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Methodical Madness: How ADHD Affects Daily Life

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Class of 2023

DePauw University Honor Scholar Program

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Prologue: Meeting the Main Character

Let me begin by saying that this project is not a kind of “self-help” document. While it may come off that way, that is not the primary objective of my project. My primary objective is to provide people with necessary, and in my opinion, essential information surrounding the experiences and struggles of daily life with ADHD. I am not here to make anyone feel guilty for treating someone with ADHD poorly, nor am I here to convince you that people with ADHD are the same as their neurotypical peers (spoiler alert, we aren’t). Additionally, this is not the kind of project where I try and convince people they have ADHD, nor am I going to push for those who do have ADHD to seek medication or other forms of treatment.

Again, this is not *that* kind of project.

I was formally diagnosed with ADHD at the age of seven, and I was fortunate enough to have access to reliable physicians and resources to properly educate both me and my family about my condition. I spent the next fourteen years trying out many different medications and treatments, some of which I still use today. Currently, I am a 22-year-old rising senior at DePauw University, and I plan to graduate in May 2023 with a Bachelor's in Neuroscience. Additionally, I am a two-sport collegiate athlete and hold a few other leadership positions around campus. I also plan to pursue an MD/Ph.D. program in neurology and hope to start working in medicine, hopefully with a focus on neurodevelopmental disorders. The point is, I plan on making projects and research like this my career, and I feel plenty qualified to create a project like this. I am aware that many ADHD help books are currently out there, and I openly encourage you to read those as well. The reason I believe my project is unique is that I *have* ADHD. I’ve lived with it, despised it, blamed it for anything that didn’t go my way, struggled with accepting it, and learned to love and cherish my condition. For those that still hate it and continue to try and “beat” it each day, I have bad news for you; you’re fighting against yourself. So just take a moment, breathe, and hear me out.

Now, it may already be apparent that I am very motivated and passionate about neuroscience in general, but I want to explain why this project is especially important to me. For starters, growing up with ADHD is hard. Being diagnosed with ADHD at any age is hard. It can be scary, life-changing, and ultimately make you feel inferior to those around you. I understand better than anyone how difficult ADHD, or any neurological condition, can make your life. Unfortunately, many of those around us that are not considered neurodivergent aren’t aware of how difficult life can be for us. This project serves to complete two goals: Firstly, I want those

who do have ADHD to learn why and how it affects their brain (at both a neurobiological level and a behavioral level) while also providing ways to potentially improve their quality of life. Secondly, I want those who do not have ADHD to better understand what life is like for their peers and hopefully mitigate some of the misunderstandings between neurodivergent people and neurotypical people regarding ADHD. To complete these goals, we have a lot of general information to sort through before we can dive into the crazy and dysfunctional world of ADHD, so let's get started.

We're starting at ground zero. What is ADHD? The National Institute of Mental Health (NIH) defines ADHD saying "Attention-Deficit/Hyperactivity Disorder (ADHD) is marked by an ongoing pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development" (National Institute of Mental Health, 2022). While this definition is pretty basic, it gets the job done. There are countless ways we can define ADHD, but for the sake of this project here is how I want us to define it. ADHD is a chronic neurological condition characterized by patterns of attention difficulty, hyperactivity, and impulsiveness that cause significant difficulty both socially and academically. Now that we have established a few basic definitions of ADHD, we can begin digging a bit deeper. Some of the questions we'll need to answer are: What is the basic neurobiology behind ADHD? How is ADHD diagnosed? What other conditions are ADHD associated with? How does it manifest? What are some of the most common symptoms? What forms of treatment are available? These are just a few of the questions we will need to go through before we can get down to business. There are so many moving parts regarding ADHD so we must get on the same page before going any further.

The Essentials

When discussing the neurobiology of ADHD there is one key signature that we need to be aware of: Dopamine. Dopamine is released from neurons and is a neuromodulator, which means it changes the activity of neural circuits such that certain circuits are more active compared to others. Dopamine is attributed to creating an intense or heightened state of focus, contracting our visual field and making us focus on things outside of ourselves (exteroception). Dopamine is also involved in motivation and wanting things, both physical and informational. We are essentially assigning the concepts of focus and attention a neurochemical identity with Dopamine.

Dopamine will largely be considered our culprit for a lot of the deficits we see in ADHD, as its ability to change the overall activity levels of neural networks is at the very core of how these deficits manifest. One way of describing these networks is done beautifully by Dr. Andrew Huberman, a professor at Stanford University's School of Medicine, where he defines the two main networks involved in ADHD. The Idle Network (or default mode network) is active when we are not doing anything; when we are sitting there letting our brain go wherever it wants. This network includes the

- Dorsolateral Prefrontal Cortex (DLPFC)
- Posterior Cingulate Cortex (sometimes called gyrus)
- Lateral Parietal Lobe

For a typical person, these three areas are synchronized and active in tandem with one another. For those with ADHD, this "Idle Network" is desynchronized. The second network, known as the Task Network, includes very similar but also very different regions in the brain. It consists of the

- Medial Prefrontal Cortex
 - other regions communicate with the Medial PFC to suppress impulses
- The rest of the task network is the same as above

(Mills et al., 2018)

In those without ADHD, we would say these two networks are anti-correlated, meaning their activity is opposing one another. However, in those with ADHD, the two networks are more coordinated, which seems somewhat counterintuitive. In typical individuals, the networks are not active at the same time, so they can operate, and function based on which network the situation is best suited for (we also think there may be some form of reciprocal inhibition between them, but we don't know for sure yet!) (Duffy et al., 2021). The driving force of both networks is dopamine. It acts as a sort of traffic conductor, activating each network whenever they are needed. But for those with ADHD, there is some underlying issue with the dopamine system, so we see a lot of correlation between the two systems because of this Dopamine issue. So, what are the possibilities? We could have dopamine levels being extremely high, or extremely low, or maybe the dopamine is just conducting the networks incorrectly (essentially the information is there but it's incorrect information). There are many possibilities, but perhaps the most widely accepted hypothesis currently is the low dopamine hypothesis. In 2015, a study was published

that drove home this low dopamine hypothesis. The hypothesis essentially states that when dopamine is not present in significant amounts in certain brain circuits, there is the unnecessary firing of neurons unrelated to the task for which that circuit is responsible (Spencer et al., 2015). To simplify this theory, when dopamine is low, neurons are firing when they shouldn't. This begins to make a lot more sense when we think about our two networks above. When trying to perform a task, those with ADHD experience a correlation between the Idle Network and the Task Network (Huberman, 2021). Do you see where this is going? *Because* dopamine is low, the Idle Network neurons may be firing when someone is trying to perform a task, interrupting the Task Network and making it harder for the individual to complete said task. This is just one example of a theory involving how dopamine and neural networks function in those with ADHD, and how these unique features and functions bring about the deficits ADHD is known for. So, for the purpose of this project, this hypothesis is the one we will be using and referencing.

The process of diagnosing ADHD has been consistent throughout the years, with the current method using the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (we will use DSM-5 for the sake of our sanity). The DSM-5 provides diagnostic criteria for a great number of mental disorders all based on common patterns of behavioral symptoms. Rather than explaining each criterion, we can just look at the exact table directly from the DSM-5 for ADHD diagnosis:

Symptoms and/or behaviors that have persisted ≥ 6 months in ≥ 2 settings (e.g., school, home, church). Symptoms have negatively impacted academic, social, and/or occupational functioning. In patients aged < 17 years, ≥ 6 symptoms are necessary; in those aged ≥ 17 years, ≥ 5 symptoms are necessary.	
Inattentive Type Diagnosis Criteria	<ul style="list-style-type: none"> • Displays poor listening skills • Loses and/or misplaces items needed to complete activities or tasks • Sidetracked by external or unimportant stimuli • Forgets daily activities • Diminished attention span • Lacks ability to complete schoolwork and other assignments or to follow instructions • Avoids or is disinclined to begin homework or activities requiring concentration • Fails to focus on details and/or makes thoughtless mistakes in schoolwork or assignments
Hyperactive/ Impulsive	<p>Hyperactive Symptoms:</p> <ul style="list-style-type: none"> • Squirms when seated or fidgets with feet/hands

<p>Type Diagnosis Criteria</p>	<ul style="list-style-type: none"> • Marked restlessness that is difficult to control • Appears to be driven by “a motor” or is often “on the go” • Lacks ability to play and engage in leisure activities in a quiet manner • Incapable of staying seated in class • Overly talkative <p><u>Impulsive Symptoms:</u></p> <ul style="list-style-type: none"> • Difficulty waiting turn • Interrupts or intrudes into conversations and activities of others • Impulsively blurts out answers before questions completed
<p>Additional Requirements for Diagnosis</p>	<ul style="list-style-type: none"> • Symptoms present prior to age 12 years • Symptoms not better accounted for by a different psychiatric disorder (e.g., mood disorder, anxiety disorder) and do not occur exclusively during a psychotic disorder (e.g., schizophrenia) • Symptoms not exclusively a manifestation of oppositional behavior
<p>Classification</p>	<p>Combined Type:</p> <ul style="list-style-type: none"> • Patient meets both inattentive and hyperactive/impulsive criteria for the past 6 months <p>Predominantly Inattentive Type:</p> <ul style="list-style-type: none"> • Patient meets inattentive criterion, but not hyperactive/impulse criterion, for the past 6 months <p>Predominantly Hyperactive/Impulsive Type:</p> <ul style="list-style-type: none"> • Patient meets hyperactive/impulse criterion, but not inattentive criterion, for the past 6 months Symptoms may be classified as mild, moderate, or severe based on symptom severity

(AAFP National Research Network, 2019)

Looking at the table above gives us a crystal-clear idea of what they look for when trying to assess if someone has ADHD. It also is notable that there is a difference in diagnosis based on age as seen in the excerpt at the top. This is the most used form of diagnosis for ADHD. You can use some other neuroimaging to assist with your diagnosis process, but it is uncommon because these tests are expensive and only performed by very experienced professionals. However, the reliability of the DSM-5 has been a hot topic of debate, as the DSM-5 is not necessarily perfect (or reliable for the most part). The best solution we have is comprehensive evaluations that consist of a thorough diagnostic interview, gathering information from outside sources such as parents/guardians, spouses, etc., and using other ADHD rating scales like the DSM-5 to determine how the individual fits into these criteria. This is currently the best form of diagnosis we have, and for the most part I would argue for its validity if it were being completed by an

experienced and reliable clinician. This is what the diagnosis process consists of at its core, and we will touch on the validity and reliability throughout the project as we explore some of the common symptoms apparent in ADHD.

Moving on, we must also understand that diagnosis is not perfect (as seen above) and because of that, there is often overlap with ADHD and other neurological conditions. For the sake of both time and simplicity, we will be brief as I just want readers to be aware of some commonly confused and incorrectly diagnosed conditions with ADHD. The most common of these are Anxiety, Depression, Autism Spectrum Disorder (ASD), OCD, and Tourette's Syndrome. These are probably the most common conditions people with ADHD can be incorrectly diagnosed with. Additionally, people with one of these conditions could also be incorrectly diagnosed with ADHD as well. We will really dive into this and discuss the implications later, but for now, just understand that diagnosis is not a cut-and-dry process and there is a ton of overlap regarding symptoms and how they affect behavioral patterns.

Perhaps one of the most important questions regarding ADHD, and most medical conditions for that matter, is how we can treat it. Well, the good news is that we have a few options for treating ADHD, and some people may have symptoms so mild they do not even seek treatment. The bad news? There is currently no cure, and treatment is HIGHLY individualized. In other words, just because one form of medication or treatment was useful or successful for you, does not mean it will be the same for others. For starters, we will have a "crash course" on ADHD medication. First, we need to classify these medications into two different groups: Stimulants and Non-stimulants.

Stimulants:

- **Immediate-Release (short-acting) medications**
 - Usually taken every 4 hours (as needed) and are among the cheapest forms of medication.
- **Extended-release (intermediate-acting and long-acting) medications**
 - Usually taken once in the morning, and are not needed to be taken again; it is crucial tablets are not chewed or crushed; last for over 8 hours typically

Non-stimulants:

- these can be tried once stimulants are no longer viable or practical

Now that we know the different classifications, we can look at another table that outlines the common branding, duration, and chemical names for a few of each type of medication.

Common ADHD Medications		
Brand	Generic Name	Duration
Short-acting amphetamine stimulants		
Adderall	Mixed amphetamine salts	4-6 hours
Dexedrine	Dextroamphetamine	4-6 hours
Dextrostat	Dextroamphetamine	4-6 hours
Short-acting methylphenidate stimulants		
Focalin	Dexmethylphenidate	4-6 hours
Methylin	Methylphenidate (chewable or liquid tablets)	3-5 hours
Ritalin	Methylphenidate	3-5 hours
Intermediate-acting methylphenidate stimulants		
Metadate CO	Extended-release methylphenidate	6-8 hours
Ritalin LA	Extended-release methylphenidate	6-8 hours
Long-acting amphetamine stimulants		
Adderall-XR	Extended-release amphetamine	10-12 hours
Dexedrine Spansule	Extended-release amphetamine	6+ hours
Vyvanse	Lisdexamfetamine	10-12 hours
Long-acting methylphenidate stimulants		
Concerta	Extended-release methylphenidate	10-12 hours

Daytrana	Extended-release methylphenidate (skin patch)	11-12 hours
Focalin XR	Extended-release dexamethylphenidate	8-12 hours
Quillivant XR	Extended-release methylphenidate (liquid)	10-12 hours
Long-acting nonstimulants		
Intuniv	Guanfacine	24 hours
Kapvay	Clonidine	12 hours
Strattera	Atomoxetine	24 hours

(American Academy of Pediatrics, 2019)

Don't be alarmed, you will not be required to know all the names or durations for the quiz. The point of the table is to illustrate just how many types of medication is out there (trust me, there are plenty more) and to show you that there are plenty of options and ultimately you will probably find one that works best for you specifically. However, these medications come with a cost that is not monetary known as side effects. It is also important to note that side effects are more prevalent in stimulants compared to nonstimulants. Each of the medications listed above boast different side effects based on their chemical makeup and brand design so I'll spare us all the headache and just list out some of the most common side effects associated with these stimulants.

- Decreased appetite/weight loss
- Sleep problems
- Social withdrawal (we'll discuss why this is ironic later)

Some of the more uncommon, but very possible side effects can be:

- Rebound effect (increased activity or bad mood as medication wears off)
- Transient muscle movements or sounds called tics
- Minor growth delay (I had some of this growing up!)

Again, these are not here to scare you away from being medicated. If your ADHD is causing significant difficulties, and a professional recommends you try medication I highly encourage you to try different ones out and get the help you need. Now we have a basic grasp of medication, we'll move on to other forms of treatment. The most common of these treatments

being Cognitive Behavioral Therapy (CBT). Personally, I myself have been to quite a few psychiatrists and done plenty of CBT. I firmly believe it not only helps, but it lets you understand how your deficits manifest and when they manifest so you can consciously catch yourself before you act impulsively or interrupt someone (just a few examples for context). A few other types of treatment include neurofeedback, meditation, yoga, mindfulness, dietary intervention and more. Why do you need to know this? Well, for starters, some people DO NOT like therapy or any kind of formal “sit down with a psychiatrist in a corduroy suit” type of vibe. So, I just want these people to know there are plenty of options out there that do not involve putting fancy drugs into your body (you’re welcome D.A.R.E.) and these methods have been proven to help with ADHD.

The Big Three

When looking at ADHD from the outside, a person might think there are too many symptoms or manifestations to really narrow down the day-to-day experience of dealing with ADHD. And, in a way, these people aren’t wrong. ADHD is a unique and sometimes confusing condition that does not usually follow one set way of showing up. However, I am going to organize and explain some of the most common and essential experiences, deficits and struggles people with all types of ADHD encounter in daily life. In other words, please do not feel discouraged or invalidated if your ADHD has manifested or impacted your life in a way that I do not explain in this project. Your experiences and your condition are valid and should be taken seriously by everyone who truly cares and wants the best for you, but in this project, I will be focusing on some of the most common and well-known experiences. So, how are we going to organize these things? I’m going to refer to these sections as The Big Three (copyright not pending).

The first section (“You Aren’t Oblivious, You’re Just ADHD”) is all about how ADHD affects our Focus/Attention in all sorts of scenarios and situations. I will walk you through the basics of what we already know regarding how we focus or pay attention to things, as well as explaining the why and how of our ability to prioritize and choose consciously what to pay attention to. Many people with ADHD, including myself, have blamed themselves or felt frustrated due our inability to focus and/or pay attention. I’m here to set the record straight and explain exactly what is happening in our beautiful (but different) brains whenever we experience

these deficits. These chapters are designed to explain how your brain works, and *why* it works that way when it comes to focus and attention. Think of this first section as your introduction into learning about exactly how your brain operates at a neurobiological level, giving you a chance to learn and understand that having trouble focusing or remaining attentive is not your fault (you are doing your best, be nice to yourself!) You deserve to understand exactly how your brain operates, especially since your brain is slightly different from the average person. Nevertheless, you still have ADHD, and you still have these deficits. So, what can we do? The good news is, there are plenty of tips, tricks and strategies to help people like us go through life with much less difficulty!

The second section (“Silent But Deadly”) is all about what I consider to be the more unknown (at least in my experience with non-ADHD people) side of ADHD. Here we’ll discuss how ADHD affects our social behavior and our ability to interact with peers, participate in conversations, and even how it affects intimacy. I will explain how these deficits occur from both a biological and behavioral point of view, so we really drive home the idea that while these deficits are very real and present in our lives, they are not things we should necessarily feel guilty for succumbing to. My main objective in this section is to help those with ADHD understand that they are not “weird” or “unlovable” or even incapable of having a social life. They just have a neurological condition that makes social life slightly more difficult and confusing. In addition to this, we will touch on why ADHD can often cause social deficits to manifest in an alarmingly similar way to ASD. While reading through this section, those with ADHD will hopefully feel heard and understood, whereas those reading this without ADHD may feel a bit guilty of alienating or judging a peer for being a bit socially incompetent. That is not my goal, as you may recall from the very beginning. My only goal is to educate anyone who reads this project and help them understand what life is like with ADHD, whether they have it or not. To echo the previous section, there is a reward for “passing go” in this game. Just like our first section, there are a lot of different strategies for dealing with and improving your daily life as you struggle with these deficits.

The last section (“The Ugly Truth About ADHD”) will address some of the problems and shortcomings of research and the medical field in general regarding ADHD. Issues involving accessibility, representation and miseducation take the forefront of this section while a few others crucial details will be outlined and explained. I am fully expecting this section to “ruffle

the feathers” of some people within higher academia. Honestly, I don’t care. We will be looking at the field of ADHD research as well as how people go through the medical process of being diagnosed and treated with ADHD. Put simply, we’ll be diving into the sociopolitical and socioeconomic side of ADHD (and neurodiversity). Now, you may be thinking “This is just some naïve kid making bold and idealistic claims about how we should do things” or “he has no real understanding of how research works at institutions” and I will not stop you from having these thoughts. Sure, I may not be tenured at a university to do research, nor am I in residency or practicing medicine (yet, not yet). However, I don’t need any of those experiences to see how a lack of access, representation and reliable information have plagued the lives of hundreds of thousands of people. So please, just bear with me and understand I am *not* here to blindly call out anyone. I just want to make people *think*. With that, we’re almost ready to dive into the first major part, after a brief note on what you can expect to see from here on out.

