ATTENTION AND INHIBITORY CONTROL IN NEURODEVELOPMENTAL DISORDERS: A NEW ASSESSMENT APPROACH THROUGH NESPLORA AULA.

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1. INTRODUCTION.

- **Attention** and **inhibitory control** are high-order processes frequently and severely affected in most childhood and adolescent-onset disorders (Craig et al., 2016; Diamond, 2013; Robbins et al., 2012).
- **Virtual reality (VR)** has become a successful tool to study both processes in Attention Deficit Hyperactivity Disorder (**ADHD**), but there are few similar studies with other neurodevelopmental disorders such as Autistic Spectrum Disorders (**ASDs**) (Díaz-Orueta et al., 2014; Iriarte et al., 2016).
- VR reproduces **natural and dinamic environments** that allow to measure processes that previously couldn't be evaluated, such as motor activity; and facilitate the initial predisposal of children and adolescents to the evaluation (Díaz-Orueta et al., 2014; Iriarte et al., 2016).

OBJECTIVE

- **Differentiate attentional and inhibitory control profiles in ADHD and ASDs using a virtual reality neuropsychological test.**

2. METHOD.

- **18 unmedicated male** children matched by age (7-10 years), diagnosed with ADHD-inattentive subtype (ADD) and ASDs (High-Functioning).

Groups	ADD	ASDs
N	10	8
Age	8.50 ± 0.97	8.63 ± 1.41
IQ	97.50 ± 9.94	108.75 ± 9.88

- **AULA test**: a Continuous Performance Test with visual and auditory stimuli, two different tasks and distracting conditions

XNo task
High response rate

"Apple"
DON'T press!

X task
Low response rate

"Seven"
Press!

3. RESULTS.

TOTAL SCORES

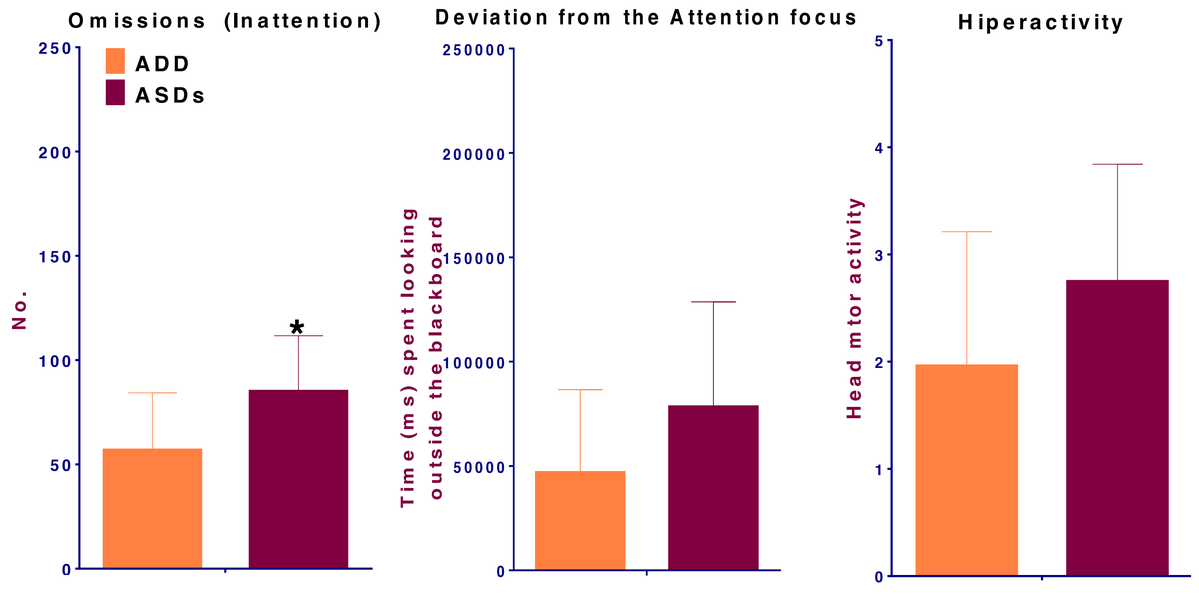

Figure 1. Three of the general indexes measured in AULA. ASDs group committed a significantly greater number of omissions errors than ADD group (t (−2.2) = 16; p = 0.042).

