

Apr 12th, 5:00 PM - 5:45 PM

## The Brain: A Panel

Ashima Brown

Jamila James

Cara Clark

Mikayla Rolda

Anna Le

*See next page for additional authors*

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**Presenter Information**

Ashima Brown, Jamila James, Cara Clark, Mikayla Rolda, Anna Le, Jourdan Lawrence, and Brylea Huitt

The Brain's Power on Personality Development

Ashima Brown, Cara Clark, Jamila James, and Susan Salzman

Collin College

### Abstract

The brain is a complex organ with many secrets yet to be discovered. With the information given in this project, readers and viewers of the project will learn one of the most puzzling things of the brain and its impact on developing a personality. The following essay contains information regarding how concussions and brain trauma affects the personality. Factors that contribute to the brain's impact on personality development such as the stages of development (infancy, toddlerhood, preschool, school age, adolescence), disorders affecting personality development, and finally, internal and external stimuli, are also mentioned. This detailed project entitles several types of imaging including Magnetic Resonance Imaging (MRI) as well as CT and PET scans Each of these categories plays a major role in developing and molding a personality, hence the project's slogan: It's what makes you, you!

*Keywords:* [brain, personality, development, impact, disorders, imaging]

### The Brain's Power on Personality Development

Although it is understood a personality is developed by many things such as genetics, internal and external stimuli, and stages of aging, an individual's personality is also partially developed by an individual's brain structure (Adelstein, Shehzad, Mennes, DeYoung, Zuo, Kelly, & Milham, 2011). The frontal lobe within the brain structure is located directly behind the forehead, is used every day since its responsibilities include basic functions such as planning, organizing, problem solving, selective attention, performing a variety of "high cognitive functions" including behavior and emotions, and of course, personality. Research shows that the frontal lobe seems to work in action with the posterior cingulate cortex, located towards the center of the human brain, encased by different brain regions (Nielsen, Zielinski, Ferguson, Lainhart, & Anderson, 2013). The posterior cingulate cortex is responsible for developing a personality along with an individual's memory, learning process, and emotions. However, to stimulate these brain regions to develop a personality, the brain must recognize internal and external stimuli throughout the stages of human development, both physically and mentally.

There are five primary stages of physical and mental development; infancy, toddlerhood, preschool, school age, and adolescence (McLeod, 2013). Each stage has its own unique internal and external stimuli. However, not all individuals have the same stimulus which is why everyone has a different personality. Some stimuli can be a constant in each stage while certain individuals may grow out of them. There are two types of stimuli; internal and external. An internal stimulus is a sensation which causes an individual to take action, whereas an external stimulus is a sensory stimulation. Internal and external stimuli can take the place of several temporal states, the most common temporal states (types of stimuli) are activity level (both internal and external stimuli), distractibility (internal stimuli), intensity (internal stimuli), regularity (internal stimuli),

sensory threshold (external stimuli), approach/withdrawal (internal stimuli), adaptability (internal stimuli), persistence (internal stimuli), and mood (internal stimuli) (Portugal, Alves, Arruda-Sanchez, Rao, Volchan, . . . Mourao-Miranda, 2017). These things will allow people to explore virtues.

Typically in the first stage of infancy, a child develops the basis of their personality with primarily internal stimuli since a child develops a relationship of trust or distrust with their guardian and/or other people. The most common temporal states seen active during this stage are activity level, regularity, intensity, approach/withdrawal, and mood (McLeod, 2013).

The stage following infancy would be toddlerhood. Once again, the stimuli seen most during this stage of development would be internal stimuli. At this stage, a person discovers shame, self-confidence, and occasionally self-control; however it is common to see stubbornness, negativism, and tantrums. The brain uses this stage to help recognize how an individual will act in situations. Will the individual panic and show negativism, or will they show self-confidence and self-control? This is all determined by the internal stimuli known as mood, adaptability, and even approach/withdrawal (McLeod, 2013).

In the next stage, preschool, the primary stimuli a preschooler explores is external. These children have reached a stage in their lives where they are curious and active. At this stage, a preschooler is ready to explore everything in a physical matter and build relationships outside of their families. The external stimuli seen most commonly in this stage are activity level and sensory threshold. Allowing this curiosity and activity to take place allows the preschooler to shape their imagination and build a connection with friends (McLeod, 2013).