Part 1: You aren't
Oblivious You're Just
ADHD:
Difficulties with
Focus/Attention

Chapter 1: Executive (Dys)Function

Have you ever been hard at work on a huge paper due at the end of the week, and suddenly, you get a notification on your phone from a group chat? You pick your phone up (like any sane human being) and before you know it, over an hour has passed since you put your phone down. Or maybe you've suddenly got the *unbearable* urge to work on a set of notes for class, so you spend the next 2-3 hours slaving away at those notes instead of taking them normally and getting more assignments done. Sound familiar? I'm talking about Executive Function (EF), or, in these cases, Executive Dysfunction (EDF). Executive function serves as an “umbrella” term for a lot of the deficits we will be discussing throughout this project, as it plays a role in the manifestation of many different deficits within ADHD. Executive function is defined by Harvard's Center on the Developing Child as “the mental processes that enable us to plan, focus our attention, remember instructions, and juggle multiple tasks successfully.” For your brain to do this effectively, it requires 3 different functions to occur and operate optimally: working memory, mental flexibility, and self-control (small “pow-wow” incoming).

- **Working Memory** regulates our ability to retain and make use of information over short periods of time
- **Mental Flexibility** allows us to either sustain or redirect our attention in response to different demands or to apply different rules based on the setting/environment
- **Self-control** is how we set priorities and resist our impulsive responses to situations

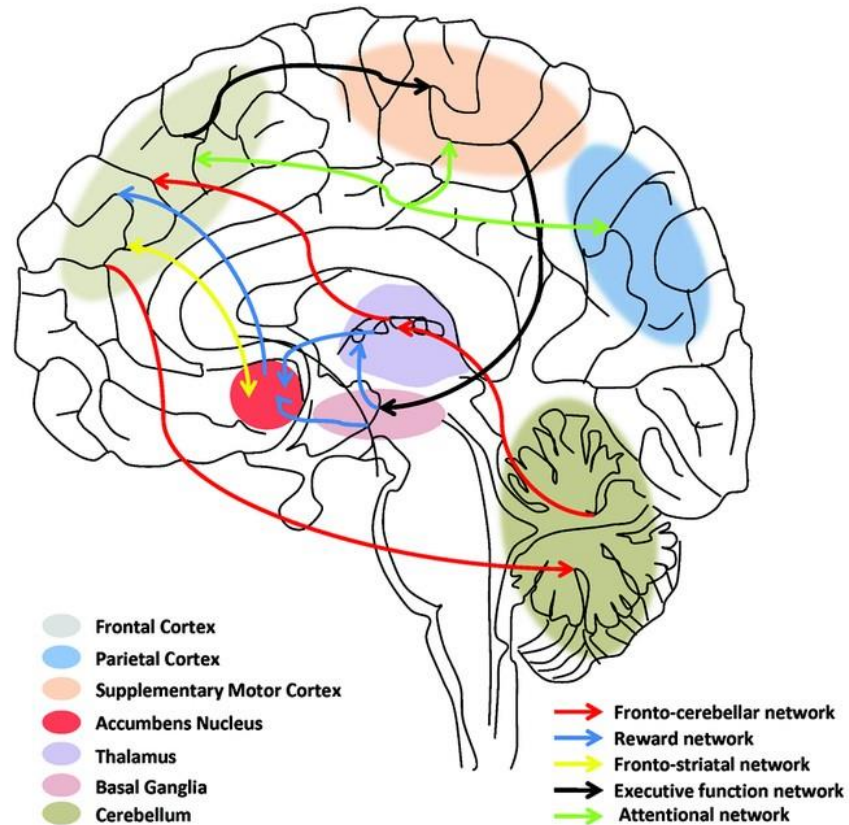
(Harvard University, 2015)

Now that we have a good understanding of *what* executive function is, I should explain why this one feature is so important. To put it simply, executive function deficits are the core of ADHD (Brown, 2009). Consider the two examples I gave at the beginning of this section. One dealt with distractibility (a common experience for people with ADHD), while the other was a reference to hyperfocusing (something we will define and differentiate from hyperfixation later). **EDF can be found in almost all the deficits we see in those with ADHD.** You may be thinking, “Well if it's so damn important, how do we even measure this or tell if someone is experiencing EDF?” To which I would answer: great question, let's talk about it.

As we've already discussed, it is likely to be seen in comprehensive diagnoses for ADHD and is easily recognizable to a well-trained and experienced clinician/psychiatrist. The deficits EDF exhibits are vastly different. For example, being distracted by unimportant stimuli is a result of EDF, and so is the inability to properly focus on the person you are having a conversation with. Deficits can also take shape in the form of mismanaging time, missing social cues, inability to follow instructions consistently, inability to sit still, and many more. These are just a few examples of executive function deficits that can occur in daily life with ADHD (and believe me, we will talk about A LOT more) but we also need to discuss what we know regarding the biology of executive function and dysfunction.

This is probably the part where a lot of people either get nervous or excited. Personally, I love learning about biology and how things work. I find the processes of our body fascinating and they never fail to surprise me with their complexity and intricacy. Regardless, I promise I will try to keep things will be as simple as possible (for both our sanities). Executive function is currently understood to rely on neural networks including the prefrontal cortex (PFC), parietal cortex, basal ganglia (BG), thalamus, and cerebellum (Martinez et al., 2016). There is another region involved, and it may very well be the most important region affected by ADHD. The Reticular Formation, sometimes referred to as the reticular activation system (RAS). The main function of the RAS, which operates a sort of neural hub, is to prioritize stimuli and help the brain activate networks specific to the stimuli being received. For many obvious reasons a dysfunctional RAS would be present in ADHD, which primarily causes difficulties with prioritizing stimuli and maintaining focus. Below I have an image showing the regions and "pathways" we are talking about:

Basic Neural Networks Involved in ADHD



(Purper-Ouakil et al., 2011)

I want you to focus on the wording I used. These are *neural networks*. The point I'm getting at here, is that these deficits are complex, and there is no acute reason for them. Very rarely do we see a neural dysfunction happen due to one single malfunction or irregularity. When we see executive functioning deficits, we would expect to see dysregulation or lack of activity in one of or maybe all these regions when executive function was needed. EF is a vastly important and complex cognitive ability, but now that you have some information on what it is, and how it works within the brain, we can really get down to business.

Last year, I was in the middle of my busiest semester of college to date. I had 4 courses, 3 had labs on top of the original lecture period, and I was in the middle of soccer season. My

planner was full of assignment dates and notes on what needed to get done at what time. Yet, I was having a lot of trouble remembering these dates and assignments and often I would end up doing assignments that were not due until weeks later, while the assignments I had due in the next few days would be untouched. Now, I'm cognizant that this happens to everyone, ADHD or not. However, this was something that happened almost every single day for me. This is prime real estate for EDF. For those of you reading this who have ADHD, I imagine you're nodding your head and almost exhaling with a sense of relief here. Trust me, this happens to a lot of us. Based on the information we discussed earlier, we should expect some dysregulation of the reticular formation and other neural networks to be involved, in addition to seeing these deficits in other kinds of tasks involving prioritization. Another region of focus for us would be the PFC, which is one of the big hitters when it comes to decision-making and planning. Additionally, research has shown that EF deficits are very common in those with ADHD. ADHD was clearly associated with struggles in a few key EF domains, with the strongest associations seen within measures for spatial working memory, vigilance, response inhibition, and some measures of planning (Wilcutt et. al., 2005). This meta-analysis indicated that the deficits I experienced, which primarily fall into the categories of planning and vigilance, are not only common, but *expected* to some degree.

What does this mean? It means that there is nothing, I repeat, NOTHING wrong with any of us experiencing these deficits. They are features of our conditions and knowing that these areas of cognition might be affected allows us to plan and formulate strategies to work around some of these deficits (which is f*****g awesome if you ask me). So, how do we work around some of these deficits? The short answer is it depends. For me, when I know I have a hectic week coming up, I will write down everything I know I have to do, regardless of its due date or level of importance. Once I've done that (please do your best not to audibly gasp) I number all the assignments based on the due date. The lower the number, the sooner it is due. Crazy right? But for people like us with ADHD, this one little change can make all the difference. Before making this change, I was relying on my brain to know and assign importance to each assignment, which is about as efficient as trying to pick your favorite crayon out of a box blindfolded. Yet, when I stick a little number next to an assignment, I am telling my brain what is more important and what *needs* to be done now. Wait, you said you've already tried numbering your to-do lists or assignments? Underline them, change the color of your pens, or

circle them. Assign the importance yourself ahead of time since you now know you're prone to experiencing deficits in these areas.

I also remember a time I made this massive list of things I needed to get from Walmart. The list consisted of fruit snacks, granola bars, toothpaste, floss, chocolate milk, clothes hangers, tide pods, and dryer sheets. Typical college shopping list. So, do you have any predictions as to how my trip to Walmart went? I went there for 8 items; how many do you think I left with? Got your prediction locked in? I left Walmart with 12 items total, and only 4 of the 8 items I went there for. And believe me, this is not a rare occurrence. This happens damn near *every* time. While this may not be something you directly experienced, the idea of assigning importance to things and then executing or remembering what is important is the true deficit here.

Another example I can vividly remember was during my time in high school when I worked in a veterinary clinic as a kennel attendant. We had to intake new animals and give them their food and water (just the way they specifically liked it) at certain times, all while rotating groups of them to go out and run around and do their business. There were a lot of steps and different jobs that had to be done all throughout the day, and I really struggled at it. I constantly forgot to take certain groups of dogs out. As a result of this, the people whom I worked with were constantly getting mad at me and frustrated because I didn't do my job correctly. And they were correct, I was not doing my job. The point I'm making here is that I wasn't just blatantly forgetting. My ADHD was making these responsibilities harder than normal. Now, before we get into why this happens, I need you to understand one SUPER IMPORTANT thing: Just because you have ADHD does not mean you can use it as an excuse or a crutch. You have a responsibility to yourself and others to understand and improve these deficits in your life, especially if they cause workplace issues (because you are liable to provide quality work if your employer is paying you).

So, why does this happen? Once again, our old friend EDF is at work here. As we've already seen, EDF causes a lot of deficits in areas involving working memory, planning, vigilance, and more. In both examples, we are most likely dealing with working memory, planning, and some vigilance as well. Once again, these deficits are supported by research. One study decided to determine whether EF deficits (both self-reported and via testing) contributed to the degree of impairment in measures involving occupation problems, employer workplace adjustment, and clinician-rated occupational adjustment (Barkley & Murphy, 2010). What they

found was that self-reported EF ratings were “significantly predictive” of impairments in all 11 measures of occupational adjustment. Essentially, these adults with ADHD experienced significant deficits in all 11 categories, which included but were not limited to: % jobs quit due to hostility, % jobs fired from, employer-rated impairment score, employer-rated overall work performance, etc. Long story short, adults with ADHD that expressed *more* EF deficits got lower scores in employer-rated categories, and higher scores in the % jobs quit categories above. The point I’m getting at is this: workplace performance issues are not uncommon in those with ADHD. EDF will likely make certain tasks within the workplace more challenging for you, and thankfully I have some solutions for you to try out. My first, and most important recommendation for you is to be open about these deficits with employers. If you feel comfortable enough, ask your employer to sit down with you so you can express a few things about how you would best adjust to a workplace environment. Inform them that you are aware of certain deficits you experience but assure them you can work around them and still complete your job. Secondly, I would advise you to do one of the following: reach out to a trusted psychiatrist or professional to ask about CBT or another way of improving these deficits. It is widely supported that CBT, used in tandem with medication or on its own, can significantly improve ADHD deficits in all domains, not just EF (Pan et al., 2019). So, if you are experiencing a lot of these deficits and it is affecting your ability to work or perform daily tasks, please contact a primary care physician or trusted psychiatrist (if you have access to one).

Now that we’ve looked at the big hitter, we have more to discuss in terms of Focus/Attention. Our next stop will be a bit of a time crunch, as we look at why and how people with ADHD struggle to perceive, manage and grasp the concept of time and the passing of time. I wouldn’t want to waste any of your time, so let’s explore this phenomenon and hopefully increase our understanding of the minds of those with ADHD (and I promise not to make any more puns or references using the word “time”).

Chapter 2: Where Did the Time Go?

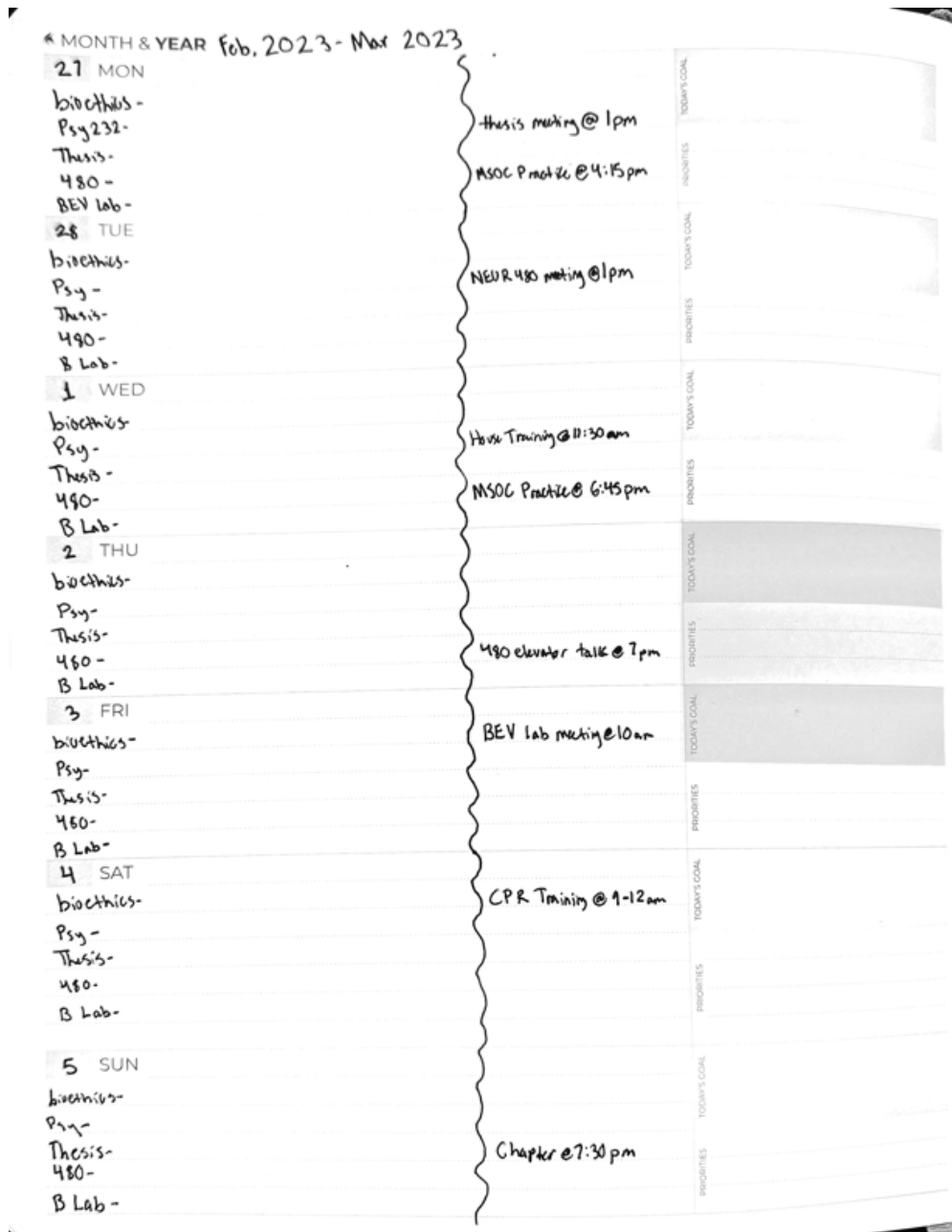
The burden of living in the 21st century can be summed up in a few words: Where did the time go? For most of our lives, we barely stop to consider the notion of time passing. Many of us, ADHD or not, often struggle with perceiving, managing, and using our time effectively. Whether that be in the context of organizing our days, knowing how to use time effectively in a social context, or just simply understanding how long an hour of time is, it's easy to feel overwhelmed or lost when trying to perceive time. However, those with ADHD experience more deficits when it comes to time perception compared to those without ADHD (Meaux & Chelonis, 2003). What exactly does this look like you ask? Allow me to illustrate what this may look like in the everyday life of someone with ADHD.

When I first got to college, I assumed that making friends and fitting in would be different than in high school. High school was a cesspool of immature, egotistical children who were trying to figure out who they were. Many of them, did so by saying yes to all kinds of ridiculous things in a desperate attempt to fit in or be “cool”. I was not one of those kids. Having changed from public school to a private high school I went from having a lot of friends to very few. I mostly kept my head down, focused on school and sports and stuck to my past friendships, and kept my circle very small. I was horrible at making friends, so I just didn't even try making them at all. Yet, once I got to college, I was determined to change that. My ADHD had other ideas. During my freshman year, I once again felt as if I didn't have a group or identity. I roamed around occasionally making small conversations with my peers. My only real friend was my first-year roommate and teammate (shoutout to BR 324).

Why was I awful at making friends and meeting new people? In hindsight, my time perception (or lack thereof) was a big factor. When people with ADHD struggle to perceive time, it's not just in the context of getting work done or organizing their day. It can manifest socially as well. I was horrible at perceiving time in conversations. When should I join in? How much silence is too much? Should I think about my response or just respond immediately? These simple things were an enigma for me. And this is what some major studies have explored as well. In a study comparing children with ADHD and children without ADHD, they noticed that the children with ADHD have a temporal perception deficit which could affect language skills and motor timing (Smith et al., 2002). So, the inability to perceive these small temporal periods correctly impacts our ability to socialize effectively (simple right?) What we really need to

gather from this, is that ADHD can affect our time perception and management in more ways than one. On the bright side, there are many ways to combat these deficits. Most studies show that when treated medically, these time disparities tend to normalize. Other methods such as the Zimbardo Time Perspective Inventory (ZPTI) can also help improve these deficits in those with ADHD (Ptacek et al., 2019).

Another way these deficits appear is in the context of time management. When trying to manage your time, it can be hard to know how much time you will need to get assignments done or study for tests. Say I had a test on a Friday, I would usually decide to start studying for the test on Wednesday of that week. In my head, I'm saying "I have two whole days to study, that's plenty of time." I go about my week and once I get to Wednesday, I realize that I don't have two *whole* days to study. My busy schedule as an athlete combined with my other commitments means that I only have a few hours each day to study. So here I am with a terrible perception of time. However, some may argue that everyone is prone to this, and I would agree. Many of us, ADHD or not, procrastinate or underestimate how busy we truly are. Yet, for those with ADHD we are experiencing this inability to manage time due to some underlying EF deficits (remember this?). In the domain of time management, people with ADHD report much more concern in comparison with their peers regarding their ability to manage time and prevent procrastination (Kane et al., 2011, Green & Rabiner, 2012). It's very likely that these deficits are caused by an inability to properly prioritize and organize which we saw earlier in the EF section. Fortunately, these time management skills can be improved through practice and thoughtful organization. Like the EF section, being mindful of how you label things in daily planners can help your time management immensely. Personally, I like to set time boundaries for things within my planner. I give myself a specific time frame to do each thing throughout my day. Here's a picture of my planner I use during the school year, and how I like to organize things:



Now I understand there isn't much written down, but once I have assignments, deadlines, and due dates, those will be emphasized by underlining, numbering, etc. to make sure I know what needs to be prioritized. Even simple solutions like keeping your planner neat and consistent can help your organizational skills immensely.

