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Student Name: Emily S. Hall

Address: Anchorage, AK

Student ID Number: E-mail: eshall@alaska.edu

Phone Number(s): ( )

Degree Program: Bachelor of Arts Campus: University of Alaska Anchorage

Major: English # credits enrolled (current semester): 9

Student's Signature*: Emily S. Hall

Faculty Mentor: Heather Adams Department/College: English College of Arts & Sciences

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Reflective Essay

I started with a subject that I was really interested in, then had to find the right research question to move my research forward, to create a space for my writing and have something substantive to present to my audience. My research question started very basic and changed several times as I learned more about my topic. I discovered early on that the question I was initially asking had essentially been answered in several articles. I reread some of my primary texts and came up with a better, broader research question. I revisited my question at various stages of my project to see if it needed to be altered or if I had strayed too far from it.

For this project I started with a special issue of a peer reviewed journal with articles on my chosen subject matter. A preliminary search in other rhetoric journals revealed a few more articles. From these articles I looked in the bibliographies of my articles, looking at a number of their sources that were relevant to my project and reviewing those as well. I conducted boolean and truncated searches as well. I would sign into the Consortium Library, so when I looked through Google scholar I would be granted access to articles from journals the library subscribed to.

From the library homepage I looked at specific journals, starting with the journal with the special edition. As I looked into sources from the bibliographies I could find the articles cited through online access to their journals. As I compiled different sources I created an annotated bibliography where I had a brief summary of the article and some of the keywords. I spent over a hundred hours in the library quiet study areas and used library computers for word processors that allowed me to make endnotes and hanging indents in my paper.

I consulted about five different journals specifically for my essay. In these journals and through searches I found about seven articles that were directly about my subject matter, and over thirty articles related to it. Twenty of them were from bibliographies of the articles I started with. I consulted three
books in the library that were in the sciences of my interdisciplinary subject that I was not familiar with. Looking in the stacks around those books I found another book that became one of my sources that related closely to my subject.

While looking into these different disciplines I consulted a peer working in a scientific field and talked with them about research methods in their field, how they defined and studied in their discipline. These conversations helped me understand nuances that gave me a deeper understanding when I went back to the texts and articles.

As I read articles for content for my paper, I also paid attention to the rhetorical moves the writers were using. I looked at how authors used headings and subheadings, whether it was more common to see footnotes or endnotes, and how authors used brackets. I also learned about citation styles from the articles I read, such as how multiple texts from the same author were cited. Paying closer attention to the rhetorical moves of texts also helped me understand some of the ways authors in my discipline addressed their audience. What stood out to me the most was how authors composed their abstracts and introductions, where a lot of the authors wouldn't simply give their thesis for their article and the supporting points, but would often overtly explain what each section of their paper would be about.

In order to synthesize papers into my project, I prioritized themes and looked at how texts intersected and complimented one another. There were several times when a section of my paper felt clumsy, and I would experiment with taking out a source and see how things reoriented. Twice I pulled out a source from a section that felt forced and was able to later reenter them in clean, coherent synthesis. At different points of research for this project I reread previous works and looked at how my understanding of the conversation changed and how I could change the tone of certain parts to reflect that conversation.

The most difficult aspect of my project was figuring out how to effectively write to my
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audience. After doing research to familiarize myself with the subject matter I had difficulty in starting my paper, and my initial attempts were halting. I met with a teacher in my field and went over what I had written. The teacher helped me reorient myself to an audience who was not steeped in my findings. I did two reverse outlines, one when I was in the middle of my project and was unsure how to move forward, and one when I was nearing completion of the project to check for cohesion and smooth transitions.

During the process of writing this project I had a peer who reviewed my paper at different stages. I talked to them about my research, and explaining my findings to a peer helped me hear what I needed to address in my paper from the questions and feedback I received.

