



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.

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Introduction

- **The incidence of ADHD is from 3 to 7%. 80% are males.**
- **It begins to present itself between 3 and 5 years, at 7 years or at the start of adolescence.**
- **It occurs both in children with normal intelligence and children with mental deficiency, as well as in gifted children.**
- **A multimodal treatment is required. The disorder is included in the Manual of the DSM-IV-TR (American Psychiatric Association, 2000) and in the CIE-10 (World Health Organization, 1992).**

Objective

■ To determine to what extent the d2 Test and CPTII V.5 are valid for the diagnosis of ADHD in gifted children.

■ We consider that the scores which the gifted children with ADHD obtain in these tests are different to those of the “normal” child with ADHD.

■ Thus, it may be the case that gifted children in these tests obtain scores which mask the effectiveness of the said tests for diagnosing ADHD in gifted children.

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- Attention test d2
- Conners' Continuous Performance Test CPTII V.5

2.- Research Hypotheses.

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4.- Results of the hypotheses proposed:

- a) the results of the gifted pupils with ADHD are different to results obtained by gifted pupils without ADHD in the d2 Attention TEST and in the CPTII.
- b) the results of gifted pupils with ADHD are different to the results obtained by non-gifted students with ADHD in the d2 Attention Test and in the CPTII.

1.- Categories of existing tests for diagnosis

- **To diagnose ADHD no instrument is either necessary or sufficient, whatever the data it obtains or however sophisticated it is when we measure a process. But many instruments provide reliable, valid and valuable information, which it is very useful to take into consideration together with the observations of the students themselves and those of other people close to them.**
- **The categories of the existing tests, which are useful for evaluating ADHD, include structured and semi-structured interviews, inventories and psychometric tests of attention and memory, organization and planning, aptitudes, learning deficit and other functions often affected by ADHD.**

1.- Categories of existing tests for diagnosis: Attention Test

- **Aufmerksamkeits – Belastung´s-Test (Test d2).
Author: Rolf Brickenkamp.**
- **Area of application: starting from 8 years of age, adolescents and adults.**
 - **Over the last 35 years the test has undergone 8 revisions which have served to ensure its empirical and clinical applicability.**
 - **It shows a high level of appraisal, both as regards its reliability as well as the validity of its content, criteria and construct.**
 - **The test is used in many specialties of psychology, such as neuropsychological, clinical, pharmacological, applied, industrial and child psychology.**

1.- Categories of existing tests for diagnosis: Attention Test

■ Aufmerksamkeits – Belastung´s-Test (Test d2).

- In Europe it is known as the concentration test or selective attention test and in the United States it bears the name of breadth attention, selective attention or sustained attention test.
- Test d2 is a concise measure of selective attention and mental concentration. Td2 involves a concentration activity with respect to visual stimuli.
- Good concentration requires an adequate motivation and concentration of attention.
- These two aspects, applied to the Td2, are reflected in three components of attention behaviour: Speed or quantity of work, the Quality of the work and the relation between Speed and Accuracy of performance.

1.- Categories of existing tests for diagnosis: Attention Test

- **Conners' Continuous Performance Test (CPTII V.5).**
- **Author: Keith Conners and MHS Staff.**
- **Area of application: starting from 6 years. For children of 4 and 5 years Conners' Kiddie Continuous Performance Test CPT (K-CPT V.5) is used.**
 - **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 tests of children with Attention Deficit Hyperactivity Disorder (ADHD) and children without that disorder (Losier and cols. 1996), in general, it was found that children with Attention Deficit Disorder presented more errors of omission and commission, but they showed few answers in the reply bias (tendency to respond or not to respond).**

1.- Categories of existing tests for diagnosis: Attention Test

Conners' Continuous Performance Test (CPTII V.5).

- Multiple studies have shown a reduction of errors in the CPT when the children are treated principally with methylphenidate. These findings have led to the use of CPT on the part of some clinics to measure response to the treatment.
- In some of the most extreme claims about the CPT it has been asserted that the test is the definitive proof for ADHD.
- It is known that some affected subjects score normally in the CPT (false negatives) and some subjects with ADHD present irregularities in the test (false positives).

1.- Categories of existing tests for diagnosis: Attention Test

■ **Conners' Continuous Performance Test (CPTII V.5).**



3 2.- Research Hypotheses

■ a) To observe whether there are significant differences between gifted students with ADHD and gifted students without ADHD in:

- Test d2, and
- Test CPTII.

■ b) To observe whether there are significant differences between gifted students with ADHD and non-gifted students with ADHD.

- Test d2, and
- Test CPTII.