I'd like to shift our focus to some of the neurobiology at work here. I read some interesting studies regarding how blinking affects our perception of time. To start, research has explored the idea that blinking is a mechanism that allows us to perceive time and its passing. It

is understood that blinking allows us to perceive time since our environment can change during the time that our eyes are closed when we blink. However, this is where things get interesting. The striatal pathway that controls the rate of blinking is controlled by *dopamine*. Research has shown that when these pathways have an excess amount of dopamine (primarily in the nigrostriatal pathway involving the D2 receptors) people tend to experience more rapid eye blinking. This increase in rapid eye blinking causes people to overestimate visual and auditory subsecond intervals (Terhune et al., 2016). What this means is that right after we blink, we reset our perception of time. Think of it like the lap function on a stopwatch. Thus, the more we are blinking, the more we perceive time passing, and we overestimate time intervals (essentially, if you blink more, you think time is passing faster than it is!). Now I want us to think back to the discussion we had on the dopamine hypothesis for ADHD. When dopamine levels were high, people blinked more and tended to overestimate how long something lasted. So, if people with ADHD have a *lower* overall level of dopamine in the striatal pathways, they must be blinking *less* than those with a regular level of dopamine (or elevated level). This causes them to underestimate time intervals, making them more disorganized (both spatially and temporally), and could possibly cause them to experience an overall lack in focus. This is another way to rationalize and explain what is happening at a biological level within the brain of someone with ADHD, and why they may struggle to manage time effectively (just some fun extra information for you!).

As usual, the good news is that there are methods to help deal with these kinds of issues. The obvious solution is to use medication to help raise dopamine levels. However, there are some other methods that may help improve focus and attention by controlling eye blinks. This study had the children focus on a point across the room and resist the urge to blink unless it was necessary. After doing this for only a few minutes each day over the course of 12 weeks the children were able to significantly improve their ability to focus just by controlling their rate of blinking (Lai & Chang, 2020). In this case, the children didn't even need a pharmacological intervention to improve their symptoms. It is likely that a pharmacological intervention strategy may normalize dopamine levels within this pathway, but drug related solutions suffer from accessibility issues.

Clearly, the domains of time management and perception are heavily interwoven with EF and our ability to focus. Those with ADHD do experience difficulties when trying to manage

time and perceive it, but they are not doomed to fail. Many methods and studies are furthering our understanding of ADHD and time-related domains, as we understand more each day. Our next chapter will be one of major importance. It's time to explore how ADHD affects our ability to focus in academic environments, and how it impacts the success of students both in the short term and long term.

Chapter 3: I Hope You Studied for the Test

This chapter is likely the one many of you reading this have been waiting for. One of the most common concerns is the difficulty those with ADHD experience in academic environments. To be fair, modern academia is a minefield for those with ADHD. Sitting still for hours on end, being told to focus for long periods of time on one thing, avoiding external stimuli in a classroom full of other people, you get the idea, right? Let me expand on this a bit. When I was 8, I got in trouble for interrupting class multiple times. At first, the teacher told my parents, “Your son is so bright, he always does well on assignments, but recently he’s been blurting out in class, not completing his worksheets, and his grades are starting to drop.” Of course, my parents were concerned. I never talked. I was always quiet, even around my parents and the few friends I had. My parents knew I had ADHD, I was diagnosed at seven, but they didn’t know it was going to affect my schooling so much. Before we really get into things, it’s important to understand that these deficits can present in many ways. The main issue is that ADHD is associated with poor academic outcomes (Loe & Feldman, 2007, Biederman et al., 2004, Barry et al., 2002). What this “blanket statement” really means, is having ADHD makes it much harder for you to succeed in an academic environment! (Obviously, this is an issue). The Feldman study found that children with ADHD scored significantly lower in reading and arithmetic achievement tests, which makes sense because reading requires one to focus without being distracted while arithmetic requires good mental and spatial organization (both of which are harder for many with ADHD as we discussed earlier). Thankfully, the treatment seems to significantly improve these academic outcomes. Medication is the obvious first choice for many, but for those who do not have access to medication, behavioral treatment options (such as CBT and other popular interventions) have been shown to reduce the core symptoms of ADHD and increase productivity. Furthermore, more recent studies have shown that multimodal treatment, combining medication and behavioral intervention, significantly improves academic achievement scores in those with ADHD (Arnold et al., 2015). For those interested in what kinds of behavioral treatment were used in the multimodal model, they primarily used: Parent training based on Barkley and MacMahon, an STP program designed by Pelham, and a school-based treatment consisting of two different parts (The MTA Cooperative Group, 1999). (If you want more specifics, check out that article in the references to dive deeper into the individual methods

themselves.) For those with ADHD struggling with their overall academic success, there are plenty of ways to improve.

Let's shift our focus onto some more specific examples and talk about tests. More specifically, test taking and the struggles those with ADHD face during formal examinations. Being asked to sit still and focus intensely on a task for extended periods of time is not usually the strong suit of those with ADHD. The same was true for me. In elementary school, we used to do these multiplication tables, and you had a certain period to complete a bunch of multiplication problems. I was great at math, but when I was forced to rush and focus intensely under unreasonable pressure, I couldn't do it. I usually ended up having to do a different test (with much harder multiplication problems) that would give me more time to complete it. Similarly, in high school and even now in college, I have occasionally used my ADHD to get extra time for exams. In my case, I only use my "extra time" for the big cumulative exams at the end of a semester since those exams are usually around 3 hours (I really have a hard time focusing on one thing for longer than 1-2h hours max). Now, for those of you reading this that also experience difficulties taking tests, whether it be due to your ADHD or not, don't worry. Test-taking is a skill. It can be trained and improved like anything else. However, we need to examine some of the research first and look at some neural networks as well before we can start working on those skills. To summarize this tricky domain of research, there has not been a direct correlation observed between ADHD and the overall reduction of test scores (at least, not enough to constitute a solid argument.) However, ADHD *is* linked with several studies indicating a relationship between test anxiety and ADHD (Dan & Raz, 2012, von der Embase et al., 2018). Another study suggested that those with ADHD simply perceive they are performing poorly even though they are performing on par with their peers (simply put, they have no confidence in their ability.) I know that is a lot, so let me break it down. Beginning with test anxiety, test anxiety has been known to cause lower academic scores (Chapell et al., 2005). Thus, higher test anxiety means, on average, a lower score. Turning to ADHD, we see that in a 30-year meta-analytic review, students with ADHD had higher average test anxiety compared to those without ADHD (von der Embise et al., 2018). While ADHD itself may not *directly* cause lower test scores, it does seem to be correlated with higher test anxiety, which in turn may facilitate lower average test scores. Another possible reason is a bit more speculative, but I still find these kinds of conversations fascinating. Remember our little discussion on time? We know now that people

with ADHD struggle to perceive time passing and often tend to overestimate or underestimate time periods that pertain to tasks.

Obviously, this is an issue for testing. For example, if someone with ADHD is told they have 2 hours to complete an exam, they may rush and feel pressured under an unrealistic, or perhaps it would be better to say, a *self-fabricated* time crunch. On the other hand, they could take way too much time on their first few questions and end up having no time left to complete the rest of the exam. While I am merely speculating here, I encourage you to take these seriously. These are situations I have found myself in more than a few times, and it is infuriating. I am NOT saying that ADHD is the exact cause of these situations. I AM suggesting that people with ADHD are more likely to make these miscalculations of time, and as a result of that, will receive lower average test scores simply because they were not able to effectively use their given time during that test. Now, what can we do about this? The answer is simple. First and foremost, I strongly encourage anyone still in school who may be reading this to go to your school's Accessibility Services and find out what accommodations you are eligible for. To get accommodations you need almost always need to have a formal diagnosis of ADHD. Thankfully, if you do not have a formal diagnosis, these offices can usually help you find a reliable way to get a formal diagnosis (I say usually here because I cannot generalize how each individual school district, high school, university, etc. does things). Once you can get that diagnosis, you usually have access to a few different accommodations. The most common accommodations granted to students with ADHD regarding testing are extra time (usually time-and-a-half), a separate testing environment, the ability to schedule exams on different days, and in some cases an alternate exam structure (this is a bit more uncommon). Again, I strongly encourage you to find out if any of these accommodations are available to you, and if so, please use them. I have used them myself, and they are so helpful. Personally, I have only ever requested extra time because I know during longer exams my focus wavers so having extra time allows me to not rush myself and make sure I am focusing to the best of my ability. Outside of requesting accommodations for testing, there are a few other things I would recommend to those who struggle or feel they perform poorly on tests. The first suggestion may seem obvious but not many people understand how helpful this can be. You need to *practice*. I know right? This is especially true for those who experience lots of test anxiety. If you spend all week dreading the test, you will build up so much nervous anticipation that you may not even make it through the first 10 minutes. Instead, you

should simulate the testing environment (as best as you can) while you are studying or preparing for it. Earlier I stated that test taking is a skill, and it is one that can be improved. The first step to overcoming your test anxiety is to practice taking tests. Please do not think I am so naïve as to think that all you need to do is practice a few times. This is easier said than done and will be very difficult for some of you. I know how hard overcoming some of these anxieties are (you will find out just how much I understand these feelings later in Part 2). I promise you if you can commit to the idea of just getting 1% better each time you practice it will become much easier to stay motivated. Before I give you another strategy, I want to reiterate that none of these are a replacement for studying effectively. If you do not study effectively, you will have no chance of performing well on the exam no matter how confident you are. For those interested in how to study more effectively, I would suggest reading the book *Make it Stick: The Science of Successful Learning* by Henry L. Roediger III, Mark A. McDaniel, and Peter C. Brown, as they explain how to best learn and retain information so you can utilize it effectively and consistently.

Moving on, the second strategy is more of a personal one I have used for the big tests. I would like to give a shout-out to my mom for this one since she's the one who taught me this (love you Momma G). Before you take that big test, make a quick pit stop somewhere private (unless you aren't embarrassed to do this in front of others) and just take a few deep breaths before posing in whatever way makes you feel the most powerful. Pretend you're posing so someone can make a statue out of you, and you need to be heroic. The story my mom tells me is that she did this before any trial she had. As a Hispanic woman practicing law, which is a historically male-dominated workforce, my mother was always very aware of how some people may not take her seriously. She did this posing trick before all the trials she did as a prosecuting attorney, and she still uses this trick before any cases she hears now (yeah that's right, Momma G is a judge now. I mean it when I say my mom is one of my biggest heroes). So, try this out before you take your next test. Clear your mind, breathe and pose however you need to make yourself feel strong and confident. I've used this tactic quite a few times, and while I may feel a bit dumb at first, I have usually done better on the tests because of it.

As we move on to our last section in Part 1, I will briefly mention something that I want readers to consider each time I bring in research to this project. Do not just take research as an objective fact. Every day we are learning, re-learning, and re-evaluating how we understand the world around us and our own biology. Also, do not think these studies are even close to being

accurate enough to generalize. I am generalizing (sort of) to help people understand what *may* be going on in their brains. As we will discuss later, these studies have a long way to go before they can even begin to be truly indicative of the general population. With those brief points out of the way, let's move on to our last chapter, as we talk about how ADHD affects people in the workplace.

Chapter 4: Clocking In

How many of you reading this have had a job? I would assume that almost all the people reading this work have had at *least* one job. Well, let me tell you a little story about jobs and ADHD. In high school, I had the opportunity to work as a kennel attendant for a local veterinary hospital, and while I really enjoyed getting to work with all kinds of animals, the job was a challenge for me. To illustrate the responsibilities of my job, I will put them into a friendly list, and then break down exactly why I struggled so much with this job:

- Feed & Water all kenneled animals
 - Follow specific instructions for animals that had dietary restrictions or special foods
- Take all animals out to play and relieve themselves at least twice per day
 - Animals must go in rotating shifts (group the animals up)
 - Avoid grouping unfriendly animals in groups together (some must go alone)
- Give all animals medication and fresh towels/bedding before closing up
- Check that all animals awaiting surgery or other medical attention are safe and not in severe discomfort

While this list may not seem hard to some, it was especially challenging for me. I constantly forgot to take certain animals out (mainly the ones that had to go alone), and I also forgot to give some animals water, as I was switching my focus from one thing to another every 5-10 seconds. These shortcomings were caused by my ADHD, and while that does not provide me with an excuse, it does give me an explanation and gives me a tangible, definitive reason behind these mistakes so I can work on improving and mitigating these mistakes. ADHD is constantly adding more stress and pressure to the lives of those who work jobs of all kinds. Shift workers, blue-collar jobs, typical 9-5's, everyone who works in the professional world could be struggling to do their jobs effectively due to ADHD. However, before we can get to more specific examples, we need to look at the bigger picture. Are those with ADHD more likely to experience impairments in their occupational tasks? One study found that when examining 11 different occupational measures of workers, both with and without ADHD, those with ADHD experienced more occupational impairments across *all 11 measures*. Furthermore, they also noticed that self-ratings of EF deficits were significantly predictive for both groups (Barkley & Murphy, 2010).

Let's break this down. For those who had ADHD, their EF deficits caused them to have higher rates of occupational impairment, and in some cases, the impairment was to a much higher degree. In laymen's terms, those with ADHD are more likely to struggle completing occupational tasks, and in some cases, make more significant mistakes during task performance. The second part was just something I found interesting. When they say that self-ratings were predictive for all groups, they are essentially saying that whenever a subject believed they were having or going to have EF deficits, they ended up *having* EF deficits. I just find this fascinating since it brings up the notion that what you think will happen is more predictive than the actual biology behind what is happening (which is a debate for a separate body of work).

Another study looked at college students in the workplace, and how their jobs were affected by ADHD. They found that overall, the students with ADHD displayed significantly more difficulties than those without ADHD, primarily regarding the types of symptoms and the number of areas impacted (Shifrin et al., 2009). While this was expected, there are some interesting points they made further on in their discussion. Overall, the majority indicated symptoms like "Am easily distracted," "Difficulty sustaining attention," and "fidgets or squirms in seat." Interestingly, when they divided the participants by subtype, these common symptoms changed. For Inattentive Types, "fidgets and squirms" was replaced by "forgetful." Alternatively, Combined Types gave "feels restless" as their most common symptom. Another interesting relationship in their data was rates of firing. Participants with ADHD had a rate of .58, which is very high compared to the .19 rate of participants without ADHD. This means that those with ADHD are more likely to have been fired or be fired compared to those without (which is both fascinating, and a bit unsettling). Finally, (to really drive home this relationship between ADHD and job difficulties) we turn to a review article examining 35 articles, 19 of which are longitudinal (that means they are examining the same study population over a set time to see changes based on specific variables), where they explored the occupational impairments of ADHD youth transitioning into the workplace. What they found, was that those with ADHD had more educational impairments, making them less likely to graduate high school and college. Subsequently, they faced lower occupational attainment, more job instability and had more job performance impairments (Gordon & Fabiano, 2019). As if that wasn't enough, those with ADHD also had lower annual income, more public aid reliance and increased risk for homelessness as well. Trust me, these statistics are not damning, but they also should not be

taken lightly either. Now that you understand job difficulties are not only common for those with ADHD, but also expected to some degree, we can begin to discuss some ways that you might be able to mitigate these deficits.

If you are to learn anything from this next section, please make sure it is this paragraph. If you are either applying for jobs, whether they be corporate, research based, or anything in between, please (and I cannot stress this enough) PLEASE do not go into that job interview thinking it is ok to leave out that you have a formal diagnosis of ADHD. I am *not* telling you to put ADHD at the very top of your resume, in fact, I wouldn't put it on there at all. I *am* telling you to be upfront about your ADHD during the process of an interview or anything else that comes after resumes. Let me be as specific as possible here. Once you get past the resume stage of any job application process, you will (likely) go through an interview process next. You *should not* immediately tell them that you have ADHD. You never want to start off saying you have any kind of downside. However, you can weave your ADHD into your answers. For example, when I was applying to different summer research programs, I got into a very good program sponsored by NSF for Computational Neuroscience at the University of Missouri. Once I met my PI, the head of my lab, she asked me all kinds of questions about what I was familiar with and what I was able to do. For instance, she asked me: do you have any prior formal research experience with regards to data analysis and collection? And how familiar are you with using excel and MATLAB programs? Here's how I answered her. "Well, I have done research at my institution alongside my major advisor, and I am always using MATLAB and excel to collect, analyze, and manipulate data from our studies. Originally, he had reservations due to my ADHD sometimes making me prone to miss deadlines or get hyperfixated on certain unimportant details, but I mitigated those by doing x, y, z..." So, by doing things this way, you can still give professional and accurate answers about your relevant skills, while also mentioning that you have ADHD. The key comes after you mention it. I went on to explain how I mitigated those deficits to prove that for her lab, there would not be any significant roadblocks for me to perform, but at the same time, I also let her know that if a small mistake with timing or attention happens, it is not simply because I am being irresponsible. I implore you to save this, write it down, make it your lock screen, but please just remember this one little skill. It has been a huge help for me so far in my very limited professional career and I am confident it will continue to help me as I progress further. Moving on, another important thing for you to know is that ADHD

is considered a cognitive disability. As such, ADHD issues in the workplace are considered in light of the Americans with Disabilities Amendments Acts of 2008 (ADAAA). To summarize this act, they basically say that those with cognitive disabilities are protected from workplace discrimination in employment (Robbins, 2017). The interesting thing about Robbins' article is that he outlines how managers can better their workplace environments so their ADHD employees can efficiently operate. He uses the August 2013 Workers' Compensation Guide to illustrate some examples of how managers can preemptively manage ADHD employees.

- Divide large assignments into smaller tasks
- Provide a checklist of assignments
- Provide electronic or physical planners/organizers
- Develop a color-coded system (huh... seems like someone else mentioned this)
- Set a timer giving ample time to complete assignments

All of these are things managers can do to help their employees with ADHD thrive and work effectively. However, it is not just on managers to change and learn to adapt, it is also on us to learn how to mitigate our symptoms and work effectively. One strategy I really like using is the so called 30-60 strategy given to me by my psychiatrist. He said, if any task takes longer than 30 minutes, put your phone on DND. If any task takes longer than 60 minutes, set an alarm that stops you at exactly 70 minutes and then you must take a break. What he's doing here is giving us a blueprint to maximize our efficacy when working. I used this a lot during my summer research. Usually for data entry or analysis, my phone went on DND for 30-60 minutes while I focused solely on those tasks. I invite you to come up with your own time limits and try them out while working or studying or doing tasks of any kind. Lastly, one other way we can mitigate workplace difficulties is for those with ADHD to see a counselor or therapist regularly.