I feel that there are two major takeaways from this project that I got, and neither of them are things that I expected. The biggest awareness I feel that I gained from doing this research project was the need to check back in with myself at different stages of the project, to review my research question and how my project was taking shape. The second was that research is not a solitary venture where a person sits down with books and a computer and slams out a report. It is collaborative, even when not doing a group project, there are benefits to asking questions to teachers, experts, and fellow students. Getting input from peers on ideas and how you want to explain things brings a deeper, richer awareness of how you are interacting with your broader audience.
Neurowhat? Neurorhetoric: The Marriage of Rhetoric and Neuroscience

Emi Hall

University of Alaska Anchorage

In 1990 president George Bush senior made an official proclamation that the 1990s would be the “Decade of the Brain.” But interest in the brain did not stop after 1999, it only continued to grow. In 2013 president Barack Obama proposed the BRAIN initiative, Brain Research Through Advancing Innovative Neurotechnologies. Bush and Obama state that advances in neuroscience are getting science closer to creating better treatments and cures for brain disease and mental illness, like Parkinson’s, epilepsy, schizophrenia, and PTSD. But neuroscience advancements have become of interest to more than the presidents and the medical community. The media and the public have caught the brain craze as well. Magazines feature articles about neuroscience reports, and more nutritional supplements are showing up to help maintain and improve the brain. Books and games advertise their ability to train your brain and exercise your mind. It is not only the presidents and the public that have a growing investment in neuroscience. New fields in academics are starting to show up, like neurolaw, neuroeconomics, neuroeducation, and neurorhetorics.

The growing field of neurorhetorics has much to offer to academia. Neurorhetoric can look at the growing persuasive appeal of neuroscience and neuroimages, but it is also a versatile field for interdisciplinary discussion. Neurorhetoric looks at neuroscience research to see what new perspectives can be gained to create and add to conversations in rhetoric and rhetorical theories. In collaboration with neuroscientists, rhetoricians in neurorhetoric can look at the language and structures in neuroscience to provide new insight to scientists in how they rhetorically frame their research, bringing about new questions for neuroscience research.
Neurorhetoric can add to a number of different rhetorical fields, such as feminist and gender studies, animal studies, and the rhetoric of disability. In 2010 Rhetoric Society Quarterly published a special issue on neurorhetoric, featuring Jordynn Jack and Gregory Appelbaum’s “This is Your Brain on Rhetoric: Research Directions for Neurorhetorics,” which has since become the cornerstone of neurorhetoric research. I will be using it to look at the methodology taking shape for neurorhetoric, and the conversations that have started in neurorhetoric about the appeal of neuroscience. I will then look at some of the ways neurorhetoric is interacting with the rhetoric of disability to display one of the ways neurorhetoric is being used. Neurorhetoric as a field of rhetoric inquiry sounds harrowing as an undergraduate, and I will recount my experience in looking into this field.

**Definition**

Jordynn Jack and Greg Appelbaum, a rhetoric scholar and neuroscientist, respectively define neurorhetoric as the rhetoric of neuroscience and the neuroscience of rhetoric (413). Rhetoric analyzes neuroscience research to gain new perspectives that can add to rhetorical conversations. Neurorhetoric looks at the language within the discourse of neuroscience, the way the conversations are shaped as well as the implications of the language used. Rhetoric being the field of persuasion, neurorhetoric would not be complete without being defined as the field that looks at the persuasive power of the brain as well, as will be expanded upon later.

To highlight the investigations of how neuroscience lends itself to rhetoric, Jack and Appelbaum discuss neuroeconomics, the study of how people make decisions. Neuroeconomics has discovered the “basic computational physiological functions” of how people make decisions (417). Such knowledge could be a new perspective to explore in rhetorical reasoning and desire, as long as the definition of reason and the limitations of the study are understood.

To explain the rhetoric of neuroscience, an example in Jack and Appelbaum’s article uses studies of autism, specifically terms used toward autistic subjects in neuroscience studies (420-
In neuroscientific experiments they distinguish their variables to measure the differences. Neuroscientists can choose to use words like “healthy people” to differentiate between non-autistic and autistic groups. The term healthy implies that people with autism are unhealthy, but autism is not confined to a lab looking at differences. Groups who argue for the acceptance of autism will use the word “difference”, and those who argue for the cure to autism use the word “disorder.”

**Methods for Neurorhetoric**

Just as neurorhetoric is growing in its definition, so too is its methodology. Undoubtedly interacting with different fields of rhetoric will require slightly different modes of conducting neurorhetoric, but the core of its methodology has taken shape. While complex and with the emphasis of great caution, neurorhetorics is by no means insurmountable. Jack and Appelbaum created a guide that has become foundational for approaching and conducting neurorhetoric.