When someone has reached the stage of school age, it is all about developing proper intellectual skills, learning self-discipline, and learning to be hard working. Once again the

primary stimulus seen is internal. The most common internal stimulus seen in the school age stage includes distractibility, intensity, regularity, approach/withdrawal, adaptability, and persistence. These stimuli will account for how one's academic character is built, hence why the stage is labeled as "school age."

The final stage of developing a personality is adolescence. An adolescent focuses on finding their identity and self in society, however, what most adolescents don't realize is that every stimuli they have experienced within their previous stages of development help shape them into who they are (McLeod, 2013).

Brain regions such as the frontal lobe and posterior cingulate cortex are able to process the internal and external stimuli an individual has experienced over their five primary stages of development and creates an appropriate reaction. These reactions are what make you, you. However, there are disorders that can affect the way your brain develops a personality.

Because the frontal lobe is used every day, it is responsible for basic functions that are used on a daily basis. However, when the frontal lobe is damaged, all these functions are disrupted. Falls are the leading cause of traumatic brain injuries (TBI's) in America for children ages zero to fourteen and adults forty five and older. It accounts for forty percent of all TBI's (Marin, Weaver, Yealy, & Mannix, 2014).

Sports are also a big contributor to brain trauma, specifically concussions. Concussions are caused when the head suffers a strong enough blow to make the brain slide back and forth forcefully against the inner walls of the skull (Bergland, 2013). More severe concussions can lead to bleeding in or around the brain. This kind of bleeding can be fatal, so concussion symptoms should be monitored for several hours after the initial blow to the head. Some symptoms may include confusion, headache, ringing in the ears, slurred speech, delayed

responses to questions, and a dazed appearance. In children, other symptoms include memory or concentration problems, irritability, personality changes, sensitivity to light or sounds, loss of balance, excessive crying, and lack of interest in favorite toys. In high school sports, the most concussions reported are from soccer for females and football for males. In youth, ages five to eighteen, bicycling, football, basketball, soccer and playground activities result in the most concussions. The best way to avoid concussions is to use the right protective equipment, make sure it fits properly, and is worn correctly throughout the activity; however there are disorders that can affect the way your brain develops a personality

Damaging a brain with falls and concussions will make the brain respond differently to all internal and external stimuli, causing personality disorders (Kringler, Brand, & Eidenmüller, 2016). Although people of all ages suffer from this, personality disorders are more commonly developed in children than adults. The definition of personality disorder is a deeply ingrained and maladaptive pattern of behavior of a specified kind, typically develop by the time one reaches adolescence and causing long-term difficulties in personal relationships or in functioning in society. People with personality disorders have a tendency to be rigid and are often unable to respond to changes and the demands of life. Personality disorders are thought to be caused by genes and environmental stimuli. Some risk factors include family history, abusive and chaotic family life in early childhood, and variations in brain chemistry and structure. They can lead to relationship problems in all aspects of life, social isolation, and in some cases alcohol and/or drug abuse (Barnicot & Crawford, 2017).

There are three different clusters of personality disorders categorized by the different behaviors and symptoms. The first cluster, "A", includes odd or eccentric thinking and behaviors, the second (B) cluster includes overly dramatic, emotional, erratic behavior and is



often unpredictable, and finally, the third “C” includes anxious and fearful thinking and behavior. Cluster “A” symptoms range from paranoia, schizoid (avoid social activities), introversion and withdrawal, and schizotypal behavior (strange and outlandish beliefs and extreme anxiety).

Cluster “B’s” symptoms is antisocialism and extreme mood changes. Cluster B also includes people who use self-mutilation (self-harm) and suicidal gestures to gain attention or manipulate those around them. People with a narcissistic personality as well as people with extreme mood swings from self-adoration to insecurity are classified under cluster “B”. Impulsive actions and chronic feelings of boredom and emptiness are other traits of borderline personality disorder which are more common in females than males (Claridge & Davis, 2003).

Cluster “C” is a combination of Avoidant personality disorder, Dependent personality disorder, and Obsessive-compulsive personality disorder. Avoidant personality disorder takes hold of individuals and makes them hypersensitive to rejection. Hypersensitivity is the fear of criticism and social discomforts are characteristic of this disorder. Dependent personality disorder makes people rely on others to make decisions for them, and require frequent assurance, disappointment, and criticism can lead to a complete mental collapse. Obsessive-compulsive disorder makes people never feel satisfied with what they have done and achieved. They are incapable of adapting to changes, but they are orderly and methodical. When people with Obsessive-compulsive disorder need to depend on others, they feel out of control and isolated from everything (Barnicot & Crawford, 2017).