Remember how the self-reported deficits correlated with the actual deficits in those studies earlier on? Your self-confidence matters. If you are unconfident, nervous and constantly worried about making mistakes, you will not be able to work efficiently at all. Seeing a qualified professional and having them help you lessen the burden of feeling inadequate, doomed to fail, or like you do not belong will allow you to focus more on your job and less on your constant and obsessive worrying. I personally struggle with constant imposter syndrome and talking to a counselor has really helped me get over that and allowed me to focus on my work and my studies.

While ADHD might impact the live of us all in many ways, from our inherent ability to focus, our academic success, our workplace efficiency, even to our ability to perceive and manage time. I hope that after reading through this first section you not only feel more empowered and understood, but you also feel more equipped and confident in your ability to take control of your life and start using your ADHD to accomplish bigger and better things than you ever imagined. I truly do view my ADHD as a superpower. I have befriended it, and I learned to stop fighting it. I now understand how it affects me, my biology, my behavior, and my actions with regards to how I focus and direct my attention. I hope that those reading this with ADHD can begin to feel the same way I do, and those without ADHD can understand and realize how much the lives of those around them are affected by ADHD. With that being said, we move on to Part 2 where we discuss the rather unknown side of how ADHD affects people and their social abilities.

Part 2 SILENT BUT DEADLY:

How ADHD affects social
function and cognition

I can still remember my first day of 3rd grade. Walking into the room and seeing my best friend sitting there filled me with joy. The year was going to be great, but I was wrong. I had just started taking my ADHD medication (Vyvanse for those wondering), at the ripe old age of 8. Having been diagnosed with ADHD earlier that year, I wasn't aware of what that meant. From the very first day, I struggled immensely to make friends in my new class. I constantly interrupted people when they were talking, I wasn't the best at filtering my words, and I often had to ask people to repeat things multiple times when they were speaking to me. At the time, I just thought I was being myself, and I was. My peers, out of pure lack of understanding and knowledge, alienated me and labeled me as weird. So, what was my solution? I reverted to how I was before I got into school. I became silent unless necessary, and altogether I stopped socializing with people unless I was required to. For those reading this, perhaps you have also had this happen to you, or perhaps not. When brainstorming what to name this part, I ended up asking a friend for some insight. I explained to him that I wanted to write about the side of ADHD I felt often goes unnoticed, but also causes some of the worst deficits, in my opinion at least. He jokingly said, "Ah the silent, but deadly one" and I immediately knew that was it. This part is all about that often overlooked or unseen side of ADHD. The social deficits. For those who have ADHD, regularly read this literature, or are just more versed in neurological conditions, the social side of ADHD is not overlooked. However, when interacting with most people, I often find they have no idea just how much ADHD affects the social lives of those who have it. Many of my close friends, the ones who have known me and about my ADHD for many years, were dumbfounded when I laid out all the different ways ADHD affected me and my social life. Perhaps many of you reading this have felt the same way when talking to close friends or loved ones. That feeling of not being fully understood, feeling like an outcast, like you don't belong. This section is very important to me. I have spent most of my life as a social outcast, in part because I failed to realize that I needed to work to improve socially, but also because my peers simply were not aware of the deficits ADHD causes. Hopefully, by the end of this part, you, and those around you will have a more intimate understanding of how ADHD impacts social cognition and function, so we can all understand and interact with one another in a more cohesive and effective way.

Chapter 5: Distracted Discussions

As the title suggests, this chapter is about the heart of human social interaction: conversations. Conversations are a minefield for many with ADHD, and for some, they can even be anxiety inducing. This concept is often one that many of my peers don't truly understand. Conversations are almost second nature to many of them. For those with ADHD, not so much. Conversation requires an immense amount of focus for us, and many of us also struggle with anxiety during social interaction because of our fear of rejection due to a mistake. You may be thinking, are people with ADHD really experiencing this much peer rejection? Yes, they are. One study saw at baseline, 52% of children with ADHD were rejected by peers, compared to the 14% of the randomly selected classmates (Mrug, et al., 2012). Over half of the children with ADHD were rejected by their classmates. As indicated in the beginning of this section, ADHD can cause a multitude of deficits socially, but for this chapter I want to really focus on the deficits that happen during conversation. Let me give you an example.

Earlier this semester I was sitting in the main common area of Julian, our science and math building on campus, having an interesting conversation with a younger girl who was considering majoring in neuroscience. Not only was she eager to learn about it, but she wanted to pick my brain about why I cared about it so much. She was telling me about why she wanted to major in it, why it mattered to her and what she hoped to do once she was moving on into her professional life. Or at least, I think that's what she told me about. She had given me a good 2 to 3-minute spiel on her passion for neuroscience (which is just amazing to hear) but I had heard almost none of it. You know what I did hear? I heard the conversation of two guys behind me arguing about what would win in fight between a grizzly bear and a silverback gorilla (the obvious answer is grizzly bear, for anyone wondering). I ended up asking her if she could repeat some of it and apologized for zoning out. Thankfully, she was very understanding, and I had a very good conversation with her after that. But why did this happen? What was happening in my brain that suddenly made it decide to process all the background information rather than the information I was actively trying to focus on?

To start, the core of the problem is that there were multiple stimuli involved here. Both the conversation I was involved in, and the one happening behind me. Ultimately, my brain opted to prioritize a bit of both, and I ended up looking like a jackass. So, we know the root cause, but what really happened? When presented with multiple stimuli, the brains of one study's

participants with ADHD appeared to be desynchronized. More specifically, the posterior parietal cortex was desynchronized whenever irrelevant speech or music was present during their simulated conversations (Salmi et al., 2020). Let's break this down. These participants were trying to focus on a conversation, and when the researchers played the audio of music or another conversation. As a result, they noticed a desynchronization of the posterior parietal cortex for those with ADHD. Following? This means, that when external stimuli are present, there could be desynchronization in the brains of those with ADHD causing them to lose focus and miss entire parts of conversations altogether. This is a prime example of how people with ADHD can do well in 1-on-1 conversation, but struggle once more people are added. The more people, the more stimuli being thrown out into the environment, meaning more chances for desynchronization.

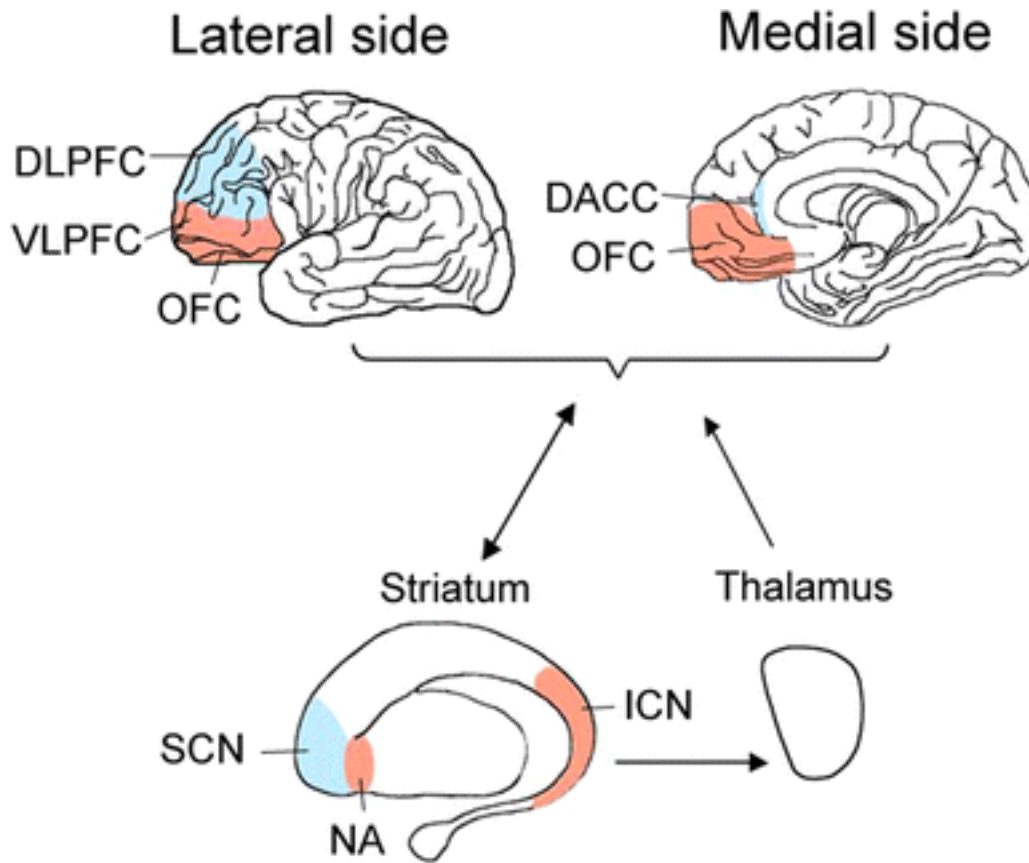
If this situation sounds familiar, don't worry – you're not alone. There are ways to get better at being a good and attentive listener, regardless of the desynchronization in your brain or not. Remember from earlier, our biology is not the be-all-end-all. I want to help you understand the biology behind these deficits, so you can recognize them and enact real change in your daily life. How do you begin improving your skills as a listener? The first tip I would give you is to understand how to use body language to indicate you are listening. Nodding your head, occasionally saying “mmhm or yeah” can also be a good idea (just don't overdo this one) and making regular and consistent eye contact are all great places to start.

Next, I would suggest you practice listening to people and remembering what they said. Part of being an effective listener is listening to understand, not to respond. One thing I did (and I still sometimes do) was to participate in conversations and just listen. I wouldn't really say anything or make any points, I just listened. Then, when the conversation died down, I would try to write down at least one thing each person said. If I could do that, then I had done a good job listening. Now some might find this a bit extreme, but for me it really helped me learn to be patient and to listen effectively. Maybe these tips can help you improve as a listener and help you learn to filter out those unimportant stimuli. Believe me, improvement was not easy, and I often felt like a loser for having to do things like this but be patient with yourself. Give yourself a break, you're trying and that already half the battle. Moving on, we arrive at the doorstep of what is perhaps the most well-known social deficit in ADHD – interruption.

Interruption is referring to the habit many with ADHD seem to have within conversation. They will immediately blurt out what is on their mind, even if another person is talking already. I have been and continue to be prone to this symptom. However, this symptom is just the cause of a few minor deficits, and it can be fixed and surpassed almost entirely. Here, we go back to meet some old friends of ours, working memory and spatial attention. If you remember these two areas of cognition are some of the most affected areas in ADHD. These areas do not just pertain to our general focus, as they also affect our social abilities as well. So, why do we interrupt others? There are 3 main reasons. Lack of impulse control, struggle regulating focus, and fear of forgetting relevant information. The first two reasons are textbook ADHD. These have EDF written all over them. Trust me, that concept will never go away. Not only do people with ADHD struggle to control their impulses, as we have already discussed earlier when talking about the default mode network and task network and in the DSM-V criterion for diagnosing ADHD. They also struggle to remain focused and attentive during conversation, like we previously discussed in this chapter. The interesting one is the third reason. The fear of forgetting important or relevant information. Why would this fear be present in those with ADHD? Surely even normal people forget good points here and there during a conversation. Sure, but people with ADHD are known to have poor working memory compared to those without. Meaning, they are more prone to come up with a good point for a conversation and then forget it before getting to say it.

Now, I'm not justifying interrupting someone just because you came up with a good point, but at least now you might have an idea as to the motivations behind these tendencies. While you may be expecting me to show you articles that demonstrate how disruptive behavior is common for those with ADHD, that is not the case. I want to propose some interesting and potentially eye-opening neural pathways that may be involved during these disruptive behaviors. Almost every single meta-analysis out there will tell you that people with ADHD are prone to interrupting others, but wouldn't it be cool to try and figure out what's going on? One brilliant study examined the mechanisms that regulate emotional problems from the understanding of ADHD and comorbidity with disruptive behavior disorders (DBD). Let me preface by saying, if you often interrupt peers due to having ADHD, this does not mean you have a DBD. They simply wanted to examine *potential* mechanisms by looking at a specific relationship between morbidities. They found that the role of abnormal connection in each cortico-striato-thalamo-

cortical (CTSC) circuit, particularly the emotion circuit, may be responsible for targeted EDF at the neural level (Zhu et al., 2018).



(Zhu et al., 2018)

To summarize exactly what they say, they define the EF circuits of ADHD as either “cool” or “hot.” Cool EF is required to solve abstract and contextualized problems including response inhibition, adaptation, task-switching, etc. On the other hand, Hot EF includes the motivation, reward, emotional responses, and emotional decision making. The pathway involved in this cool EF originates in the DLPFC and DACC and extends through the superior caudate nucleus (SCN) and thalamus (see the blue regions in the figure above). The pathway of hot EF is hard to distinguish from cool EF, since cognition is composed partly of emotional information. Cortical neurons originating from the ventrolateral prefrontal cortex (VLPFC) and the orbitofrontal cortex (OFC) project to the nucleus accumbens (NA) or the inferior caudate nucleus (ICN) and thalamus (see red regions in figure above). So, now that I’ve bombarded you with all

this complex nomenclature and technical information, let's break things down. The main point of all this is to help you understand that these networks are responsible for two major things. Response inhibition, and delay-related deficit. The cool EF pathway is being dysregulated, causing response inhibition. Essentially, the person is unable to keep themselves from responding to a stimulus, like a thought that is relevant to a conversation (its coming full circle!). Similarly, on the hot EF side of things, these emotional behavior related circuits are likely associated with behavior problems in ADHD, meaning these deficits on the "hot" side of things could be exacerbating the dysregulation even more.

Knowing that these deficits can happen and how they might happen is great, but how do we prevent them from happening? I want to bring our attention back to the reasons people often interrupt others, and when we look back over those, there is really one big issue. We can't slow down our brains. They run a mile a minute and we lose our thoughts just as fast as we get them. One way to work around this is to take notes during conversations. I wouldn't advise you to do this for an average everyday conversation but for those important ones with family, close friends, or any other important person, take little annotated notes of what they say, write down questions you have (or use shorthanded notes to remind you of those questions), and make sure that you maintain good eye contact while you are taking notes.

While conversations are a huge area of deficit for those with ADHD, there are still many more areas of social life that remain affected. Our next area of focus is peer relationships, and how ADHD affects our ability to develop, maintain relationships with our peers. In addition to this, we will explore ADHD and peer rejection, alongside other facets of social interaction involving peer relationships.

Chapter 6: Peer Relationships

The term “peer” seems a bit loose to me at times. Obviously, when I say peer, I’m referring to someone who you see as an equal to you, like a classmate, friend, acquaintance, etc. The relationships we have with our peers are often overlooked in terms of their effect on our daily life. Everyone has close friends, those who support you, fight for you, and never let you settle for being a lesser version of yourself. I am *not* talking about these people. I’m talking about the people you got to class with, the ones you occasionally see and/or talk to, but never really become friends with. When I was in 1st grade, I had many friends (as all young, innocent children usually do). However, 3rd grade was when things really changed. I was recently diagnosed with ADHD and began experiencing social deficits daily as a result. I had 1 real friend, who thankfully never left my side, but when it came to any other kids at that school, I felt isolated. I was awkward, and other kids in my class quickly picked up on it. The social skills they naturally had, were like a foreign language to me. Combining this with my now growing social anxiety, I had one hell of a formula for being labeled as a loner. Which is exactly what happened. I was labeled the “quiet, loner kid” and at first, I was ok with it. I didn’t want to talk to anyone but my friend, so it worked for me.

But nothing stays the same forever. In the coming years, my friend made more friends and I saw them less, meaning I was truly alone now. Fast forward to middle school and high school, the same situations occurred. My social anxiety and lack of social awareness caused me to really struggle when interacting with my peers. I was still an outcast, and it weighs heavily on you as a person. I desperately wanted to be social. Human beings are social creatures, and there is a growing sector of literature suggesting that being antisocial has detrimental long-term health outcomes (primarily brain health). I experienced peer rejection all the way through high school, and even slightly here in college. I struggled and clawed my way out of my social anxiety and forced myself to become more social. But people don’t realize how hard it is to be outcast like I was. I became severely depressed, reliant on my own ability to satisfy and support myself. Believe me, no matter how strong or independent you think you are, you won’t win against yourself. Why am I telling you this? I want people to understand the immense impact peer relationships have on the lives of those with ADHD. We can have as many “friends” as we want, but if we go out into the world and feel alone, misunderstood, and unheard by our peers, we will not last long before we begin to struggle and falter.

Before we can look at some specific examples of the literature regarding these peer relationships, we need to understand just how common their effects are. According to the literature, 50-70% of children with ADHD experience peer relationship difficulties. Similarly, research also suggests that 56-76% of children with ADHD have no mutual friendships (Gardner & Gerdes, 2013). Numbers don't lie, and these percentages are certainly representing a majority. If you have ADHD, you most likely struggle with peer relationships, and struggle to make real friends, plain and simple. Now, while knowing this helps us comprehend the scale of the issue, it does not actually explain the *why*. For years, research has focused on the disruptive and offensive behaviors of children with ADHD that leads to peer rejection. However, I believe that it is not **entirely** the fault of the children with ADHD. The peer group has some fault as well. One brilliant study seemed to agree with me, as their review called for more examination and intervention within peer groups alongside ADHD interventions. The three main problems they believe the peer group is responsible for are *Social Devaluation, Exclusionary Behavior and Reputational Bias* (Mikami & Normand, 2015).

Looking at social devaluation, they explain that children will often discriminate from anything that is not the "norm" for that classroom environment. Surprisingly, children with ADHD receive some of the harshest discriminations. Relative to the reactions towards children with physical conditions, depression, and anxiety, peers possess the most negative judgments about children with ADHD (Hinshaw, 2005). Additionally, being labeled as "ADHD" seems to also cause social devaluation with peers making more judgements about those who have that label despite their behavior being within the "norm" (Canu et al., 2007, Whalen et al., 1983). So not only do peers discriminate against those with ADHD, but they do so in a more severe manner, and they will discriminate based purely on the label of a peer being "ADHD."

Next, they discuss exclusionary behavior, which is perhaps the one needing the least amount of explanation. Examples they discussed were saying mean things within earshot, preventing access to resources or information, spreading rumors/lies, destroying possessions, and overt physical aggression (Leary, 2007, pp.105-142). The main problem here, is that this has a sort of domino effect. Such peer behavior broadcasts that the child is low status and discourages other children from including that child (Perry et al., 1988, Reuland & Mikami, 2014). This sort of domino effect is especially harmful as it only exacerbates the level of exclusion for the child with ADHD, making it harder for them to be included the more it happens. As discussed before,

the mere label of being “ADHD” is enough for children to devalue that child, meaning even the label itself could cause exclusion regardless of the actual behavior of the child in question.

Lastly, they discussed reputation bias. Once a peer becomes inclined to view someone negatively, it is often difficult to change that view. For children who are disliked, peers will often interpret their behavior as hostile, and selectively remember their unskilled behaviors. On the other hand, for children who are liked, these same behaviors are perceived benignly (Peets et al., 2007, Peets et al., 2008). What they are saying is that the behavior of a child does not carry as much weight compared to the social reputation of that child. You could have a bad social reputation and be perfectly “normal.” It wouldn’t matter, as children would still scrutinize and alienate you. This is especially true for those with ADHD having already seen how their label alone makes them more unliked compared to their peers.

