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Variable Attention Stimulus Trait (VAST) Spectrum Traits: A Brief Discussion on Attentional Control & Emotional Regulation in Attention Deficit-Hyperactivity Disorder (ADHD)

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Abstract: Attention Deficit-Hyperactivity Disorder (ADHD) was first identified in 1902 by a British pediatrician, Sir George Still, as an abnormal defect in children's moral control that caused poor control of their behavior despite their average and/or above intellectual capacity. It was not until the late 20th century when the American Psychiatric Association formally recognized ADHD as a mental disorder, whose hallmarks are excessive amounts of inattention, hyperactivity, and impulsivity. Also known as the triad of impairments in ADHD, these symptoms are pervasive, impairing in multiple contexts, and otherwise age-inappropriate. Only recently, Hallowell and Ratey (2021) introduced the concept of Variable Attention Stimulus Trait (VAST) in their book ADHD 2.0 to describe the condition. They argued that VAST/ADHD is unrelated to intelligence and has nothing to do with the deficit of attention. VAST/ADHD describes about how each brain/mind is uniquely wired affecting the way one deals with stimulation and attention. In this paper, the authors have chosen to explore two of the traits on the VAST/ADHD spectrum - (i) attentional control/sustained attention, and (ii) emotional regulation/impulse control - to illustrate the condition of ADHD as a variability of attention rather than a deficit of attention.

Keywords: ADD, ADHD, Attentional Control, Emotional Regulation, Impulse Control, Sustained Attention, VAST

1. Introduction

Whenever the word *inattention* is uttered by a teacher or parent about a child in class or at home, the first thought that always comes to mind is that the child might have Attention Deficit Disorder (ADD) or Attention Deficit-Hyperactivity Disorder (ADHD) (Kessi *et al.* 2022; da Silva *et al.* 2023). The other term that is also frequently used or heard is *distraction* and it is also associated with the same challenging condition. Though the two words - inattention and distraction - seem to be the same, they are not and, strictly speaking, should never be taken as synonymous. Inattention refers to a person's preoccupation in internalized thought, whereas distraction refers to the diversion of attention away from the on-going target activity toward other unrelated tasks.

In the big picture, inattention has something to do with attentional control (AC), while distraction has to do with sustained attention. In the former, AC entails paying attention for a long period of time while concentrating on a given task until it is done. This means it involves two distinct behaviors: (i) paying a full attention to an external or environmental stimulus; and (ii) turning out or not attending to other things in order to complete a given activity. AC, therefore, constitutes a foundational activity for success in executive functioning (EF), apart from emotional regulation or impulse control. In the latter, sustained (or undivided) attention refers to a person's ability to stay on-task or focused on a situation or activity in spite of other distractions, fatigue or boredom. For young children, the duration of staying on-task or remained focused on a given activity with minimal supervision or monitoring is rather short, but adolescents are able to have a prolonged duration to complete a one-to-two hour homework (with short breaks in between). Both AC and sustained attention (SA) are executive functioning (EF) skills. Besides, the EF skills also include task initiation, cognitive flexibility, problem-solving, working memory, planning-and-organizing, time

management, emotional regulation (ER; also known as impulse control or IC for short, but both ER and IC are not exactly synonymous; see Section 5 for explanation), stress tolerance, and self monitoring.

As mentioned earlier, inattention and distraction (or distractibility) are symptoms associated with ADD/ADHD in addition to hyperactivity and impulsiveness (or impulsivity). Often, these symptoms are treated negatively as if they are chaotic and disruptive to the normal routine. Hence, ADHD is also categorized under Disruptive Behavioral Disorder (Chia, Ng, & Kuan, 2010). However, Hallowell and Ratey (2005) argued that these are brain traits with positive and negative effects. To avoid the stigma or pitfalls of the ADHD label, they renamed it Variable Attention Stimulus Trait (VAST for short; also see Hallowell & Ratey, 2021, for detail).