Some personality disorders can be treated with individual, group, and family psychotherapy. There are also medications that can be prescribed to relieve anxiety and

perceptions. In psychotherapy, people can learn to control certain aspects of their disorders and learn to make decisions and form relationships.

Along with studying what causes these disorders and how to treat these disorders, there have been numerous machines that have helped scientists gather additional information pertaining diagnosing brain disorders by viewing brain patterns that show how it operates (Portugal et al., 2017). The most common machine was invented in 1990 by Seiji Ogawa, known as the Functional magnetic resonance imaging or MRI/fMRI, (Bergman, 2015). This machine measures brain activity by detecting the changes in blood oxygenation which help scientists map which parts of the brain are more active than other (Demitri, 2017). Another common machine used with brain patterns is the Computed Tomography (CT) scan. The first CT scan was invented in 1928 by British engineer, Godfrey Hounsfield (Grinnell, 2012). A CT is a particular machine that creates a picture of the brain by scanning the different absorptions of X-rays. This machine helps scientists see a very distinct and clear picture of a patient's brain to determine certain brain activity (Demitri, 2017). Lastly, another very reliable and known machine is a PET scan. The “Positron Emission Tomography” machine or PET scan uses small amount of short-lived radioactive material to properly map functional processes of the brain. This machine guides neuroscientists to detect the different regions in the brain with the most to least brain activity (Demitri, 2017).

Over the centuries, there have been numerous neurological discoveries with the help of many high-functioning machines. These three unique machines and many others have helped scientists discover new information about the brain every day and help them uncover the secrets it has to tell. With the help of these numerous machines and hard determination, the future holds

many possibilities to discovering new information about personality and the function of the brain (Mitchell & Kumari, 2016).

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Appendix A: Participation Agreement Form

(See attached form)

Participation Agreement

Date: February 1, 2017

**Due: February 3, 2017 @ 11:59 p.m.**

Name: Ashima Bown

Classes participating in the URHSS project include students from the Central Park Campus (CPC) Human Anatomy and Physiology II Classes taught by Professors R. Brown & R. Cravo along with students from the Health Sciences Academy (HSA) classes taught by Professors K. Newby & T. Sanchez

Human Biological Organ(s) interested in:

The Brain.

Interest in medicine or research:

Research in the brain's power on personality development.

Additional information:


Not applicable.

Style of communication/presentation preferred:

Video and/or trifold presentation board.

**Review Rubric criteria and grading or replacement assignment per individual Professor.**

Agreement to participate with assigned partner in the Premier Workshop: Undergraduate Research Health Sciences Symposium. I attest I will meet all requirement of the assignment and present on March 31, 2017.

Signature: 

Printed Name: Ashima Brown

## Appendix A: Participation Agreement Form

(See attached form)

Participation Agreement

Date: February 3, 2017 Due: February 3, 2017 @ 11:59 p.m.

Name: Cara Clark

Classes participating in the URHSS project include students from the Central Park Campus (CPC) Human Anatomy and Physiology II Classes taught by Professors R. Brown & R. Cravo along with students from the Health Sciences Academy (HSA) classes taught by Professors K. Newby & T. Sanchez

Human Biological Organ(s) interested in: Brain

Interest in medicine or research:  
 Pediatric Psychology, Pediatric General Doctor

Additional information:  
 n/a

Style of communication/presentation preferred:  
 Poster or Video

**Review Rubric criteria and grading or replacement assignment per individual Professor.**

Agreement to participate with assigned partner in the Premier Workshop: Undergraduate Research Health Sciences Symposium. I attest I will meet all requirement of the assignment and present on March 31, 2017.

Signature: *Cara Clark* Printed Name: Cara Clark

Email: cclark37@cougarweb.collin.net [This will be shared with partner(s)]

You will be matched with a student in another class by your Professors. Your information will be shared for contact purposes. We ask that you correspond via email, texting, or zoom. This will be a project that you can work on and from which you can grow and develop as a scholarly writer and researcher. If you have further questions, please contact your professor(s).

Appendix A: Participation Agreement Form

(See attached form)

Participation Agreement

Date: 2/13/17 Due: February 3, 2017 @ 11:59 p.m.

