

Depression has been prevalent in my family for generations. I only became aware of this recently when I was diagnosed with some kind of chemical imbalance. I always have assumed that depression was due to social causes; people became depressed because they were unhappy with themselves. It was their fault for being unhappy. I thought that people that were unhappy because they were unsure and insecure of themselves. Until about a year ago I strongly believed that this was true. Not until I was diagnosed with depression and anxiety disorder myself did I realize that it most likely was due to genetics. I became curious about the topic and found that there is a lot of new research around genetics and the debate of nature versus nurture, specifically concerning the relative importance of an individual's innate versus personal experiences. Most interestingly, through studying identical twins, scientists have been able to recognize how much of our selves are shaped by our genetics and how much is due to our environments. Researchers have also developed a new science called "epigenetics," which suggests that we are able change gene activity in a way that does not involve alterations to the genetic code but can still get passed down to at least one successive generation. When looking at the nature versus nurture debate, many questions arise about the amount of freedom we have when bound to the constraints of our genetic makeup and the environment we are born into. These studies in epigenetics, however, suggest that we do have freedom to a certain extent, and that there are ways to solve genetic disorders.

Depression can be caused by many factors that seem permanent, but symptoms can be improved or changed. Literally defined, chemical imbalance or depression is the cause of emotional distress and disturbances. Researchers have attempted to find the causes of common disorders such as anxiety, depression and ADHD, and they believe that some form of chemical imbalance in the brain is involved in some way.<sup>1</sup> While the exact link between chemical imbalance and emotional disorders has not been found, clinical studies and medical observations have been able to identify a number of chemical inconsistencies that occur in individuals who report experiencing symptoms related to these disorders. There are a series of factors that may contribute to chemical imbalance of the brain such as learned behavior, personality traits, abuse, trauma and negative experiences, brain chemistry and genetics.

Douglas F. Levinson, M.D. and Professor of Psychiatry, and Walter E. Nichols, M.D., Professor in the School of Medicine, and Director of the Program on the Genetics of Brain Function at Stanford University, have recently conducted studies analyzing patterns of illness in families to estimate their "heritability," or roughly what percentage of their cause is due to inherited genetic traits. In order to conduct these studies, Dr. Levinson and Dr. Nichols examined twins, one with depression and who has a twin without symptoms of depression and then find if the twin has the illness as well. Identical twins have the same DNA and fraternal twins share 50 % of the same DNA. If genes are part of the cause, then the test subject's identical twin will have a higher risk of inheriting the gene than the fraternal twin. Through this kind of extensive testing, they found that there is probably 40-50% of heritability in severe depression. This means that 50% of

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<sup>1</sup> "Does a Chemical Imbalance Cause Depression?" *60 Minutes*. New York, New York, 19 Feb. 2012.

depression is caused by genetics and the other 50% is due to psychological or physical factors. By looking at the parents and siblings of these patients, Dr. Levinson and Dr. Nichols were able to determine the likelihood of the patients to also suffer from depression. They also found that if someone had a parent or sibling with major depression, they were at 2 or 3 times greater risk of developing depression than the average person, which is around 10%. They differentiate between parents and siblings that have experienced major depression and parents and siblings that have recurrent depression, depression that has happened more than once in a person's life and developed early in life. 3.5% of the population is said to have recurrent depression. Siblings and children with this form of depression will develop it at 4 or 5 times greater rate than the average person.<sup>2</sup>

There have been no studies done that can point to a specific causes of depression, but we do know that there are ways to override genetics within our DNA. No one simply "inherits" depression from his or her mother or father. Each person inherits a unique combination of genes from their mother and father, and certain combinations can predispose a person to a particular illness. There are probably genetic changes that can increase the predisposition to both major depression and to certain anxiety disorders including generalized anxiety disorder, panic disorder and social phobia. Also, some people have a more general lifelong tendency to experience unpleasant emotions and anxiety in response to stress. Epigenetics suggests that we can alter our genetics within our lives to override symptoms of depression, anxiety and stress. New studies show that environmental factors like diet, stress and prenatal nutrition can make an imprint on genes that is passed from one generation to the next. These studies suggest that through healthy lifestyle and fitness we are able to alter our genes permanently. Unlike Darwin's theory of evolution, which suggests that it takes centuries to selectively breed our genetic makeup, these studies suggest that it can happen over the course of a single human's lifespan and then be passed down to their children. Antidepressants have also been proven to leave epigenome altering on our DNA sequence.<sup>3</sup>

With these new discoveries I now understand that I am in control of my destiny. I am not determined by my genetic make up. Yes, there is a high percentage, 40-50%, that I will be severely depressed at some point in my life because of genetics. But this also means that there is 50-60% chance that I will develop severe depression. With this information, I am able to discover things that may trigger this depression, such as malnutrition, unhealthy diets, insufficient exercise, stress, and anxiety. I am aware of how to control these things. I am also able to comprehend the anomaly of the nature versus nurture debate. I always have felt that I am destined to be a certain prototype that my parents have developed for me. Without realizing it, they have set a life for me, one that will be very difficult for me to break out of. By raising me in a certain environment, with

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<sup>2</sup> Levinson, Douglas F., and Walter E. Nichols. "Major Depression and Genetics." *Stanford School of Medicine*. Print.