3.-Research Methodology

- **Ages: between 4 and 20 years.**
- **Individuals from all parts of Spain.**
- **Middle and upper middle class.**
- **Number of students selected.**
 - **First hypothesis:**
 - **n= 47 gifted students with ADHD, and**
 - **n= 17 gifted students without ADHD.**
 - **Second hypothesis,**
 - **n= 41 gifted students with ADHD, and**
 - **n= 15 non-gifted students with ADHD.**

3.- Research Methodology

- In order to consider a pupil as intellectually gifted the psychometric criteria has been maintained of the obtention of an IQ equal to or over 130 on the Wechsler and/or Stanford-Binet Intelligence Scales.
- The system used for diagnosis was the DSM-IV-TR (American Psychiatric Association).
- The CPTII was applied to all the children in the sample and, to those who were 8 or older, the Td2 also.
- Correction of the attention tests (CPTII and Td2) was carried out separately by two people trained for this purpose.
- The data was introduced into the statistical program SPSS and the t test was carried out from Student: comparison of averages of independent groups.

a) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and gifted students without ADHD in the CPTII Test

■ Sample:

- Gifted with no associated disorder, $n = 17$.
- Gifted with ADHD, $n = 41$.

■ Significant statistical results:

■ **Hit RT Standard Error:** gifted pupils without ADHD obtain in the CPTII greater consistency in response speed, i.e., reaction times were less variable (27% more) in terms of consistency than the gifted students with ADHD.

■ **Variability of standard error:** gifted students without ADHD obtain greater consistency in performance and attention (26% more) than gifted students with ADHD.

a) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and gifted pupils without ADHD in the CPTII Test

■ Sample:

- Gifted with no associated disorder, n= 17.
- Gifted with ADHD, n= 41.

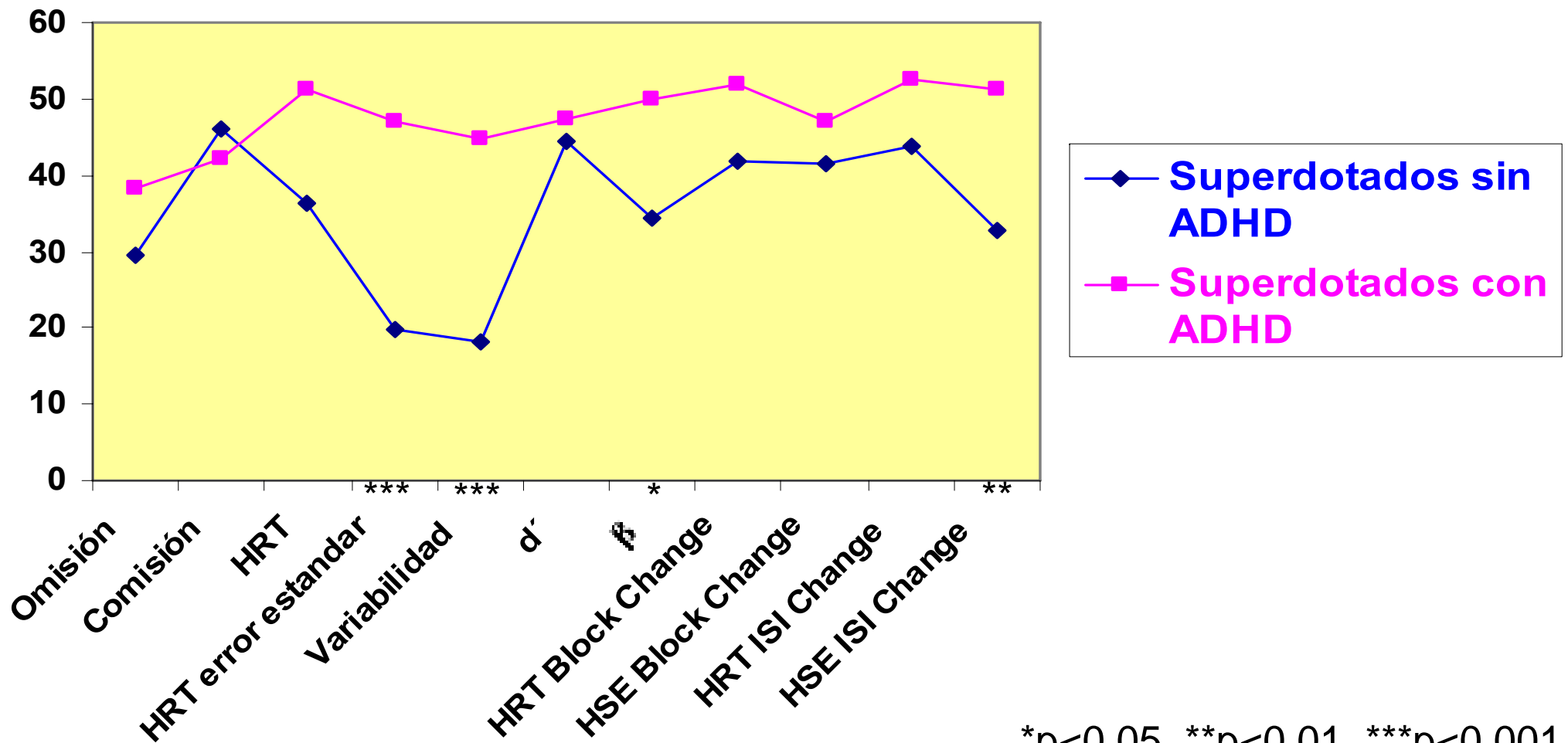
■ Significant statistical results:

- **Response style (β):** gifted students without ADHD show a more liberal response style, which allows them to respond to the majority of the target stimuli (16% more difference with respect to the students with ADHD).
- **Hit SE ISI Change (Standard error per inter-stimulus intervals):** gifted students without ADHD show a greater consistency in the reaction times in the different inter-stimulus intervals (18% more difference with respect to gifted students with ADHD).

a) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and gifted pupils without ADHD in the CPTII Test

Distribución valores medios en el CPT II

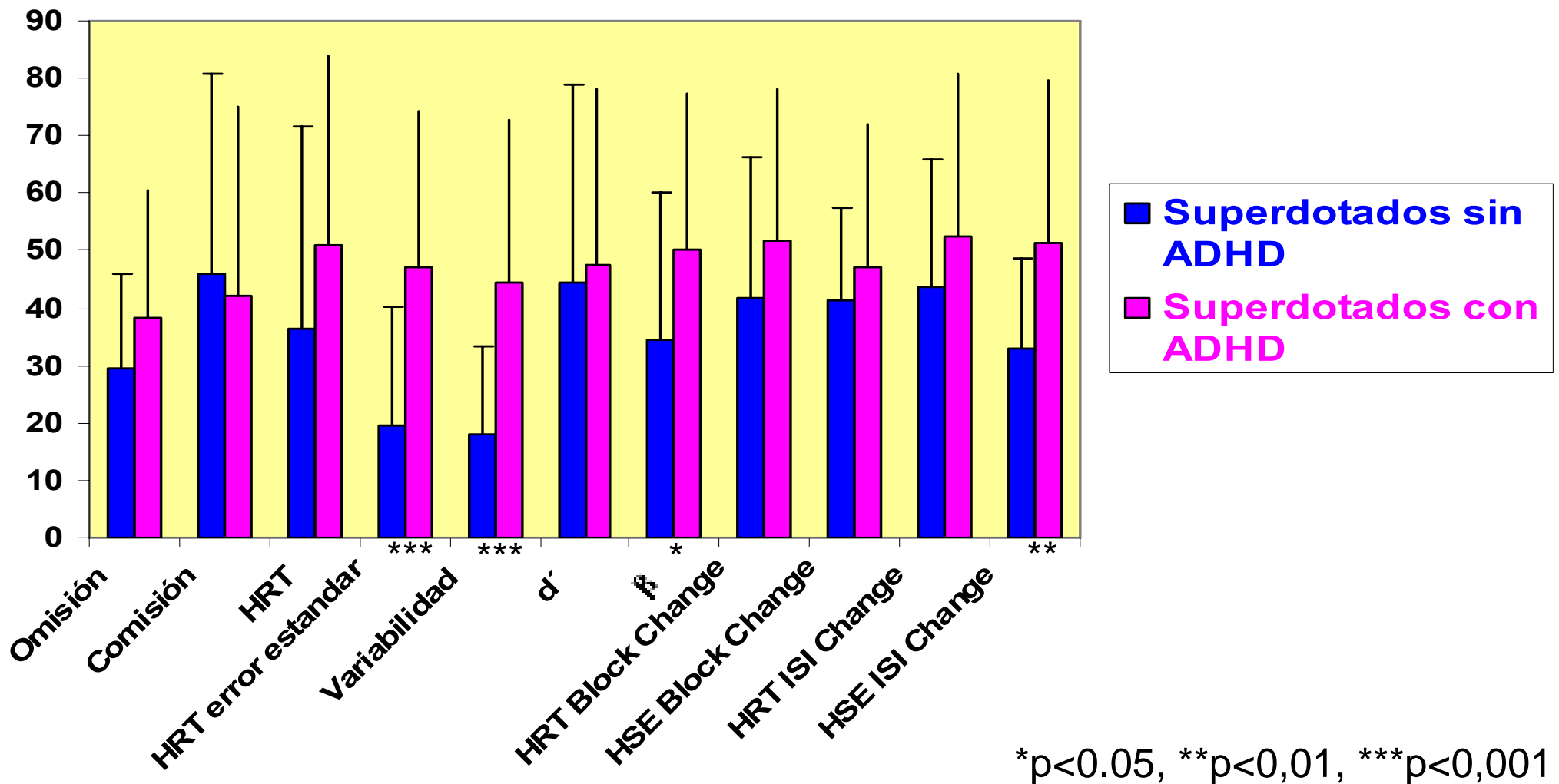


*p<0.05, **p<0,01, ***p<0,001

a) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and gifted pupils without ADHD in the CPTII Test

Distribución valores medios en el CPT II



a) **Research Hypothesis:**

To observe whether there are significant differences between gifted students with ADHD and gifted pupils without ADHD in the Td2 Test

■ **Sample:**

- Gifted with no associated disorder, $n = 12$.
- Gifted with ADHD, $n = 31$.