Name: Jamila James

Classes participating in the URHSS project include students from the Central Park Campus (CPC) Human Anatomy and Physiology II Classes taught by Professors R. Brown & R. Cravo along with students from the Health Sciences Academy (HSA) classes taught by Professors K. Newby & T. Sanchez

Human Biological Organ(s) interested in: brain

Interest in medicine or research:  
brains power / personality development

Additional information:  
how the brain creates personalities

Style of communication/presentation preferred:  
video and/or poster board

**Review Rubric criteria and grading or replacement assignment per individual Professor.**

Agreement to participate with assigned partner in the Premier Workshop: Undergraduate Research Health Sciences Symposium. I attest I will meet all requirement of the assignment and present on March 31, 2017.

Signature: Jamila James Printed Name: Jamila James

Email: james21@cougarmail.colih.edu [This will be shared with partner(s)]

You will be matched with a student in another class by your Professors. Your information will be shared for contact purposes. We ask that you correspond via email, texting, or zoom. This will be a project that you can work on and from which you can grow and develop as a scholarly writer and researcher. If you have further questions, please contact your professor(s).




Appendix B: Consent Form

(See attached form)

URHSS Consent Form

Topic: The Brain's Power on Personality Development

Logo:



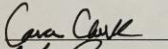
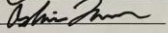
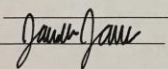
Slogan:  
It's what makes you, you.

I, Cara Clark, give Ashima Brown and Suzanne Salzman permission to use this research project, which will be presented at the Undergraduate Research Health Science Symposium, in the future for educational purposes, understanding that it is intellectual property of all parties.

I, Ashima Brown, give Cara Clark, Jamila James and Suzanne Salzman permission to use this research project, which will be presented at the Undergraduate Research Health Science Symposium, in the future for educational purposes, understanding that it is intellectual property of all parties.

I, Suzanne Salzman, give Ashima Brown, Jamila James, and Cara Clark permission to use this research project, which will be presented at the Undergraduate Research Health Science Symposium, in the future for educational purposes, understanding that it is intellectual property of all parties.

I, Jamila James, give Ashima Brown, Susan Salzman and Cara Clark permission to use this research project, which will be presented at the Undergraduate Research Health Science Symposium, in the future for educational purposes, understanding that it is intellectual property of all parties.

X		Date: <u>1/31/17</u>
X		Date: <u>1/31/17</u>
X		Date: <u>1/31/17</u>
X		Date: <u>1/31/17</u>

Contact Information:  
Ashima Brown- [abrown134@cougarmail.collin.edu](mailto:abrown134@cougarmail.collin.edu)  
Cara Clark- [cclark37@cougarmail.collin.edu](mailto:cclark37@cougarmail.collin.edu)  
Suzanne Salzman- [ssalzman1@cougarmail.collin.edu](mailto:ssalzman1@cougarmail.collin.edu)  
Jamila James- [jjames21@cougarmail.collin.edu](mailto:jjames21@cougarmail.collin.edu)

## Appendix C: Copy of Introductory Email to Student Mentor

(See attached form)

Ashima Brown <[abrown134@cougarmail.collin.edu](mailto:abrown134@cougarmail.collin.edu)>

to Suzanne ▾

Susan,

We now have a new partner working with us. Her name is Jamila James and goes to the Health Sciences Academy of Collin College, located at Plano East Senior High School with Cara and I. Just wanted to let you in on We are excited to be working with you and we'll keep in touch as we gain information regarding our project! And thank you for signing the consent form!!

...

Ashima Brown

On Sun, Feb 5, 2017 at 9:24 PM, Suzanne Salzman <[ssalzman1@cougarmail.collin.edu](mailto:ssalzman1@cougarmail.collin.edu)> wrote:

Hi Ashima!

Thank you for the email, and I am sorry it has taken me so long to get back to you. I signed the consent form that you sent and shared it with both you and Clara. Please let me know that you received it. I look forward ladies!

Best regards,  
Suzanne Salzman

On Fri, Feb 3, 2017 at 3:37 PM, Ashima Brown <[abrown134@cougarmail.collin.edu](mailto:abrown134@cougarmail.collin.edu)> wrote:

Hello Susan,

I am Ashima Brown, from the Health Sciences Academy of Collin College, located at Plano East Senior High School. My partner and I, Cara Clark, are participating in the URHSS Project. Our professor has notified our mentor for our interest in our project on the human brain. I have attached a file containing our consent form which Cara and I have already signed. We are awaiting your signature as well and if you have any questions email me. We look forward to collaborating with you!

Thank you,

Ashima Brown

Appendix D: Proposal Outline:

The Brain's Power on Personality Development

Logo:



Slogan:

It's what makes you, you.