Now that we’ve discussed how these three domains play out in social context regarding ADHD, how can we use interventions to improve within these areas? To combat social devaluation, positive teacher-child relationships should be heavily encouraged so that child can begin to be thought of as having a higher status within the classroom. Additionally, it gives the child an outlet to express their feelings. Encouraging inclusiveness can be helpful in mitigating exclusionary behavior. While this is much easier said than done, it only really takes one person to step up and ask that child with ADHD to join their group and suddenly the problem is dissolved instantly. Regarding reputational bias, if the strengths of the child are highlighted, their reputation can be somewhat “stainless”, and peers will be forced to admit that their reservations are misinformed and ultimately biased due to their lack of understanding (this one was big for me growing up). Before we wrap up this section of peer relationships, there is one more element that we need to examine, the aspect of relationship quality.

What do I mean when I say relationship quality? At its core, I am discussing the worth of a relationship. There are significant differences in relationship quality for those with ADHD compared to those without. As seen in the previous paragraphs, people with ADHD are universally disadvantaged when it comes to meeting new people. They are much more likely to be seen as less desirable as a friend (Bickett & Milich, 1990). I can attest to this as well. Throughout most of my life I have struggled to make a good first impression at all different ages, and often found myself struggling to make friends quickly, like many of my peers. One study examined the effect ADHD symptomology has on the ability to make friends and determine the

quality of relationships. Their results were interesting, so let's go over them. To start, they found that students with high ADHD symptoms reported greater difficulty providing emotional support and managing conflict compared to their low-symptom counterparts (McKee, 2014).

Furthermore, greater ADHD symptoms in participants and friends were related to reduced quality of relationships. However, if the severity of symptomology was similar between two people, the relationship benefitted overall. These results are fascinating for a few reasons. First, we see that ADHD symptoms were making it hard for individuals to be "good friends", as they couldn't provide support or deal with conflict (Personally, I struggle a lot with empathy and have been called heartless by some peers). We also see that if ADHD symptoms are more severe, the overall quality of the relationship decreased (no surprise there). The cool part (in my opinion) was the fact that similar symptom severity benefitted the relationship. What they saw, was that if they put two people together, who had high ADHD symptoms (likely a lot of social and attentional dysfunction), these people not only had better first impressions, but their relationship quality was good. This is likely caused by the mutual understanding of the two high ADHD people, since they can empathize with one another's inattentive problems (this is not always the case, since some people with ADHD lack empathic response altogether). This study is truly fascinating, but we have some issues to address.

People with ADHD struggle to provide emotional support and deal with conflict, and that makes it hard for them to be a "good and reliable" friend. Like many of these issues, I must begin by encouraging you to do two things: be patient and practice. I am not an expert on dealing with conflict, and I am extremely unempathetic. Yet, I still know I am a good supportive friend. I may not be able to sympathize or empathize when my friends are in distress, but I can help in different ways. For example, when a friend of mine came to me expressing that he was having a sort of crisis, I panicked at first. I told him to just call me and explain what was going on. I knew that no matter what he said, I wouldn't be able to put myself in his shoes or comfort him, but I could listen. I sat there and I listened to everything he had to say. I only responded when he explicitly asked me to, and I was simply being an active listener. In this situation, that was all he really needed. But what if you have a friend who needs that emotional comfort and support? How do you navigate that? Great question, this is what I do. Your friend comes to you, they've got some heavy stuff going on and they need someone to help them out. You must be transparent with them. I would start by saying something like

“Hey, I know you have some really tough things going on right now, and I can’t even imagine what that’s like. I just want you to know that I’m not the best at dealing with emotional support, but you matter to me, and I want you to feel safe and supported. What do you need from me right now?”

Being upfront, and personal with them is important. If you let them know that you aren’t great with emotional stuff, they may be a bit unsure at first. You need to let them know how they can help you support them. For me, I am terrible at knowing what people need. They come to me for support, and I bring solutions. By asking them what they need from you, it takes all that pressure and stress away so you can be present and attentive to their needs. For those reading this and saying “Wow, it doesn’t sound like people with ADHD struggle to be supportive since you seem to have it figured out”, trust me, I don’t. I have spent hours upon hours practicing, thinking, and working on being supportive and more empathetic. I can’t change that I truly do not feel empathy most of the time for my friends when they are struggling or in pain. What I can change, is how I go about helping them regardless of how I feel. Even if I don’t feel empathy in those moments, I still love my friends. So, I make sure I am still present and attentive to their needs because they would do the same for me. I already know I won’t have that immediate reaction of emotions like everyone else, which is exactly why I am still able to be helpful and provide emotional support. This is the entire purpose of this project. To make those with ADHD more aware of their common struggles and deficits so they can begin to work with and around them. I promise that the more you understand yourself and your condition, the easier life gets. Our next chapter will be one that discusses a big obstacle for many of us with ADHD. We’re talking about love and romantic relationships full of that tricky, weird stuff called emotions.

Chapter 7: Falling in Love With ADHD

When I originally named this section, I thought people might misinterpret it, but hey, that's half the fun of being given a completely blank slate and full creative license. When I say falling in love with ADHD, I am not telling you to love your ADHD (ok, maybe throughout this project I HAVE been telling you to do that, but not in this chapter). What I really mean is how are romantic/intimate relationships affected by ADHD? Or are they? (They are, but it's not like ADHD ruins relationships). However, ADHD does affect many facets of intimacy such as, sexual function, sexual behavior, relationship quality, and overall relationship satisfaction. These are a few of the domains affected, but believe me, there are more. To begin, I want to explore some of the touchier topics in this chapter.

Disclaimer: I will be talking about sexual function, sexual desire, and sexual behavior. If this topic is either uncomfortable for you, or you would rather not learn about how ADHD affects those areas of life, I fully understand. Now that you've been warned, lets discuss how ADHD affects these domains.

When discussing sexual dysfunction, we need to get a baseline understanding of what we already know. Studies show that sexual dysfunctions are frequent among psychiatric patients, likely due to the influence of psychopathology or the pharmacological treatments used by these patients (Angst, 1998, Jannini & Siracusano, 2018, pp. 41-51, Zemishlany & Weizman, 2008). Furthermore, we already know that those with ADHD face serious impairments in professional life, intimate relationships, and general health (Jannini & Siracusano, 2018, pp. 75-82). When I began diving deeper into these review articles and meta-analyses, I was surprised by just how significant the proposed effects were. When examining sexual function and ADHD, individuals with ADHD report more sexual desire and more masturbation frequency than typical individuals. One proposed reason for this is that these individuals use it as a coping strategy to relieve stress. (Soldati et al., 2020). However, I think the real reason for this increase in sexual arousal is due to ADHD individuals having lower overall dopamine, and by becoming sexually aroused, they can flood their reward systems with dopamine (in a similar way to the coping mechanism of binge eating those with depression often express). Furthermore, they also found that the ADHD subtype causes different effects. Most notably, combined types had more sexual desire than inattentive types, which makes sense due to their symptom severity being much higher on average. Further investigation revealed that those with ADHD reported much lower sexual

satisfaction (Soldati et al., 2020). They hypothesized that this is likely due to the inattentive nature of ADHD reducing their focus during sexual encounters, but the difference was not significant overall. What this means, is that they *found* a difference, but the difference was not significant enough for them to think there is a serious interaction happening.

Moving on, when we look at the sexual dysfunctions involved with ADHD, they found a few interesting things. Firstly, there was a difference between men and women. The most common dysfunctions for men were orgasmic problems, premature ejaculation, sexual aversion, and negative emotions during/after sex. Women, on the other hand, had common dysfunctions such as sexual excitement problems, orgasmic problems, and sexual aversion. Regarding the higher excitement and orgasmic problems in women, they proposed that this could be related to distractibility as discussed previously. The higher prevalence for sexual aversion was thought to be caused by low-self-esteem, fear of intimacy and poor relational skills, all typical of individuals with ADHD. The same reasons were hypothesized for men, but men had lower rates of these than women did. So, now that I have once again bombarded you with research findings and science words, lets break things down.

Understanding how sexual health is affected by ADHD is crucial for long-term satisfaction and happiness. So, lets recap what we've learned. Overall, individuals with ADHD are significantly affected regarding their sexual health. They experience more sexual desire, lower sexual satisfaction, more masturbation frequency, and in general, a lower overall sexual relationship quality. They also experience sexual dysfunctions like orgasmic problems, sexual aversion, and sexual excitement problems. Obviously, for those of you reading this that have been in a serious and intimate relationship, you understand how sexual intimacy can vastly deepen and improve the quality of relationships. If these individuals with ADHD experience so many roadblocks and deficits in sexual function alone, it starts to make even me question how they can experience quality intimate relationships. However, I urge you not to take these article results as pure facts. To begin, they are statistical analyses performed by looking at many different studies. These articles seek to find patterns, and just because they find a pattern does not mean you will be one of the people affected by that pattern (the last thing I want to do is make anyone with ADHD reading this think their future sex life is doomed to fail). I just want people to be aware of how ADHD *might* affect their intimate relationships when it comes to sexual function and behavior.

Now, we'll focus on how to possibly combat some of these deficits. In the interest of not embarrassing us all, I will keep my personal secrets to myself, but I can offer some advice and a few resources to you all if you are experiencing some of these deficits in your intimate relationships. To start, if you see a therapist or anyone else for your condition, bring these struggles up to them, and ask them how they might suggest you work on them. They are a qualified professional after all, and they have complete confidentiality ;). Secondly, I would talk to a healthcare professional, ideally your primary care provider if you have one, and ask them about the medication you are taking (if any) and how it might cause sexual dysfunction. I know these conversations can be embarrassing, but these people are the best ones to talk to about it, rather than trying to ask your parents or even your partner instead. Unfortunately, sexual functions aren't the only area of intimate relationships affected by ADHD. Relationship quality itself is often affected by ADHD as well, especially at the adolescent level.

When I say relationship quality, I mean the duration of the relationship, the level of intimacy, and the emotional regulation during the relationship. Interestingly, these effects are slightly different when comparing adolescent to adult relationships. To begin, I'd like to share a personal story about how I noticed a change in my long-term relationship as I began getting older. I got into my first serious relationship towards the end of high school when I was 17. Her and I ended up dating for almost 4 years, and we did long-distance for most of that (more power to those doing long-distance, it is not easy). During the first two years of our relationship, things seemed to be great, and they were. The distance was hard, but we made it work and we communicated well. However, once I turned 20, things seemed to disconnect a bit. I began thinking about life differently. I started thinking more long-term, researching medical schools and grad schools, while my girlfriend of 18, was in her first year of college and still figuring her life out. Our once happy and spontaneous style of being together changed. I watched our relationship slowly die over the next two years and ultimately her and I are no longer together (no hard feelings of course, sometimes things just don't end up the way you want, no matter how hard you fight for it).

Why am I telling you this? For one big reason. The notion that ADHD affects relationships differently based on age is real. Even for me only being 22 compared to 17, the change was massive. So please do not dismiss these slight changes that research has observed thus far in relationship quality.

Starting with adolescents, research has often lacked regarding the effects ADHD has on adolescent intimacy, leaving a void that desperately needs to get filled. Despite this void, we do have *some* research that has explored how intimate adolescent relationships are affected by ADHD. Adolescents with ADHD report having more partners (sexual and nonsexual) than their typically developing (TD) peers, with females reporting significantly shorter relationship durations than their TD counterparts. Males, on the other hand, report their first instance of sexual intercourse being 2 years earlier than their TD peers (Rokeach & Weiner 2014, Margherio et al., 2020). For all the parents reading this with young teenagers who have ADHD please do not freak out. Like many of the studies I have referenced, this is only one example population. I would like to think your 15-year-old child is not some kind of sex addict, so please do not freak out. However, these results do offer up some interesting implications.

ADHD adolescents are getting into more romantic relationships than their TD peers, meaning more “heartbreak” and less overall stability. Females have shorter relationships, while males seem to be having sex earlier. Obviously, these have implications regarding young teens having sex irresponsibly, which may lead to unexpected pregnancy or other consequences, but we aren’t focused on those outcomes. If these children are entering and exiting relationships more often, they will begin to see that as the norm. Later in adult life, when their peers are searching for mature and long-term relationships, these individuals will likely be left out as candidates due to their lack of emotional maturity regarding serious relationships and intimacy. I’m not condemning your child to a life alone, rather, I am suggesting that children with ADHD should be questioned about their romantic lives and relationships (if they have one) so we can get a better understanding of their ability to function and understand emotions and intimacy. We already established earlier that some people with ADHD struggle to understand emotional support, which is a huge factor in intimate relationships. This area of research should serve as an indicator to check in on younger teens and adults who have ADHD, just to see how they are doing with regards to intimacy and relationships. In the effort to paint a sort of chronological narrative, we move on to discussing the romantic lives of college students with ADHD.

For college students, life is hard. Romantic relationships can either be a blessing or a curse. Their lives are full of deadlines, time crunches and to-do lists. If you are in an understanding and supportive relationship, often these stressors become much less stressing and easier to deal with, but not all relationships are like that. College students with ADHD are

already under significantly more academic and work-related stress than those without ADHD (which we discussed earlier in Part 1!). Relationships are much harder to navigate for those with ADHD, and often only add to the stress of that individual. What do relationships look like for college students with ADHD? Are they of the same quality? The short answer is, we're not sure, yet. One study examined the relationships of college students with ADHD and found that higher levels of symptomology resulted in increased social impairment and higher levels of state and trait anger, but no change in relationship satisfaction or partner violence levels (Sacchetti & Lefler 2014). So, while the satisfaction or overall quality of the relationship seemed to be unaffected, ADHD individuals were still experiencing impairment and increased levels of anger within their relationships. To me, this still seems like an issue because these individuals are much angrier compared to others, and it makes me wonder how much of that anger is due to the additional stress of a relationship.

On the other side of the research, we see those with ADHD experiencing lower relationship quality (Bruner et al., 2015) compared to their typical peers. This leaves us in a tricky spot, because the deeper you dig the more divided the field seems to get. Some report significant drops in relationship quality, while others report some emotional dysfunction or social impairment (like above), but no drop in overall satisfaction or quality. In this case, I am going to suggest that we take the results of both with a healthy level of skepticism. Yes, those with ADHD in college are experiencing impairment and dysfunction with regards to intimate relationships, but that does not mean the quality of those relationships *always* suffers. There are simply too many variables here to generalize or attempt to generalize anything.

I will leave us with my opinion here: College students with ADHD are already experiencing higher levels of stress, dysfunction, and impairment in their daily lives through academics, platonic social life, and work obligations. The introduction of an intimate/romantic relationship has the *potential* to exacerbate and worsen the stress levels of these individuals. However, if their partner is understanding and willing to be patient with them, individuals with ADHD will likely flourish over time and be able to develop the necessary skills to cultivate a high-quality intimate relationship. That is what I believe we should get out of this section, so lastly, we look at adult life and how those relationships are altered by ADHD.

Adult life with ADHD is all the rave in today's research. Until recently, ADHD was often thought to just disappear once adulthood was fully reached. Obviously, that's wrong, and now

more and more adults are being diagnosed with ADHD daily than ever before. What does ADHD look like in married life? Does it affect satisfaction in marriages? Affect the ability to provide or parent? The research seems to think so. For those married to someone with ADHD, please do not think I am bashing your marriage or choice of partner (I have ADHD too, so that would be awfully hypocritical of me). One study decided to examine the differences between being married to someone with ADHD and being married to someone without ADHD. Those married to a spouse with ADHD reported significantly lower intimacy and lower marital satisfaction compared to typical spouses. Moreover, they found that spousal reports of intimacy dropping mediated the relationships between their spouses ADHD and marital satisfaction (Ben-Naim et al. 2017). These results are important for a few reasons.

Firstly, they indicate that married life with an individual who has ADHD may be difficult. It's not a 1:1 ratio, but personally I know *I* can be hard to deal with sometimes and imagining that daily would give me a headache. Secondly, we are seeing a drop in quality and satisfaction for adults here. This study especially highlights how ADHD can affect both those who have it, and those who are close to them. The implication here is that if you are an adult who is married with ADHD, maybe you should look a little closer at your marriage and see if there is anything you can change or improve. Communication is your friend here, and I'm betting if you went and talked to your spouse about wanting to be more present or more intimate, they would likely accept that conversation with open arms and be happy that you are working on yourself. Again, I'm not saying these results are condemning at all, as the field of research regarding ADHD and intimacy is very new and still has a long way to go before, we can even begin to generalize anything. I am saying that these results can help you look closer at your own life and see if you are experiencing similar outcomes. If you are, then you know you need to have some conversations and reevaluate your relationship a bit, so both of you can get on the same page. Think of these studies as a way of checking in with yourself. They make you ask yourself questions that make you look at yourself in a more objective and unbiased nature, so you can improve your own quality of life as well as your partners.

While our section on intimacy was both slightly short and not necessarily as robust as I would have liked, I cannot do myself or any of you the injustice of wrongfully reporting research. The field still has a long way to go, but I am hopeful it will continue to fill out and become much more robust soon. Our final chapter for Part 2 will deal with some of the

miscellaneous features of social life with ADHD that I simply could not fit into any of the other chapters. Features ranging from social anxiety, overstimulation and empathy deficits are all very possible for those with ADHD to experience. Let's wrap up Part 2 in a more fun and lighthearted fashion, as we discuss some other interesting and fascinating features of ADHDs social dysfunction.

Chapter 8: Oddballs

Continuing with the theme of unknowns, I want to touch on a side of social deficits that often takes more of a backseat role when people discuss the social symptomology of ADHD. The ugly truth is that many people with ADHD struggle to adapt and feel comfortable in social environments. Instead of focusing on the conversations or relationships within these gatherings we will look at a big picture model here. For example, large groups of people at a sporting event, bar, party, concert, etc. For many of us with ADHD, these settings may not always be easy to manage and navigate. Growing up, I used to get severe anxiety when I was in large crowds of people. Typically, my reaction to this situation was to shut down and go into a sort of “autopilot” mode; my only objective was to make it to my seat, or to wherever I would be staying for most of my time during the event. Obviously, this is not ideal. I struggled with this feeling of unease and uselessness all the way into college and even now I still struggle a lot with large crowds and social gatherings. The real question I wanted answers to was *why*. Why am I unable to function normally when large crowds of people or frankly, large amounts of stimuli are around me? Even at a young age, my therapist tried to explain to me that I was overstimulated, and my introversion caused me to “shut-down” in order to fight off that feeling of overstimulation and social anxiety. To fully grasp this idea, let's break these up and define overstimulation first.

Overstimulation (in the form that we are concerned with) is excessive psychological or mental stimulation. Simply put, too many stimuli for your brain to manage and handle. If you are familiar with this novel area of research, overstimulation is often equated to sensory overload (seeing as overstimulation is essentially an overload of stimuli, the equation tracks rationally). The realm of sensory overload research is...complicated. There is an apparent lack of review studies and concrete information specific to ADHD alone, and the majority of sensory overload research focuses on autism spectrum disorder (ASD). Lucky for us, ASD is *heavily* linked to ADHD (a concept we will be focusing on in Part 3!) which means we can utilize *some* of the studies on ASD and sensory overload to get a decent idea of how ADHD individuals might experience sensory overload. Remember the story I just told you about how I often got overwhelmed walking into crowded places? That's sensory overload. Let's put our thinking caps on, shall we?