Neuroscience uses different forms in their research, such as raw numerical data, statistics, and other such computations that rhetoricians need to be aware of. It would be easy for rhetoricians to read the abstract and discussion sections of a neuroscientific report. The abstract is where the intent, variables, and methods are summarized, and the discussion at the end of the paper gives the researchers findings, how they interpret their findings, and suggestions of further inquiries. These pieces are easy to read, conversational, but this would be like reading the introduction and epilogue of a book without bothering to read the story. Rhetoricians need to be able to read the methodologies and interpret the results to fully understand a scientific study, to read the whole story. As Jordynn Jack states, rhetoricians should not simply hop on the “neuro-bandwagon” (Jack 406).

As outlined by Jack and Appelbaum, rhetoricians should use the rhetoric of science to approach neuroscience research. To gain that understanding, rhetoricians need to be able to understand the different parts of how neuroscience is composed and how its research works
Rhetoricians need to be able to consider the context of where the report fits within its field, the framework of the study, its methodology and limitations. Just as in rhetoric, neuroscience has its own debates, its own different approaches to subjects and conclusions with suggestions for further investigation. It is important for a rhetorician to understand neuroscientific definitions. Jack and Appelbaum discuss how neuroscience uses operational definitions, definitions that can be scientifically measured (418). The authors did a preliminary study where they took 20 scientific articles that used the terms reason and emotion, and compared the definitions of the articles. They found that out of the 20 articles, six articles defined emotion and reason, each with a different definition (418-9). Reasons for this could be that the definitions in the other 14 articles were considered implicit, or in the six, the reports used specific definitions for the purposes of their study. What matters is that rhetoricians need to be aware of such differences when doing research; not only so that rhetoricians understand how neuroscience is conducted, but so they can point out such discrepancies. Rhetoricians also need to know neuroscience terminology, such as “neural correlates” just as it would be important for a neuroscientist to understand the terminology like “agency” before writing about it in rhetoric. Along with understandings of neuroscience processes and how neuroscience can interact with rhetoric, rhetoricians need to be aware of scientific pitfalls, particularly neurofallacies, which will be explained later.

Chris Mays and Julie Jung, a graduate assistant and professor of rhetoric, state that part of neurorhetoric’s methodology should be its defense against “cognitive reductionism” (42). Cognitive reductionism is reducing neuroscience theory and research into means of use and application. The authors state that neuroscience’s appeal is its scientific nature that is perceived as being factual and definitive. There is concern that rhetoricians will use neuroscience as its primary evidence in conversation, or make broad claims on the basis that neuroscience is a “hard science”. Mays and Jung use the example of Jani Emig in 1977 who studied people practicing a
type of composition while undergoing an EEG scan, an early neuroimaging technology (44-45).

Emig believed that neuroimaging could provide great insight into the way people create and interact with composition, but the study had a sweeping claim of “here [in the brain] is where people create different types of composition.” Not only is this claim too broad to be studied or yield results, the methods and perspectives of neuroscience have since changed as neuroscience research and neuroimaging have advanced. Thus neurorhetorics needs to display how neuroscience, like any other field, is ongoing and unfinished.

Jack and Appelbaum strongly encourage collaborative research between rhetoricians and neuroscience researchers (528). Despite how different these fields are from one another, the authors state that there is much to be gained by collaboration. “…that neurorhetorics research should involve both careful rhetorical analysis of neuroscience arguments as well as consideration of how neuroscience can inform rhetorical theory and practice” (Jack and Appelbaum 429). David Gruber, Jordynn Jack, Lisa Keranen, professors of rhetoric, with John M. McKenzie, and Matthew B. Morris, professors communication in their collaborative article “Rhetoric and the Neurosciences: Engagement and Exploration,” emphasize the need for collaboration. The authors say neurorhetorics can look at the appeal of neuroscience research as well as the way it is structured and discussed in and out of its field to give understanding to the humanities and social sciences. With collaboration comes exchange; rhetorical analysis would also give neuroscience a perspective of itself, how its research is created, framed and discussed, for new insights and prospective research (3). Many rhetoricians are wary of the prospect of neurorhetorics, and the authors say that there will be much debate as to how much rhetoric and neuroscience should interact with each other (4).

