

What's Going on in my Brain!?: Practical Neuroscience 101
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References

Research and articles on ADHD:

- Swanson, J. M., Kinsbourne, M., Nigg, J., Lanphear, B., Stefanatos, G. A., Volkow, N., ... & Wadhwa, P. D. (2007). Etiologic subtypes of attention-deficit/hyperactivity disorder: brain imaging, molecular genetic and environmental factors and the dopamine hypothesis. *Neuropsychology review*, 17, 39-59.
- Tripp, G., & Wickens, J. R. (2009). Neurobiology of ADHD. *Neuropharmacology*, 57(7-8), 579–589.
<https://doi.org/10.1016/j.neuropharm.2009.07.026>
- Batty, M. J., Liddle, E. B., Pitiot, A., Toro, R., Groom, M. J., Scerif, G., ... & Hollis, C. (2010). Cortical gray matter in attention-deficit/hyperactivity disorder: a structural magnetic resonance imaging study. *Journal of the American Academy of Child & Adolescent Psychiatry*, 49(3), 229-238.
- Nakao, T., Radua, J., Rubia, K., & Mataix-Cols, D. (2011). Gray matter volume abnormalities in ADHD: voxel-based meta-analysis exploring the effects of age and stimulant medication. *American Journal of Psychiatry*, 168(11), 1154-1163.
- Durston, S., van Belle, J., & de Zeeuw, P. (2011). Differentiating frontostriatal and fronto-cerebellar circuits in attention-deficit/hyperactivity disorder. *Biological psychiatry*, 69(12), 1178-1184.
- Cortese, S., Kelly, C., Chabernaud, C., Proal, E., Di Martino, A., Milham, M. P., & Castellanos, F. X. (2012). Toward systems neuroscience of ADHD: a meta-analysis of 55 fMRI studies. *American Journal of Psychiatry*, 169(10), 1038-1055.
- Spencer, T. J., Brown, A., Seidman, L. J., Valera, E. M., Makris, N., Lomedico, A., ... & Biederman, J. (2013). Effect of psychostimulants on brain structure and function in ADHD: a qualitative literature review of magnetic resonance imaging-based neuroimaging studies. *The Journal of clinical psychiatry*, 74(9), 5654.
- Faraone, S. V., Asherson, P., Banaschewski, T., Biederman, J., Buitelaar, J. K., Ramos-Quiroga, J. A., ... & Franke, B. (2015). Attention-deficit/hyperactivity disorder. *Nature Rev. Disease Primers* 1, 15020.
- Franckx, W., Llera, A., Mennes, M., Zwiers, M. P., Faraone, S. V., Oosterlaan, J., ... & Beckmann, C. F. (2016). Integrated analysis of gray and white matter alterations in attention-deficit/hyperactivity disorder. *NeuroImage: Clinical*, 11, 357-367.
- Gehricke, J. G., Kruggel, F., Thampipop, T., Alejo, S. D., Tatos, E., Fallon, J., & Muftuler, L. T. (2017). The brain anatomy of attention-deficit/hyperactivity disorder in young adults - a magnetic resonance imaging study. *PloS one*, 12(4), e0175433. <https://doi.org/10.1371/journal.pone.0175433>
- Segal, A., Parkes, L., Aquino, K. *et al.* Regional, circuit and network heterogeneity of brain abnormalities in psychiatric disorders. *Nat Neurosci* 26, 1613–1629 (2023).
<https://doi.org/10.1038/s41593-023-01404-6>

Leon, L., Tran, T., Navadia, M., Patel, J., Vanderveen, A., Cruz, M. I., Le, T. M., Assuah, F. B., Prager, V., Patel, D., & Costin, J. M. (2024). Alternative Treatments to Pharmacological Therapy in Pediatric Populations With Attention-Deficit/Hyperactivity Disorder (ADHD): A Scoping Review. *Cureus*, 16(3), e55792. <https://doi.org/10.7759/cureus.55792>

<https://psychscenehub.com/psychinsights/neurobiology-of-adhd/>

[ADHD and the brain \(understood.org\)](https://www.understood.org/en/articles/adhd-and-the-brain) - <https://www.understood.org/en/articles/adhd-and-the-brain>

“The Neurobiology of ADHD” from: [Adult ADHD Resource Center | TEAM ADHD For HCPs \(team-adhd.com\)](https://www.team-adhd.com/adult/adhd-resources/resource-center) - <https://www.team-adhd.com/adult/adhd-resources/resource-center>

Research and articles involving dopamine and neuroplasticity:

Madadi Asl, M., Vahabie, A. H., & Valizadeh, A. (2019). Dopaminergic Modulation of Synaptic Plasticity, Its Role in Neuropsychiatric Disorders, and Its Computational Modeling. *Basic and clinical neuroscience*, 10(1), 1–12. <https://doi.org/10.32598/bcn.9.10.125>

Valentin, V. V., Maddox, W. T., & Ashby, F. G. (2014). A computational model of the temporal dynamics of plasticity in procedural learning: Sensitivity to feedback timing. *Frontiers in Psychology*, 5, 643.