Why would individuals with ADHD be prone to sensory overload? Why do they feel overwhelmed in areas full of people, or novel stimuli? Think back to the prologue and chapter 1

where we discussed some of the neurobiology and neural mechanisms of ADHD, as well as the neural functions ADHD individuals often experience deficits in. While you're thinking about those questions, let's do some exploring of the theories and concepts regarding sensory overload.

Sensory overload results from an inability to gate stimuli. Put simply, those with ADHD struggle to filter out irrelevant stimuli (Sommer et al., 2021). This is consistent with the larger bodies of research we already discussed with EDF. Those with ADHD struggle to focus on relevant stimuli, especially when there are many irrelevant stimuli present. If these individuals are unable to filter out irrelevant stimuli, they likely struggle to process and deal with the irrelevant stimuli. This is where the theory of sensory overload in ADHD comes from. The inability to sort through what is relevant and irrelevant leave the brain confused and overwhelmed. Thinking back to the questions I proposed, here's why I think this happens.

We already discussed what possible mechanisms are at play here, with the inability to gate stimuli, but the region I would think is responsible for this is the **reticular formation**. Remember that little guy from earlier? The main function of the reticular formation is believed to be the prioritization of stimuli within our brains (this is a very "loose" definition). This little region of our brain has connections to almost *all other regions* of the brain and is constantly prioritizing and managing what we perceive and process from the world around us. With that, we know that ADHD is characterized by a lack of dopamine (in theory) and the reticular formation contains a lot of dopaminergic neurons and is included in many of the main dopaminergic neural pathways. Theoretically, if ADHD individuals have lower dopamine levels, and the reticular formation usually contains/needs a lot of dopamine, perhaps the dysregulation of its function in stimuli prioritization is caused by this lack of dopamine. Which, in turn, may result in the sensory overload those with ADHD often experience. Of course, this mechanism is purely hypothetical, but I figure I may as well give my two cents here.

With that out of the way, what can we do to limit the sensory overload? A large body of research will advocate for medication, as most ADHD medication seeks to operate on these dopaminergic pathways in the brain and return those levels to "normal." I have my own personal opinions on medication, but I'm saving those for later. If you have access to medication, and it works well for you, great. If not, here's something my psychiatrist suggested to me that has worked amazingly.

When you walk into a room or go to a crowded place and you feel that overstimulation settling in, the first thing you need to do is take 3 deep breaths. After you center yourself, you start playing **the game**. He calls it the game because the game can be *anything*. The game is to focus on something, usually something that you can count. Like some strategies for dealing with panic attacks, he told me to count things in that crowded place. It could be the number of hats, or how many people are wearing glasses, blue shirts, handedness (a personal favorite of mine because I have to focus more). It doesn't matter *what* you count, just find something in the room or setting that you can begin counting and focus only on that for the first few minutes. Then, begin easing yourself out of the game and slowly take in your surroundings, focusing on one thing at a time. Again, like many of the strategies I have shared in this project, these take practice and patience. You'll get better at this over time, and you should notice that the more you do this, the less often you'll need to play the game as time goes on. This process is often used in therapy, and it is commonly referred to as systematic desensitization (look it up, there's hundreds of different ways to implement this). I cannot stress this enough, be patient with yourself and over time you'll see results, I promise. Next on our list of oddballs, I want to focus on some emotional dysregulation. The main deficit I want to explore regards the emotion of empathy.

Empathy is a key emotion for the human experience, as humans are social beings and crave the feeling of being understood. Everyone wants to be heard and have people that can put themselves in their shoes. For those in pain, or struggling with difficult emotions or situations, empathy is often the one feeling that can put people at ease.

Small disclaimer here: I am not going to attempt to make anyone feel invalidated with this section. Any problem or emotion we feel as humans is valid. Regardless of circumstance, causes, etc. you are allowed to have an emotional response to situations. I am simply trying to explain the experience of empathy from my point of view, and from the view of many others with ADHD.

This following is not a “blanket” statement; it is an exploration of different perspectives and experiences. Now, what does empathy mean to those with ADHD? The short answer is...it depends on the person. Certain symptoms of ADHD, like EDF, are often viewed as “universal.” Almost everyone with ADHD is experiencing some level of EDF, so we can easily generalize those symptoms and explain the common deficits it presents. Empathy, on the other hand, is much more difficult to generalize. We've already seen that those with ADHD experience

emotional dysregulation, so we can identify that empathy might be dysregulated (since it is one of our many emotions). Yet, there is no hard or fast rule telling us that empathy is always affected. This is why we often have patients take questionnaires and cognitive tests, so we can attempt to identify which emotions are dysregulated. In my case, during my original diagnosis of ADHD, they initially thought I was on the ASD spectrum due to my high levels of emotional dysregulation. For lack of a better explanation, I was blind to empathy, and I had a very short temper when it came to being provoked. Additionally, I was also extremely shy, and only spoke when it was necessary. The only reason they determined I had ADHD-C instead of ASD was due to my ability to articulate my thoughts accurately and intelligently when I was prompted to. After I received my official diagnosis, I was then started on some medications, and began seeing psychiatrists to work on my social and emotional deficits. Up until the age of 17 or 18, I still had almost no feeling for empathy. I understood what it was, and I knew *when* I was supposed to feel it, but I never actually felt it. I really struggled with this, because I had to pretend to feel empathy towards others, and while some might have believed it, there were others who didn't. It frustrated me because empathy seemed to be this emotion that connected people and allowed them to understand one another. Others could feel empathy for me, but I could never reciprocate that feeling.

So, backing up a slight bit, why do some of us with ADHD struggle to feel empathy? To answer this, first we need to understand how emotional dysregulation happens. In our brains, a region called the amygdala is largely responsible for our emotional responses. It signals our cerebral cortex to feel certain emotions based on the experiences we are having, and in typical individuals, the cerebral cortex often inhibits the emotional response (since it's likely an overreaction). However, for those with ADHD, this connection is weakened in some way. The cerebral cortex cannot properly inhibit these emotional responses, which is why those with ADHD often experience more emotional dysregulation overall. Looking at empathy, there are a few key points we need to highlight.

Overall, children with ADHD are consistently reported as being less empathetic than their peers, by their own parents (Marton et al., 2008). This is especially concerning, since these children are unaware of their deficits in empathy, and this particular study found that the children with ADHD had lower levels of social perspective taking, identification of feelings and outcome evaluations than their peers (all of these are skills that pertain to empathic response). These

children are unaware of their deficits, and they are struggling to respond empathically compared to their peers. Another study examined the empathic responses of adults with subclinical ADHD (ADHD symptoms but not a formal diagnosis). They found that those with subclinical ADHD scored lower on the Empathy Quotient (EQ) compared to typical participants (Groen et al., 2017). They believe these lower scores are a result of the inability to read facial cues, body language, and other social cues. This makes sense, as those with ADHD often struggle with these social cues, especially in the context of a more serious emotional situation. So even adults who are not formally diagnosed with ADHD exhibit this deficit in empathic response (I would bet if they did this study with participants who were formally diagnosed, the gap in scores would be even wider).

Furthermore, there was another study with an even more fascinating result. They wanted to examine if ADHD affected Theory of Mind (ToM) (the cognitive capacity to change perspective). They believed adults with ADHD would have significant ToM deficits. Their results indicated that those with ADHD showed a severe lack of empathy, but no deficit in ToM functions. (Abdel-Hamid et al., 2019). This is especially interesting since their results were very robust regarding the lack of empathic capabilities. These were studies done on adults, suggesting that the inability to empathize is linked to ADHD and not to a lack of emotional maturity or experiences. The point being, it's not uncommon for those with ADHD to experience a lack of empathy. Additionally, these deficits are not limited to adolescents, and can affect adults as well. These deficits are also likely linked to the rejection ADHD individuals experience socially and result in difficulty of closer interpersonal relationships.

Like many of the other deficits discussed in this project, a lack of empathy and other emotional deficits can be worked on and improved. In my case, I had to begin with social cues. I worked on reading body language, especially facial cues, while my peers were talking. When they were upset, I took note of what their face looked like, how their arms moved, how they were sitting, and the inflection of their voice. While all of these helped me recognize patterns over time, they did not fix this lack of empathy. Perhaps your experience with empathy is different. For me, I do not feel it at all, even when I should. However, through a lot of practice and learning, I know when I *should* feel it, and I can compensate by mirroring the body language of those around me, and usually, they never know the difference.

What if you *do* feel empathy, but you just never know how to express it? If that is the case, you should start observing how others respond to you with empathy. Watch those who do respond to it well, and mimic what they do. You can always do what I did, and begin observing social cues and looking for patterns, but if you just mimic those who are naturals, you'll get better in no time. Another option is a growing area of literature advocating for empathy training in those who experience deficits, but it is so new and polarized I am going to leave it alone for the sake of my project. If you have a psychiatrist, they will likely already be implementing some of the best training techniques to help you understand empathy and learn to master your emotions, so please work with them if you have access to that resource.

It is my personal hope that research continues to focus on empathy and how ADHD affects the empathic abilities of those who have it. I find it both fascinating and worrisome that these individuals (like me) cannot connect with their peers in such an intimate and meaningful way. Their peers can empathize with them, but they cannot reciprocate, and it is my hope that new methods for training empathy will prove to be effective and help us understand the emotions of those around us so we can better function in social contexts.

I'd like to thank all of you for staying with me up until this point. For those of you with ADHD, I hope I was able to shed light on your condition, make you feel heard and understood, and allow you to feel empowered by having ADHD. Your condition truly can be a superpower once you learn how to live alongside it, and I hope this project was able to give you that gentle nudge toward becoming friends with your ADHD. However, this is not where my project ends. If you are satisfied with just learning about ADHD, and how it affects the daily lives of those who have it, you can stop reading here (unless you'd like to keep reading!). From this point on, the mood of the project will change. I will say it now: **I have a bit of an agenda for Part 3.**

In this next part, we will be discussing all the gripes, groans, and grievances I have with the entire "ADHD community." It is not my intention to offend anyone, nor is it my goal to sound angry, entitled, or uninformed. I am simply going to point out the areas in which research, accessibility, understanding, and the scientific community, in general, have failed. Failed in their mission to educate us, and in their mission to provide us with accurate and effective methods of treatment and care. With all that in mind, I will now move on to the final part of this project, where we discuss the not-so-fun side of ADHD and its socioeconomic and sociopolitical factors that need to be discussed.

Part 3

The Ugly Truth About
ADHD:
The Shortcomings of Research,
Accessibility, and Education

Before We Begin

Before we jump into Part 3, there are a few things that need to be said. To begin, this section will not be formatted like the others. There will not always be a story about my experiences, or what I've done to fix deficits in my life. What there *will* be, are complaints and tough conversations about why research is biased, shortsighted, and nowhere near where it should be. As I have stated previously, I am not here to make anyone feel attacked or personally responsible, but we need to do better. These are not the statements of some naïve kid; they are observations and suggestions for the future of this field. This section is going to upset some people that read it, while others will likely agree with everything I am saying. My only true intention is to make people think. So, let's start thinking.

Chapter 9: Misdiagnosis vs Missed Diagnosis

I'll start by addressing the name of this chapter, which was a clever little play on words thought up by Prof. Kevin Moore (my major advisor and the coolest dude ever). In this chapter, we are going to discuss the biggest issue ADHD currently faces, which is the actual diagnostic process itself. In 2010, it was estimated that almost 1 million children were misdiagnosed with ADHD (Elder, 2010). While most conditions have some sort of statistic like this, there is a significant weight that comes with an ADHD diagnosis. The real issue here is that a diagnosis usually happens when the patient is young (ages 7-12) and oftentimes, the diagnosis is based on the inability to sit still and be calm in school environments. Here's a question: Can ANY 7-year-old child sit still and quiet for more than 2 hours at any given time? I'd bet a bunch of money they can't. Of course, a younger child is going to struggle with being calm in school. Kids are bundles of unbridled energy and life. They crave activity and excitement, so how can we expect them to sit still and focus for 7 hours a day? Obviously, we shouldn't expect them to be capable of that. With that being said, let's dive into the first big part of this chapter and focus on misdiagnosis.

Misdiagnosis is the idea of someone being diagnosed with a condition when they do not actually have that condition. Why does this happen? It could be a result of inaccurate diagnostic criteria (the DSM-V is shit, change my mind), or it could be a result of incorrect conclusions as I explained above with children being high energy rather than ADHD. The bottom line is, we are talking about the situations where: someone is diagnosed with ADHD when they don't have it; when someone with something else is diagnosed with ADHD; or when someone with ADHD is diagnosed with something else. My first order of business is with the core diagnostic material, the DSM-V.

As we mentioned in the very beginning, diagnosing ADHD starts with the DSM-V, as it is the baseline for diagnosing most cognitive conditions. The issue is, the DSM-V is absolute garbage. The difference between any two conditions based on the questions in the DSM-V is so blurred and generalized that you may as well have 8 different conditions at once when you use it. That is why I advocated for a full-scale, comprehensive diagnosis of ADHD in the beginning. But wait, you said that the DSM-V isn't good, so why doesn't everyone just do the full comprehensive diagnosis? There are three major reasons:

- 1) The price tag for a diagnosis like this is going to range anywhere from \$2000-\$3000 (I know because I recently had another full diagnosis done)
- 2) The exams take around 6-8 hours to fully complete
- 3) Most people do not have access to these resources, or they do not trust these resources (we will harp on this at the end)

Now, if these confuse you, let me explain. To start with, it's expensive. If you have that kind of money to spend, then go ahead and get the full diagnosis done. But if we're being realistic, most people are not going to want to spend that kind of money (and when you start to consider if their insurance covers any of the costs, which it usually WON'T, then it makes even more sense). Secondly, sitting there for 6-8 hours doing boring, mind-numbing tasks is brutal, and many people have jobs and day-to-day tasks. They simply don't have the luxury of time. They must make ends meet and they can't waste any time throughout their day. Lastly, some people don't have a place to do these kinds of tests within a reasonable distance of their homes. Or, they don't trust these resources due to generational trauma, cultural differences, or a lack of understanding between them and the healthcare system. Regardless of their reasons, getting a full, comprehensive diagnosis is often hard or impossible for most people. Which means we are stuck with the shitty versions of the tests. In turn, this leads to a lot of misdiagnoses, which leads to people taking medication they don't need (if they even have access to that medication).

Why is this such a big deal? Because these people are putting medication into their bodies when they don't need to! For starters, ADHD medication is far from perfect. It causes problems with sleeping, it can sometimes make people feel like they "lose their personality," it can reduce appetite, and has a million other possible side effects. Why the hell would you WANT to take that medication if you don't need to? For example, imagine you are diagnosed with ADHD, and a psychiatrist gives you a prescription (Rx) for Adderall. You start taking the medication, and not only is it expensive (and critically unavailable right now due to shortages), but it causes all sorts of problems, and you don't notice a change in your day-to-day life. You later find out that you don't have ADHD, but you just have social anxiety disorder and mild depression leading to lapses in focus. See my issue here? The DSM absolutely sucks, and even after you go through a big, long, and expensive diagnostic process, they can still be wrong.

This is not to attack or call any professions frauds, I am just trying to make people aware of how inaccurate the diagnostic process can be. Another aspect to consider is the social implications of a misdiagnosis. If someone is diagnosed with ADHD, they change the way they look at themselves. Immediately, the things they thought were normal, are now magnified and scrutinized by them and their peers as different or weird. Remember the studies where even being labeled as ADHD caused peer rejection? Yeah, this problem is very relevant to quality of life. On the other hand, if someone with ADHD is given a much more serious diagnosis, like ASD for example, that also has severe implications. I would imagine the reaction to being diagnosed with ASD is much more intense compared to ADHD, given how novel ASD research and treatment is.

The point I'm trying to drive home is this: proper diagnosis matters. Giving someone a diagnosis is not just the job of many people around the world, it is an art form. The diagnoses you make *matter*. They aren't just flimsy words that sum up the patterns of behavior a patient demonstrates. They become an identity when a professional says them. Being diagnosed with ADHD at 8, I was blessed to be ignorant to those implications, and I simply decided it wasn't a big deal. However, as I got older, that identity slowly crept up on me and began to take shape. I can only imagine what it must be like for those diagnosed in early adulthood or even around teenage years. For some, it may be a liberating experience, a way to quantify years of struggle and confusion around their deficits. A reason behind their individuality if you will. However, for others, it can be suffocating. The idea that you have a condition, regardless of its severity, is still one you must come to terms with. I won't compare an ADHD diagnosis to cancer or any other life-threatening diseases, but it can still be scary. That is why diagnoses must be improved. We must continue to improve and develop new ways of diagnosing people with more efficiency, while also providing better access to accurate diagnoses.

The second matter to discuss is this notion of "missed diagnosis." What I mean by that is someone with ADHD was not diagnosed with it and essentially gets told they are "fine." There will certainly be overlap, as missed diagnosis is a specific case of misdiagnosis. Nevertheless, this is still an important aspect of the diagnostic process that needs to be addressed. To begin, why is a missed diagnosis a big deal? Well, in case you couldn't tell from the definition, someone had ADHD and they were told they are completely fine. Ok, they are completely fine, but they still have ADHD. So why would we not want that person to know this information?

Would it be ok to have someone come in and have a brain tumor only for the doctors to say they are perfectly healthy and send them home? NO! Why should we treat ADHD or any other medical condition/diagnosis differently? If someone has ADHD, but they somehow slip through the full diagnostic process and are told they do not have ADHD, two things happened. Either the person doing the diagnostic exam royally f'ed up, or their symptoms may be mild enough to not show anything significant (yet another reason we should change how we diagnose all these conditions). The bottom line is, people have a right to know what is going on in their bodies, especially if they're going to pay you to examine them.

Now, I *am not* saying everyone who comes in complaining of symptoms common to ADHD should be diagnosed with it, that would be another disaster altogether. I *am* saying that we should be more thorough with cases that may be mild or prone to slipping through. For example, if you have a patient who is complaining about inability to focus, or a severe deficit in social functioning, but performs well on the diagnostic tests and materials, there may be an underlying cause for their ADHD or those symptoms. They should not just be written off as a no. I have raging ADHD, but I also know that I perform well on the cognitive tests given during these diagnoses. The real kicker comes with my social deficits. Those are much more prominent compared to my attentional deficits. My point being, many people are just written off as a no, when in fact they may just have very mild form of ADHD that can be handled without any pharmacological intervention.

On the other side, missed diagnosis can also entail someone being diagnosed with ADHD when they have something else. I also included this in the misdiagnosis section, so I won't bore you by regurgitating the same points. The one thing I will say, is that regardless of how a missed diagnosis occurs, they need to be reduced. Medical professionals, psychiatrists, mental health professionals, whatever title you adhere to, I want you to think. Why did you pursue cognitive health? What about the brain fascinates you? Do you truly want the absolute best for every person who walks through the doors? I'm not questioning you because I think you are bad professionals; I just want to ask the questions nobody else will. Someone has to start poking the bear.