Main Ideas:

- Brains impact on personality development
- How the brain creates personality
- Concussions/ brain trauma affects personality

Subcategories:

- Stages (Infancy, Toddlerhood, Preschool, School Age, Adolescence)
- Disorders affecting personality development and its brief description
- Internal and External Stimuli

Presentation Style:

- Video and/or tri-fold presentation board

Roles:

Ashima- Emails, main idea: how the brain creates personality, and subcategory: stages of personality development

Cara- Main idea: concussions and brain trauma and subcategory: disorders affecting personality development

Jamila James: Main idea: brain's impact on personality and subcategory: internal and external stimuli

Contact Information:

- Ashima Brown: [abrown134@cougarmail.collin.edu](mailto:abrown134@cougarmail.collin.edu)
- Cara Clark: [cclark37@cougarmail.collin.edu](mailto:cclark37@cougarmail.collin.edu)
- Jamila James: [jjames21@cougarmail.collin.edu](mailto:jjames21@cougarmail.collin.edu)
- Susan Salzman (mentor): [Ssalzman1@cougarmail.collin.edu](mailto:Ssalzman1@cougarmail.collin.edu)

## Appendix E: Project Proposal

The group of researchers of this project chose the brain as their human organ for the Undergraduate Research Health Sciences Symposium (URHSS) project and has determined a presentation board and possibly a video as their mode of presentation. The group of researchers have also chosen the topic “The Brain’s Power on Personality Development” with the slogan “It’s what makes you, you!” The project covers multiple factors that the brain relies on to develop a personality and what factors can disrupt that development or alter the personality. Those factors include stages of aging, infancy, toddlerhood, preschool, school age, and adolescence. Each of these stages of aging allows a growing human to learn from their experiences and mistakes, which makes an adult who he or she is today.

Another factor the brain uses for personality development would be internal stimuli. Internal stimuli are based on feelings and cause a change physically inside of a body or in one's behavior. If you feel hungry, you will eat. Sometimes if you're sad, you will cry. It's a cause and effect reasoning for personality development. External stimuli also contribute to the brain's ability to develop a personality. An external stimulus is a physical change outside of the body.

In conclusion, personality disorders, seen by imaging machines such as MRI, CT, and PET scans, are another factor contributing to personality development. These disorders typically develop over time and can cause long-term difficulties in a person’s life, affecting how the individual uses their qualities and essentially molding their qualities into something completely new or stopping the development of a personality all together.

## Appendix F: Annotated Bibliography

Anokhin, A. P. (2016). Genetics, brain, and personality. *Neuroimaging Personality, Social Cognition, and Character*, 71-90. Doi: 10.1016/b978-0-12-800935-2.00004-x

Advances in human genetics and neuroscience have given new opportunities and theories for understanding biological bases of personality. These theories explain that personality is a mix between genes, brain, and personality traits. In the article, the author talks about genetic research in connection to personality and the brain structure and function. It explains how the research is used effectively by using genetics to determine how the brain structure and function are key when personality is developed. It also explains any issues that should be addressed in the future.

Barnicot, Kirsten, and Mike J. Crawford. "Specific Mental Health Disorders: Personality Disorders." *International Encyclopedia of Public Health* (2017) 55-59. Web. 6 Feb. 2017.

Personality disorders (PDs) have negative consequences for both the person with the disorder and the people around them. While people are unsure how to react to these disorders, the people suffering have become social pariahs with poor health. Because there are so many different types of disorders, there is not a uniform way to treat all of them. There are clear links between childhood adversity and the foundation for such disorders. Evidence shows that many forms of personality disorders can be fixed by psychosocial intervention.

Berglund, C. (2013, May 10). Neuroscientists discover keys to individual personality. Retrieved February 06, 2017, from [https://www.psychologytoday.com/blog/the-athletes-](https://www.psychologytoday.com/blog/the-athletes-way/201305/neuroscientists-discover-keys-individual-personality)

[way/201305/neuroscientists-discover-keys-individual-personality](https://www.psychologytoday.com/blog/the-athletes-way/201305/neuroscientists-discover-keys-individual-personality)

The short article, “Neuroscientists Discover Keys to Individual Personality”, the author, Christopher Bergland actually talks about how a person's genetic makeup might contribute to their personality characteristics. Along with genetic makeup, Mr. Bergland also goes into great detail about the anatomy of the brainstem and how the little neuron connections within them compose of personality traits.