2. Attention Deficit Disorder and/or Attention Deficit-Hyperactivity Disorder

Medical science first documented children exhibiting inattentiveness, impulsivity and hyperactivity in 1902, identified by the British pediatrician, Sir George Frederick Still (b.1868-d.1941), who "described the condition as 'an abnormal defect of moral control in children' … found that some affected children could not control their behavior in the same way a typical child would. He did note … these children were still intelligent" (Edge Foundation, 2022, para. 4). Since that time, the disorder has been given numerous names, including minimal brain dysfunction, hyperkinetic impulse disorder, hyperkinetic reaction of childhood, and attention-deficit disorder with or without hyperactivity.

The American Psychiatric Association (APA) issued its first edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) in 1952 (American Psychiatric Association, 1952; Holland, 2021). This manual listed all the officially recognized mental disorders. It included known causes, risk factors, and treatments for each psychiatric condition. The APA did not recognize ADHD in the first edition of DSM. "When DSM-II was published in 1968 (American Psychiatric Association, 1968), it included hyperkinetic reaction of childhood for the first time" (Holland, 2021, para. 8). Then in 1980 (American Psychiatric Association, 1980), the APA released DSM-III in which the name of hyperkinetic reaction of childhood was changed to attention deficit disorder (ADD). At that time, most "[S]cientists believed hyperactivity was not a common symptom of the disorder. This listing created two subtypes of ADD: ADD with hyperactivity, and ADD without hyperactivity" (Holland, 2012, para. 10-11). In 1987, the APA (American Psychiatric Association, 1987) published its DSM-III-R which removed "the hyperactivity distinction and changed the name to attention deficit-hyperactivity disorder (ADHD) … included the three symptoms of inattentiveness, impulsivity, and hyperactivity (triad of impairments in ADHD) into a single list of symptoms and did not identify subtypes of the disorder" (Holland, 2021, para. 12-13). This was the very first time that ADHD was officially recognized.

In 2000, the DSM-IV (American Psychiatric Association, 1994) with its subsequent text revision (DSM-IV-TR; American Psychiatric Association, 2000) established the three subtypes used by healthcare professionals even today: (i) predominantly inattentive type ADHD; (ii) predominantly hyperactive-impulsive type ADHD; and (iii) combined type ADHD. With the publication of DSM-5 (American Psychiatric Association, 2013), "the disorder has been renamed simply as attention-deficit/hyperactivity disorder (ADHD)" (see Children and Adults with Attention Deficit/Hyperactivity Disorder, 2017, para. 4). The same term is retained in the subsequent text revision of the DSM-5 (see DSM-5-TR; American Psychiatric Association, 2022).

Much has been already researched, written and published on the ADD/ADHD (e.g., Faraone *et al.,* 2021; Tobarra-Sanchez *et al.,* 2022; Zhao *et al.,* 2022). According to the fact sheet About ADHD published by the Children and Adults with Attention-Deficit/Hyperactivity Disorder (Children and Adults with Attention Deficit/Hyperactivity Disorder, 2017), ADHD is defined as "a neurodevelopmental disorder affecting 11 percent of school-age children (Visser et al., 2014). Symptoms continue into adulthood in more than three-quarters of cases (Brown, 2013). ADHD is characterized by developmentally inappropriate levels of inattention, impulsivity and hyperactivity … without identification and proper treatment, ADHD may have serious consequences, including school failure, family stress and disruption, depression, problems with relationships, substance abuse, delinquency, accidental injuries and job failure. Early identification and treatment are extremely important" (para. 2-3).