Just to humor some of the people sitting here saying "OK, anyone can complain and notice the faults of something, but are you gonna suggest any ways to fix this?" Yes, person sitting there reading this, I am. I can't promise you'll be satisfied with my suggestions, and you

will likely think they are radical and idealistic (which they are). That's ok. I'm merely starting the conversation. If I *had* the solution figured out, and knew exactly how to fix the problems, I wouldn't be writing this, I'd be pushing to implement my solutions immediately. So, let's discuss what I think we should do to make the diagnostic process a bit easier and potentially more accurate overall.

To begin, let's focus on improving the efficacy of the diagnostic process for ADHD overall. Our first improvement must address the biggest issue, which is the use of the DSM-V. I understand that using the DSM-V as a general diagnostic material saves a lot of time for practitioners, and I still think the DSM-V should be used for an initial diagnosis. In clinical diagnoses, particularly those made by psychiatrists or psychologists there is this idea of "Rule-Outs" (R/O). What R/O basically means is that based on the perceived symptoms they either observe or are told the patient has, they rule out certain conditions because further examination is needed to determine if that condition is present or not. Put simply, R/O on a diagnosis is the clinician's way of saying maybe.

I think, they should utilize the DSM-V during the intake appointment and identify a few R/Os based on that. For example, say they administer the DSM-V and a few other diagnostic materials, and they R/O depression, anxiety, and ADHD. Not only do these conditions have a lot of overlap, but they all have ways they can be tested and examined further. I think there should be a subsection for each disorder the DSM-V covers, allowing clinicians to then conduct an exam for each condition specifically. Basically, there should be a general diagnostic material, like the DSM, for each condition specifically (these exist, but how often do these get used and are they reliable?). These materials should focus on the symptoms and behavioral features that are unique and not likely to overlap with other conditions. Going back to our example, this hypothetical "new material" is used for ADHD, and the clinician discovers this person exhibits a lot of ADHD specific symptoms. However, these symptoms are also characteristic of some people with ASD, so what now? The clinician didn't R/O or determine ASD initially so there is no need for them to worry about this overlap. The development of condition specific materials is not a novel idea, but rarely is it used in intake appointments.

Recently, I had to do another intake at a new psychiatrist for my ADHD, and I asked them if they needed to do anything other than the DSM-V, because it had been 14 years since my last intake for ADHD, and they told me that nobody ever does testing past the DSM-V unless

they are truly stumped and out of options. In my case, having a previous comprehensive diagnosis helps them save some time, but what if I had never been diagnosed before? Yeah, I didn't need this extra testing, but what about someone who just recently started presenting symptoms? Do you think they would like to know their clinician is content with making an educated guess when they could do some extra testing to be more accurate? I think most people would prefer that. That is why I think the easiest solution here is to create some kind of generalized diagnostic material for each condition separately and use these after the DSM-V is administered so clinicians can better determine what each patient might be dealing with. Easier said than done, but doing something like this would greatly increase the accuracy of diagnoses for many conditions that are often misdiagnosed.

Before we get more optimistic, which will hopefully be something I can say for each chapter, I need to address the common theme that will be seen in every section of Part 3: Accessibility. This refers to *everything*. Access to affordable diagnosis, medication, treatment, knowledge. Anything and everything. We will focus on this throughout the chapters, and it will be a common theme of my disdain throughout. Please bear with me, and understand it is not coming from a place of hatred, I am just disappointed. Accessibility will be the focus of our next chapter and will continue to pop up throughout the rest of this part as well. With that in mind, let's move on to Chapter 10: The Universal Solution.

Chapter 10: The Universal Solution

Accessibility is key. Hundreds of thousands in the US alone struggle to access basic resources. When it comes to diagnoses, treatments, medications, and understanding of medical knowledge nothing is different. Many people do not have access to a clinic where they could even get a reliable diagnosis of ADHD. Those who have a clinic, likely can't afford to get that comprehensive analysis. If you even have to ask why this is a problem, I am disappointed. Thousands of people are left to their own devices to figure out how to treat or mitigate their symptoms. Kids buy Adderall of their friends, not knowing if they have ADHD or not. They self-treat by flooding their brains with dopamine, turning to recreational (nicotine products, for example) or hard drugs (cocaine, meth, etc.). They continue to struggle academically and/or socially as they sink into depression or get swallowed up by their anxiety. I'm not creating these hypotheticals to be snarky or facetious. I *know* people who did this. People who didn't have proper access to medical care, diagnosis, medication, etc. I watched many of them sink into unhealthy and degenerate lifestyles. For many of them, they likely didn't have ADHD, but I know some of them did. If only they had the same access as me, the same privileges I did, they might have been able to take better advantage of their opportunities. They were bright, and full of life. Some were friends, others just peers whom I knew in passing, but this lack of access was the only thing that differed between me and them.

Before I get ahead of myself know this: I am not placing all the blame on the field of ADHD research, or the pharmacies, or the hospitals, medical professionals, legislators, or anyone else. It is a collective effort of ignoring the imbalanced and unfairness of our entire system here in the US. I cannot accurately speak on the systems of other countries, but here in the US, I can confidently say that accessibility is not part of the "freedom" Americans have (if we even have any true freedoms). The issues with accessibility I want to address come from 3 main areas: access to medication/treatment, access to research and knowledge, access to inclusion (we'll define this when I get to it).

Access to medication/treatment comes first. While it seems like having access to the forms of treatment and medication for your condition is a no-brainer, here in the US that is not the case for most conditions. Perhaps the most glaring example would be the *ridiculous* prices of insulin, which is ESSENTIAL for the survival of thousands who have diabetes. More

specifically regarding ADHD, here are some of the statistics surrounding the lack of access to medication and treatment.

Children:

Treatment:

- About 75% of children in the US with ADHD undergo some form of treatment (Danielson et al., 2018)
 - 31.7% of children with ADHD receive treatment and medication
 - 30.3% take ADHD medication only
 - 14.9% undergo behavioral treatment only

ADHD Medication:

- 62% of children with ADHD are currently taking ADHD medication (Danielson et al., 2018)
 - 18.2% of 2-5 y/o with ADHD
 - 68.6% of 6-11 y/o with ADHD
 - 62.1% of 12-17 y/o with ADHD

These are just some general statistics about medication and treatment in children with ADHD in the US. On a positive note, I would say having 75% of children receive *some* form of treatment is pretty damn good. However, we need to avoid getting tunnel vision, as that is only 75% of the children who were *diagnosed* with ADHD. What about the thousands who couldn't afford a diagnosis? What about the other 25%? When you look closer at the medication statistics, you see that not a lot of people are really getting medication. The biggest groups are the 6-11 y/o and 12-17 y/o groups. Having around 60-70% of them on medication is ridiculous. That age range is the one where most of the issue will begin to really cause problems. For those with ADHD who are starting to drive, one lapse in focus could mean death.

Educational issues are another huge concern for many who are struggling with ADHD, and that K-12 period is arguably the most crucial period of learning. It is where we form habits, learn study skills, it is when we learn *how* to learn. The fact that around 30% or more of children with ADHD (not counting those who can't access proper diagnoses) don't have access to medication should concern us. It blows my mind that nobody sees an issue with this. Or, if they

do understand the issue, it blows. Y mind there aren't more people speaking out about it. While the lack of access might not have a lethal consequence like the insulin example, it still has significant repercussions. That medication could be the difference between someone getting into college or not. It could be the difference between a car accident and a safe drive home.

Now, there is a general lack of access to both medication and treatment, but this lack of access is further exacerbated by something most of us knew was coming. We need to address the glaring differences between ethnicities and genders. Simply put, I am going to describe how everyone except white males are receiving less treatment and medication.

For starters, a brief disclaimer is needed addressing the LGBTQ+ community. I would love to be able to give detailed and helpful statistics, but many of the studies and people examining these disparities just haven't put out their data as of now. I will say that I am confident these individuals not only receive less treatment and medication, but they do so blindly. There is little to no research regarding how ADHD acts differently in these individuals, and there needs to be more. I will harp on this a bit later, but I wanted to touch on it briefly here. For those in that community, I promise I did not leave you out because I wanted to. I just cannot provide you with inaccurate and unreliable data.

Regarding the disparities, African Americans will come first, followed by Hispanics. Nearly 79% of white children with ADHD take medication. That percentage for African American children with ADHD is only 27.3%. But why? There are 3 main reasons behind this:

- Caregiver perspectives on ADHD, influenced by access to research and information (we will discuss this later), personal experience, and cultural norms
- Caregiver concerns about the safety of medications
- Caregiver mistrust in physicians and the pharmaceutical system; stemming from a belief that ADHD is a form of social control

(Glasofer et al., 2020)

Let's talk about these. To start, regarding the first point, they are outlining one of the bigger points I want to discuss later. African American parents are less knowledgeable about ADHD overall, mainly because they have had less exposure or access to this kind of information. Similarly, there is a bit of a cultural bias here as well. These parents believed that the symptoms

caused by ADHD, were merely a result of either lacking discipline, or that their child would “grow out of it.” They were less likely to think there was an actual medical reason for their child’s behavior. This results in one of the reasons we see such a big difference in diagnosis rates, with white children being 2 times as likely to seek a diagnosis compared to African Americans.

The second point is probably the biggest one, and it stems once again from the lack of familiarity with ADHD and the research surrounding it. These parents do not trust the medications at all. They are worried (like any good parent) that this medication could harm or cause more problems in their child. Most express concerns regarding the possible addictive properties of medication, the weight changes, and the sedating effects medication might have. If you are a parents worried about these, let me ease your burden. The weight changes might happen. I can’t sugar coat that many ADHD medications do suppress appetite. That effect has only ever lasted for a few weeks at most for me. I still to this day eat more than most of my peers, and I take a rather large dose of my medication. Changing medications could help alleviate this as well, some are more suppressing than others, so it can be a game of musical chairs at times. The bigger issues are the sedative and addictive concerns.

ADHD medications are *stimulants*. They do not act fundamentally like a sedative. However, for some children with ADHD, taking the medication can “mellow” them out. In some cases, this might be necessary, especially if the child is extremely inattentive. I can tell you, that I do feel a bit different on my medication. It doesn’t change me as a person, I am still the same person, with the same feelings, desires, passions, goals, etc. When I am taking my medication, I am simply more focused and have better control over my decision making, simple as that. For the addictive properties, I would be cautious believing that. Yes, they can be addictive. That’s true. But your child should not be administering this medication themselves (especially not before being closer to 16-18). Additionally, medication is only given in specific amount by pharmacies because it limits the amount the medication can be abused. So, yes, they can be abused and addictive, but not if your child is taking them as recommended and doing so correctly.

Lastly, we have the view that ADHD is a form of social control. I don’t want to come off as rude, but I struggle with this one. I get how this could be a genuine concern, especially since the African American community has been mistreated by our medical system in the past. The mistrust here is deep and valid, African Americans have been lied to, excluded, and pushed down at every turn. Many African American parents believe an ADHD diagnosis to be a form of social

control. These medical professionals want to medicate children so they “sit there like zombies” (Olaniyan et al., 2007). There is a deep mistrust in healthcare professionals, and this transcends down into pharmaceuticals as well.

All 3 of these points contribute to the overall lack of African Americans being medicated or treated for ADHD. This is heartbreaking for me to know, as I have seen some of these happen firsthand with friends of mine. These kids who are already fighting against the odds (because our country can’t seem to treat people equally) must battle an even bigger demon because they aren’t getting proper treatment. They have every right to distrust our medical system. These families deserve better information and better accessibility, yet, we have sat and watched these disparities go on for far too long while doing nothing. If anything, we should feel ashamed that these people don’t trust both the research and the professionals. I will gladly ruffle some feathers if it means these people get proper access and treatment. Those in this field have failed, and it’s time they step up and be accountable for these failures.

Hispanics have similar outlooks regarding medical treatments, ADHD included. Some of the biggest roadblocks for the Hispanic community regarding ADHD are:

- Language barriers
- Financial difficulties (seen in many African Americans as well)
- Lack of education
- Stigma about mental illness in Hispanic culture
- Misunderstanding between healthcare providers and Hispanic parents
- Cultural barriers

This list could be longer, and I won’t be able to touch on everything, but for me the 3 biggest issues are lack of education, misunderstanding between providers and parents, and the cultural barriers (stigma included). To begin, we can start with the misunderstanding between parents and providers.

Looking at this misunderstanding is often hard, especially since Hispanics make up one of the larger minority representations in the US. I also elected not to talk about the language barrier, since many hospitals and healthcare offices are not highly encouraging or even *requiring* bilingual workers to combat language barriers. This misunderstanding goes beyond language. We must remember, for many of these parents, they are immigrants or first-generation citizens. Them, or

their parents, moved here to seek out a better life, and now they are encountering a road bump in their plans. I am not going to talk about how these people may or may not be illegal (personally, I don't care, we should treat them anyway if you ask me). I am trying to illustrate their perspectives in dealing with healthcare providers. Our healthcare system is vastly different from many of their native countries, and it can be very intimidating. We ask for detailed family histories, personal information, medical histories, and much more. In their countries, they likely see someone, and then get some kind of treatment or medication quickly (depending on the country, we can't really generalize here). This is the first big misunderstanding. Many of these parents think the doctors may be assuming they are illegal immigrants. They are scared. Regardless of their citizenship, I would be surprised if these families willingly gave up their family history or their personal histories. In the most respectful way possible, these people don't always trust white doctors. I'm not saying it's a problem with ethnicity or race, I'm saying the communication needs to be gradual and built by trust. A calm and collected physician who knows their language would be best, someone who can carefully explain why certain information is necessary. Now, our focus isn't exactly diagnostic medicine, I just wanted to give a broad example of why these people might be wary of healthcare here.

Focusing in on our specific issue, the access to treatment and medication with ADHD is a bit more complicated. Bringing in a more personal example, I have one friend who has ADHD, textbook symptoms, and a diagnosis to match. His family is Hispanic, they are from Mexico to be specific, and he got his diagnosis recently, at the age of 21. He first started presenting symptoms at 9 years old. Why did it take so long to get him diagnosed? Because his parents refused to believe doctors, school counselors and anyone else who told them he had ADHD. His parents viewed ADHD as this "made up" disease that gave people an excuse to be lazy (if you know anything about Hispanic people or culture, you know they are very hardworking and communal, everyone helps, and nobody gets to make excuses). So, for years he struggled and was called lazy by his parents. They didn't understand because none of the doctors they talked to cared enough to keep trying. They simply got rebuffed by the parents, and decided it wasn't worth it. I'm not saying the doctors should have forced his parents into treating him, but giving up at the first sign of resistance? Come on! Negotiate a little bit or something. Maybe you could tell them you just want to test out some treatments and see if he gets a bit of improvement, and they might take the bait. Or you could talk to them without their child present and then be a bit more forceful.

Regardless, the only reason he finally got a diagnosis was that he saved up for it himself and got it with his own money against his parents' wishes (with my blessing and encouragement of course ☺). As a result, he dragged his parents into the psychiatrist he went to, a very experienced and bilingual psychiatrist who finally was able to make his parents understand their son's condition. This story has a happy ending but for many Hispanic children or young adults with ADHD the story does not end this way. Many just decide their parents are right and try to fight through the symptoms and they decide to live their lives as best they can, believing ADHD to be a made-up construct. The influence of parents is much stronger in Hispanic culture than many people understand. That is why this understanding between the clinician and parents must be strong to provide optimal treatment to these individuals.

The second big point is very similar to the first. The cultural barriers of mental health in Hispanic culture are huge. Rarely is mental health discussed or even acknowledged in Hispanic culture. Things like depression, anxiety, and other general terms are never used. One big example can be seen in my family alone with my father. Born to an Ecuadorian mother and father (grandpa was in the military, mom had 4 kids in total and was a badass mom). My father was raised on the idea that crying or being sad was weak. Sure, when he was young crying was natural. But my grandfather always held my father to insanely high standards. He had to be the best in anything he did, and he was not going to be weak. Real men suppress their feelings and deal with things efficiently. There's no time to be sad. Many Hispanic men (and women) are raised this way. Depression isn't often talked about. Many Hispanic families simply don't believe these conditions exist. ADHD is very similar. Oh, you can't focus on school? You clearly aren't disciplined; you need to try harder.

This cultural barrier surrounding mental health is a huge problem for Hispanics. They can't access resources for ADHD treatment because they simply don't believe they need them. My goal isn't to convince Hispanic they should be medicated, it's to convince healthcare professionals that this barrier needs to be taken down. Of course, there is the obvious financial barriers present, since Hispanics are traditionally lower in socioeconomic status compared to whites, but that doesn't matter if these people aren't even aware of the issue in the first place. They need to understand mental health is real, and it is important. I was lucky that my parents took it seriously. Sure, my father was a bit hesitant, but he's a big baby when it comes to my mom, and I'm sure my mother pushed quite hard for my father to take my struggles in school seriously. Thousands of children

and young adults struggle each year with ADHD, and their cultural background is preventing them from even knowing they have potential resources to help (their ability to access those resources is still limited by other barriers, but access is *impossible* if they don't even know the resources exist). This brings me to my final point, the lack of education.

The lack of proper education is present in almost all minority groups, and I would even wager it might be present in whites as well. ADHD is not a huge focus when it comes to education and outreach. Mental health outreach largely focuses on depression, anxiety, and some of the other common conditions. ADHD needs to be advocated for more. If there are more people in Hispanic communities starting conversations about ADHD, providing the public with accessible and reliable information, it may lead to more families seeking out a diagnosis, challenging their cultural norms and possibly even building up some trust in the medical system. It's not an overnight fix but having members of these Hispanic communities advocating for the changes in cultural and traditional understanding surrounding ADHD is the perfect starting point for educating and creating constructive conversations about the health of children and young adults in their communities. This is something that should be done in all communities. Making research and information accessible to the public is crucial, and I really think this is the perfect starting point for these communities to make a change.

While all of this is good, understanding the barriers to treatment and medication is just the tip of the iceberg. The real monster lies in access to research, not just access to the results and implications of studies, but access to participation, and representation.