The prospect of doing neurorhetoric can be overwhelming. The necessity of being cautious, the responsibility of understanding the complexity of neuroscience is a lot for a researcher to take on, but there is support for rhetoricians interested in the field of neurorhetoric.
As an undergraduate English student interested in neurorhetoric I did not have to take on understanding neuroscience and neurorhetoric alone. There are resources in the library on my campus that are introductory for learning about neuroscience and the way it works. There are tutors in the sciences that walked me through different aspects of science methodologies and understandings, such as how scientists differentiate facts from theories. A professor who works with neuroscience on my campus is available by appointment that I can go to with questions. There is also a professor of rhetoric I can meet with to talk about rhetorical studies that can help me with understandings of rhetoric, and get feedback from as I work through the process of creating this rhetorical piece. Along with explanatory articles such as Jack and Appelbaum’s and Jung and Mays’ are other tools. As well as writing peer-review articles on neurorhetoric, Jordynn Jack has created a public video “Jordynn Jack speaks on ‘Neurorhetorics’” (Itineration), and the Prezi she used in her video is also available, “How to Do Neurorhetorics: A Tutorial” (Prezi).

**Neurofallacies**

Understanding neurofallacies is key when entering neurorhetoric, neurofallacies were explained by Jack and Appelbaum, and have since become an integral part of neurorhetoric study. Racine, Bar-Ilan, and Illes, all professors working at the Stanford Center for Biomedical Ethics, had their article “fMRI in the Public Eye” published in February of 2005. The article talks about the discourse between neuroscience and the public through the media; particularly the miscommunication of neuroscience research. The authors talk specifically about how fMRI research is being misconstrued through what have come to be known as “neurofallacies:” neurorealism, neuro-essentialism, and neuro-policy (160-1). These neurofallacies have become a strong tool outside of neuroethics. Neurofallacies have been used by rhetoricians to look at the discourse between the media, neuroscience, and the public, as well as a tool to look at neuroscience articles themselves. As stated before, rhetoricians should also look at their own work for neurofallacies.
**Neuro-realism**

The authors state that neuro-realism is "how coverage of fMRI investigations can make a phenomenon uncritically real, objective or effective in the eyes of the public" (160). Racine, Bar-Ilan, and Illes use the example of a title, "Fat really does bring pleasure," an article that does not discern any methodologies or scientific understandings of the neuroscience report it was based on, but makes a sweeping claim to its audience about why high-fat foods taste good. The fMRI scans are used as a visual map, where highlighted sections of the brain are used as the author's evidence. Jack and Appelbaum propose that neuro-realism is not confined to fMRI studies, but can be seen in other reports of neuroscience research because of its use of metaphors.

**Neuro-essentialism**

"...reflects how fMRI research can be depicted as equating subjectivity and personal identity to the brain" (Racine, Bar-Ilan, and Illes 160). This is well described by Jack and Appelbaum as rhetorically being like a "double synecdoche" where the brain is used as a term to cover a function or a phenomenon. At the same time the brain is used to define people. The authors use the example "Odds are that gambling addict's brain is built differently." This claim generalizes that the whole brain of an addict is different, and makes the implication that addicts are different people entirely from non-addicts.

**Neuro-policy**

"Neuro-policy describes attempts to use fMRI results to promote political and personal agendas" (Racine, Bar-Ilan, and Illes 161). The creation of neuro-policy is often reducing neuroscience to information that can be used as proof, thus as fact. The authors talk about how neuroscientists have been called to weigh in on social debates, wanting hard science to make their position stronger. Examples can be taken from the articles above. Someone could say there are such high obesity rates in America because of the prominence of high fat foods and
restaurant chains need to be reduced, or addicts' brains are different so they shouldn't be allowed in casinos.

