

## Differences between ADHD and normal children on two attention tasks: CPT-II and CSAT. Preliminary data.

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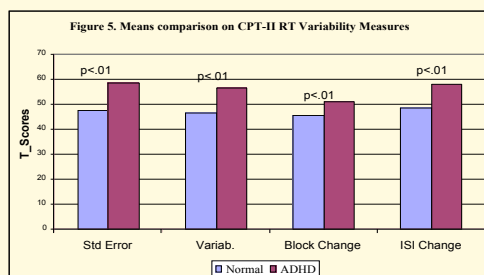
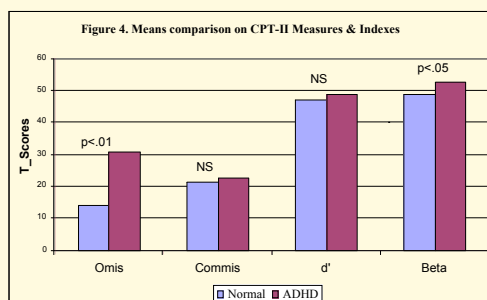
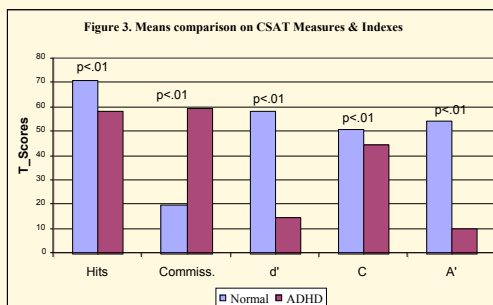
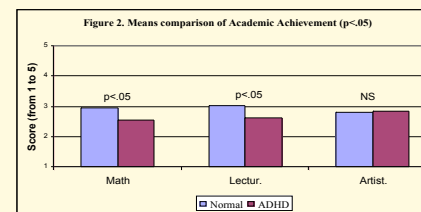
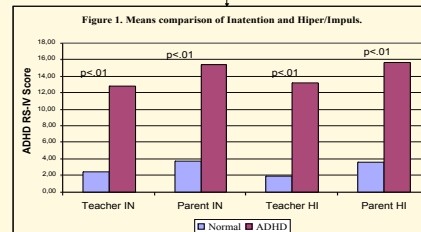
### OBJECTIVES:

This study attempts to examine differences between an ADHD group and a control group on two related but different attention tasks: Conners' CPT-II (Continuous Performance Test) and CSAT (Children Sustained Attention Task). The CPT-II is a sustained attention task based on continuous performance, and the CSAT is a sustained attention task based on a vigilance paradigm

### METHODS:

The ADHD sample was recruited from Son Llatzer Hospital's ADHD Unit. This sample was composed of 74 children, 69% boys (M= 8.77, DE= 1.36). The matched control sample was selected from normal schools. It was ruled out the presence of ADHD symptoms with the parent and teacher ADHD Rating Scale-IV (ADHD RS-IV). This sample was composed of 107 children, 66% boys (M=8.34, DE= 1.06). Each subject was assessed with the CPT-II and CSAT tasks, and T-Tests for both raw or T scores (omissions, commissions, etc.) and indexes scores (d', C, beta, A, etc.) was performed. There were not differences neither age nor sex variables. We used the ADHD RS-IV and a measure of academic achievement to confirm the behavioral and scholar differences between both samples (see figures 1 and 2).

CSAT VS. CPT-II PARAMETERS		
PARAMETERS	CSAT	CPT-II
Stimulus	Numbers from 0 to 9	Letters (A, B, C...)
Target	6-3 (30% aprox)	X (10% aprox)
Response	Press spacebar when target (3 after 6) is on screen	Press spacebar when any letter except "X" appeared on the screen
Inter-Stimulus Interval (ISI)	One block, and one ISI: 250 mlsc.	18 blocks of 20 trials, and 3 ISI: 1, 2, and 4 sc.
Time	7 min. and 30 sec. (aprox.)	15 min. aprox.
Ages	From 6 to 11 years	From 6 to... (undefined)
Neuropsychological paradigm	Sustained Attention by vigilance	Sustained Attention / Motor inhibition by continuous performance.
Direct Measures	Hits (omissions), commissions, Hits Reaction Time (RT)	Omissions (hits), commissions, Hits Reaction Time (RT)
Combined Indexes (Signal Detection Theory)	Attention capacity: d' and A'. Response Style: C	Attention capacity: d'. Response Style: Beta
Variability Measures	No	Hit RT std. error, variability, hit RT block change, and hit RT ISI change



### CONCLUSIONS-1:

**CSAT MEASURES (Figure 3):** The ADHD group showed a significant poor performance in Hits and Commissions (there were not differences in RT). So, we also found significant differences in d' and A' (attention capacity): ADHD group showed a decreased attention. The response style of ADHD group were more disinhibited than Normal group.

### CONCLUSIONS-2:

**CPT-II MEASURES (Figure 4):** There were significant differences between ADHD and Normal groups in Omissions, but not in Commissions. On the contrary of CSAT, the Hit RT showed statistical differences: ADHD children were more slow (mean= 528 mlsc) than Normal Children (mean = 471 mlsc) (p<.01). We don't found differences in attention capacity (d'), but the ADHD group Response Style were slightly more disinhibited than Normal group

### CONCLUSIONS-3:

**CPT-II VARIABILITY (Figure 5):** We found significant differences between all the variability measures. Standard Error is a measure of response speed consistency, the Variability of Standard Error is a measure of "within respondent" variability. Hit RT Block Change measures change in reaction time across the duration of the test. Hit RT ISI Change examines change in the standard error of reaction times at the different ISI Intervals. In all cases: the higher the variability, the greater the inconsistency in the response speed. As we can see, the inconsistency is clearly associated to ADHD group.

### FINAL CONCLUSIONS:

It is possible to differentiate attention performance from CPT-II and CSAT tasks between ADHD and normal children, but not in the same way. In the CSAT we can observe "attention capacity" differences. While in the CPT-II we can observe mainly more variability in RT measures. Both results could be consistent with theoretical models, and so we can consider CPT-II and CSAT as complementary attention measures in the ADHD assessment: CSAT, as a vigilance task, could be used as a "performance measure", and CPT-II, as an inhibition task, could be used as "variability response measure".

### REFERENCES AND CONTACT

- Conners, C. K., & MHS Staff (2000). *Conners' CPT-II: Continuous performance test-II*. Toronto, ON: Multi-Health System (MHS).
  - Servera, M. & Llabrés, J. (2004). CSAT (Children Sustained Attention Task). Madrid: TEA ediciones (Spanish: <http://www.teaediciones.com/teasp/buscador.asp?idGama=225>)
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