■ **Significant statistical results:**

- **TR, total of elements processed:** gifted students without ADHD show greater processing speed (23% more difference with respect to gifted students with ADHD).
- **VAR, variability:** gifted students without ADHD show minor stability and consistency in work time (13% less difference with respect to gifted students with ADHD).

a) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and gifted pupils without ADHD in the Td2 Test

■ Sample:

- Gifted with no associated disorder, n= 12.
- Gifted with ADHD, n= 31.

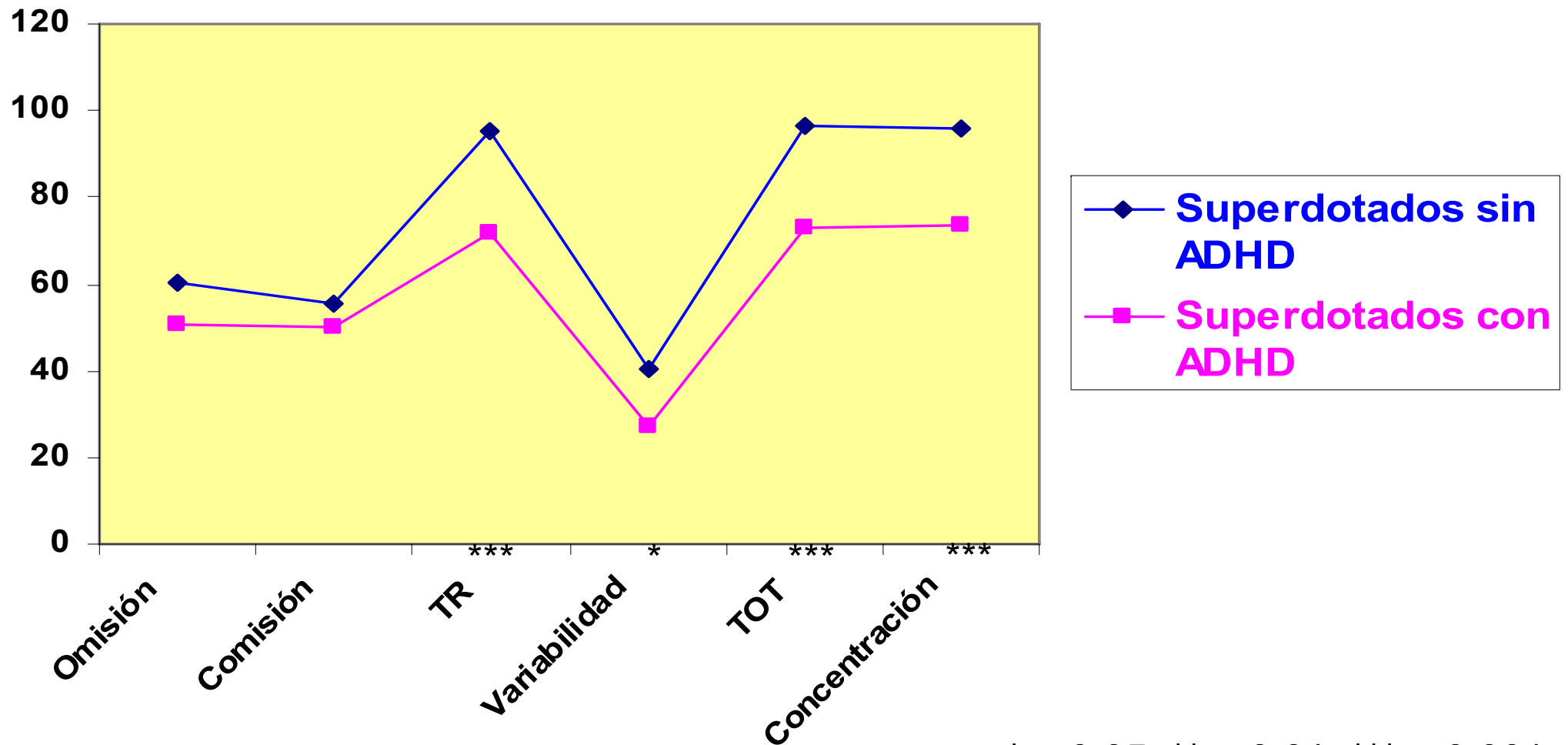
■ Significant statistical results:

- **TOT, total effectiveness of the response:** gifted students without ADHD show greater attention and inhibitory control and a greater relationship between speed and accuracy (23% more difference with respect to gifted students with ADHD).
- **CON, concentration:** gifted students without ADHD show a greater balance between speed and accuracy in the performance (23% more difference with respect to gifted students with ADHD).

a) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and gifted pupils without ADHD in the Td2 Test

