



# You Might Think This Article Is About You

*A Neurological Overview of  
Narcissistic Personality Disorder*

by Kaitlyn Griffith



Sometimes they are serial killers, sometimes they are well known celebrities, and sometimes they are the ones that you love the most. Those affected by narcissistic personality disorder (NPD) show some major cognitive and social differences from “normal” people—they consistently demonstrate many personality factors that might shock others. Most people don’t realize that those with NPD have brains that actually differ from our own. Research has shown that those with narcissistic personality disorder show structural and biological differences within their brains. These differences can lead to a plethora of issues: socially, mentally and physically. NPD is a rare disorder, as only 0.0 to 6.2% of the general population is diagnosed with it, most of these diagnoses being men (50 to 75%).<sup>1</sup> The word “narcissist” is a commonly used term that gets loosely thrown around; learning more about the disorder and how one’s biology may have an effect is an important and interesting matter. Mental health is a popular topic in our society, and so more knowledge of personality disorders will be very helpful in understanding these mental disabilities. Limited amounts of research has been done in the fields of neuroscience and psychology regarding NPD. Developing further and advanced new research for this disorder can help to diagnose patients more easily and readily, and to find more therapeutic and medicinal treatments for those affected by NPD.

## History of NPD

Narcissism’s earliest roots come from Greek mythology, as it is named after Narcissus. Narcissus was a handsome young man in Greek mythology who fell in love with himself through a first glimpse in the water’s reflection. Narcissus

was so enamored with himself that he stayed staring at the water’s edge until his death, not being able to care for himself because of his self-obsession. NPD has an interesting background due to the length of time that it took to classify it as a disorder. Psychoanalyst Otto Rank first wrote about narcissism in 1911,<sup>2</sup> giving the world the first definition of the disorder. Rank described narcissism as self-admiration and vanity. In 1914,<sup>2</sup> the well known psychoanalyst, Sigmund Freud, discussed narcissism in a published paper called *On Narcissism: An Introduction*. Freud’s complicated outlook on narcissism suggested a connection of the disorder to one’s libido. To Freud, narcissism was part of human nature regarding self-love. Narcissism was not recognized as a personality disorder until 1967 when Otto Kernberg suggested a theory of three different types of NPD: normal adult narcissism, normal infantile narcissism, and pathological narcissism, which can also have different subtypes. Years later in 1980,<sup>2</sup> narcissistic personality disorder was officially recognized in the third edition of the Diagnostic and Statistical Manual of Mental Disorder (DSM-3).

NPD has always been a struggle for professionals to diagnose, especially since those who are affected do not see anything wrong with themselves or their behaviors, and it becomes the norm to refuse help from others. NPD has commonly been diagnosed comorbidly with other disorders such as depression or addiction so it is frequently diagnosed after another disorder appears first. There are many different life situations leading up to NPD; it can arise through a combination of situations or directly from one factor. The environment in which someone is raised, genetics, and neurological and biological factors

are all at play when it comes to the diagnosis of NPD. These factors result in the varying symptoms and subtypes of narcissism, the struggle for affected patients to ask for help, and the many unknowns of the disorder all create difficulties in diagnosing and treating NPD.

## NPD in the World

With the rarity of the disorder, one may think that you would not see many narcissists walking around, but there are notable people throughout generations who have been diagnosed with NPD or who have been speculated to have NPD. Some of the most well known serial killers have been diagnosed with narcissism; Ted Bundy and Jeffery Dahmer are both known to have NPD. These individuals and others like them show an unusual amount of cruelty and violence; they also show behaviors such as lying, deception, and sadism,<sup>3</sup> which are behaviors consistent with symptoms of malignant NPD. Bundy and Dahmer both showed a sense of grandiosity, a severe lack of empathy, and a need for admiration and power. These known NPD traits were present in these serial killers, but at an extreme—the killings and sadistic actions that they performed were normalized within their own brains because of their skewed perception of the world. Some are not affected to this extreme.

