Activation of the default mode network during focus-requiring tasks is related to elevated reaction time variability in children with ADHD *by Parsa Nilchian | Aaron Mattfeld*

Attention-deficit/hyperactivity disorder (ADHD) is the most common mental condition in U.S. children and affects more than 6.1 million individuals between the ages of 2-17 years. Recent studies have identified elevated reaction time variability (RTV) as a reliable feature of ADHD, yet it is under debate whether increased RTV is related to lapses of attention, and the neural mechanisms behind high RTV are not well understood. The default mode network (DMN) is a functional brain system responsible for internally-directed mental processes, and it is most active when not engaged in cognitively demanding tasks. **Activation of the DMN during active states could pose as an internal distraction and disrupt top-down executive control. We predicted that DMN activation during externally directed tasks would lead to an increase in RTV**. **Further, we anticipated DMN activation to precede abnormally slow responses.** We used blood-oxygen level dependent (BOLD) magnetic resonance imaging (MRI) while participants with and without ADHD performed a standard sustained attention to response (SART) task. We then examined the activation of the DMN during episodes of aberrant RTV to ascertain the nature of the aforementioned association. The neurobiological mechanisms that cause attention-deficit must be better understood to detect inattention reliably. Our project hopes to innovative by providing a path toward using RTV as a metric to identify inattention. This study aims to be the first to date to provide a comprehensive hypothesis to explain the neural underpinnings behind increased RTV in ADHD. The current system to diagnose ADHD in children may be ineffective because it is based on potentially subjective behavioral observations by parents and teachers. Identifying increased RTV as a behavioral marker of ADHD may enable a more effective method of diagnosing ADHD in children, resulting in more successful treatment outcomes and decreased costs of care for families of children with the disorder.