Distribución valores medios en el Test d2

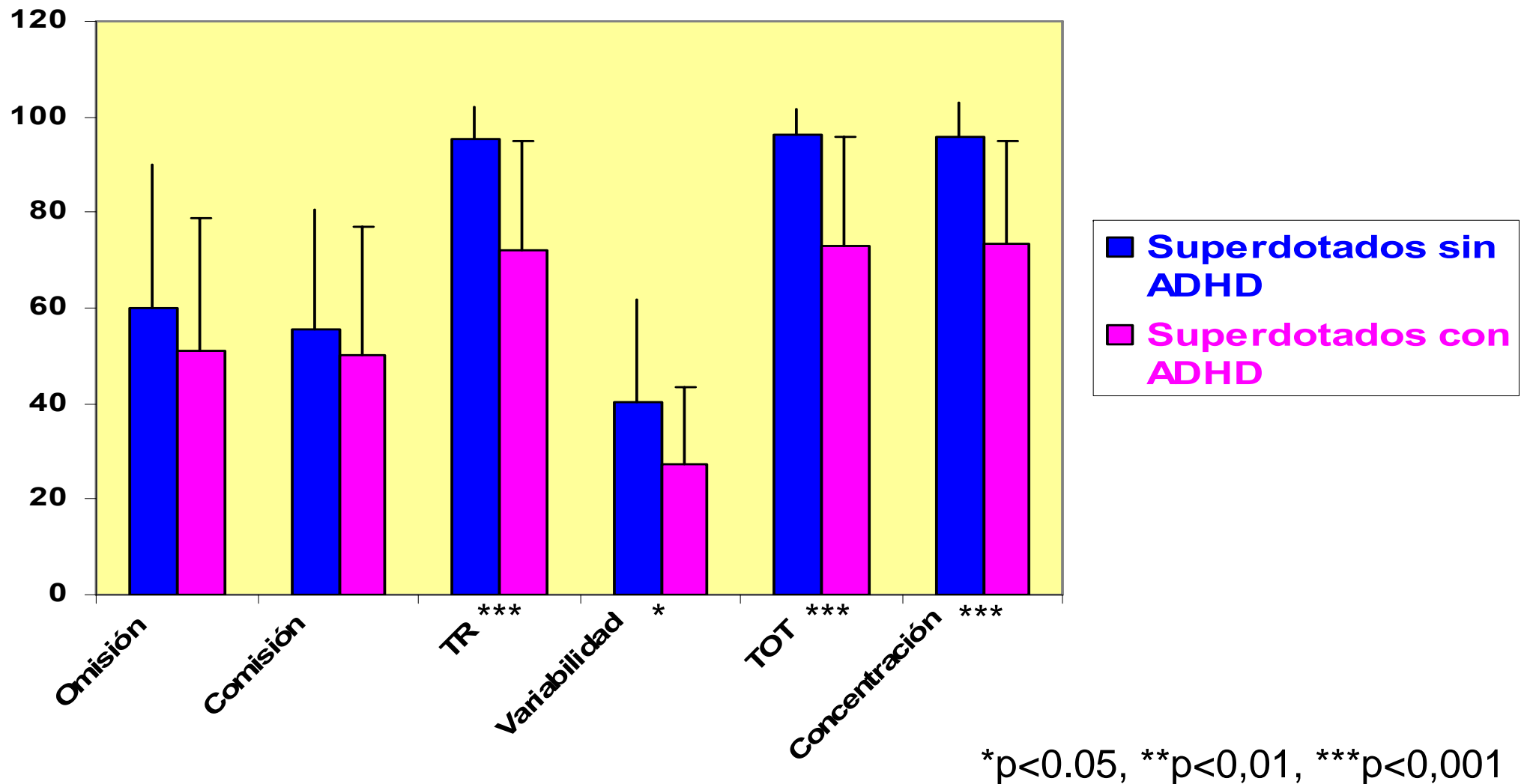


* $p < 0.05$, ** $p < 0,01$, *** $p < 0,001$

a) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and gifted pupils without ADHD in the Td2 Test

Distribución valores medios en el Test d2



b) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and non-gifted pupils with ADHD in the CPTII Test

■ Sample:

- Gifted with ADHD, $n = 41$.
- Non-gifted with ADHD, $n = 15$.