If someone were to ask me, what is the one thing you think the ADHD research field needs to change right now? My answer is simple. The access to studies via representation and information. It's all great and dandy to advocate for sharing information and knowledge with underrepresented groups, but none of that fucking matters if the studies are all done on straight white males. Remember all the interesting, fascinating, and helpful studies from Parts 1 & 2? Yep, most of them were done with straight white males. That means their results are only *truly applicable* to straight white males. The obvious problem is that ADHD is present in all genders, all ethnicities, and all sexualities. We have been and are continuing to leave out everyone except straight white males. Yes, I am being very facetious. Yes, there are a lot of studies focusing on women, but not enough. Most studies are done on white males, with white females being second on the list. If you can't tell how pissed off I am, I'm telling you now. It's ridiculous. How are we

supposed to treat anyone else? I can't seriously look at a young African American with ADHD and tell them their condition is the same as the participants in those studies on white men, can I? The problem is one that has been perpetuated in many fields of research, and it needs to stop. Why is this such an issue? There are quite a few reasons for the lack of diversity in research studies, and they differ based on who we are discussing. Starting with the biggest issue, we have funding. The funding for research is very institutionalized. Studies go through a very long, and tedious process before getting approved by the IRB, and then funding is given if the study is deemed to be helpful and worth funding. I'm directly calling out whoever oversees this funding process. You people are part of the problem. I don't know if I should call you sexist, racist, or homophobic, but based on the severe lack of studies focused on women and other genders, ethnic minorities, and sexual minorities, all these descriptions fit. For years, women, ethnic minorities, and even those in the LGBTQ+ community have been drawing the short straw in research. You can't justify why they are not being represented more. Call me naïve, call me facetious, I don't care. Do better. For decades, women have been prevented from holding any sort of power, getting any sort of credit for research, and for being the focus of many studies. Yes, there are lots of studies on just women. But there are infinitely more studies on just men. Those who fund research will likely claim that studies with women have hurdles that increase the time needs to preform studies, like women being on hormonal products, or having cyclic hormonal changes. The study has a few more variables to account for and control. You're scientists, do the damn study. Women deserve to be represented in research and in the scientific literature. There are obvious biological, anatomical, and physiological differences between men and women, so we need to increase our understanding of these differences. Doing so will allow us to treat women and men better individually, and it will help women learn more about how ADHD and other conditions affect them specifically compared to their male counterparts. Extending even further from that, we need to start doing research on those who do not fit into these specific gender roles. My own personal opinions aside, some individuals do not identify as male or female. They still deserve the same representation and respect as everyone else. Treatment is obviously going to be different for them, so research should strive to expand into these domains as well.

Another claim they will use is that those in ethnic minority groups are not willing to participate in studies. Man, I wonder why? Perhaps African Americans are scared because historically they were used in early research as lab rats for unethical and dangers studies? Man,

whose fault is that? When looking at ethnical differences, we see an even bigger gap in research, especially when we look at ADHD. In fact, the disparity is so large, I couldn't even find an article discussing the differences. Ethnic minorities are so underrepresented that nobody seems to even be looking at the percentage of studies focused on just African Americans, just Hispanic, just Asians, etc. The only way we can truly get somewhat generalizable and applicable results regarding ADHD and its effects for these ethnic minorities is by doing research focused on them specifically. Here is exactly how this needs to happen. First, studies regarding the different symptomology, presentation and manifestation of ADHD need to be done on study populations consisting of only African Americans, only Hispanics, only Asians, etc. Then once we have a large collection of studies on each group, regarding specific pathophysiology, behavioral symptoms, and other facets of ADHD, the field will then do systematic reviews on each ethnic group individually, followed by meta-analyses so we can obtain some solid and fairly generalizable results. Now comes the fun part. After we painstakingly do this for each ethnic group, we control for gender, age, sexuality, and other variables to further reduce exclusion and increase the scope of the results reliability and application. Then, once we've done all this, we start conducting studies focused on all ethnic groups. Studies with White males, African American males, Hispanic males, Asian males, etc. This allows us to examine specific differences between the ethnic groups regarding ADHD, which only strengthens our understanding of how cultural, environmental, and social factors influence and change the outcomes of ADHD and its development. Additionally, this approach allows us to identify any core differences in ADHD based on pure biological differences due to ethnicity. The door will be busted wide open on ADHD if we expand our focus to minority groups as a whole; the only problem is none of the people in charge want to. There are factors involved, and I've already named a few earlier in this section. Unfortunately, these people are simply upholding a systematic process that excludes minorities. This process has been active since the dawn of modern research and continues to operate in most programs, labs, and other venues of academia. There needs to be change. I don't care what your study is focusing on. I don't care where you are conducting research. You can always control for external factors, and a lot of the times doing so is a big pain in the ass. **The difficulties of studying minority populations doesn't justify the systematic exclusion that has persisted for decades.** African Americans don't trust researchers? Get out into the communities of these people and start building bridges. Encourage younger children to pursue research, get them and their families involved in

opportunities to develop skills and grow fond of the academic process. A little conscious effort goes a long way, and I know these things are easier said than done. Yet, as soon as I get involved in researching (whenever that time comes) I plan of focusing on minority groups and outreach to that population. Regardless of the topic I am researching, I want these populations to know that the world of researching is not abandoning them. They have just as much right to information, and the development of understanding as anyone else. There are others who agree with me, I know there are. A handful of studies in ADHD research have begun focusing on minority groups alone, and it makes me elated to see that. I hope the number of minority focused studies continues to grow exponentially in all fields, as it has been far too long a wait for these populations to finally get representation. As we shift our focus slightly towards a new chapter regarding stigmatization and education about neurodiversity, I want to make sure I was clear. Yes, I am deeply upset regarding the current state of academic research, not only with ADHD, but holistically. However, there are already some small steps being made in many fields to combat these imbalances and I think that is enough to start a big wave of change and reconsideration regarding the systems in place for research within higher academia. It won't be easy, and it will likely be slower than desired, but I am hopeful these injustices will be overturned and corrected by those of us who truly care and refuse to sit by and watch the continued oppression of minority populations, whether they are a minority of ethnicity, gender, sexuality, etc.

Chapter 11: Read the Book, Not the Cover

By now, I would hope many of you reading this have heard the phrase “don’t judge a book by its cover.” For those of you who have been living under a rock (we’re full of weird sayings) this phrase is a simple way of telling someone not to make any rash judgements regarding another person. Usually, people judge others based on their physical features, things they have heard about them, or a brief, singular interaction they might have had. For those of you who are like me, and you psychoanalyze anyone and everyone you meet, this can be hard to avoid. I have made many judgements of someone preemptively and later realized I was wrong. However, these often immature and usually unharmed predispositions are taken to a much more serious level when they become a sort of stigma. The traditional definition of a stigma via the Cambridge Dictionary is a strong feeling of disapproval that most people in a society have about something, especially when this is unfair. My definition of a stigma is a chronic, negative predisposition towards someone, or something based on little to no knowledge or understanding. Either way, stigmatization is much more serious than the occasional assumption. Like many neurological conditions, stigmatization is extremely common in ADHD (we saw this in the studies of peer rejection in young children earlier). Here, we’re going to discuss the shortcomings of education regarding neurodiversity, and how stigmatization has hindered the success of many neurodivergent individuals.

To begin, we should address the main issue regarding neurodiversity. This term was recently put into use, with the intention of allowing those who have neurological conditions to feel more *normal*, and perhaps more included in society, while also trying to preserve the sense of individuality their conditions might have given them (put that on a fucking T-shirt). While noble in its intention, I think the use of neurodiversity only succeeded in complicating the situation surrounding many neurological conditions. I do agree that these individuals enjoy having a sense of individuality, seeing as I identify with my ADHD proudly, and I also agree that grouping together different conditions allows them to also identify with one another in a unique way that helps them hear and see each other as allies and friends who understand some of the struggles they experience. Unfortunately, this created a different divide, instead of the divide being normal person vs. [insert condition here], it is now neurotypical vs neurodiverse. We merely substituted one division for a slightly less marginalizing division. Don’t get me wrong, its progress, but it’s not the right kind of progress. Whether we look at the first divide or the second, there is little to no conversation or understanding being created. I have many friends who are neurotypical, and many

who are neurodiverse. We all live on the *same* planet, governed by the *same* universal physical laws and processes, we experience very similar stimuli daily, the disconnect is how our brains *react, perceive, and respond* to these stimuli. I am conscious of efforts to bridge the gap between neurodiverse and neurotypical groups, and sure, I'd say that there is a focus and awareness of the need to bridge this gap. We just really suck at it. It isn't the fault of those trying, it's the fact that trying to explain the lives of neurodiverse people is impossible unless you operate on a condition specific, or person specific basis. Regarding ADHD, I have a neurotypical friend who always tries to understand and bridge this gap in how my brain works compared to his (he's an incredible individual who is very integral to my life). However, when interacting with anyone else with ADHD, he reports to me that using the same guidelines he's learned over the years of our friendship doesn't work with others. This is the big challenge. While neurodiversity did provide a sense of inclusion and belonging to many, it also generalized neurological conditions and made many people think *all* neurodivergent individuals operated similarly. It sounds ridiculous, but so many people have told me things like "oh, I didn't know people with ADHD could have symptoms of ASD" or "I thought that was something all neurodiverse people did." Some of this comes from sources of misinformation, the largest culprit being social media of course (do your own research or find someone with an actual degree and years of professional experience if you want to use social media as a source of information). As one could imagine, this gap in understanding, and incorrect use of information leads to harmful outcomes surrounding all sorts of conditions. For our sakes, we're focusing on ADHD, but all neurodiverse conditions are stigmatized daily.

Stigmatization in ADHD is much more common in younger individuals (ages 5-20), as they are much more immature, socially inept, and generally more trusting and gullible to information they absorb. That is why larger perveances of per rejection happen during adolescence, especially in teens regarding ADHD. Teens are just horrible, mean, spiteful people; they think they are invincible and at the end of the day, nobody looks back on their teen years and feels proud. Stigmas are serious, and they are not to be taken lightly. Rumors about how ADHD individuals are "weird" or "awkward" often dominate the halls and classrooms of schools across the US, and likely the world altogether. These stigmas lead to persistent exclusion, isolation, and alienation of these people, which has serious adverse effects.

Human beings are social creatures, even the most introverted human being will suffer long-term cognitive deficits from isolation. For younger individuals, the period of k-12 is crucial for

long-term brain health. Your brain is at its most plastic, meaning it can form new habits, memories and create better pathways the easiest. K-12 is the period of learning where you form a baseline and should be learning *how to learn* (whether this happens is another conversation entirely). Thousands of bright, young minds have been discouraged and destroyed by the stigmatization of ADHD in their surrounding environments. Whether this happens through bullying, being coddled, treated as incapable, or simply being ignored and unsupported, thousands are convinced of their insignificance.

This is the wake-up call to end this shit right now. If you know someone with ADHD, and you've seen them being treated poorly for no reason, do something about it. I've seen just how bad it gets; I've even seen teachers join in on the bullying before. It needs to stop. Yes, people with ADHD experience the world and process it in a different manner than typical people. Why does that make them undeserving of respect? If anyone can answer that question with a supported, methodical, and rational argument I'll listen. Nobody deserves to be treated this way, regardless of their condition. I'm sorry you have to repeat what you said 3 times because they zoned out while you were speaking, I'm sorry they didn't realize you wanted emotional support instead of a solution to your problem, I'm sorry they told you the truth and it hurt your feelings. I get it, a lot of the things ADHD people do daily can be annoying to some degree, but it's the same thing for them dealing with you! It goes both ways. 99% of the time, that person with ADHD who did *something* to you, or to someone else that was "weird" or "annoying" knows it isn't normal, and they likely spend their time dreading over those situations where they slip up. Why is it so hard for people to just stop and think for a few seconds? Believe me, I'm guilty of judging people incorrectly, I've done it plenty of times. You know what's different between me and most people? I usually end up questioning why I decided to judge someone so swiftly, and I reflect on it and try to think of reasons beyond my control. Maybe they have a condition, maybe they were having a rough day, or they didn't get a lot of sleep and were irritable. Any judgement based on only a few interactions with someone can't possibly be accurate. I strongly encourage anyone reading this to ignore rumors about anyone and find out what people are like for yourself. Having been the target of rumors, it only takes one brave soul to destroy the rumors and turn them back on those who started them.

The purpose of this section isn't to end bullying or to become some kind of "be nice" campaign. If it ends up that way, great. The reason we need to address the stigmas and prejudice

behind ADHD is that it's extremely hurtful and outright unfair. Unfortunately, these stigmas come in all shapes, sizes, and situations. With the most common ones, like being loud, or quirky (if you say ADHD makes you quirky, you're an idiot), and other things like being lazy and unmotivated. Yes, some of these might be possible outcomes, but they aren't givens. They don't happen to everyone with ADHD. Furthermore, they aren't even controllable by most of the people who have ADHD. IF you judge someone for their neurological condition you are judging them for something that they don't have full control over (congratulations on being a terrible person). Thankfully, the big solution to this issue is the simplest one. JUST BE NICE. Crazy right? All you have to do is not judge someone based on the things you hear from someone else, especially if you have never talked or interacted with them. Just because they have ADHD or some other condition, doesn't mean you can judge them. Just like you can't judge a neurotypical person without meeting them, these individuals with ADHD deserve the same chance and same level of respect. However, when it comes to education about neurodiversity and neurological conditions in general, I have found that the level of understanding is severely lacking. Even for those who *have* these conditions, there is a disconnect in truly understanding the differences and significance of neurodiversity. In our final chapter, I want to discuss how we can better educate people about these neurodiverse conditions and how we can make these individuals feel more included and understood by society.

Chapter 12: The Gateway to Understanding

Our final chapter will have a more hopeful and positive vibe since we're discussing education and how to better understand neurodiverse individuals. Last chapter I explained the issues surrounding the definition of neurodiversity and how it often creates a bigger disconnect than it was intending, but for all intents and purposes, we'll use it as a general term to make this section a bit easier to follow. Educating people about neurodiversity is the main goal of this project. My only true aim was to educate those with and without ADHD about how daily lives are affected with this condition. The reason this form of education seems so strange and unheard of, is because nobody is doing it. So many sources of information and knowledge have agendas and underlying purposes behind it. For me, I just want to provide the best possible information I can, so anyone who reads this feels like they understand the way life is for those of us with ADHD. Additionally, this project allows those who have ADHD to find comfort in understanding they aren't alone and that their problems are valid and can even be improved. This form of information is not available for many of the conditions described as neurodiverse. Some conditions might not be understood well enough by current research, which is another problem, but for those that have ample research, education needs to be the forefront of concern. If everyone knew the facts behind anxiety disorders, depression, OCD, ADHD, ASD, etc. there would be a lot less assumptions, generalizations and ignorance surrounding the difficulties these conditions can present. How many times have you heard of someone trying to explain their depressive episodes to a friend, only to get a response like "well, you just have to be more positive about things" or some bullshit like that. These people clearly don't understand how depression works. Depressed people can be as positive as they want, it's not going to change the fact that every single action they take is physically and mentally draining, their motivation sapped away for reasons they often can't explain. If more people understood the basics surrounding depression and were more supportive and understanding, there would be far less suicide deaths per year.

Education is by far the most important factor for any kind of injustice or misunderstanding. Proper education, especially when people are younger, could fix so many problems. I'm not saying we need to turn every child into a social justice warrior but giving children a comprehensive and full understanding of how to treat people correctly, and teaching people how different neurological conditions effect those who have them is crucial for the betterment of everyone's lives. On the other hand, there is also the responsibility of those with said conditions to understand what they

have as well. If someone with ADHD came up to me and complained about being socially withdrawn and outcast by their peers, I would feel sorry for them. However, if they also had never learned about, or tried to work on reducing their deficits, I would be a bit confused as to why they are complaining so much. The responsibility of education and understanding goes both ways here. Neurotypical people need to understand and educate themselves on the conditions neurodiverse people have, so they can be less judgmental and more open to interacting and accommodating these unique and interesting people. However, neurodiverse individuals have a responsibility to educate themselves about their own condition and learn to better adjust and conform to the norms of society around them. By doing so, they will be able to better understand and communicate with their neurotypical peers, who will likely be both thankful and inspired by their efforts to adjust and manage their own conditions. Understanding one another is a two-way street, I can't stress that enough. It will never be a 50/50 either. Sometimes as a neurodiverse individual you are going to have to adjust more than you'd like, making the relationship 70/30. On the other hand, maybe you find someone who is really educated and accommodating, making the interaction 30/70. Regardless of which way the interaction sways, you should be able to flex both ways. That's how everything works. Sometimes you have to put up with people who are less understanding and more rigid, and that's ok. Having a good understanding and being properly educated about these conditions gives you the best chance to adapt and be able to adjust to the environment and situations of everyday life. While this final section is short, I hope its message does not get lost, as it is arguably the most important section of the entire project. With that in mind, we wrap up our project, with a short note to my younger self, and a reflection on the future of my own life, and on the impacts this project might make on others' lives.

Epilogue: Reflection and Hope for the Future

Chapter 13: Note to My Former Self

Hey there kid, its yourself, from about 12 years in the future. I know you'll never be able to read this, being stuck in the past and all, but there's a few things you need to know. To start, you made it into college bud! You never gave up on your academics and all that hard work paid off! You should be proud of yourself, and I know you're going to continue doing great. Another cool thing is that you got to play soccer in college too! The journey there was crazy, and definitely not easy, but we achieved that dream, and nobody can take it from us. The real reason I wanted to write this letter to you is to tell you this:

Every twist and turn in life has been hard for you. ADHD has made your life lonely. Having few friends, being called "weird" and "quiet" has made people think they can walk all over you and pressure you into doing what they want. We both know that didn't work, so they bullied you and spread false rumors about you. Don't worry about it bud, it makes us stringer in the long term. Despite being so scared and misunderstood you'll end up finding a few good friends, so hold onto them and make sure they know how much you appreciate them. Learning about your ADHD hasn't been easy, and it's going to keep getting more complicated and difficult. Even now I learn more about it each day. Just keep pushing bud, I promise you'll figure things out for the best. Regardless of that, I know you're struggling. The mean words and thoughts don't change. No matter how friendly or accommodating you try to be, some people are just mean. They can't change who they are, and their behavior is out of your control, so just know that if you do your best, that's all anyone can ask of you. In a few years, things are going to get really tough. We're going to make some really dumb decisions and get close to making a few choices that might have ended things a little prematurely. I can't tell you enough, just hang in there and know we'll make it to the other side in one piece. Despite all the challenges, adversity, and struggles, I am about to graduate college, and go on to do all kinds of cool things. I'm planning on working for a bit while I do research on Autism and other neurological conditions, and eventually I want to go to med school to pursue Neurology. It's funny how the thing we hated so much growing up became our passion and our drive to help others. I'm beyond excited to see where this journey called life takes us next, and I just want you to know that I love you bud. Being able to say that to myself took a lot of personal work and reflection but I can confidently say that I truly love who we are, I wouldn't change a damn thing about us. Just know that no matter what, even when all else fails, you'll always have me to rely on, because one day,

we befriended our ADHD and our lives changed for the better. Head up kiddo, the world is yours to explore and discover, so go be great and change people's lives.

Now, to address those of you who have made it this far. Thank you. Thank you for your undivided attention, for listening to what I have to say, and most of all, thank you for being you. Every single person who reads this is at a different point in their life. For some, you are curious about ADHD, curious about your friend's condition or your own. Others may be struggling with theirs, they may feel alone and abandoned. Regardless of where you are in life, this project has been the most fun and eye-opening experience of my life so far. Getting to discuss something important to me and hopefully help people as a result is an experience I am truly grateful for. To those of you reading this, I have a few things I need to send you off with.

First, never stop learning. I don't mean school here. Never stop being curious, never take things at face value. Question, discover and find out what things really mean. Being curious will take you far in life and it is something that can benefit everyone.

Secondly, you are important, you are loved, and you matter. I cannot stress enough how important self-love is. You will often find life solitary and lonesome. Even if you think others hate you, you're wrong. There are people who care about you out there, but how can you be happy if *you* don't care about you? Even if these are just the words of some 22-year-old, I care about every one of you. You matter, your feelings matter and your ideas matter.

In closing, thank you once again for your attention and open-mindedness. I hope I was able to do this project justice and help enhance your understanding of ADHD and the world those with ADHD live in. Now, if you'll excuse me, I must shift my attention elsewhere.

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