**Persuasions**

Jordynn Jack adds to the definition of neurorhetorics, as rhetoric is the field of persuasion, neurorhetorics explores “...the rhetorical appeal, effects, and implications of this prefix, neuro-...” (Jack 406). To this end, there is the interdisciplinary persuasion and public persuasion. Academic persuasions have been discussed above, but there is considerable discussion around the public appeal of neuroscience and the concerns this persuasion raises. Neurorhetoric looks at how the brain appeals to people, and also the growing evidence of just how persuasive the brain is. Interest in the brain is not a bad thing, but misinformation is concerning for neuroethics in terms of how the information impacts the lay audience, and frustrating to neuroscientists.

As the field of persuasion, neurorhetoric is examining the growing appeal of neuroscience and neuroimaging. Professor of Communication Davi Thornton’s *Brain Culture* examines the prominence of neuroscience, in video games (6), news articles (59), self-help books (67), and exhibits (128), all catering to maintain brain health, open the brain’s potential, and optimize the brain. In her introduction Jack notes that brain training games and shows effectiveness is inconclusive in science (405), but this does not stop the promotion of these outlets. Thornton discusses the determinism given to neuroscience, how scientific explanations of brain functions being “hard wired” could have an effect on people’s identity with a sense of predestination (51). Cliodhna O’Connor and Helene Joffe, professors in the Faculty of Brain Science at the University of College London, raise this same question in their study, with the findings that people have not been struck with a sense of predetermination (258-9). Both Thornton (260) and O’Connor and Joffe (59) talk about the new model of brain plasticity, that the brain can change has led to the new wave of ideas and brain products.
The debate as to how persuasive neuroimages are to the public is ongoing. Psychologists David McCabe and Alan Castel conducted a study in 2008 that reported people were more persuaded by articles including brain scans versus the same articles without (349). Psychologists N.J. Schweitzer, D.A. Baker, and Evan Risko built a study off the model of McCabe and Castel in 2012, which reported that brain images did not add persuasive value (508). McCabe and Castel, Jack and Appelbaum, Mays and Jung, and Racine, Bar-Ilan and Illes discuss the fact that brain scans are interpreted; they do not provide direct answers. An example is fMRI scans; scans of blood oxygenation levels mapped onto brain scans (McCabe and Castel, 350). Neuroscientists interpret the data from these scans for their research, but there is much concern about the persuasive effect of fMRI images.

McCabe and Castel talk about how neuroscientists are frustrated by the way neuroresearch and neuroimages are depicted. They state that the way neuroscience is conducted, how neuroimages require interpretation, and other aspects of neuroscience research should be added to the public discussion of neuroscience so that it can be better understood (351). Racine, Bar-Ilan, and Illes discuss the ethical questions neuroimaging persuasion raises, and suggest that neuroscientists should take on understanding public discourse in order to accurately reproduce their research in the media (163). The reactions of neuroscientists to the ways neuroscience is being disseminated, changing conversations with the public are another area ripe for neurorhetorical analysis.

Disability

O'Connor and Joffe found that many people with mental illness want scientific explanations, scientific data of chemical imbalances, or brain scans, of their illness, “Qualitative analysis indicated that much of brain-based explanations’ appeal derived from their apparent ability to provide an objective, morally neutral tool to legitimize people’s experience” (258). This tool can be seen in the rhetoric of disability as people with mental illness use it as a stepping
stone to regain their credibility. Rhetorician Jenell Johnson talks about the rhetoric of disability, specifically the stigma of mental illness and how it effectively takes away their rhetorical voice, what she calls *kakoethos*, an article not expressly on neurorhetoric, but aptly describes the way mental illness is perceived. Rhetorician Katie Rose Guest Pryal talks about how those with the stigma of mental illness, or what she terms “neurologically different,” using a rhetorical strategy of narrative called “mood memoirs,” to regain their *ethos*. Johnson, as well as O’Connor and Joffe, and Jack and Appelbaum talk about advocacy groups working to lessen the perception of mental illness meaning mentally disabled.

