.

PROCCES

In order to consider a student as intellectually gifted the psychometric criteria of IQ equal to or over 130 on the Wechsler and /or Stanford-Binet Intelligence Scales has been maintained. The DSM-IV-TR (American Psychiatric Association) has been used for diagnosis ADHD.

CPT II Test was applied on all students (64 in the first research hypothesis and 56 in the second research hypothesis). The d2 test was also applied on students who were 8 or older. The correction of the two attentional tests was realized, separately, by two trained professionals.

The obtained data were introduced into the statistical program SPSS and the Student´s t test for comparison of media from independent groups was carried out.

RESULTS

FIRST HYPOTHESIS

Regarding the first hypothesis, results got by gifted children with ADHD will be significantly different from results got by gifted children without ADHD in d2 and CPTII tests, we have differentiate two parts:
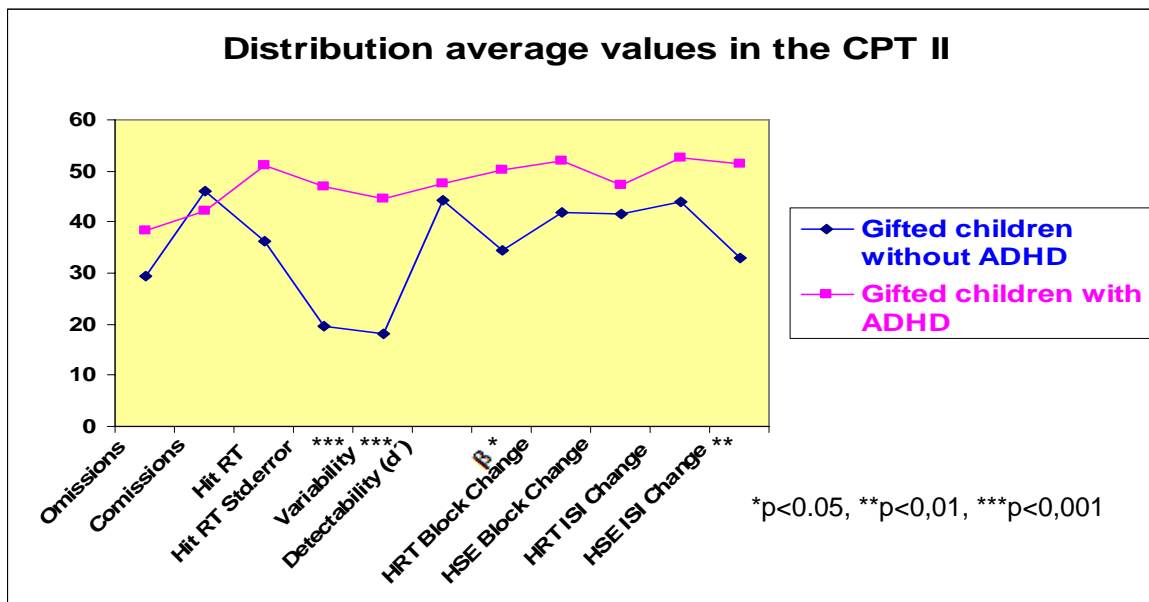
PART I:

Results got by gifted children with ADHD will be significantly different from results got by gifted children without ADHD in the CPTII test. For proving this hypothesis we selected a sample of 41 gifted children with ADHD and 17 gifted children without ADHD. We got the following observations at a statistic level:

Gifted students without ADHD got higher value in Hit RT Standard Error, i.e. their reaction times were less variable in terms of consistency (27% more) than the gifted students with ADHD.

In the same way, regarding the variable of Variability of Standard Error, the gifted students without ADHD got a greater consistency in their performance and attention (26% more) than gifted students with ADHD.

Also, gifted students without ADHD showed a more liberal response style (16% more liberal) than the gifted students with ADHD, so they were able to respond to the most target stimulus.