Ashby, F. G., Valentin, V. V., & von Meer, S. S. (2015). Differential effects of dopamine-directed treatments on cognition. *Neuropsychiatric disease and treatment*, 1859-1875.

Blier, Pierre & Briley, Mike. (2011). The noradrenergic symptom cluster: Clinical expression and neuropharmacology. *Neuropsychiatric disease and treatment*. 7. 15-20. 10.2147/NDT.S19613. Available via license: [CC BY-NC 3.0](https://creativecommons.org/licenses/by-nc/3.0/)

Psychology Today: How to Boost Dopamine Naturally by Judy Ho Ph.D., ABPP, ABPdN, September 20, 2024. <https://www.psychologytoday.com/us/blog/unlock-your-true-motivation/202409/how-to-boost-dopamine-naturally?eml>

Synapse Image credit: [How Does Neuroplasticity Work? Jon Lieff, M.D. \(jonlieffmd.com\)](https://jonlieffmd.com/blog/how-does-neuroplasticity-work) - <https://jonlieffmd.com/blog/how-does-neuroplasticity-work>

[Worlds Of Learning: How the Brain Learns th.bing.com](https://www.understood.org/en/articles/adhd-and-the-brain) | 1502 × 1093

<https://www.understood.org/en/articles/adhd-and-the-brain>

Research on executive functioning and attention networks:

Menon, V., & Uddin, L. Q. (2010). Saliency, switching, attention and control: a network model of insula function. *Brain structure & function*, 214(5-6), 655–667. <https://doi.org/10.1007/s00429-010-0262-0>

Baum, G. L., Ciric, R., Roalf, D. R., Betzel, R. F., Moore, T. M., Shinohara, R. T., ... & Satterthwaite, T. D. (2017). Modular segregation of structural brain networks supports the development of executive function in youth. *Current Biology*, 27(11), 1561-1572.

Sbailhat, H., Rajkumar, R., Ramkiran, S., Assi, A. A. N., Shah, N. J., Veselinović, T., & Neuner, I. (2021). Dynamics of task-induced modulation of spontaneous brain activity and functional connectivity in the triple resting-state networks assessed using the visual oddball paradigm. *Plos one*, 16(11), e0246709.

Molnar-Szakacs, I., & Uddin, L. Q. (2022). Anterior insula as a gatekeeper of executive control. *Neuroscience & Biobehavioral Reviews*, 139, 104736.

Schimmelpfennig J, Topczewski J, Zajkowski W and Jankowiak-Siuda K (2023) The role of the salience network in cognitive and affective deficits. *Front. Hum. Neurosci.* 17:1133367. doi: 10.3389/fnhum.2023.1133367

[How Does Neuroplasticity Work? \[Infographic\] - NICABM -
https://www.nicabm.com/brain-how-does-neuroplasticity-work/](https://www.nicabm.com/brain-how-does-neuroplasticity-work/)

Research on Mindfulness

Zylowska L, Smalley SL, Schwartz JM. Mindful awareness and ADHD. In: Fabrizio D, editor. *Clinical handbook of mindfulness*. New York, NY: Springer; 2009. p. 319–38.

Flook L, Smalley SL, Kitil MJ, et al. (2010) Effects of mindful awareness practices on executive functions in elementary school children. *Journal of Applied School Psychology*. 26(1):70-95
<https://doi.org/10.1038/s41598-022-17325-6>

Hasenkamp, W., & Barsalou, L. W. (2012). Effects of meditation experience on functional connectivity of distributed brain networks. *Frontiers in human neuroscience*, 6, 38.

Schoenberg, P. L. (2016). Mindfulness intervention for attention-deficit/hyperactivity disorder: Theory and action mechanisms. *Mindfulness-Based Cognitive Therapy: Innovative Applications*, 203-213.