3. Variable Attention Stimulus Trait (VAST)

Based on the current understanding of ADHD, its hallmarks are excessive amounts of inattention, hyperactivity, and impulsivity, and this triad of impairments are also pervasive, impairing in multiple contexts, and otherwise age-inappropriate (American Psychiatric Association, 2013, see pp. 59-65; American Psychiatric Association, 2022; Foreman, 2006; World Health Organization, 2022). However, symptoms of ADHD have also been found to arise from challenging problems observed in two important areas: (i) executive functioning (EF) - resulting in executive dysfunction (Brown, 2008; Diamond, 2013; Malenka, Nestler, & Hyman, 2009); and (ii) emotional regulation (ER) or impulse control (IC) - resulting in emotional dysregulation (EDR) or impulsiveness (Faraone *et al.,* 2019; Retz *et al.,* 2012; Shaw *et al.,* 2014). They have already been mentioned at the beginning of the paper, and are also considered to be core traits of ADHD.

Hallowell and Ratey (2022) were against the use of the term ADHD, arguing strongly that it is inaccurate and potentially a corrosive name. They explained that "the term 'deficit disorder' places ADHD in the realm of pathology, or disease. Individuals with ADHD do not have a disease, nor do they have a deficit of attention; in fact, what they have is an abundance of attention. The challenge is controlling it" (Hallowell & Ratey, 2022, para. 2). They went on to propose a new term - Variable Attention Stimulus Trait (VAST) - in their recently published book ADHD 2.0 (Hallowell & Ratey, 2021), and argued that it is a more accurate descriptor for ADHD, "a name that allows us to 'de-medicalize' ADHD and focus instead on the huge benefits of having an ADHD brain" (Hallowell & Ratey, 2022, para. 3). With VAST, Hallowell and Ratey (2022) pointed out that there are always pairs (see Table 1): e.g., a person can hyperfocus versus another person who cannot focus (has nothing to do with hypofocus); one who is easily distracted versus another who notices things others do not; a person who is hyperactive versus another who has the drive to succeed; and one who acts impulsively versus another who does right with spontaneity. For instance, an individual, who can be easily distracted, can also be curious, too. This means distractibility is a positive trait as it arouses one's curiosity to inquire or find out about something in the process of learning or acquiring new knowledge. That is to say that anyone with VAST can succumb to perceived rejection (also known as Rejection Sensitivity Dysphoria or RSD), but s/he can just as easily thrive with perceived recognition, an experience, which Hallowell and Ratey (2022) have termed as Recognition Responsive Euphoria (RRE). In other words, VAST and ADHD exist on a continuum in both opposite ends. According to VAST Diversity (2022), not understanding the fact that VAST/ADHD traits (or VAST/ADHD spectrum traits as preferred by authors of this paper) exist on a continuum that can change, people with VAST/ADHD are vulnerable to becoming impaired.

Table 1. Continuum of VAST/ADHD Brain/Personality Traits

Traits	Positive ..... Negative
Attention control	Is attentive ..... Is inattentive
Sustained attention	Can hyperfocus .....Cannot focus
Awareness	Notices things others do not ..... Is easily distracted
Ambitiousness	Possesses the drive to succeed ..... Is hyperactive
Impulsive control	Does right with spontaneity ..... Acts impulsively

The term VAST, unrelated to intelligence, refers to a person's brain has a unique neurological wiring that can lead to "creative thinking, adventurousness, courage, integrity, perseverance and a desire to make a change" (VAST Diversity, 2022, para. 7). This means that each VAST/ADHD mind/personality is unique and different from others since "they are wired in a way that affects how our minds deal with stimulation and attention" (VAST Diversity, 2022, para. 20). VAST is not about attention deficit as in ADD/ADHD; "it is about a variability of attention" (VAST Diversity, 2022, para. 5). Symptoms associated with VAST/ADHD can positively or negatively impact a person's life, work as well as relationships (Hallowell & Ratey, 2022). Hence, a VAST/ADHD mind/personality is considered neurologically atypical and this trait is highly genetic. According to VAST Diversity (2022), an estimation of "about 10% of the population has Variable Attention Stimulus Trait" (para. 8).

In this paper, two VAST/ADHD spectrum traits - (i) attentional control (inattentiveness vs attentiveness), and (ii) emotional regulation/impulse control (dysphoria vs euphoria) - are used to illustrate the variability of attention in ADHD.