Donald Trump has also shown narcissistic tendencies, making him an interesting subject of study and ridicule in our modern world. Donald Trump sparked interest concerning narcissism in 2016; after the election many articles and books were written exploring the connection of NPD and Trump. Though he has not been diagnosed, he does show many tendencies towards the disorder. In the past years, Trump has shown trends of grandiosity, a superficial nature, sensitivity to criticism,

deceitfulness, a lack of empathy and remorse, poor control, and antisocial behaviors.<sup>4</sup> A large hint towards Trump's tendencies comes from the many mistakes he has made in his line of work while speaking to the public, but he shows no remorse or embarrassment to things that have been said. Other leaders with narcissistic tendencies include Adolf Hitler, Joseph Stalin, and Pol Pot.<sup>3</sup> Along with powerful dictators or presidents who have been thought to have NPD are famous celebrities such as Kim Kardashian, Kanye West, Madonna, and more. These celebrities exhibit an intense admiration for themselves and a love for fame and power. We have to wonder, what structural and biological differences are these dangerous or powerful people experiencing? Are we able to better treat and help these individuals? Are we able to diagnose this disorder earlier in order to prevent the sadistic and/or power hungry behaviors that cause people of the world to lose faith in humanity?

## What is NPD?

NPD is characterized by several thoughts and behaviors. Narcissistic individuals may experience a constant pattern of

grandiosity, hypocrisy, fantasies of having power and importance, and a necessity for special treatment and adoration.<sup>5</sup> This disorder has varying ways of presenting itself and different levels of severity. Those affected by NPD are usually exploitative, arrogant, lacking empathy for others, and often very envious.<sup>4</sup> One diagnosed with NPD may exhibit an obsession over how others view them, attention-seeking behavior, an inability to take criticism well, and significant social impairments. These signs of NPD come in different combinations and forms. There are many different ways that one can experience this personality disorder, yet another reason why NPD is such an interesting area of study. This is why NPD is so hard to diagnose.

There are different levels of narcissistic personality disorder, ranging from someone who thinks way too highly of themselves on your sports team, to someone who is sadistically dangerous and explosive. Four distinct subtypes have been studied<sup>6</sup>: (1) individuals who are craving, clingy, needy, and demanding; (2) individuals with paranoia, who are critical and suspicious; (3) individuals who are manipulative and deceptive, taking pride in their deliberate

deceptions; (4) individuals who are aggressive, sadistic, reckless, and exhibitionists, the most severe form of narcissism, malignant narcissism. When speaking about Ted Bundy, we would place him into the fourth category. Bundy was diagnosed with malignant narcissism while he was in jail, as his overly sadistic and aggressive killing behaviors placed him in this category. When thinking about someone like Donald Trump, we would probably look closer at the first and/or third levels of NPD. Those who have an abnormal obsession with seeing themselves in a position of power have a way of being deceitful and manipulative. These subtypes of narcissism change across researchers and psychologists, but they all have similarities. These varying subtypes that have been researched are another reason that narcissism requires more attention in the field. How might these different narcissistic tendencies affect the brains of the individuals with NPD? Do biological differences surface between these subtypes?

The DSM-5 defines NPD with a range of terms and aspects of the disorder, but there are deeper psychological aspects that come along with this disorder. Those diagnosed suffer regularly with dramatic shifts in their self-esteem.<sup>7</sup> There may be a serious struggle in self-esteem and body image due to cognitive distortions. From the outside, one with NPD may seem aggressive, lacking in empathy, sadistic, and mean, but on the inside they are feeling a sense of inferiority, boredom, loneliness, and emptiness. They have trouble accepting themselves and their self-image. These mental states lead to a comorbidity between NPD and substance-use disorders, other personality disorders, and bipolar disorder.<sup>4</sup> The sense of entitlement that comes along with NPD often leads to ruined interpersonal

