

# EMBRACING

## Working with ADHD and the Prefrontal



WHAT IS THE PREFRONTAL CORTEX, how does ADHD have an impact, and what the heck does the story of Goldilocks have to do with anything?

The prefrontal cortex (PFC) is the highest part of the brain—both literally and figuratively. It sits at the top and in the front (hence the name, prefrontal) and is the final part of our brain to develop, both in terms of evolution and also fetal and human growth. Some evidence suggests that brain development persists until at least the mid-twenties, and possibly until the thirties. This is especially true as it relates to the prefrontal cortex.

And it's a picky part of the brain, which is where the story of Goldilocks and the three bears comes in. As you probably remember, Goldilocks went into the bears' house in the woods and found the porridge "too hot" or "too cold" before discovering the one that was "just right" (and so on with chairs, beds, etc.). Well, Yale professor Amy Arnsten likens the prefrontal cortex to the character Goldilocks, in that it needs to have everything *just right* in its chemical environment in order to function optimally.

This is important to know for all of us, because this part of our brain plays a role in many important executive functions such as:

1. Pursuing goals and thoughtfully guiding our actions;
2. Dealing with things that are conceptual rather than concrete;
3. Encoding important memories and retrieving appropriate memories so they can be used to inform current decisions;
4. Helping us to make thoughtful decisions, use our insight, demonstrate good judgment, and be flexible;
5. Understanding what others are thinking;
6. Monitoring errors;
7. Understanding what is real vs. what is imagined or remembered; and
8. Allowing us to delay gratification.<sup>1</sup>



# GOLDILOCKS

## Cortex

by Ann Betz, CPCC, PCC and Ursula Pottinga, CPCC, PCC, BCC

When certain chemicals, known as catecholamines (hormones produced by the adrenal glands) such as dopamine and norepinephrine (the adrenalin of the brain), are out of balance—that is, in the words of Goldilocks, there are *either* too few or too many—our highest brain doesn't work optimally. This part of our picky brain simply wants everything just right!

Here's how it works technically: Being tired, bored or unmotivated releases very small amounts of catecholamines, while being stressed creates a massive and constant flow of these chemicals. The ideal state is that of being alert and interested, in which case short bursts of catecholamines are released in response to stimulus in the environment.

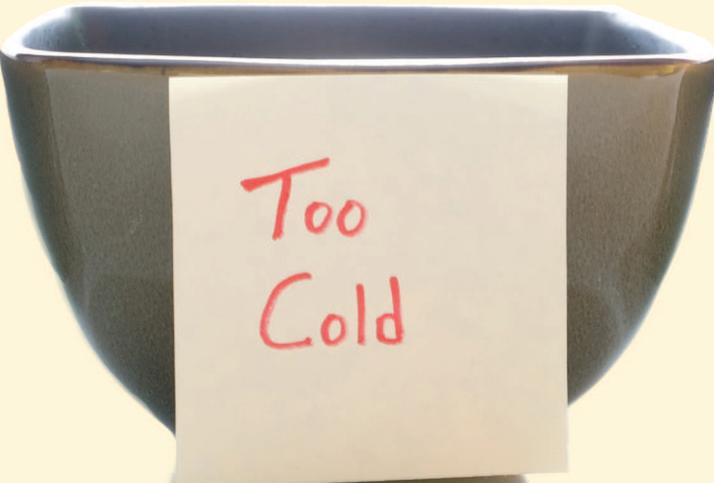
In both the case of too little catecholamine activity and too much, the effect on the PFC is to put it in a state of distraction, disorganization, forgetfulness, and lack of

inhibition, while the perfect amount of catecholamine release enables the person to be focused, organized and responsible. In other words, too little engagement and too much stress both take us to the same ineffective place. In order to be at our best, we need to be in balance.

### What role does ADHD play in the PFC?

So, what does this mean in terms of ADHD? The most common current understanding of ADHD is that it is a neurobehavioral disorder associated with structural and chemical alterations in the PFC, and featuring two common impairments—an inability to pay attention and focus, and difficulty with inhibiting certain behaviors—both of which are key jobs of our highest brain, the prefrontal cortex.

Generally, in people with ADHD, this is because it is difficult for their brains to create enough catecholamines



Too  
Cold



Just  
Right

# THE GOLDILOCKS OF THE BRAIN— Your Prefrontal Cortex

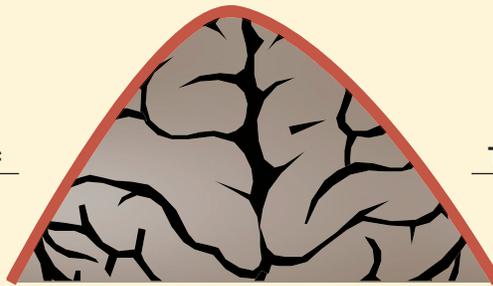
When we are in balance, we have access to high level functioning:

goal direction ~ delaying gratification ~ making and retrieving memories  
decision-making ~ understanding what others are thinking ~ abstract concepts

Just right =

dopamine and norepinephrine in balance

Too little stress/stimulation =  
not enough dopamine  
and norepinephrine



Too much stress/stimulation =  
too much dopamine  
and norepinephrine

When we are under- or over-stressed, we have impaired functioning:

foggy thinking ~ poor impulse control ~ poor decision-making  
poor memory ~ lack of empathy ~ black and white thinking

Adapted from Hains and Arnsten, *Learning and Memory*, 2008, ©BEabove Leadership, 2016

(again, primarily dopamine and norepinephrine) in day-to-day life.<sup>2</sup> Thus, extra stimulation is needed to even begin to feel at all focused and present. This can manifest as disruptive behavior (particularly in children, whose prefrontal cortices are still developing fully), but in fact, the person is most likely simply seeking to find a chemical balance so that they feel better. ADHD is often treated with stimulants, which people who don't understand the condition can find odd, since the person may be abnormally active. But the stimulant has the impact of bringing the brain to a "just right" state of focus and increased calm.