Finally, the gifted students without ADHD showed higher value in Hit SE ISI Change, so their reaction times were more consistent in the different inter-stimulus intervals (18% more consistent) than the gifted students with ADHD.
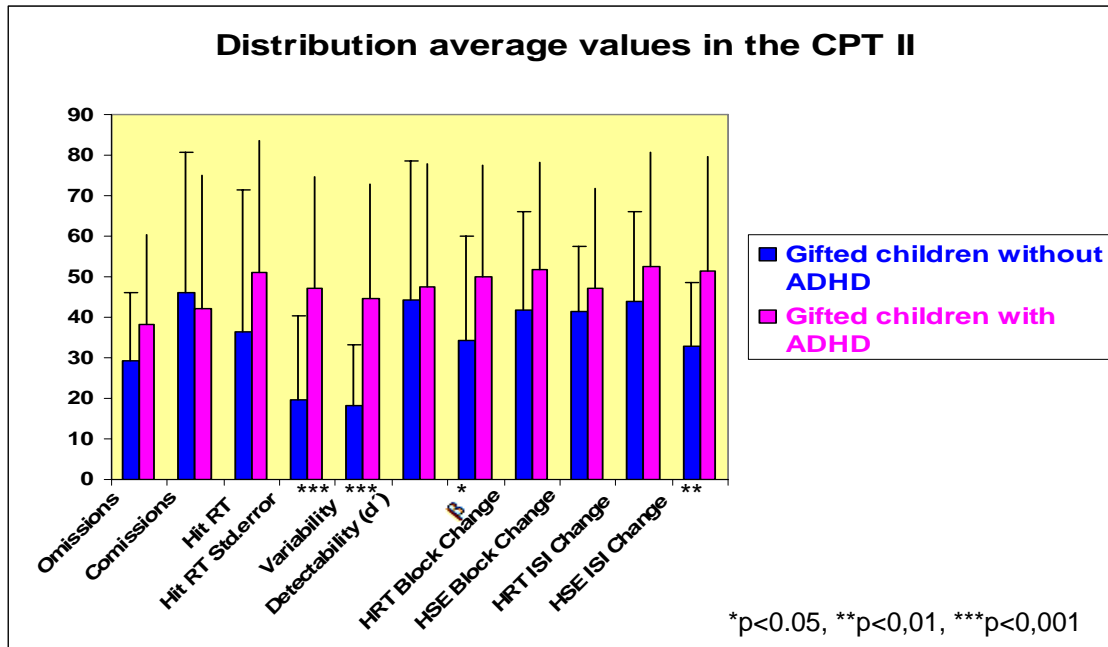
*p<0.05, **p<0,01, ***p<0,001