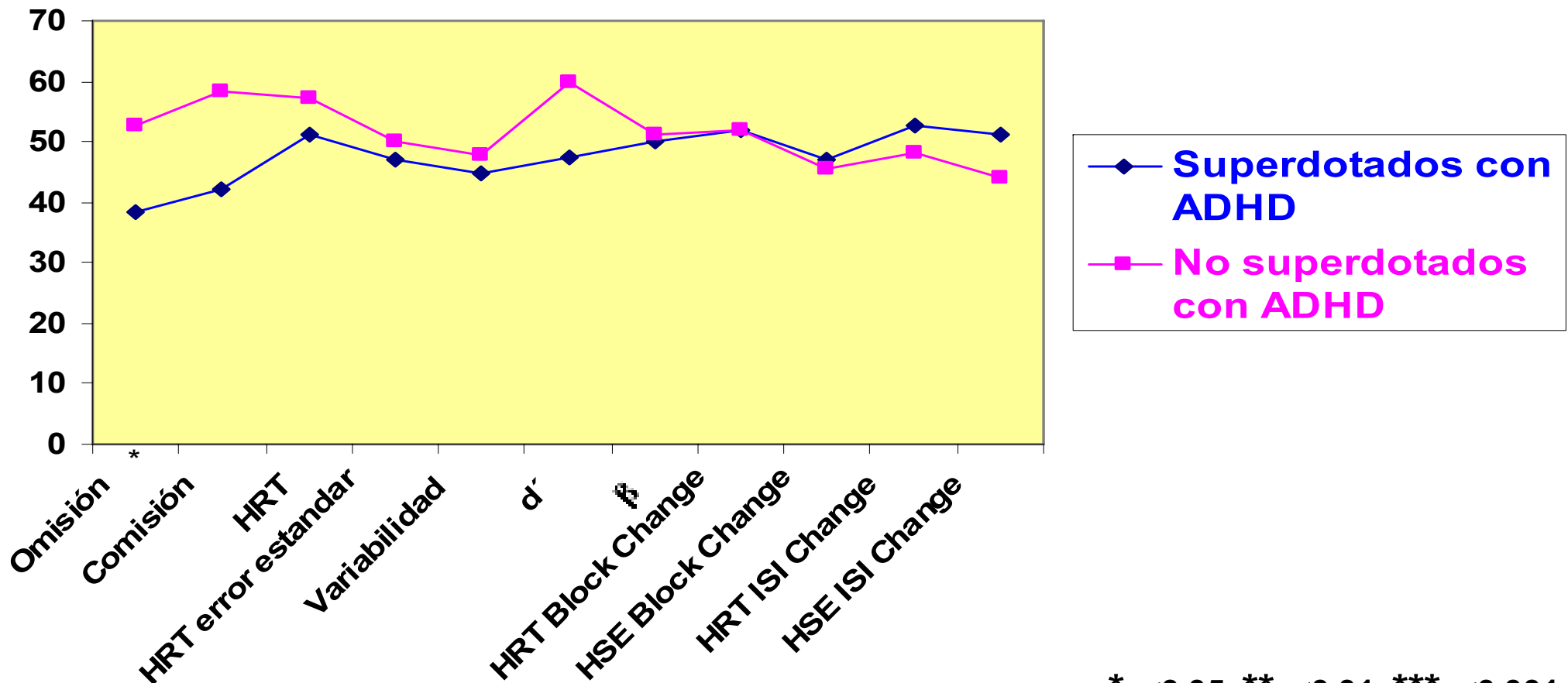
■ Significant statistical results:

■ **Omission:** gifted students with ADHD commit a smaller number of omissions: the number of elements which should have been marked but were not (14% fewer omissions than non-gifted students with ADHD).

b) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and non-gifted pupils with ADHD in the CPTII Test