4. Attentional Control

Attentional control (AC), also known as endogenous attention or executive attention, refers to an individual's capacity to select what s/he wants to pay attention to or concentrate on, and what to ignore (Astle & Scerif, 2009). AC, mediated by the frontal areas of the brain which includes the anterior cingulate cortex, is closely related to other EF skills, such as working memory, time management, and sustained attention (Astle & Scerif, 2011; Posner & Petersen, 1990).

In the VAST/ADHD, the spectrum traits for AC - hyperfocus and hypofocus (i.e., under-focus or cannot focus) - are opposite poles to each other. Both are concerned with sustained attention, too. Hyperfocus can be described as an intense condition of mental concentration or visualization that channels the conscious mind on a certain object, task or topic of interest. It is often considered as a psychiatric trait of ADHD together with inattention. Moreover, it is also a trait that has been associated with other mental conditions, such as autism spectrum disorder, bipolar personality disorder, obsessive-compulsive disorder, and schizophrenia (Ashinoff & Abu-Akel, 2021; Kooij *et al.,* 2019; Webb *et al.,* 2005). According to Webb *et al.,* (2005), "… there are no empirical data that support hyperfocus as an aspect of ADD/ADHD. In gifted children without ADD/ADHD, this rapt and productive attention state is described by Csikszentmihalyi (1990) as 'flow' … What has been coined 'hyperfocus' in persons with ADD/ADHD seems to be a less medical-sounding description of perseveration. Thus, the apparent ability to concentrate in certain limited situations does not exclude the diagnosis of ADD/ADHD" (pp. 50-51).

As an ADHD symptom, hyperfocus is the ability to zero in intensely on an interesting project/activity for hours at a time (Flippin, 2022). It may bear a relationship to the concept of flow defined by Csikszentmihalyi (1990) as a state of deep absorption in an intrinsically enjoyable activity (e.g., when actors, artists or athletes are fully focused on their performance). In some situations, both flow and hyperfocus can be a useful aid to academic or career achievement; in other situations, however, they could be a liability, distracting from the task at hand. However, unlike hyperfocus, flow is often described more positively, suggesting hyperfocus and flow are not two sides of the same condition under contrasting situation or intellect (White & Shah, 2006).

Hypofocus, whose prefix 'hypo-' means 'under' or 'deficient' (i.e., 'under-focus'), means limited or low concentration and is a total opposite of hyperfocus. Conditions associated with hypofocus include anxiety, bipolar disorder, depression, and trauma-related disorders. People with ADHD have been found to suffer from stress, anxiety and depression (Alexander & Harrison, 2013; Wasserstein, 2005) and they hypofocus or cannot focus in studies or at work.

5. Emotional Regulation/Impulse Control

According to Knowles (2022), emotional regulation (ER) refers to a person's ability to modulate his/her emotional state and positively cope with challenging situations and emotions. Without learning how to regulate one's emotions and actions, people can get frustrated and behave inappropriately, only to worsen the situation. Like ER, impulse control (IC) refers to the way of managing one's behavior and emotions in order to avoid harming oneself or others. For example, during the early childhood phase, basic safety reactions (e.g., not to dash across a busy road) help a child to develop impulse control. During adolescence, adherence to safety regulation helps the teenage child to think carefully before engaging certain risky behaviors (e.g., binge drinking and substance abuse) and aim for acceptable social norms. By adulthood, impulsive behavior in all situations is better managed, and thus, avoiding hasty, reckless, or harmful behavioral outcomes.

