



Attention Deficit Hyperactivity Disorder in Children



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Thesis Statement

Attention Deficit Hyperactivity Disorder (ADHD) is a common mental health condition that is not truly understood. Both diagnosed and undiagnosed children face many hurdles, especially in school. How is ADHD related to cognition?

What is ADHD?

ADHD is a disorder that influences the attention span and concentration of individuals of all ages. This disorder normally shows itself in the childhood years and continues to amplify as time continues (Fabiano, 2021).

Symptoms

- Impairment of working memory, responsive functions, organization and overall intelligence levels (Huang, 2016)

Causes

- Not only does one's brain function influence ADHD, but there are also ties to one's environment (Diamond, 2005)
- Some environmental factors include deprivation, brain injury, psychosocial adversity, and stroke (Castellanos, 2002)
- When looking at genetic factors, it comes down to the genotypes and how well those genotypes interact with the environment (Castellanos, 2002)

The ADHD Brain

Caudate Nucleus

- Controlling coordination, memory and learning (Schlak, 2019)
- People with ADHD have asymmetry or abnormalities in the Caudate (Castellanos, 2002) leading to hyperactivity, along with learning deficits (Schlak, 2019)

Prefrontal Cortex

- Responsible for response inhibition, motor control and reaction time (Castellanos, 2002)
- The time in-between the signals of response is what determines one overall reaction ability, and those with ADHD have been recorded to have longer time increments in-between signals which leads to delay of reaction (Castellanos, 2002)

Children's ADHD Brain

- Children have a noticeable decrease in posterior-inferior lobule of the cerebellar vermis, which influences perception (Castellanos, 2002)
- Cortical thinning and reduced surface area show up more in children (Zhang-James, 2020)

ADHD and Education

Students with ADHD...

- Have a hard time concentrating and keeping information (Jangmo, 2021)
- Require more specific attention than other students (Jangmo, 2021)
- Struggle with productivity, and lower scoring on tests (Jangmo, 2021)
- Have poor relationships with teachers (Jangmo, 2021)

References

- Castellanos, F. X., & Tannock, R. (2002). Neuroscience of attention-deficit/hyperactivity disorder: The search for endophenotypes. *Nature Reviews Neuroscience*, 3(8), 617-628. <http://dx.doi.org/10.1038/nrn896>
- Diamond, A. (2005). Attention-deficit disorder (attention-deficit/hyperactivity disorder without hyperactivity): A neurobiologically and behaviorally distinct disorder from attention-deficit/hyperactivity disorder (with hyperactivity). *Development and Psychopathology*, 17(3), 807-825. <http://dx.doi.org/10.1017/s0954579405050388>
- Fabiano, G. (2021, Oct 25). What causes ADHD and can it be cured? *The Conversation U.S.* [https://www.proquest.com/newspapers/what-causes-adhd-can-be-cured/docview/2585599590/se-2Top of the Document](https://www.proquest.com/newspapers/what-causes-adhd-can-be-cured/docview/2585599590/se-2Top%20of%20the%20Document)
- Huang, F., Sun, L., Qian, Y., Liu, L., Ma, Q., Yang, L., Cheng, J., Cao, Q., Su, Y., Gao, Q., Wu, Z., Li, Qian, Q., & Wang, Y. (2016). Cognitive function of children and adolescents with attention deficit hyperactivity disorder and learning difficulties: A developmental perspective. *Chinese Medical Journal*, 129(16), <http://dx.doi.org/10.4103/0366-6999.187861>
- Jangmo, A. (2021). *Attention-deficit/hyperactivity disorder and educational outcomes: 10 Etiology, treatment effects, and occupational outcomes* (Order No. 28800773). [Doctoral dissertation, Karolinska Institutet (Sweden)]. ProQuest Dissertations & Theses A&I. (2586560639).
- Schlak, J. (2019). *The caudate nucleus and executive functioning in children with attention deficit hyperactivity disorder and/or reading disorder* (Order No. 13898612). [Doctoral dissertation, Southern Illinois University at Carbondale]. ProQuest Dissertations & Theses A&I. (2305564869).
- Zhang-James, Y., Helminen, E., Liu, J., The Enigma-ADHD Working Group, Franke, B., Hoogman, M., & Faraone, S. V. (2020). *Evidence for similar structural brain anomalies in youth and adult attention-deficit/hyperactivity disorder: A machine learning analysis*. Cold Spring Harbor Laboratory Press. <http://dx.doi.org/10.1101/546671>