Johnson states that *kakoethos*, or “bad character” is how mental illness is seen as a manifestation of bad character in a person, as judged by their audience (465). She then explains how *kakoethos* is not an enduring property, as the audience’s views change, *kakoethos* can thus be changed. While this article is not situated around neuroscience, it does display public perceptions of mental illness. In the presidential election of 1972 Thomas Eagleton, Missouri senator, was running for vice president for George McGovern, and lost all rhetorical voice once he disclosed he had been treated for mental illness. In his speech he correlated his problems to physical illness, reasoning that he had suffered from the physical stress of working so hard (469). The public engaged in a debate about mental illness and disability for over two weeks before Eagleton was taken off the presidential ticket (459-460). McGovern blamed Eagleton for his loss to Nixon, and since 1972 this event has been named the “Eagleton Affair.” The Eagleton Affair has become synonymous with politician mental illness secrets, and has been cited in multiple presidential elections (460). When Eagleton was dropped, he was criticized mainly not for his hospitalization, but that he had not told the press earlier (470). Despite the criticism given, Eagleton went under what Johnson called the “diagnostic hermeneutic,” where the public takes on the role of diagnosis, in this case looking for physical symptoms of Eagleton’s mental illness; people took notice of shaky hands or a tremor in his voice to be such attributes, and his
credibility was questioned in publications like the *Times* (470). In *kakoethos*, the audience is the judge of a person, and can be subject to change. Johnson goes on to say that after Eagleton was dropped from the ticket, and underwent diagnostic hermeneutics, his audience changed, and Eagleton was shown support (472). He received a standing ovation when introduced at a baseball game, and stories appeared in magazines such as *Newsweek* and *Life* defending Eagleton instead of criticizing him (472). He returned to the senate, and was never lost an election thereafter.

Pryal’s article about the “mood memoir” for these people to regain their *ethos*. In a mood memoir the author combines the scientific explanation of their illness with personal narrative to create the authority of their narrative (483). Pryal examines the rhetorical strategies of the mood memoir, how most mood memoirs follow a specific construct: apologia, awakening, criticizing doctors, and laying claim. In the *apologia* authors defend and explain the reasons for their narrative, that the work is not so much about them, as it is for people with mental illness to be given a voice (486). They also describe the seriousness of their illness, likening it to physical illness such as cancer or diabetes, making their stories more relatable (489); just as Eagleton tried to explain his mental illness as an allegory of physical stress. In the awakening, author describe the moments when they became aware of their illness by describing the environment they were in and allegories of physical sensations when they came to the realization of being mentally ill, making the experience tangible to their audience (490-2). This is followed most often by the convention of criticizing doctors, when the author “talk[s] back” to medical professionals, criticizing the medical system that maintains rigid definitions and treatments for illness (492). They recount stories of unprofessional doctors and failed treatments (493-4). Authors then lay claim, normalizing their illness using statistics or citing famous people who suffer their illness. “A greater number of sufferers suggest that although mental illness can be horrible, it is not unusual” (495). Pryal concludes by saying that people with mental illness should not be automatically excluded from rhetorical conversations, and that mood memoirs are a way to
convey the difficulties faced by the rhetorically disabled to readers (499). Pryal does contend that people outside of the artistic realm would be less likely to regain their *ethos* through a mood memoir, because, as O’Connor and Joffe state, many people prefer scientific explanations to validate their illness. People whose profession is outside of the arts are also less likely to use a mood memoir, where creativity is downplayed, such as a scientific researcher (499).

Mental illness is a matter of much debate in public and the disability. Where authors in Pryal’s mood memoirs compare their illness to physical illness, Johnson cites studies that report such comparisons can make people with mental illness classed as different from normal people (474). This is supported by O’Connor and Joffe, that while biological reasoning of brain difference does reduce blame placed on the mentally ill, it is also linked with social distance (261). Pryal contends that mood memoirs can display the rhetorical challenges faced by the mentally ill (499), “-but it does little to break down the traditional rhetorical limitations of the mentally ill outside of literary or creative spheres” (498). These articles convey different aspects of mental illness perceptions, and how they are changing. For example, Johnson talks about the National Alliance on Mental Illness (NAMI), focused on breaking down the stigma of mental illness.

Neurorhetoric has not created great change within the field of rhetoric of disability, but it is actively adding to the conversations. This interaction is a great example of the validity and versatility of neurorhetoric. Herein, neurorhetoric has been used responsibly and appropriately, and has thus given insight for future exploration.