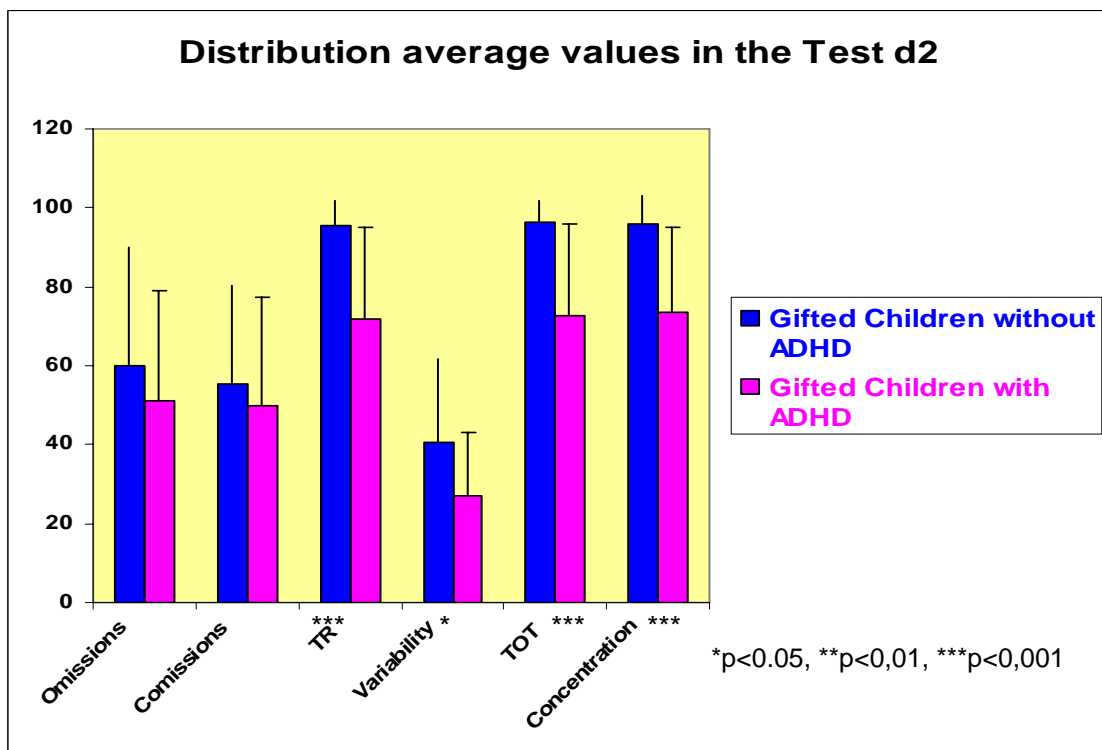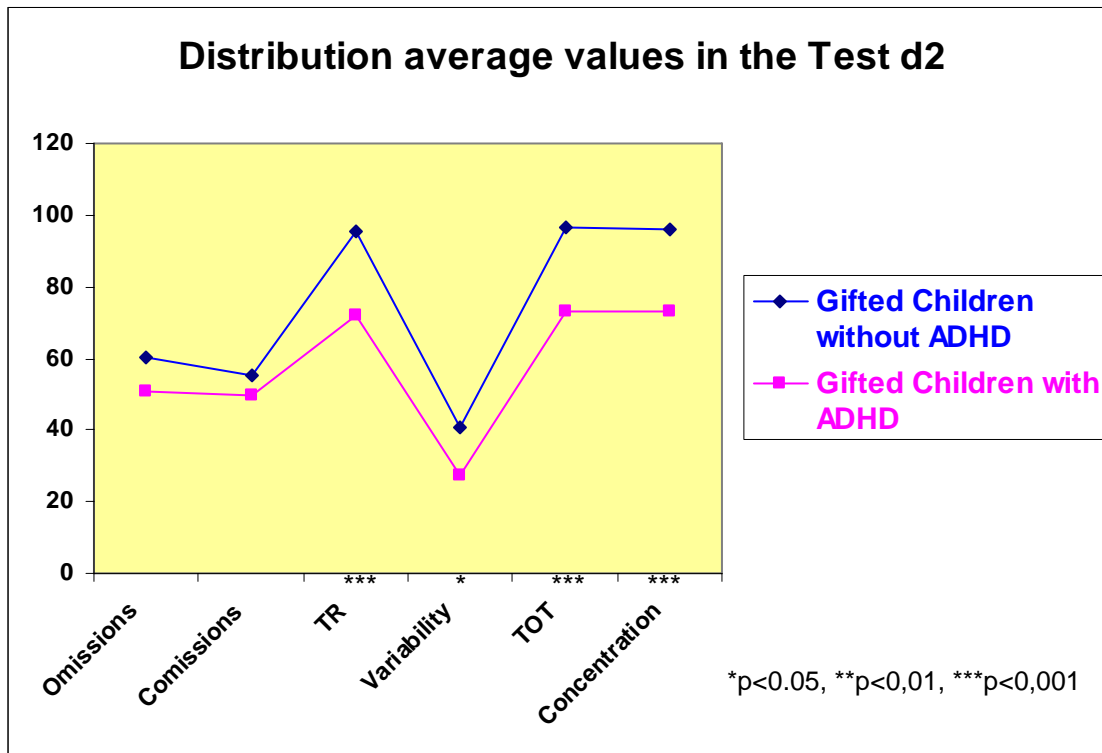**Distribution average values in the CPT II**

PART II:

Results got by gifted children with ADHD will be significantly different from results got by gifted children without ADHD in the d2 Test. For proving this hypothesis we selected a sample of 31 gifted children with ADHD and 12 gifted children without ADHD. We got the following results:

Gifted students without ADHD show a quicker speed in the information processing versus gifted students with ADHD (23% difference). (TR value).

Gifted students without ADHD show a greater stability and consistency in the work time (13% more) than gifted students with ADHD. (VAR value).

Gifted students without ADHD show a better attentional and inhibitory control and a higher relation between speed and accuracy than gifted students with ADHD (23% of difference). (TOT value).