There is a host of additional complexities with ADHD, and a full understanding of the disorder is still in process from a research standpoint. Many feel overloaded and unable to sort through incoming stimuli, thus leading to the common challenges of lack of focus and disorganization. There is also evidence that the imbalance of dopamine means that people feel less reward (dopamine has many roles in the brain, but one of its chief duties is the release when something is rewarding, making us feel good) in day-to-day life. This can lead to reward-seeking and/or risky behavior in some people.

## What helps?

As mentioned above, it is generally understood that people with ADHD are in a state of "too little" stimulation in the course of their day-to-day life, as the neurotransmitters in their brain aren't working up to par. However, there are two important caveats here. First of all, this complex neurological disorder can include elements (as mentioned above) of being unable to filter incoming information and stimuli, leading to a stress overload.<sup>3</sup> In addition, the very challenge of having ADHD itself can also be extremely stressful to the person. Therefore, it's important to note that we never want to make any assumptions about where people are at any given time, no matter what their ADHD label may incline us to predict.

Our recommendation is to share the PFC curve shown above so that the person can better understand the mechanisms of their own brain. This in and of itself often leads to huge "aha" moments. For example, one of our students immediately realized what had happened to his young son, who was failing fifth-grade math. When the boy would work at home with his mom, he was capable of astonishing levels of understanding. But at school, he turned

in lackadaisical work and the teacher felt he was not grasping even the basics he needed to know. The school's response was to put the child in an easier math class, and when the parents argued for more challenge, they were accused of being helicopter parents and were dismissed.

Luckily, they didn't give up. They took their son to external testing, where he was found to be capable of *tenth*-grade math. With the expert's report in hand, they were able to convince the school to finally give their son the challenge he needed in order to be stimulated enough to perform to his academic ability. Looking at the PFC curve put it all into place for our student, making complete sense of something he was only able to grasp intuitively before.

After explaining and exploring the curve, the next question might be simply, "Where are you right now? Are you in *too little*, or *too much*?" Since the outcome of too much or too little are the same, it can sometimes be difficult to discern where people are from outside observation, but generally most people know when asked. From here, you can help the person with targeted strategies for either increasing their stimulation (if they are in *too little*) or decreasing their stress (if they are in *too much*).

### Working with too little

This side of the curve is all about stimulation and reward. At BEabove Leadership, we tend to think of this as the "get moving!" side. Not because action is inherently right, but because it is critical to bring some sort of stimulation into the picture so that the brain can begin functioning better. For example, we often find job seekers landing in this place, which can tend to make them feel unworthy, unmotivated, stupid, and slow—not great self-beliefs for getting hired! So we encourage them to begin volunteering or taking classes. Not because of the networking opportunities (if that happens, great!) but because their brains will feel better and they will be more able to reconnect with the valuable, employable person they are.

Some effective strategies for working with *too little* include:

- Finding something challenging to learn (curiosity is linked to dopamine production and challenge creates adrenaline);
- Focusing on a bigger vision and exploring what is really important (when people are in touch with what is really at stake for them, it is often a bit scary, which creates adrenaline);
- Doing something new and different (novelty is linked to dopamine production and challenge creates adrenaline); and
- Small steps that can be celebrated (even checking something off a list can give us a hit of dopamine).

*It's important for all human beings to see progress and feel a sense of reward and accomplishment, and this is certainly true for people with ADHD.*

### Working with too much

This side of the curve is all about reducing the amounts of adrenalin and dopamine rushing through the drain and taking us off balance. The good news is that according to scientific research, there are many techniques proven to reduce the amount of stress chemicals in the body. Here's what tends to work, in order of effectiveness:

- Naming the emotion—have the person check in and state how they are really feeling;
- Controlling the environment—changing anything they can (such as working from home to avoid a stressful commute);
- Focusing on what they value and what is important;
- Reframing the situation;
- Being present in the here and now (breathing, noticing body sensations, etc.).

It's important for all human beings to see progress and feel a sense of reward and accomplishment, and this is certainly true for people with ADHD. We believe that making small, measurable steps toward specific goals, creating a kind and sustainable reward system, and reminding them that the prefrontal cortex needs to be in balance in order to function properly should help. 🧠

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**Ann Betz, CPCC, PCC, CNTC, and Ursula Pottinga, CPCC, PCC (ICF), CNTC**, are the cofounders of BEabove Leadership ([beaboveleadership.com](http://beaboveleadership.com)), and the senior trainers and developers of Neuroscience, Consciousness and Transformational Coaching, a popular training program for advanced coaches that has been offered in the US, Canada, Mexico, Turkey, China, Norway, and the UK. An international speaker and trainer on the intersection of neuroscience, coaching, and human transformation, Betz served as the neuroscience consultant to the Coaches Training Institute (CTI) for many years. Pottinga has been a master coach for over fifteen years, and has over twenty-five years of experience in professional development, working with managers, supervisors, and executives in the US, Canada, and Europe.

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### ENDNOTES

- 1 Hains and Arnsten, Learning and Memory, <http://learnmem.cshlp.org/content/15/8/551.full.pdf+html>
- 2 Prince, J, Catecholamine dysfunction in attention-deficit/hyperactivity disorder, *Journal of Clinical Psychopharmacology*, 2008. <http://www.ncbi.nlm.nih.gov/pubmed/18480676>
- 3 Blum, Kenneth et al, Attention-deficit-hyperactivity disorder and reward deficiency syndrome, *Neuropsychiatric Disease and Treatment*, Dove Medical Press, 2008. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2626918/>