**Expansion and Exploration**

Since Jack and Appelbaum’s article in 2010, neurorhetoric has gained considerable attention. Jack and Appelbaum’s analyses have begun to be responded to. Debates are forming around neurorhetoric, and neurorhetoric is beginning to be used to examine texts related to neuroscience.
Jack and Appelbaum's article had a section called "Empathy and Neurological Difference," that talked about the diagnostic criteria of autism as being unable to feel empathy (422). They once again talk about the way rhetoricians need to be careful of scientific operational definitions, in this case empathy. Scientists may study empathy in individuals by putting them through an fMRI scan while being given quizzes, shown pictures, or other quantifiable measures to show a neurological difference of empathy in autistic versus non-autistic individuals. In this case, Jack and Appelbaum point out that these measures are not what empathy is in rhetoric. In a response essay, "Temple Grandin and the Neuroscience of Empathy," Priscilla Paton talks about the neuroscientific definitions of empathy, and how they collaborate with Temple Grandin, well known animal scientist, autistic person, and autism advocate's story of feeling empathy toward animals (353). Grandin's own experience is supported by other accounts of autistic children responding to their pets. Paton talks about a conference she went to that expanded on the neuroscience of empathy and autism. One example was how the neurochemistry correlated with emotions of fear, panic, and rage change to acceptance and attachment when interacting with animals (355-6). In Grandin's own studies, autism does not always mean connections with animals (356), and Paton concedes that such studies for emotions and autism are not definitively conclusive (359).

Neurorhetorics has also begun to spark debate within its field, as seen between Brian Jackson and Chris Mays. Jackson's "Neuroscience and the New Urgency of Emotional Appeals" invokes neuroscience findings of emotional appeals, stating that neuroscience has brought a whole new understanding, that emotion is at the core of rational judgments (474). Jackson leans heavily on neuroanatomy in his explanation, citing the prefrontal cortex (479), semi-localized neural systems (480), to show how pervasive emotional reasoning is. To this end, he claims that rhetoricians can more effectively understand and utilize argument and persuasion, and also says that this new insight should be used responsibly, that it should not devolve into neuropolcy.
Mays' response essay falls in line with his work with Julie Jung in defense of neuroscience, that while Jackson good points in his essay, he is wary of how far Jackson has extended his claim (302). From Mays and Jung, and Jack and Appelbaum's previous articles, he rearticulates his concern of neuroscience being used too heavily, in this case his concern of neuroscience redefining rhetorical meanings. He reinforces that neuroscience needs to be seen and used within the context of neuroscientific research (305).

Michelle G. Gibbons' wrote "Beliefs about the Mind as Doxastic Inventional Resources: Freud, Neuroscience, and the Case of Dr. Spock's Baby and Childcare," wherein she takes a look at the evolution of Spock's book. She studies the Freudian doxa of the first edition of Spock's book, and how in its ninth edition it has transitioned to neuroscience (441). She compares the ways the editions were set up, in the first one Freud is never explicitly mentioned, his theories were discursive, but neuroscience is explicit ninth, with neuroanatomical explanations of child development (441-2). Gibbons steps back to reflect on how, like Freud, neuroscience is integrating into lay culture.

Rhetoricians are both hesitant and excited about the forming and exploration of this field. It has a variety of potential interactions, such as that of rhetoric of disability, as well as fields like rhetoric of gender, with caution and responsibility so strongly emphasized in articles about neurorhetoric methodology, neurorhetorical conversation input is being carefully contextualized in their findings, and the findings are compelling. Neuroscience is integrating itself into lay culture, and it is a boon to have a field examining neuroscience outside of neuroscience, as well as audience responses to it. It is unnecessary for undergraduates and scholars to entrench themselves in neurorhetoric, but academics should keep an open mind as neurorhetoric continues to carve out its niche in rhetoric.
Works Cited


<http://itineration.org/node/14>


<https://prezi.com/dqxmdqjdjsqr/how-to-do-neurorhetorics-a-tutorial/>


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"To find out more about fMRI brain imaging, go to the Oxford Centre for Functional Magnetic Imaging of the Brain website <http://www.fmrib.ox.ac.uk/research/introduction-to-fmri/what-is-fmri/history-of-fmri>"