And gifted students without ADHD show a better balance between speed and accuracy in their performance versus gifted students with ADHD (23% difference). (CON value).

Distribution average values in the Test d2

Gifted Children without ADHD

Gifted Children with ADHD

Omissions, Comissions, TR ***, Variability *, TOT ***, Concentration ***

*p<0.05, **p<0,01, ***p<0,001

Distribution average values in the Test d2

Gifted Children without ADHD

Gifted Children with ADHD

Omissions, Comissions, TR ***, Variability *, TOT ***, Concentration ***
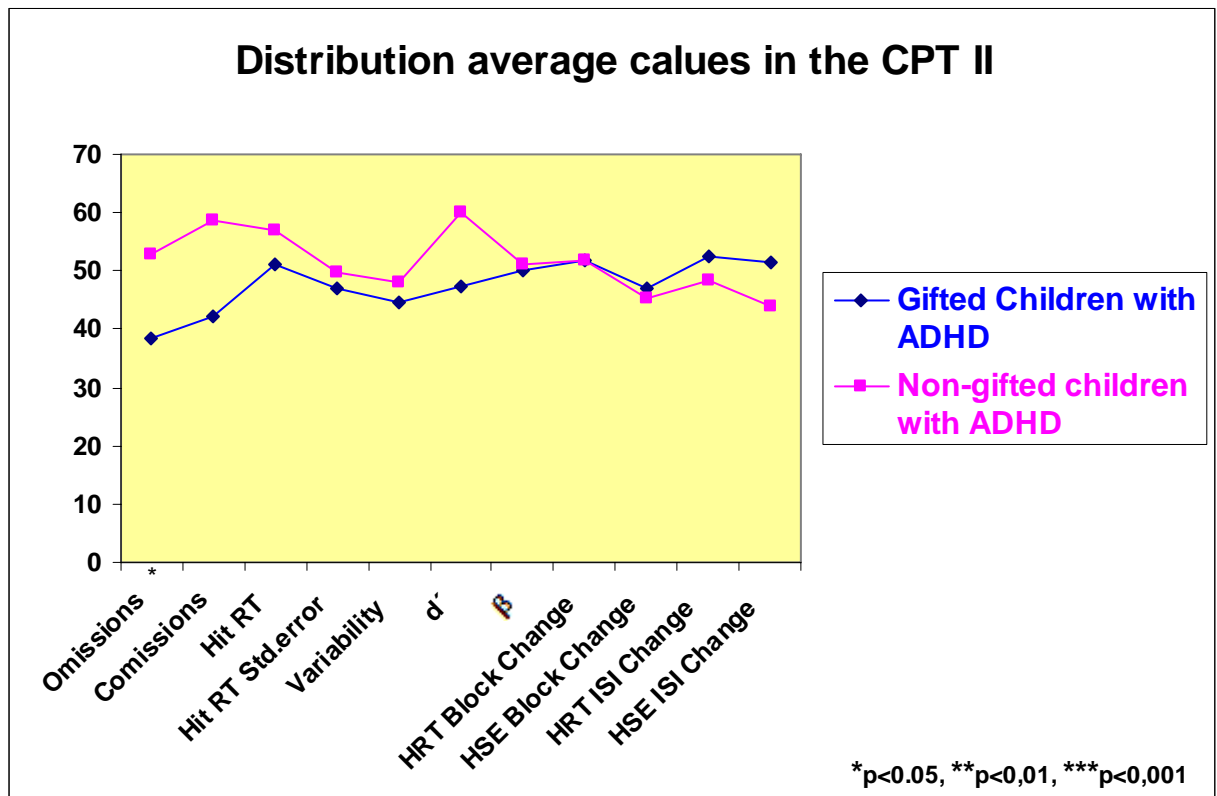
*p<0.05, **p<0,01, ***p<0,001
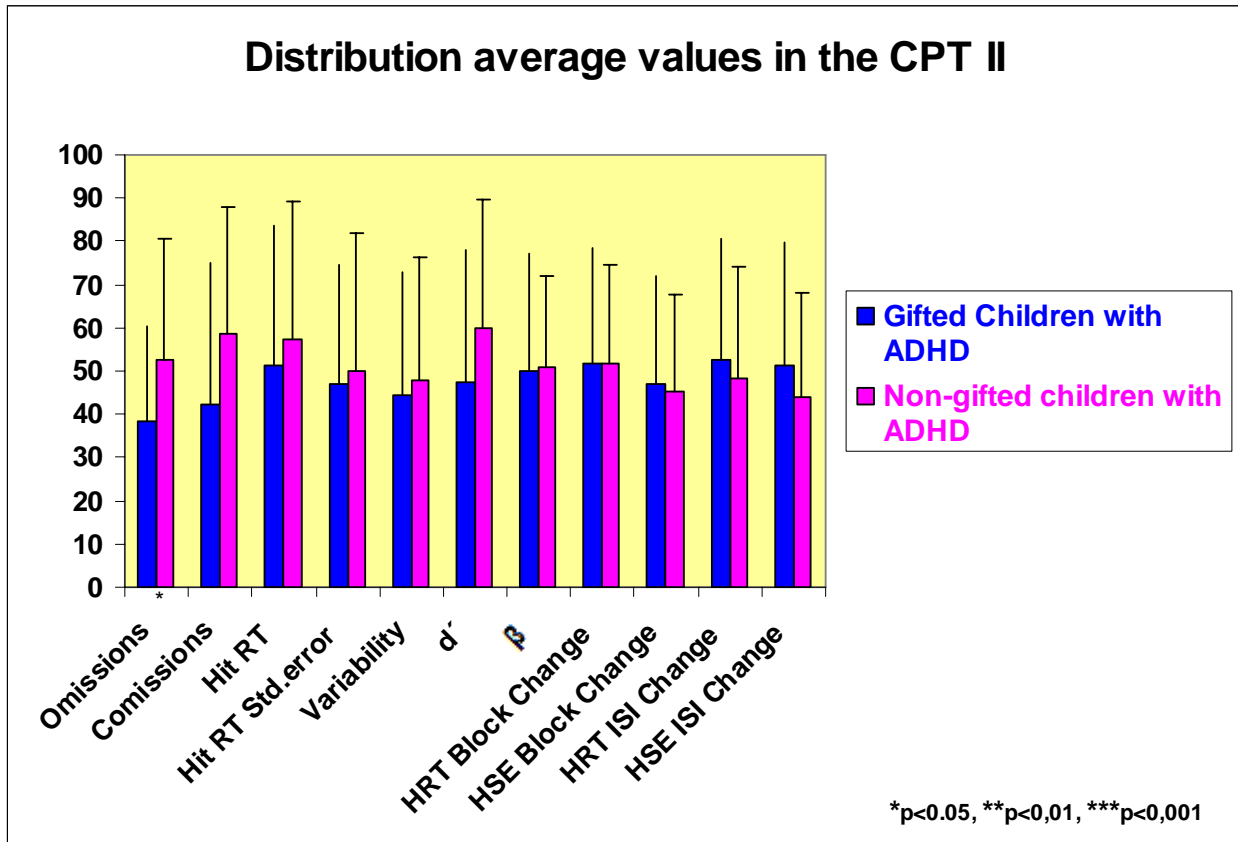
SECOND HYPOTHESIS

