

1 ADHD AND ITS TREATMENT

QUESTION ONE

Peter, a 35-year-old stockbroker, has been advised by his supervisor to come and see you, the company mental health consultant. His supervisor is complaining that he often comes to appointments late, is inappropriately fidgety, interrupts people during meetings, has been offensive toward coworkers, and has been known to party excessively on weeknights. Peter asserts that he is just fine; he has a lot of projects on his mind and is simply standing up for himself when speaking with others. He likes to go out in the evenings to unwind. Recognizing probable attention deficit hyperactivity disorder (ADHD), you interview both the patient and his work buddy, who is a longtime friend. How would you start your questions?

- A. Compared to his parents, how often does the patient ...
- B. Compared to other people his age, how often does the patient ...
- C. Compared to his childhood, how often does the patient ...
- D. Compared to his children, how often does the patient ...

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Answer to Question One

The correct answer is B.

Choice	Peer answers
Compared to his parents, how often does the patient ...	1%
Compared to other people his age, how often does the patient ...	82%
Compared to his childhood, how often does the patient ...	17%
Compared to his children, how often does the patient ...	0%

The symptoms of ADHD can **present differently** in patients at **different ages**. While **hyperactivity** is a main symptom in children for example, this will frequently translate into **internal restlessness** in adults.

- A and D – Incorrect. While ADHD has a strong genetic component, it is not advised to ask him first to compare himself to either his children or his parents. An accurate family history would be beneficial, however.
- B – Correct. When trying to diagnose this adult patient with ADHD, it is preferable to **first** ask him to **compare his behavior** to that of **other adults his age**, as this will give a better idea of the severity of his symptoms at this time.
- C – Incorrect. While it is important to obtain a medical history, the patient might not have the best recollection and might not be the best judge of his behaviors as a child.

Reference

Stahl SM. *Stahl's essential psychopharmacology*, fifth edition. New York, NY: Cambridge University Press; 2021. (Chapter 11)

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QUESTION TWO

According to DSM-5 criteria, what is the maximum age threshold for symptom onset when making a diagnosis of ADHD?

- A. 5
- B. 7
- C. 12
- D. 15

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Answer to Question Two

The correct answer is C.

Choice	Peer answers
5	4%
7	10%
12	79%
15	7%

C – Correct. In the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*, the maximum age threshold for symptom onset for diagnosing ADHD changed from 7 to 12. Other revisions included the fact that, although symptoms must have been present prior to age 12, there does not have to have been impairment prior to age 12 when diagnosing someone who is older. The symptom count threshold also changed for adults (defined as age 17 and older), with five (instead of six) symptoms required in the inattention and/or hyperactive/impulsive categories.

A, B, and D – Incorrect.

Reference

American Psychiatric Association. *Diagnostic and statistical manual of mental disorder*, fifth edition. Arlington, VA: American Psychiatric Publishing; 2013.

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QUESTION THREE

A 15-year-old with inattentive-type ADHD has a hard time staying focused on the task at hand, has trouble organizing her work, and relies heavily on her mother to follow through with her homework. Problem solving is one of the hardest tasks for her. Her difficulty with sustained attention could be related to aberrant activation in the:

- A. Dorsolateral prefrontal cortex
- B. Prefrontal motor cortex
- C. Orbital frontal cortex
- D. Supplementary motor cortex

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Answer to Question Three

The correct answer is A.

Choice	Peer answers
Dorsolateral prefrontal cortex	68%
Prefrontal motor cortex	24%
Orbital frontal cortex	7%
Supplementary motor cortex	1%

- A – Correct. **Sustained attention** is hypothetically modulated by the cortico-striatal-thalamic-cortical loop involving the **dorsolateral prefrontal cortex** (DLPFC). Inefficient activation of the DLPFC can lead to problems following through or finishing tasks, disorganization, and trouble sustaining mental effort; the patient exhibits all these symptoms. The dorsal **anterior cingulate cortex** is important in regulating **selective attention**, and is associated with behaviors such as losing things, being distracted, and making careless mistakes. This area is certainly also inefficient in this patient.
- B – Incorrect. The **prefrontal motor cortex** hypothetically modulates behaviors such as fidgeting, leaving one's seat, running/climbing, having trouble being quiet.
- C – Incorrect. The **orbital frontal cortex** regulates impulsivity, which includes symptoms such as talking excessively, blurting things out, and interrupting others.
- D – Incorrect. Finally, the **supplementary motor area** is implicated in planning motor actions; thus, this brain area would be more involved in hyperactive symptoms.

References

Arnsten AF. Fundamentals of attention-deficit/hyperactivity disorder: circuits and pathways. *J Clin Psychiatry* 2006;67(Suppl 8):7–12.

Stahl SM. *Stahl's essential psychopharmacology*, fifth edition. New York, NY: Cambridge University Press; 2021. (Chapter 11)

Stahl SM, Mignon L. *Stahl's illustrated attention deficit hyperactivity disorder*. New York, NY: Cambridge University Press; 2009. (Chapter 1)

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QUESTION FOUR

Which of the following is true regarding cortical brain development in children with ADHD compared to healthy controls?

- A. The pattern (i.e., order) of cortical maturation is different
- B. The timing of cortical maturation is different
- C. The pattern and timing of cortical maturation are different
- D. Neither the pattern nor the timing of cortical maturation is different

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Answer to Question Four

The correct answer is B.

Choice	Peer answers
The pattern (i.e., order) of cortical maturation is different	8%
The timing of cortical maturation is different	34%
The pattern and timing of cortical maturation are different	52%
Neither the pattern nor the timing of cortical maturation is different	6%

ADHD is a neurodevelopmental disorder characterized by inattentive, hyperactive, and/or impulsive symptoms. Neuroimaging has been used to evaluate cortical maturation in children with ADHD compared to typically developing controls, specifically by comparing the age of attaining peak cortical thickness in children with and without ADHD.

- A – Incorrect. Research shows that the pattern of cortical maturation is similar for children with and without ADHD. Specifically, the primary sensory and motor areas attain peak cortical thickness earlier in development than do high-order association areas such as the dorsolateral prefrontal cortex.
- B – Correct. There are differences in the timing of cortical maturation between children with and without ADHD that are apparent as early as age 7. That is, cortical maturation in children with ADHD seems to lag behind that of healthy children. In fact, the median age by which 50% of the cortical points achieve peak thickness is delayed by 3 years in children with ADHD. Delay is most prominent in the superior and dorsolateral prefrontal regions, which are particularly important for control of attention and planning. Delay is also seen in subcortical structures. A large cross-sectional mega-analysis demonstrated that the delay in brain maturation is not attributable to medication use.

Interestingly, there is one brain region in which children with ADHD achieve peak cortical thickness earlier than typically developing controls: the primary motor cortex.

C and D – Incorrect.

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References

- Hoogman M, Bralten J, Hibar DP** et al. Subcortical brain volume differences in participants with attention deficit hyperactivity disorder in children and adults: a cross-sectional mega-analysis. *Lancet Psychiatry* 2017;4(4):310–19.
- Shaw P, Eckstrand K, Sharp W** et al. Attention-deficit/hyperactivity disorder is characterized by a delay in cortical maturation. *Proc Natl Acad Sci U S A* 2007;104(49):19649–54.