Castellanos-Ryan, Natalie, Frederic N. Brière, Maeve O’Leary-Barrett, Tobias Banaschewski, Arun Bokde, Uli Bromberg, Christian Büchel, Herta Flor, Vincent Frouin, Juergen Gallinat, Hugh Garavan, Jean-Luc Martinot, Frauke Nees, Tomas Paus, Zdenka Pausova, Marcella Rietschel, Michael N. Smolka, Trevor W. Robbins, Robert Whelan, Gunter Schumann, Patricia Conrod, and The IMAGEN Consortium. "The Structure of Psychopathology in Adolescence and Its Common Personality and Cognitive Correlates." *Journal of Abnormal Psychology*. American Psychological Association, Nov. 2016. Web. 21 Feb. 2017.

The objective of this study was to use structural equation modeling to model the structure of psychopathology in an adolescent community-based sample with disorders and to identify common personality and cognitive correlates of psychopathology.

Hoyer, W. J. (2015). Brain aging (normal): behavioral, cognitive, and personality consequences. *International Encyclopedia of the Social & Behavioral Sciences*, 795-798.

doi:10.1016/b978-0-08-097086-8.34005-3

Cognitive functions that decrease as a person ages is related to brain mechanisms. Many new things have been learned about cellular details in regards to aging. Improved brain imaging helps scientists to better understand human behavior. The cognitive and personality relationship relating to the brain emphasize brain plasticity, cognitive plasticity, cognitive reserve, and compensation. Human aging and conceptualizations of healthy living limits the progress of studies.

Kringler, Wolfgang, Boris Brand, and Andreas Max Eidenmüller. "Concussion in Team Sports: Neuropsychological Aspects." *Sports Orthopaedics and Traumatology* 32.4 (2016): 364-67. Web. 06 Feb. 2017.

In team sports with increased physical contact, brain injuries are common. They require a careful examination and a professional treatment. Many universities are working to improve the way they are diagnosing and treating concussed athletes. In addition to seeing the onsite trainer, it is important for athletes to follow the corresponding return-to-play protocol established by the organization. This is the same for many recreation and club teams.



Li, W., Li, X., Huang, L., Kong, X., Yang, W., Wei, D., ... & Liu, J. (2014). Brain structure links trait creativity to openness to experience. *Social Cognitive and Affective Neuroscience*, nsu041.

The article, *Brain structure links trait creativity to openness to experience*, discusses how creativity is very important for one's personality and mindset. The authors of this article explain that with new research, it shows that the amount of gray matter in one's brain can be related to the amount of creativity and imagination one has obtained. Studies show that with more gray matter in the right side of the brain, a person's personality is altered with the effects of more openness and extroversion. Adding on, people with less gray matter on their right side on the brain, tend to be more introverted and less talkative, focusing more on analytical things of interest.

Marin, J. R., Weaver, M. D., Yealy, D. M., & Mannix, R. C. (2014). Trends in visits for traumatic brain injury to emergency departments in the United States. *Jama*, 311(18), 1917-1919.

They conducted a population-based epidemiology study for TBI visits to emergency departments throughout the United States using the Nationwide Emergency Department Sample (NEDS) database. Children under three years and adults over sixty years old had the largest number of TBI. It was discovered that most TBIs were secondary injuries, mainly to falls.

Mitchell, R. L., & Kumari, V. (2016). Hans Eysenck's interface between the brain and personality: Modern evidence on the cognitive neuroscience of personality. *ScienceDirect*. <http://dx.doi.org.library.collin.edu/10.1016/j.paid.2016.04.009>

Structural MRI and DTI are used when examining the major personality dimensions in Eysenck's (1967) biological model of personality. The article shows that Eysenck's proposal that the traits he described are related to the structure of the brain. When the brain is exposed to negative stimuli, the brain has several pathways for different emotions. There are only a few studies about introversion versus extroversion and their places in the brain, but the data available so far is consistent with Eysenck's model. Future neuroimaging studies are needed to improve our understanding of the biological basis of individual differences and its application in the promotion of wellbeing and mental health.

Nielsen, J. A., Zielinski, B. A., Ferguson, M. A., Lainhart, J. E., & Anderson, J. S. (2013). An evaluation of the left-brain vs. right-brain hypothesis with resting state functional connectivity magnetic resonance imaging. *PloS one*, 8(8), e71275. <http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0071275>

According to this article, *An Evaluation of the Left-Brain vs. Right-Brain Hypothesis with Resting State Functional Connectivity Magnetic Resonance Imaging*, there are certain parts of the brain that create and transfer certain neurons that make up your personality. For instance, the right side of the brain dominance focuses on personality and cognitive style. The left side focuses more on structure and analytical thinking.