Distribución valores medios en el CPT II

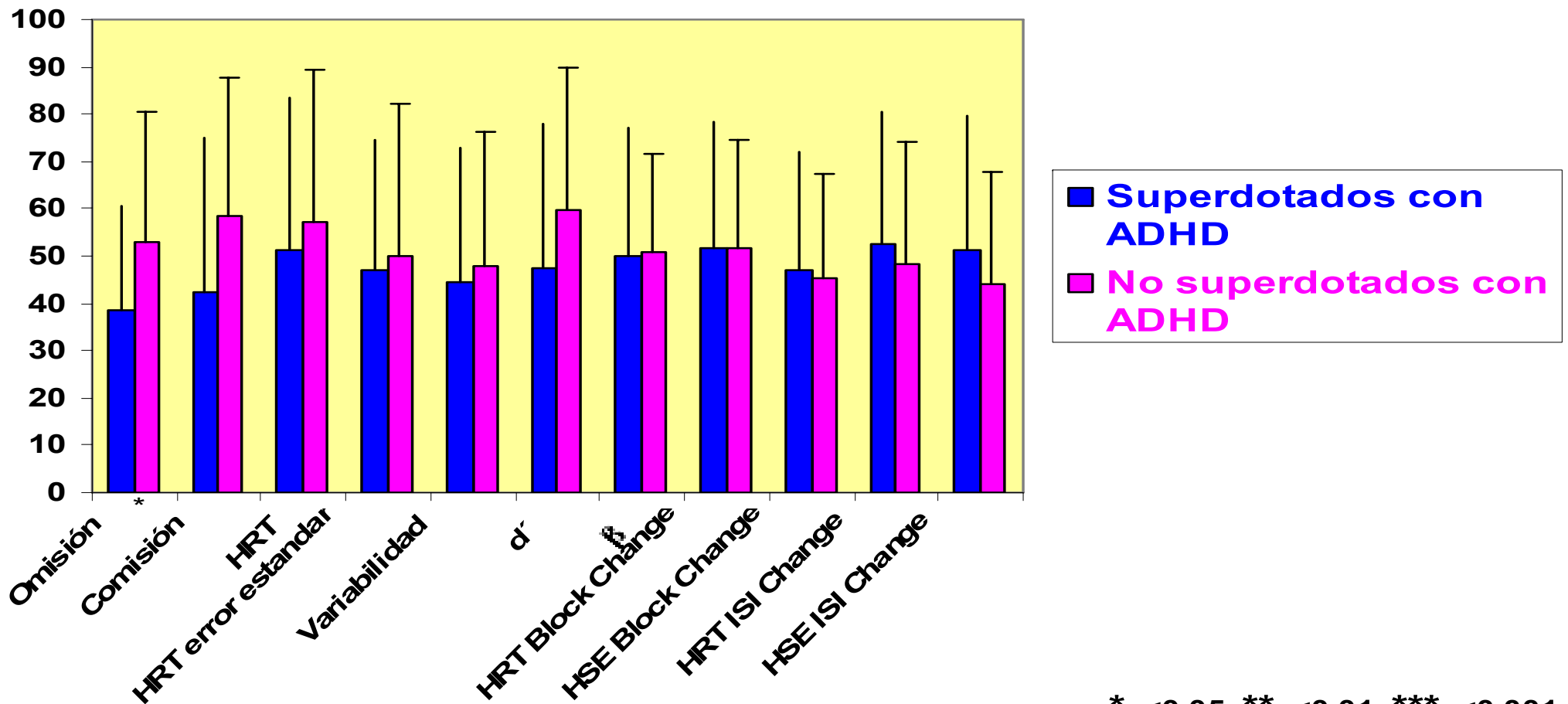


*p<0.05, **p<0,01, ***p<0,001

b) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and non-gifted pupils with ADHD in the CPTII Test

Distribución valores medios en el CPT II



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

b) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and non-gifted pupils with ADHD in the Td2 Test

Sample:

- Gifted with ADHD, $n = 31$.
- Non-gifted with ADHD, $n = 13$.

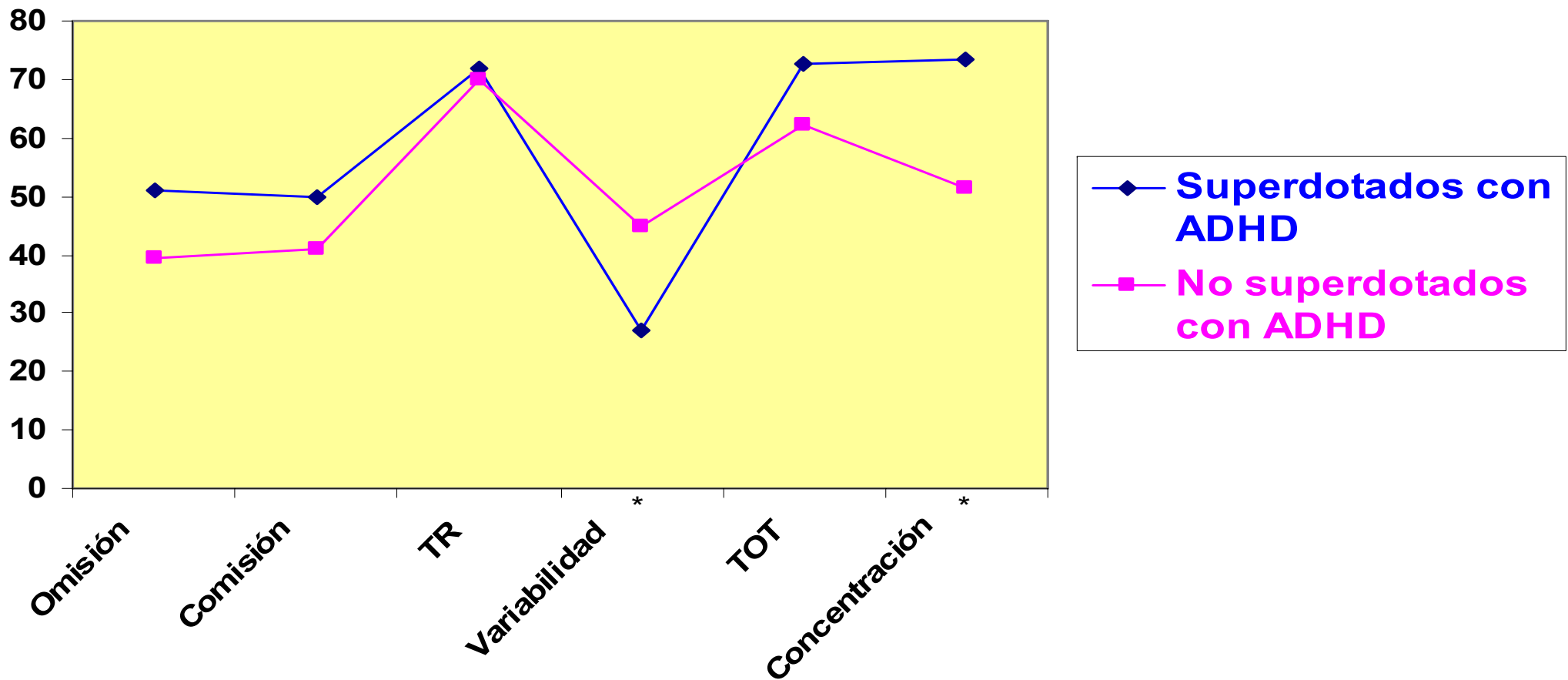
Significant statistical results:

- **VAR, Variability:** gifted students with ADHD show greater stability and consistency in the work time (17% more than non-gifted children with ADHD).
- **CON, Concentration:** gifted students with ADHD have a greater index of balance between speed and accuracy in the performance (22% more than non-gifted students with ADHD).

b) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and non-gifted pupils with ADHD in the Td2 Test

Distribución valores medios en el Test d2

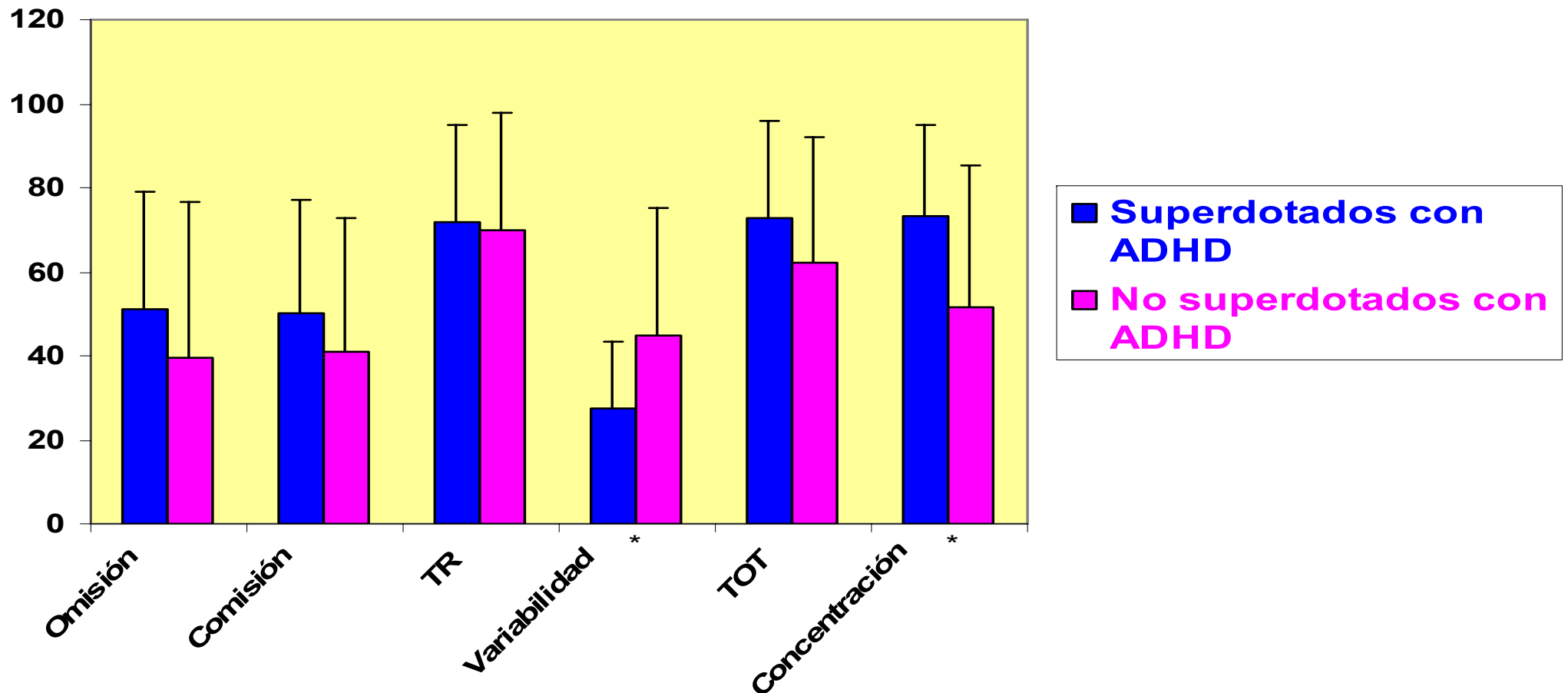


*p<0.05, **p<0,01, ***p<0,001

b) Research Hypothesis:

To observe whether there are significant differences between gifted students with ADHD and non-gifted pupils with ADHD in the Td2 Test

Distribución valores medios en el Test d2



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

Summary

- Although the samples are small, we consider that it is a relevant study given the difficulty of finding such samples. Simply to find 2 children with an IQ of over 130 requires a representative sample of 438.
- On the other hand, if the samples are small and there are significant differences, that makes us think that there really is a high probability that differences exist.
- The significant statistical differences have been observed in two attention tests, Td2 and CPTII, which due to the psychometric characteristics which support them, mean that they are frequently used in the diagnosis of ADHD.
- Significant differences have been observed in the performance of both attention tests between gifted children with ADHD and gifted children without ADHD, which suggests that these tests appear to be useful in the diagnosis of ADHD in gifted children.

Conclusion

- It is advisable to consider the peculiarities of the results of the attention tests in the diagnosis of children.
- To accept that a child can be at the same time gifted and have ADHD and to explore how these conditions interact in each child will be the most productive way of adequately focusing their teaching.
- Thus, the diagnosis of gifted children with ADHD, should be carried out by qualified persons with a wide knowledge of this dual anomaly.

**Thank you
very much**

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