SCORES BY THE TYPE OF TASK

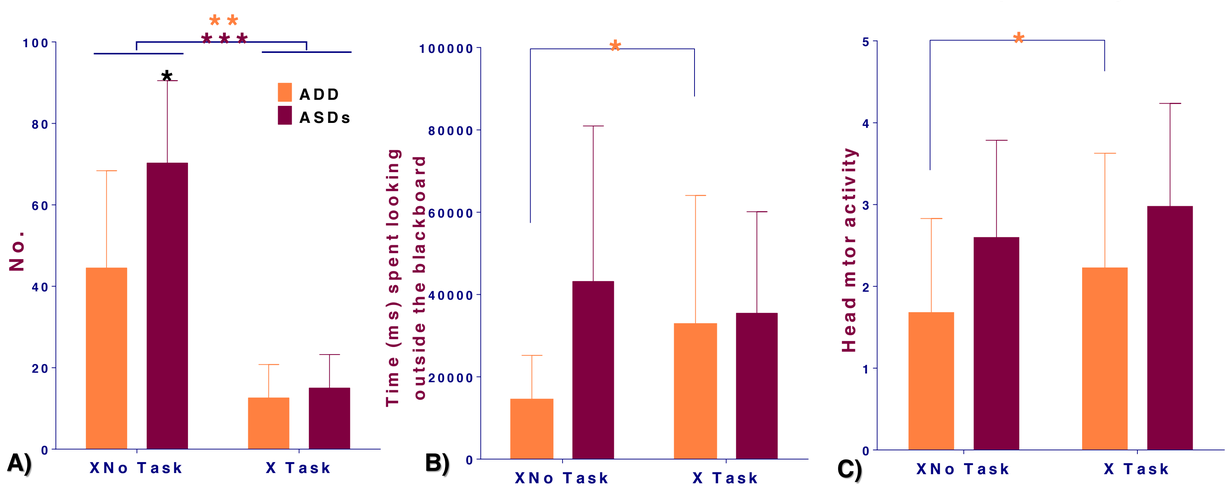

Figure 2. **A)** In XNo task, ASDs group committed a significantly higher level of omissions than ADD group (t (−2.4) = 16; p = 0.027). Besides, in comparison with X task, both groups had a significantly worse performance in this variable in XNo task (t (−4.38) = 9; p = 0.002; t (−9.78) = 7; p = 0.000). **B) C)** In comparison with XNo task, ADD showed a significantly higher level of motor activity and deviation of the attention focus in X task (t (−2.43) = 9; p = 0.038; t (−2.29) = 9; p = 0.048).

4. CONCLUSIONS.

- ADD and ASDs groups share attention deficit (Figure 1).
- Although attentional and inhibition difficulties are not core symptoms in ASDs, this group shows serious problems of inattention and distractibility, in the first case even **at a higher level than ADD** (Figure 1). An example of how **a high IQ doesn't have to be related to a better executive functioning** (Diamond, 2013).
- Inattention is considerably accentuated in tasks that demand a high-response rate (hyperactivation state) in both groups (Figure 2 A).
- Despite of ADD and ASDs groups seem to show a similar pattern, **its attentional profile is different depending on the type of task** (Figure 2):
  - **The difficulties of ASDs group remain uniform** regardless of the response paradigm.
  - While **ADD performance is differentially affected by the response paradigm.** In X task (low-rate response) this group manifests less selective attention problems but a higher level of motor activity (inverse relationship). According to previous self-regulation theories, **motor activity does not have to interfere with performance**, it could act as a mechanism of **self-regulation** to adjust to the demands of the environment (Barkley, 1997).
- **AULA is a useful test to study and compare attention and inhibitory control** in neurodevelopmental disorders such as ADD, but also ASDs.

5. FUTURE RESEARCH.

- Continue this study with **a larger and more representative sample.**
- **Incorporate new diagnostic groups** to get a better understanding of their clinical presentation and comorbidity, and facilitate differential diagnosis.
- Complement the evaluation of attention and inhibition with other neurocognitive tasks which measure other executive functions.

6. REFERENCES.

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