Passamonti Clinical Research Associate, University of Cambridge, L. (2017, February 23). What your brain structure says about your personality. Retrieved February 27, 2017, from <http://theconversation.com/what-your-brain-structure-says-about-your-personality-71826>

In the article, *What Your Brain Structure Says About Your Personality*, it discusses the scientific aspect of the brain and how it develops personalities. “Cortical stretching”, is a developmental process that shapes your brain in a way that maximizes the area in the brain and gives it a thicker and fuller look. With this being said, the brain in this stage has the full potential to develop and grow more membranes for personality development. In addition, more recent studies have shown that personality development stems from the roots and core beliefs of someone and with the help of “cortical stretching” or “the stretching of the brain”, deeper and more complex developments of the brain’s personality can develop.

Portugal, O., Alves, R. D., Arruda-Sanchez, T., Rao, A., Volchan, E., . . . Mourao-Miranda, J. (2017). Decoding negative affect personality trait from patterns of brain activation to threat stimuli. *NeuroImage*, *145*, 337-345. doi:10.1016/j.neuroimage.2015.12.050

This article is about an experiment where negative stimuli and positive stimuli were given to fifteen women, and their response was collected by pattern recognition analysis (PRA). The experimenters used functional magnetic resonance imaging (fMRI) to identify possible markers for mental illness. In the present study, the experimenters determined if positive or negative personality traits could be seen in the patterns of brain activation in response to a human threat using a healthy sample.

## Appendix G: Secondary Resources

Adelstein, J. S., Shehzad, Z., Mennes, M., DeYoung, C. G., Zuo, X. N., Kelly, C., ... & Milham, M. P. (2011). Personality is reflected in the brain's intrinsic functional architecture. *PloS one*, 6(11), e27633.

This article investigates how personality traits are reflected in the brain's functional architecture. Resting-state functional connectivity (RSFC) is used to investigate the neural correlates of the five-factor personality domains as well. Each domain of personality predicted RSFC with a unique pattern of brain regions.

Brain structure corresponds to personality. (2010, June 22). Retrieved February 06, 2017, from <http://www.psychologicalscience.org/news/releases/brain-structure-corresponds-to-personality.html#.WJilTTGrHSg>

In this short article, “Brain Structure Corresponds With Personality”, the author focuses mainly on how the physical aspects to the brain; size, weight, color and even shape, affect one’s personality. The author even groups a series of five different characteristics that are portrayed through personality and depending on how more or little you have, the shape of your brain is affected.

Claridge, G., & Davis, C. (2003). *Personality and psychological disorders*. London: Arnold.

Retrieved February 6, 2017, from [https://books.google.com/books?hl=en&lr=&id=qxnU-jzykUEC&oi=fnd&pg=PP2&dq=how+the+brain+develops+a+personality&ots=gvrjmjuuG2&sig=TtXrTbbe-ihAAMM9zeq6wRuni\\_I#v=onepage&q&f=false](https://books.google.com/books?hl=en&lr=&id=qxnU-jzykUEC&oi=fnd&pg=PP2&dq=how+the+brain+develops+a+personality&ots=gvrjmjuuG2&sig=TtXrTbbe-ihAAMM9zeq6wRuni_I#v=onepage&q&f=false)

*Personality and Psychological Disorders*, written by Gordon Claridge, Caroline Davis, discusses many, if not all, personality disorders known to man, and how they affect the structure of the human mind and how it affects one's personality. These disorders are known to shape one's personality as well as reactions. This intriguing book also speaks about how a personality can be broken down into smaller pieces and examined into a number of basic dimensions (of biological origin) that acts as a factor to develop a personality disorder.

McLeod, S. (2013). Erikson's Psychosocial Stages of Development. Retrieved February 07, 2017, from <http://www.simplypsychology.org/Erik-Erikson.html>

In the article, "How the Brain Creates Personality: A New Theory.", the two authors, Kosslyn and Miller do a remarkable job at going into great detail about the anatomy behind the development of personality and where it all begins. Along with some impressive facts, the two authors even share a theory both of them think can be the key to unlocking new research about the connection with the brain and personality.

Personality is reflected in the brain's intrinsic functional architecture. (n.d.). Retrieved February 07, 2017, <http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0027633>.