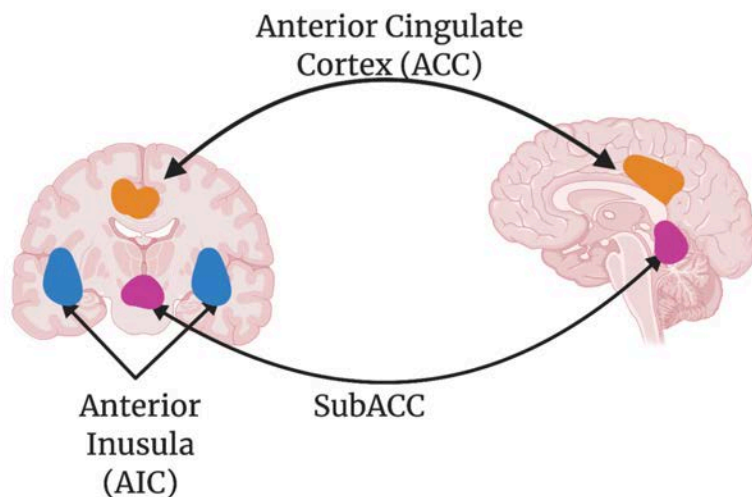


Figure 1. The social pain network. Created by Kaitlyn Griffith.

relationships, further playing into the increased sense of emptiness and loneliness.

Subjects diagnosed with NPD present themselves as some of the highest functioning patients out of all personality disorders. The poorly defined disorder and the help-rejecting behaviors of those diagnosed do not benefit in aiding those who need help the most and can result in a misdiagnosis. Many who are affected believe that they have a depressive disorder instead. More research needs to be done and more treatments need to be used in order to help diagnose and treat those affected by NPD so that future problems will not persist.

## The Social Brain

The social brain is a network of brain regions within all primates' brains that expend the most energy in social situations. Since primates live in complex societies, they need extra help in navigating that complexity. The majority of this network is made up of the amygdala, orbital frontal cortex and the temporal cortex.<sup>8</sup> It is now possible to study this brain network through imaging. There are parts of the social brain that have shown some differences within those diagnosed with NPD. Variations in size, neural connectivity, and networks help to explain some of the social differences that narcissists exhibit.

## The Social Pain Network

Narcissists are unique because they usually keep their relationships very distant while claiming that they do not need anyone else. At the same time, they care deeply about how others see them and always seem to need validation and praise.<sup>9</sup> This deviance has been shown in the social pain