In the VAST/ADHD spectrum traits for ER/IC, two conditions - Rejection Sensitive Dysphoria (RSD) and Recognition Responsive Euphoria (RRE) – can be seen as bipolar or two extremities of the emotional dysregulation (EDR) continuum. The RSD - coined by an American psychiatrist, Dr William Dodson, who notes that it is exclusive only to people with ADHD and has recommended treating the condition with medication (Maguire, 2022) - refers to "to the extreme emotional sensitivity and feelings of guilt, shame, and rejection often experienced by those living

with VAST" (Hallowell & Ratey, 2022, para. 4). Being a brain-based symptom that is likely an innate feature of ADHD, RSD is not a formal diagnosis nor is the definition found in the DSM manual; rather, it is one of the most common and disruptive manifestations of EDR, common but misunderstood with very little research done, and is also "an oft-misunderstood symptom of ADHD, particularly in adults" (Dodson, 2022, para. 2). Maguire (2022) argued that "it is a real and valid condition" (para. 2). The painful and even traumatic experience of RSD is not thought to be caused by trauma (Dodson, 2022; Hance, Blackhart, & Dew, 2018). The other end of the EDR is the RRE, which VAST/ADHD acknowledges as it as the alternate/opposite side and considered it the sister syndrome of RSD. The RRE response becomes super-charged when encouragement is received. According to Fox (2021), RRE "is a condition that essentially takes the praise and positive words of others and transforms … the ADHD subject into super-spouse ... or iron spouse ... or maybe Captain Amazing" (para. 26). From one end of dysphoria, a person with ADHD, given appropriate support and encouragement, could change and develop euphoria on the other end. This constitutes the VAST/ADHD spectrum of ER traits.

6. Conclusion

The Hallowell-Ratey perspective was taken to relook at ADHD based on VAST, i.e., to know and understand a VAST/ADHD brain/mind and how it functions is as important as being fully aware that it can react differently to stress, hormones and certain medications. The existence of VAST/ADHD traits on a continuum/spectrum can be benefits and also impairments. This means the VAST/ADHD spectrum traits can be leveraged for success or they can also become the impairments of ADHD. In this paper, the authors chose two VAST/ADHD spectrum traits - (i) the AC spectrum of hyperfocus-hypofocus and (ii) the ER spectrum of dysphoria-euphoria (i.e., RSD-RRE) - and used them to illustrate the condition of ADHD as a variability of attention rather than a deficit of attention.

References

Alexander, S.J., & Harrison, A. G. (2013). Cognitive responses to stress, depression, and anxiety and their relationship to ADHD symptoms in first year psychology students. *Journal of Attention Disorders*, 17(1), 29-37. https://doi.org/10.1177/1087054711413071

American Psychiatric Association. (1952). Diagnostic and statistical manual of mental disorders (DSM). Washington, DC.

American Psychiatric Association. (1968). Diagnostic and statistical manual of mental disorders (*2nd edition)* (DSM-II). Washington, DC.

American Psychiatric Association. (1980). Diagnostic and statistical manual of mental disorders (3rd edition) (DSM-III). Washington, DC.

American Psychiatric Association. (1987). Diagnostic and statistical manual of mental disorders (3rd edition-revised) (DSM-III-R). Washington, DC.

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders (4th edition) (DSM-IV). Washington, DC.

American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (4th edition, text revision) (DSM-IV-TR). Washington, DC. https://doi.org/10.1176/appi.books.9780890423349

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th edition) (DSM-5). Washington, DC. https://doi.org/10.1176/appi.books.9780890425596

American Psychiatric Association. (2022). Diagnostic and statistical manual of mental disorders (5th edition, text revision) (DSM-5-TR). Washington, DC. https://doi.org/10.1176/appi.books.9780890425787

Ashinoff, B.K., & Abu-Akel, A. (2021). Hyperfocus: The forgotten frontier of attention. *Psychological Research*, *85*(1), 1-19. https://doi.org/10.1007/s00426-019-01245-8

Astle, D.E., & Scerif, G. (2009). Using developmental cognitive neuroscience to study behavioral and attentional control. *Developmental Psychobiology*, 51(2), 107-118. https://doi.org/10.1002/dev.20350

Astle, D. E., & Scerif, G. (2011). Interactions between attention and visual short-term memory (VSTM): What can be learnt from individual and developmental differences? *Neuropsychologia,* 49(6), 1435-1445. https://doi.org/10.1016/j.neuropsychologia.2010.12.001

Brown, T.E. (2008). ADD/ADHD and impaired executive function in clinical practice. *Current Psychiatry Reports*, 10(5), 407-411. https://doi.org/10.1007/s11920-008-0065-7

Brown, T.E. (2013). A new understanding of ADHD in children and adults: Executive function impairments. *Routledge*, New York, NY.