<sup>3</sup> Cloud, John. "Why Your DNA Isn't Your Destiny?" *TIME* 6 Jan. 2010. Web. 16 Apr. 2012. <<http://www.time.com/time/magazine/article/0,9171,1952313,00.html>>.

a certain type of people of a certain class and race, I am instilled with a responsibility to maintain the expectations that are put on me as their child. I have always struggled with this idea in the context of opportunity and expectation. I have been lucky enough to be raised in an upper class community in New York City. My parents greatly value education, and as a result, I have attended two of the most elite private schools in the country. While I have received an excellent education, there is much pressure to exceed a certain expectation.

Since I was little, I have always thought that I was going to attend an ivy league college and then go on to attain a high power job and use my knowledge to help better the world, because that is what the people who were born into the same circumstances were also expected to do. I once heard my classmate say, “our brain is worth \$500,000” (the cost of tuition for my entire school career.) Although I do not agree with this statement, because I do not feel that you can put a dollar value to any level of intellect, his statement shocked me; I never thought about my education or brain as a whole unit. I immediately thought of better things that the money could be used for. How could that amount of money be used on a single person, when there are people suffering around the entire world? Then I realized the great responsibility and expectation put upon me to reach and exceed societal goals for a person with my privilege. How could I not take what has been given to me and use that to help better the world? While I am completely and utterly thankful for all the opportunities that I have been given, I do wonder how much I am able to sway from the privilege I was born into.

We are all born with certain genetics that obviously constrain us physically, an example being that I will never have naturally blue eyes or be six feet tall. But do I have the power to emotionally and spiritually stray from the environment that I have been born into? I believe that we are able to diverge and create our own identities to a certain extent. We are always going to have environmental subconscious pressures that we have no control over, such as our parents or economic class, but once we recognize these things and develop our own beliefs, I do think we can experience freewill. I believe that any thought or action that is radically different from the people that influenced your nature and your nurture is an act of freewill. Support of original and creative thought will encourage freewill and human’s ability to stray from a path that may have been previously determined for them. We as humans do not need to feel constrained by the concept of nature versus nurture, because ultimately we do have the power to do and think what we want. In the context of depression, depressed people should not feel bound to a life of struggle, because ultimately we have the power to diverge from what society and genetics have bestowed upon us.

Depression in the United States has become a major epidemic that needs to be closer looked at and treated. 10% of the population suffers from major depression at some point in their lives. Two times as many women as men experience major depression. Its is becoming a problem that is mistreated. Young people are getting prescribed unnecessary medications, which do not treat the problem but often further prolongs depressive bouts. Through education about depression people are able to gain insight into their own lives and learn that they do have the power to make decisions for themselves. We are not determined by our genetics. If we try hard enough to alter our

lifestyles, through therapy and healthier lives, we can permanently alter our DNA. Studies have shown that the debate of nature versus nurture is somewhat correct in that “heritability” of depression is 40-50%. But there are ways around becoming depressed. I have found that I should not feel bound to any specific lifestyle because of the genetics that I am born into. With this information, I am able to go out into the world and teach others that depression is not predetermined, and we are able to alter our predispositions in our favor.

## Bibliography

Cloud, John. "Why Your DNA Isn't Your Destiny?" *TIME* 6 Jan. 2010. Web. 16 Apr. 2012. <<http://www.time.com/time/magazine/article/0,9171,1952313,00.html>>.

Holt, Sarah, dir. "Epigenetics." *Epigenetics*. NOVA. 24 July 2007. Television.

Jones, Steve, Loon Borin. Van, Richard Appignanesi, and Steve Jones. *Introducing Genetics*. Thriplow: Icon, 2005. Print.

Levinson, Douglas F., and Walter E. Nichols. "Major Depression and Genetics." *Stanford School of Medicine*. Print.

Lippa, Richard A. *Gender, Nature, and Nurture*. Mahwah, NJ: L. Erlbaum, 2002. Print.

Lyons, Alex. "The Truth About Food Addiction." *Â« Thought Catalog*. 17 Apr. 2012. Web. <<http://thoughtcatalog.com/2012/the-truth-about-food-addiction/>>.

Miller, Peter. "A Thing or Two About Twins." *National Geographic* Jan. 2012. Web. 16 Apr. 2012. <<http://http://ngm.nationalgeographic.com/2012/01/twins/miller-text>>.

Miller, Peter. "Twins Data Reshaping Nature Versus Nurture Debate." *Talk of the Nation*. NPR. 2 Jan. 2012. Radio.

Millican, Peter. "7.1 Freewill, Determinism and Choice." General Philosophy. Oxford University, Oxford. Lecture.

Nauert, Rick. "Depressions Chemical Imbalance Explained." *Psych Central* (2008). *Psych Central*. Web.

Ornish, Dean. "Dean Ornish Says Your Genes Are Not Your Fate." TED. Monterey, CA. 16 Apr. 2012. Lecture.

Thody, Philip, and Richard Appignanesi. *Introducing Sartre*. Duxford: Icon, 1999. Print.

Winerman, Lea. "A Second Look at Twin Studies." *Behavioral Genetics*. American Psychological Association, Apr. 2004. Web. 07 May 2012. <<http://www.apa.org/monitor/apr04/second.aspx>>.

Wright, Lawrence. "Double Mystery." *The New Yorker* 7 Aug. 1995: 47-60. Web.

## **Video**

*Epigenetics*. Dir. Sarah Holt. NOVA: PBS. Web.

*The Woodmans*. Dir. C. Scott Willis. PBS, 2012. DVD