Regarding the second hypothesis, results got by gifted children with ADHD will be significantly different from results got by non-gifted children with ADHD in d2 and CPTII tests, we have also differentiated two parts:

PART I:

Results got by gifted children with ADHD will be significantly different from results got by non-gifted children with ADHD in the CPTII test. For proving this hypothesis we selected a sample of 41 gifted children with ADHD and 15 non-gifted children with ADHD. We got the following observations at a statistic level:

Gifted students with ADHD make a smaller number of omission mistakes (this type of mistakes occurs when the student don´t set the required item) versus non-gifted students with ADHD (14% difference).

Figure: Distribution average calues in the CPT II — with series "Gifted Children with ADHD" and "Non-gifted children with ADHD". X-axis categories: Omissions, Comissions, Hit RT, Hit RT Std.error, Variability, d´, β, HRT Block Change, HSE Block Change, HRT ISI Change, HSE ISI Change. Note: *p<0.05, **p<0,01, ***p<0,001*

Distribution average values in the CPT II

Legend: Gifted Children with ADHD; Non-gifted children with ADHD

*p<0.05, **p<0,01, ***p<0,001

Categories: Omissions *, Comissions, Hit RT, Hit RT Std.error, Variability, d´, HRT Block Change, HSE Block Change, HRT ISI Change, HSE ISI Change
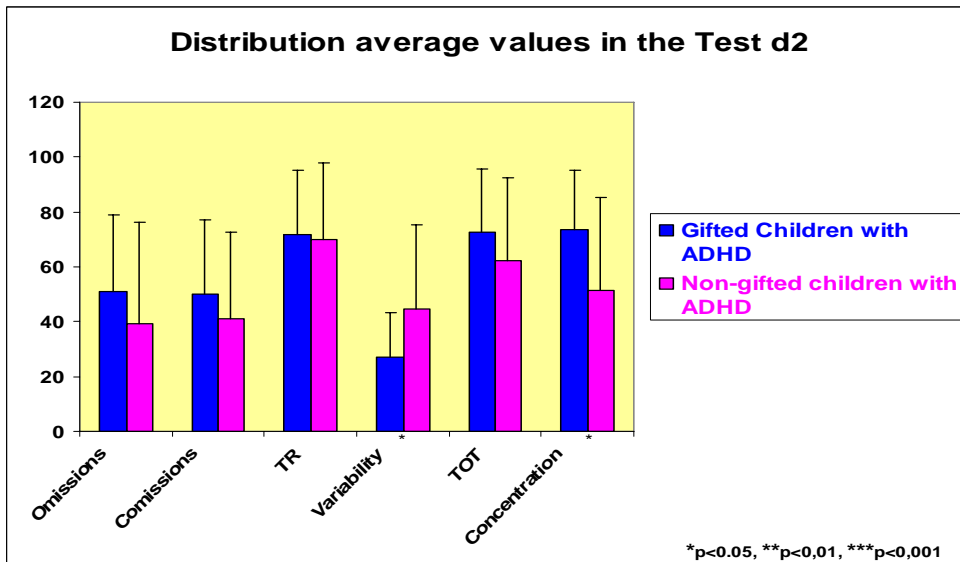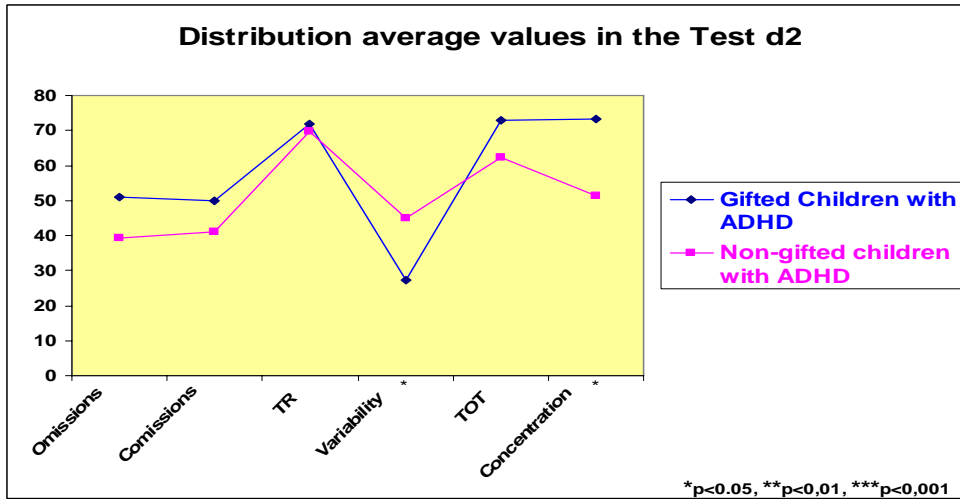
PART II:

Results got by gifted children with ADHD will be significantly different from results got by non-gifted children with ADHD in the D2 test. For proving this hypothesis we selected a sample of 31 gifted children with ADHD and 13 non-gifted children with ADHD. We got the following observations at a statistic level:

Gifted students with ADHD show higher stability and consistency in the work time (17% more) versus non-gifted students with ADHD (VAR, value).

Gifted students with ADHD have a higher balance index between speed and accuracy in performance (22% more) than non-gifted students with ADHD (CON value).