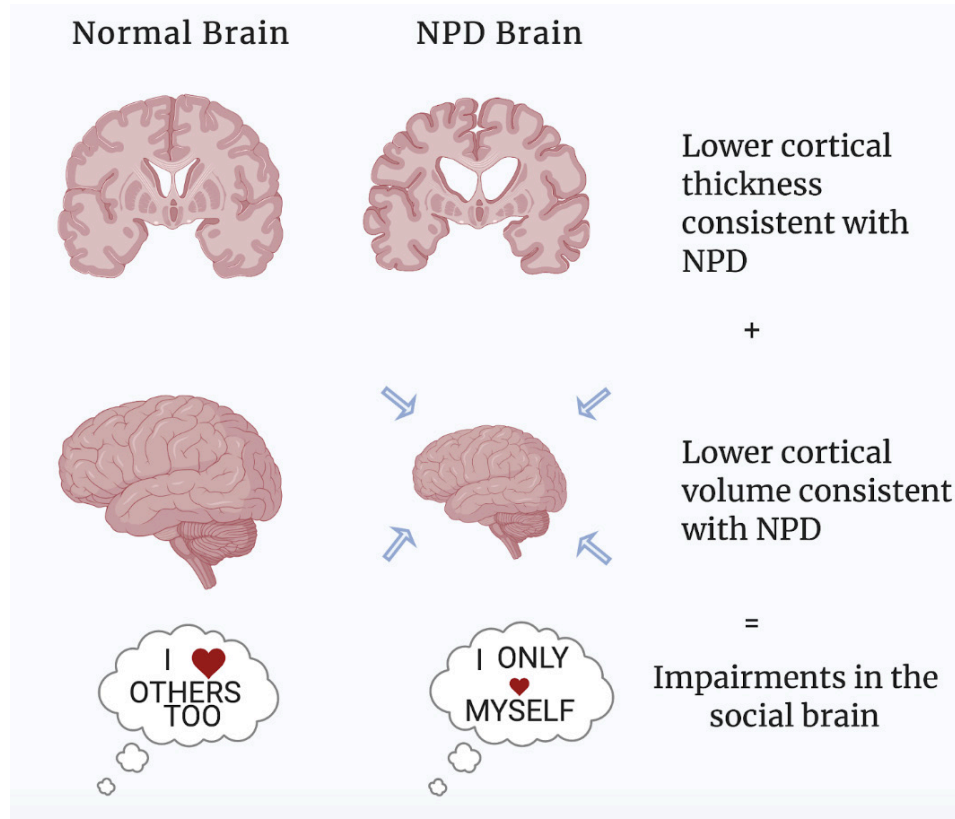


Figure 2. Structural differences between an NPD brain and a normal brain. Created by Kaitlyn Griffith.

network through imaging (Figure 1). This research suggests that the unusual amount of sensitivity that narcissists feel towards being left out or looked down on may be the product of hyperactivity in this brain network.<sup>9</sup> The distress from hyperactivity that is put on the Social Pain Network region links to long-term effects on a narcissists' mental well-being. Low self-esteem also relates to the higher activity rates within this network, which would explain these hidden feelings of a narcissist. Further research on the neural networks of narcissists must be done to fully uncover the effects. It is hard to perform these studies with self-reports because narcissists do not see themselves as what they are and have a tendency to reject any thought that would lead them to believe they are affected by NPD. The social pain network will be important throughout this article, as there are many differences within a narcissist's brain that will help to further understand the biological

and neurological basis of NPD.

## Structural Differences

Since research on NPD began, it has become apparent that those diagnosed have differences within their brain structures. The structural diversities between the brain of a narcissist and a "normal" brain can be visualized in Figure 2. A study conducted by the Qiu lab at Southwest University in China<sup>10</sup> focused on the cortical thickness and cortical volume of the brains in their study population. This study used surface based morphometry, an estimation of cortical thicknesses and volume throughout the surface of the brain, to measure cortical thickness and cortical volume. The brain's cortex consists of many folded sheets with varying thicknesses. Cortical thickness is found by combining the thickness within these layers. Cortical volume is found by multiplying the cortical thickness with the cortical surface

area; the cortical volume represents the amount or size of brain matter such as neurons and glial cells,<sup>3</sup> otherwise known as gray matter. This will then make up the perimeter of the cortex. Both the thickness and volume are determined by the amount and size of gray matter in the brain. Gray matter is crucial towards cognition as the amount is positively correlated with cognitive abilities.<sup>3</sup>

This study has found that narcissistic brains are consistent with both lower cortical volume and thickness. This relationship can be seen in Figure 2. As stated earlier, many individuals who have NPD may also be affected by personality disorders such as bipolar disorder or other mental illnesses such as depressive disorder or anxiety. Since this is a known parallel with NPD, the study focused on otherwise "healthy" individuals and used a written survey test to determine narcissistic traits and tendencies throughout the sample population. The social brain network was the primary area of study and various structural differences were found. These findings suggest that the social brain network plays a large role in pathological narcissism. With these findings, more research can be done in order to create therapeutic and medicinal treatments for those with NPD as well as earlier and

more accurate diagnostic tools.