In this article, a personality is described as “persistent human behavioral responses to broad classes of environmental stimuli.” The authors state they used a Resting-state functional connectivity (RSFC) which can detect intrinsic activation patterns without relying on any specific task, allowing them to learn how a personality is developed. The patterns the authors have found using the RSFC corresponded with functional subdivisions of the brain, primarily the cerebrum, which is responsible for motivation, empathy and future-oriented thinking. The brain uses these to develop a personality.

Personality development. (n.d.). Retrieved January 30, 2017, from

<http://www.healthofchildren.com/P/Personality-Development.htm>.

The article states personality is a “development of the organized pattern of behaviors and attitudes that makes a person distinctive.” According to this article, a personality develops with three components; temperament, environment, and character. All of these components partake in the human brain, allowing the brain to wield the power to control an individual’s cognitive ability, behavior, and maturity level which contributes to the development of a personality.

Siegel, D. J. (1999). *The developing mind: how relationships and the brain interact to shape who we are*. New York: Guilford Press. Retrieved January 30, 2017, from

[https://books.google.com/books?hl=en&lr=&id=v8t2BgAAQBAJ&oi=fnd&pg=PP1&dq=how+the+brain+develops+a+personality&ots=yWLwduwb7&sig=3rR\\_sDoXya4dr7651WbWpKCr-](https://books.google.com/books?hl=en&lr=&id=v8t2BgAAQBAJ&oi=fnd&pg=PP1&dq=how+the+brain+develops+a+personality&ots=yWLwduwb7&sig=3rR_sDoXya4dr7651WbWpKCr-iU#v=onepage&q=how%20the%20brain%20develops%20a%20personality&f=false)

[iU#v=onepage&q=how%20the%20brain%20develops%20a%20personality&f=false](https://books.google.com/books?hl=en&lr=&id=v8t2BgAAQBAJ&oi=fnd&pg=PP1&dq=how+the+brain+develops+a+personality&ots=yWLwduwb7&sig=3rR_sDoXya4dr7651WbWpKCr-iU#v=onepage&q=how%20the%20brain%20develops%20a%20personality&f=false)

The book, *The Developing Mind: How Relationships and the Brain Interact to Shape Who We Are*, written by Daniel J. Siegel, talks about neurobiology. The groundbreaking book even states some difficulties with attachment to people and how that can proceed to give problems with “emotional regulation”, which impacts the development of a human’s personality. This book is captivating and invites its readers to see how they became the people they are today, and how they will become what they are in the future.

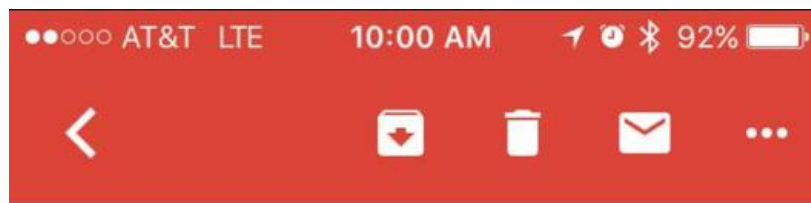
## Appendix H: Change Log

Date	Recipient	Response	Response Date	Change Made
2017-07-02	Professor Karrie Newby	Yes	2017-8 through 13-02	Formatting of abstract
2017-13-02	Professor Karrie Newby	Yes	2017-14 through 28-02	Format and grammar of proposal
2017-14-02	Professor Karrie Newby	Yes	2017-14-02	Formatting annotated bibliography
2017-21-02	Professor Karrie Newby	Yes	2017-22 through 28-02	Check for proper scholarly sources
2017-26-02	Professor Karrie Newby	Yes	2017-27 & 28- 2017	Grammar
2017-28-02	Susan Salzman	No	Not applicable	Not applicable
2017-13-03	Susan Salzman	No	Not applicable	Not applicable
2017-14-03	Writing Center (SCC)	Yes	2017-14-02	Grammar and information check
2017-20-03	Susan Salzman	Pending	Not applicable	Not applicable



## Appendix I: Writing Center Submission

(See attached form)



You have successfully made an appointment on Tuesday, March 14, 2017 between 9:00am and 9:30am. The appointment is with Olivia for Karen at SCC Writing Center /OWL. Unless your appointment is for brainstorming, please bring a hard copy of your draft to your appointment.

In order to **avoid no-show penalties**, please go online and cancel at least one hour before your appointment's start time.

You can make, cancel, or modify appointments by logging into the scheduling system at <https://collin.mywconline.com>.

See you soon!

**The Spring Creek Writing Center  
Team**

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