Chia, K.H., Ng, G. T., & Kuan, F. H. (2010). Disruptive behavioral disorders. In K. H. Chia & M. E. Wong (Eds.), Series on Special Educational Needs in Mainstream Schools (Paper No.9) (pp.1-42). *Pearson Education/Prentice-Hall*, Singapore.

Children and Adults with Attention Deficit/Hyperactivity Disorder (CHADD) (2017). About ADHD. *CHADD Help4adhd.org Factsheet*. Retrieved from: https://chadd.org/wp-content/uploads/2018/03/aboutADHD.pdf

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. *Harper & Row,* New York, NY.

da Silva, B.S., Grevet, E.H., Silva, L.C.F., Ramos, J.K.N., Rovaris D.L. & Bau, C.H.D. (2023). An overview on neurobiology and therapeutics of attention-deficit/hyperactivity disorder. *Discover Mental Health,* 3, 2. https://doi.org/10.1007/s44192-022-00030-1

Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, 64, 135-168. https://doi.org/10.1146/annurev-psych-113011-143750

Dodson, W. (2022). New insights into rejection sensitive dysphoria (RSD) (updated)**.** *ADDitude*. Retrieved from: https://www.additudemag.com/rejection-sensitive-dysphoria-adhd-emotional-dysregulation/

Edge Foundation (2022). A brief history of ADHD. *The Edge Newsletter*. Retrieved from: https://edgefoundation.org/a-brief-history-of-adhd/

Faraone, S.V., Banaschewski, T., Coghill, D., Zheng, Y., Biederman, J., Bellgrove, M.A., Newcorn, J.H., Gignac, M., Al Saud, N.M., Manor, I., Rohde, L.A., Yang, L., Cortese, S., Almagor, D., Stein, M.A., Albatti, T.H., Aljoudi, HF, Alqahtani, M.M.J., Asherson, P., Atwoli, L., Bölte, S., Buitelaar, J.K., Crunelle, C.L., Daley, D., Dalsgaard, S., Döpfner, M., Espinet, S., Fitzgerald, M., Franke, B., Gerlach, M., Haavik, J., Hartman, C.A., Hartung, C.M., Hinshaw, S.P., Hoekstra, P.J., Hollis, C., Kollins, S.H., Sandra Kooij, J.J., Kuntsi, J., Larsson, H., Li, T, Liu, J., Merzon, E., Mattingly, G., Mattos, P., McCarthy, S., Mikami, A.Y., Molina, B.S.G., Nigg, J.T., Purper-Ouakil, D., Omigbodun, O.O., Polanczyk, G.V., Pollak, Y., Poulton, A.S., Rajkumar, R.P., Reding, A., Reif, A., Rubia, K., Rucklidge, J., Romanos, M., Ramos-Quiroga, J.A., Schellekens, A., Scheres, A., Schoeman, R., Schweitzer, J.B., Shah, H., Solanto, M.V., Sonuga-Barke, E., Soutullo, C., Steinhausen, H.C., Swanson, J.M., Thapar, A., Tripp, G., van de Glind, G., van den Brink, W., Van der Oord, S., Venter, A., Vitiello, B., Walitza, S., Wang, Y. (2021). The world federation of ADHD international consensus statement: 208 evidence-based conclusions about the disorder. *Neuroscience & Biobehavioral Reviews*, 128, 789-818. https://doi.org/10.1016/j.neubiorev.2021.01.022