Structural differences were especially noticed in the anterior insular cortex (AIC). The AIC is responsible for understanding the intentions of people during social interactions.<sup>11</sup> This brain region manipulates social interactions and information, giving more evidence for why those diagnosed with NPD are affected by rather debilitating social dysfunctions. The AIC is also directly associated with empathy, one of the main deficits within a narcissist's social processing. Recent studies have shown that subjects with lesions in the AIC show deficits in both explicit and implicit empathetic pain processing.<sup>7</sup> Patients with damage to the AIC also show similar empathetic and social deviations to those diagnosed with NPD, suggesting neural deficits may be another biological underpinning for the behaviors of a narcissist. The AIC is critical in neural activity for emotional awareness.

## Reductions in Neural Connectivity

It has become evident through the study of neuroscience that different neural activations are associated with sharing and understanding the emotions of others.<sup>7</sup> As said above, there are clear differences in neural

conductivity within the AIC. In an explorative study,<sup>12</sup> neuroimaging was performed in order to examine the neural differences in empathy between non-clinical patients with a low narcissism score and those with a high narcissism score. This study also examined the psychological differences between these subjects. The results found that highly narcissistic subjects tend to show higher scores of alexithymia (the personality trait described as the inability to identify or describe emotions of others or one's self), general psychopathology, and depression.<sup>12</sup> The study demonstrated the neuronal differences in the brain, specifically in the AIC, which has been strongly associated with empathy. This finding may be able to lead researchers to a main mechanism of empathy in the brain. The fact that highly narcissistic subjects have a notable difference in neuronal connectivity in the AIC brain area explains why narcissists are normally lacking in the emotional and cognitive response of empathy.

It is also curious to see that, besides the outward representation of power and self-absorption, narcissists appear to be needy and insecure at a neural level. The DeWall lab at the University of Kentucky performed a study using a method called diffusion tensor imaging,<sup>5</sup> a type of imaging measuring the connectivity between different brain sites. Instead of measuring gray matter and brain structure, they were able to map out the brain's neural network activity. In this study, those who scored higher in the narcissistic scale were more likely to exhibit decreased neural connectivity. There was evidence of lower neural connectivity between the prefrontal cortex and ventral striatum,<sup>5</sup> brain structures that aid in the ability to think highly of oneself. The low connectivity that was found in this

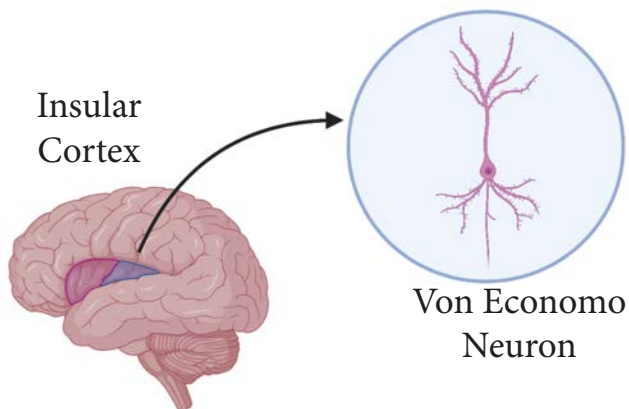


Figure 3. The Von Economo neuron. Created by Kaitlyn Griffith.

area of the brain may be the reason why narcissistic individuals heavily seek out the affirmation of others. Individuals diagnosed with NPD have a hard time realizing their own self concept, correlating with a low self-esteem.<sup>7</sup>

## The Von Economo Neuron: “Brain Cells for Socializing”

Von Economo neurons (VENs) are spindle neurons that are commonly found within the AIC. VENs are involved in complex situations and connectivity within the social brain networks. These neurons are found only in humans, great apes, whales, and elephants<sup>13</sup> and they have been examined in different studies to assess autism, dementia, Alzheimer’s, and obsessive compulsive disorder. VENs are large and have a simple structure, suggesting that they are quick in sending basic information throughout the brain. There is a specific destruction of VENs in the earlier stages of dementia and therefore the neurons are shown to be involved in empathy, social awareness, and self control.<sup>13</sup> There is also evidence of this through functional imaging (Figure 3). Recent work has found that the amount of VENs within the anterior insular cortex is linked to a lack of social awareness.<sup>13</sup> The functions of VENs as well as the area in which they are found link them to narcissism and the differences that they experience in their emotions and their emotional awareness.