Distribution average values in the Test d2

*p<0.05, **p<0,01, ***p<0,001

Distribution average values in the Test d2

*p<0.05, **p<0,01, ***p<0,001

CONCLUSION

We think this study and its results is significant and with a special relevance, although samples are small, because of the difficulty of finding such gifted students samples (i.e., to find two students with IQ over 130, it is required a representative sample of 438 students).

Regarding the first hypothesis, got results have confirmed it: there are significant statistical differences between the performance of gifted students with ADHD and gifted students

without ADHD in CPTII and D2 tests. So, both tests are strong for diagnosing ADHD in gifted students.

Regarding the second hypothesis, got results also confirm it: there are significant statistical differences between the performance of gifted students with ADHD and non-gifted students with ADHD in CPTII and D2 tests. So, we must to be very careful when we interpret results got by gifted students in attentional tests because we can find results different from results got by non-gifted students with ADHD.

Also, differences observed in attentional tests between gifted students with ADHD and gifted students without ADHD are higher than differences observed in these tests between gifted students with ADHD and non-gifted students with ADHD. These differences confirm the validity of these tests for detecting ADHD.

However, due to the results got by gifted students with ADHD are different from results got by non-gifted students with ADHD, it is necessary to consider the peculiarities of the results got in attentional tests when we make a diagnosis. It is necessary that well-trained and with a wide knowledge of this doble-excepcionality professionals make the valuation of both conditions: giftedness and ADHD. To know how these conditions (to be a gifted student and ADHD) are reciprocally influenced in every student, will be the better way to approach the student´s learning process.

REFERENCES

Benito, Y.; Alonso, J.A.; Guerra, S. & Moro, J. (2007): Diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) in gifted children. Empirical study of the use of Brickenkamp´s d2 Test and of Conners´ Continuous Performance Test II (CPTII V.5) in the diagnosis. Ideacción 26, ISSN 1695-7075. Edited by the Spanish Center of support for gifted children's development. http://www.centrohuertadelrey.com (30/12/10)

Benito, Y.; Moro, J. & Alonso, J.A. (2007): Diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) in gifted children. 2007 WORLD CONFERENCE, August 2007, University of Warwick (U.K.), World Council for gifted and talented children.

Brickenkamp, R.: Aufmerksamkkeits – Belastungs-Test (Test d2).

Conners, K. and MHS Staff: Conners´ Kiddie Continuous Performance Test CPT (K-CPT V.5).

Conners, K. and MHS Staff: Conners' Continuous Performance Test II (CPTII V.5).

Corral y otros (2005): Adaptación española de TEA Ediciones, del WISC-IV, Wechsler Intelligence Scale for Children. Technical and Interpretative Manual (2003). Harcourt Assessment, San Antonio, Texas.

López-Ibor, J.J. (2002): DSM-IV-TR.: Manual diagnóstico y estadístico de los trastornos mentales. Masson, Barcelona (Diagnostic and statistical Manual of Mental Disorders: DSM-IV-TR, 2000).

Losier, B.; McGrath P.T. & Klein, R.M. (1996): Error patterns of the Continous Performance Test in non-medicated and medicated samples of children with and without Attention Deficit Hyperactivity Disorder: a meta-analytic review. J. Child Psychol Psychiatry.

OMS (1992): CIE-10. Trastornos Mentales y del Comportamiento. Criterios diagnósticos de investigación, Décima revisión. Meditor, Madrid.

OMS (1992): CIE-10. Trastornos Mentales y del Comportamiento. Descripciones clínicas y pautas para el diagnóstico, Décima revisión. Meditor, Madrid.

Stanford-Binet Intelligence Scale (Stanford-Binet-Terman-Merrill, Forma L-M).
Terman, L.M. (1916): The measurement of intelligence. Boston: Houghton Mifflin.
Wechsler, D. (1974): Manual for the Wechsler Preschool and Primary Scale of Intelligence. San Antonio, Texas. Edición española: Escala de Inteligencia Wechsler para Preescolar y Primaria, TEA Ediciones, 1976.

Wechsler, D. (1991): Manual for the Wechsler Intelligence Scale for Children-Third Edition WISC-III. San Antonio, Texas. The Psychological Corporation.

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