Faraone, S.V., Rostain, A.L., Blader, J., Busch, B., Childress, A.C., Connor, D.F., & Newcorn, J.H. (2019). Practitioner review: Emotional dysregulation in attention deficit/hyperactivity disorder - Implications for clinical recognition and intervention. *Journal of Child Psychology and Psychiatry*, 60(2), 133-150. https://doi.org/10.1111/jcpp.12899

Flippin, R. (2022). Hyperfocus: The ADHD phenomenon of intense fixation (updated). *ADDitude*. Retrieved from: https://www.additudemag.com/reviews/post/understanding-adhd-hyperfocus/

Foreman, D.M. (2006). Attention deficit hyperactivity disorder: Legal and ethical aspects. *Archives of Disease in Childhood*, 91(2), 192-194. https://doi.org/10.1136/adc.2004.064576

Fox, K. (2021). Loving a spouse with ADHD: Understanding the misery and ecstasy. *Heartlight: Making Life work for Your Family*. Retrieved from: https://www.heartlight.org/articles/family/

Hance, M.A., Blackhart, G., & Dew, M. (2018). Free to be me: The relationship between the true self, rejection sensitivity, and use of online dating sites. *The Journal of Social Psychology,* 158(4), 421-429. https://doi.org/10.1080/00224545.2017.1389684

Hallowell, M., & Ratey, J. (2005). Delivered from distraction: Getting the most out of life with attention deficit disorder. *Random House Digital*, New York.

Hallowell, M., & Ratey, J. (2021). ADHD 2.0: New science and essential strategies for thriving with distraction - from childhood through adulthood (Audible audiobook - unabridged; narrated by F. Sanders). Random House Digital, New York.

Hallowell, M., & Ratey, J. (2022). ADHD needs a better name: We have one (updated). *ADDitude*. Retrieved from: https://www.additudemag.com/attention-deficit-disorder-vast/

Holland, K. (2021). The history of ADHD: A timeline (updated). *ADDitude*. Retrieved from: https://www.healthline.com/health/adhd/history

Kessi, M., Duan, H., Xiong, J., Chen, B., He, F., Yang, L., Ma, Y., Bamgbade, O.A., Peng, J., Yin, F. (2022). Attention-deficit/hyperactive disorder updates. *Frontiers in Molecular Neuroscience*, 15, 925049. https://doi.org/10.3389/fnmol.2022.925049

Knowles, A. (2022). Emotional regulation worksheets for adults. *Mental Health Worksheets*. Retrieved from: https://mentalhealthworksheets.com/emotional-regulation-worksheets-for-adults-pdf/

Kooij, J.J.S., Bijlenga, D., Salerno, L., Jaeschke, R., Bitter, I., Balázs, J., Thome, J., Dom, G., Kasper, S., Nunes Filipe, C., Stes, S., Mohr, P., Leppämäki, S., Casas, M., Bobes, J., Mccarthy, J.M., Richarte, V., Kjems Philipsen, A., Pehlivanidis, A., Niemela, A., Styr, B., Semerci, B., Bolea-Alamanac, B., Edvinsson, D., Baeyens, D., Wynchank, D., Sobanski, E., Philipsen, A., McNicholas, F., Caci, H., Mihailescu, I., Manor, I., Dobrescu, I., Saito, T., Krause, J., Fayyad, J., Ramos-Quiroga, J.A., Foeken, K., Rad, F., Adamou, M., Ohlmeier, M., Fitzgerald, M.,Gill, M., Lensing, M., Motavalli Mukaddes, N., Brudkiewicz, P., Gustafsson, P., Tani, P., Oswald, P., Carpentier, P.J., De Rossi, P., Delorme, R., Markovska Simoska, S., Pallanti, S., Young, S., Bejerot, S., Lehtonen, T., Kustow, J., Müller-Sedgwick, U., Hirvikoski, T., Pironti, V., Ginsberg, Y., Félegyházy, Z., Garcia-Portilla, M.P., Asherson, P. (2019). Updated European consensus statement on diagnosis and treatment of adult ADHD. *European Psychiatry*, 56, 14-34. https://doi.org/10.1016/j.eurpsy.2018.11.001