A study looked closely at VENs and found that three different receptors, the vasopressin receptor, a dopamine receptor, and a serotonin receptor, are associated with this type of neuron.<sup>14</sup> These receptors were found to have links to social bonds, the anticipation of reward during

times of uncertainty, and the anticipation of punishment.<sup>14</sup> All of these receptors explain the role that VENs play in social function and cognition. The VEN has also been researched in correlation with alcoholism and drug addiction, as well as schizophrenia. The neuron has not been heavily researched in terms of NPD, but can be linked to the structural differences in the AIC and the lack of empathy and social awareness that comes along with narcissism.

## What Does This All Mean?

NPD normally appears during early adulthood, but the ability to find biological signs (or biomarkers) of NPD earlier in life would be very beneficial to those diagnosed with NPD as well as those who are close to an individual with the disorder. A biomarker for NPD will also help with the difficulties that have occurred with the typical self reporting form of diagnosis for NPD. There are consistencies in the NPD brain that lead researchers to believe that brain abnormalities, specifically in the insular cortex, can more easily diagnose narcissism and the lack of empathy that comes along with the disorder.

There is a controversial opinion that our population may be trending towards more narcissistic trends and tendencies. The constant use of social media brings a large amount of self awareness that no other generation has ever experienced.

The constant need for admiration in the form of comments or likes on social media has brought a certain self absorption and obsession into our community. The consistent scrolling through social media has led to a daily look into certain people and pictures who are seen as “always beautiful”; this has started to deteriorate our generation’s self-image and self-confidence. The modern times of self importance and a level of obsession with our image has led to a serious change in these mental processes.

Whether or not you know someone with NPD, they are in our world and they experience it in a completely different way. Those affected by NPD do not see any reason to get help for themselves because of their egocentric mindset; they might think that they are too “perfect” for therapy. Let those you love know about the many benefits of NPD treatments. Their life can change for the better with a little help. Research in the field of narcissism can lead to even better treatments as well, as available therapies may not be enough for some who are affected by NPD. Research in narcissism can also lead us to find more early life predictors, which would be extremely helpful with the diagnosis of NPD due to the fact that the early signs of NPD may be effective in getting help sooner and quicker. Personality disorders continue to evolve; soon our world could see a safer future with more of an understanding behind the motivations of a narcissist. ■