Francesco Oliva, Francesca Malandrone, Giulia di Girolamo, Santina Mirabella, Nicoletta Colombi, Sara Carletto, Luca Ostacoli, (2021) The efficacy of mindfulness-based interventions in attention-deficit/hyperactivity disorder beyond core symptoms: A systematic review, meta-analysis, and meta-regression. *Journal of Affective Disorders*. Volume 292, Pages 475-486, ISSN 0165-0327,
<https://doi.org/10.1016/j.jad.2021.05.068>.

Bremer, B., Wu, Q., Mora Álvarez, M.G. *et al.* Mindfulness meditation increases default mode, salience, and central executive network connectivity. *Sci Rep* 12, 13219 (2022).
<https://doi.org/10.1038/s41598-022-17325-6>

Rahrig, H., Vago, D. R., Passarelli, M. A., Auten, A., Lynn, N. A., & Brown, K. W. (2022). Meta-analytic evidence that mindfulness training alters resting state default mode network connectivity. *Scientific reports*, 12(1), 12260. <https://doi.org/10.1038/s41598-022-15195-6>

Siew, S., Yu, J. Mindfulness-based randomized controlled trials led to brain structural changes: an anatomical likelihood meta-analysis. *Sci Rep* 13, 18469 (2023).
<https://doi.org/10.1038/s41598-023-45765-1>

Chand, R., Sazima, G. (2024). The Science of Mindfulness: Research and Benefits. In: Mindfulness in Medicine. Springer, Cham.

Research on Coaching:

Boyatzis, R. E., & Jack, A. I. (2018). The neuroscience of coaching. *Consulting Psychology Journal: Practice and Research*, 70(1), 11.

Boyatzis, R. E. (2019). Coaching with intentional change theory. *Professional coaching: Principles and practice*, 221-230.

Kounios, J., & Beeman, M. (2009). The Aha! moment: The cognitive neuroscience of insight. *Current directions in psychological science*, 18(4), 210-216.

Seto, L., & Geithner, T. (2018). Metaphor magic in coaching and coaching supervision. *International Journal of Evidence Based Coaching and Mentoring*, 16(2), 99-111.

Williams, Patrick. The Theoretical Foundations of Coaching. *Choice Magazine*, 4(2), 49-50.

Russell Barkley, PhD-D. "Treatments for ADHD an Overview." YouTube, accessed March 30, 2024.
<https://www.youtube.com/watch?v=uxFlcpWECNw>

Vivian Valentin's research involving neuroplasticity, reward learning, executive functions, dopamine:

Parent, J. M., Valentin, V. V., & Lowenstein, D. H. (2002). Prolonged seizures increase proliferating neuroblasts in the adult rat subventricular zone–olfactory bulb pathway. *Journal of Neuroscience*, 22(8), 3174-3188.

Ashby, F. G., Valentin, V. V., Turken, A.U. (2002). The effects of positive affect and arousal on working memory and executive attention. *Emotional cognition; From brain to behaviour/John Benjamins Publishing Company*.

Ashby, F. G., Ell, S. W., Valentin, V. V., & Casale, M. B. (2005). FROST: A distributed neurocomputational model of working memory maintenance. *Journal of cognitive neuroscience*, 17(11), 1728-1743.

Valentin, V. V., Dickinson, A., & O'Doherty, J. P. (2007). Determining the neural substrates of goal-directed learning in the human brain. *Journal of Neuroscience*, 27(15), 4019-4026.

Valentin, V. V., & O'Doherty, J. P. (2009). Overlapping prediction errors in dorsal striatum during instrumental learning with juice and money reward in the human brain. *Journal of neurophysiology*, 102(6), 3384-3391.

Valentin, V. V., Maddox, W. T., & Ashby, F. G. (2014). A computational model of the temporal dynamics of plasticity in procedural learning: Sensitivity to feedback timing. *Frontiers in Psychology*, 5, 643.

Ashby, F. G., Valentin, V. V., & von Meer, S. S. (2015). Differential effects of dopamine-directed treatments on cognition. *Neuropsychiatric disease and treatment*, 1859-1875.

Paul, E. J., Smith, J. D., Valentin, V. V., Turner, B. O., Barbey, A. K., & Ashby, F. G. (2015). Neural networks underlying the metacognitive uncertainty response. *Cortex*, 71, 306-322.

Valentin, V. V., Maddox, W. T., & Ashby, F. G. (2016). Dopamine dependence in aggregate feedback learning: A computational cognitive neuroscience approach. *Brain and cognition, 109*, 1-18.

Inglis, J. B., Valentin, V. V., & Ashby, F. G. (2021). Modulation of dopamine for adaptive learning: A neurocomputational model. *Computational brain & behavior, 4*, 34-52.