Maguire, C. (2022). Rejection sensitivity: Managing feelings of overwhelm and rejection as an adult with ADHD. *Coaches' Corner*. Retrieved from: https://add.org/rejection-sensitivity/

Malenka, R.C., Nestler, E.J., & Hyman, S.E. (2009). Chapter 6: Widely projecting systems: Monoamines, acetylcholine, and orexin. In Sydor, A. & Brown, R.Y. (eds.), Molecular neuropharmacology: A foundation for clinical neuroscience (2nd ed.) (pp. 148, 154-157), *McGraw-Hill Medical,* New York, NY.

Posner, M.I., & Petersen, S.E. (1990). The attention system of the human brain. *Annual Review of Neuroscience*, 13(1), 25-42. https://doi.org/10.1146/annurev.ne.13.030190.000325

Retz, W., Stieglitz, R.D., Corbisiero, S., Retz-Junginger, P., & Rösler, M. (2012). Emotional dysregulation in adult ADHD: What is the empirical evidence? *Expert Review of Neurotherapeutics*, 12(10), 1241-1251. https://doi.org/10.1586/ern.12.109

Shaw, P., Stringaris, A. Nigg, J., & Leibenluft, E. (2014). Emotion dysregulation in attention deficit-hyperactivity disorder. *American Journal of Psychiatry*, 171(3), 276-293. https://doi.org/10.1176/appi.ajp.2013.13070966

Tobarra-Sanchez, E., Riglin, L., Agha, S. S., Stergiakouli, E., Thapar, A., & Langley, K. (2022). Preschool development, temperament and genetic liability as early markers of childhood ADHD: A cohort study. *Journal of Child Psychology and Psychiatry (JCPP) Advances*, e12099. https://doi.org/10.1002/jcv2.12099

VAST Diversity (2022). What is VAST: Do you have this unique ADHD brain trait? *VAST Minds*. Retrieved from: https://www.vastdiversity.com/what-is-vast-adhd/

Visser, S.N., Danielson, M.L., Bitsko, R.H., Holbrook, J.R., Kogan, M.D., Ghandour, R.M., Perou, R., Blumberg, S.J. (2014). Trends in the parent-report of health care provider-diagnosed and medicated attention-deficit/hyperactivity disorder: United States, 2003–2011. *Journal of the American Academy of Child & Adolescent Psychiatry*, 53(1), 34-46. http://doi.org/10.1016/j.jaac.2013.09.001

Wasserstein, J. (2005). Diagnostic issues for adolescents and adults with ADHD. *Journal of Clinical Psychology*, 61(5), 535-547. https://doi.org/10.1002/jclp.20118

Webb, J. T., Amend, E. R., Webb, N. E., Goerss, J., Beljan, P., & Olenchak, F. R. (2005), *Misdiagnosis and dual diagnoses of gifted children and adults: ADHD, bipolar, OCD, Asperger's, depression, and other disorders*, *Great Potential Press, Inc*, Scottsdale, AZ.

White, H.A., & Shah, P. (2006). Uninhibited imaginations: Creativity in adults with attention deficit/hyperactivity disorder. *Personality and Individual Differences*, 40(6), 1121-1131. https://doi.org/10.1016/j.paid.2005.11.007

World Health Organization (2022). 6A05 Attention deficit/hyperactivity disorder. *International Classification of Diseases (11th Revision)* (ICD-11-R). Retrieved from: https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/821852937

Zhao, K., Duka, B., Xie, H., Oathes, D.J., Calhoun, V., & Zhang, Y. (2022). A dynamic graph convolutional neural network framework reveals new insights into connectome dysfunctions in ADHD. *Neuroimage*, *246*, 118774. https://doi.org/10.1016/j.neuroimage.2021.118774

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