## References

1. DB; K. E. (n.d.). Narcissistic Personality Disorder in Clinical Health Psychology Practice: Case Studies of Comorbid Psychological Distress and Life-Limiting Illness. Retrieved from <https://pubmed.ncbi.nlm.nih.gov/28767013/>
2. Cherry, Kendra. "The History of Narcissistic Personality Disorder." Verywell Mind, 23 July 2020, [www.verywellmind.com/the-history-of-narcissistic-personality-disorder-2795569](http://www.verywellmind.com/the-history-of-narcissistic-personality-disorder-2795569).
3. Peter Muris, Harald Merckelbach. "The Malevolent Side of Human Nature: A Meta-Analysis and Critical Review of the Literature on the Dark Triad (Narcissism, Machiavellianism, and Psychopathy) - Peter Muris, Harald Merckelbach, Henry Otgaar, Ewout Meijer, 2017." SAGE Journals, [journals.sagepub.com/doi/10.1177/1745691616666070](http://journals.sagepub.com/doi/10.1177/1745691616666070).
4. Ashcroft, Anton. "Donald Trump: Narcissist, Psychopath or Representative of the People?" Wiley Online Library, John Wiley & Sons, Ltd, 14 Nov. 2016, [onlinelibrary.wiley.com/doi/abs/10.1002/ppi.1395](http://onlinelibrary.wiley.com/doi/abs/10.1002/ppi.1395).
5. Chester D S, Lynam DR, Powell D K DeWall CN (2015) Narcissism is Associated with Weakened Frontostriatal Connectivity: A DTI Study. *Social Cognitive and Affective Neuroscience* 11(7) · DOI: 10.1093/scan/nsv069 ·
6. Levy, K. N. (2012). Subtypes, Dimensions, Levels, and Mental States in Narcissism and Narcissistic Personality Disorder. *Journal of Clinical Psychology*, 68(8), 886-897. doi:10.1002/jclp.21893
7. George, F., & Short, D. (2017). *The Cognitive Neuroscience of Narcissism*. Science Publications. Retrieved November 16, 2020, from [http://iamdrshort.com/New\\_Papers/The\\_Cognitive\\_Neuroscience\\_of\\_Narcissism\\_Prepublication\\_Draft.pdf](http://iamdrshort.com/New_Papers/The_Cognitive_Neuroscience_of_Narcissism_Prepublication_Draft.pdf)
8. Frith, C. D. (2007). *The Social Brain*. The Royal Society Publishing, 362(1480). doi:<https://doi.org/10.1098/rstb.2006.2003>
9. Cascio, C. N., Konrath, S. H., & Falk, E. B. (2014). Narcissists' social pain seen only in the brain. *Social Cognitive and Affective Neuroscience*, 10(3), 335-341. doi:10.1093/scan/nsu072
10. Mao, Y., Sang, N., Wang, Y., Hou, X., Huang, H., Wei, D., . . . Qiu, J. (2016). Reduced frontal cortex thickness and cortical volume associated with pathological narcissism. *Neuroscience*, 328, 50-57. doi:10.1016/j.neuroscience.2016.04.025
11. Zaki J Weber J Bolger N Ochsner K (2009) The neural bases of empathic accuracy. *Proc Natl Acad Sci U S A* 106:11382-11387.
12. Fan, Y., et al. "The Narcissistic Self and Its Psychological and Neural Correlates: an Exploratory fMRI Study." *Psychological Medicine*, vol. 41, no. 8, 2010, pp. 1641-1650., doi:10.1017/s003329171000228x.
13. Semendeferi, K., & J. M. (2011). The von Economo neurons in fronto-insular and anterior cingulate cortex. *Ann N Y Acad Science*. doi:<https://dx.doi.org/10.1111/j.1749-6632.2011.06011.x>
14. Allman, John M, et al. "Intuition and Autism: a Possible Role for Von Economo Neurons." *Science Direct*, vol. 9, no. 8, Aug. 2005, doi:<https://doi.org/10.1016/j.tics.2005.06.008>.
15. Caligor, E., Levy, K. N., & Yeomans, F. E. (2015). Narcissistic Personality Disorder: Diagnostic and Clinical Challenges. *American Journal of Psychiatry*, 172(5), 415-422. doi:10.1176/appi.ajp.2014.14060723
16. Schaer, M., Cuadra, M. B., Tamarit, L., Thiran, J., & Elie, S. (n.d.). Determinants of cortical gray matter volume: Hypotheses on Developmental Cohorts with Normal and Abnormal Cortical Morphology. Retrieved November 16, 2020, from [https://ftp.nmr.mgh.harvard.edu/pub/articles/HBM06\\_SchaerM.pdf](https://ftp.nmr.mgh.harvard.edu/pub/articles/HBM06_SchaerM.pdf)
17. H. Walter, M. Adenzato, A. Ciaramidaro, I. Enrici, L. Pia, B.G. Bara Understanding intentions in social interaction: the role of the anterior paracingulate cortex *J Cogn Neurosci*, 16 (10) (2004), pp. 1854-1863

