

***Challenges in Rhetoric of Science and  
Technology: ARST Report***



## **Rhetoric and the Neurosciences:**

### **Engagement and Exploration**

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Few popular science news articles today attract as much attention or are communicated with as much flamboyance as those involving the neurosciences. Catchy but charged headlines such as “Obese Teens May Be Lacking in Brain Size, Not Willpower” (Rettner, 2010) or “Thought Police: How Brain Scans Could Invade Your Private Life” (Wise, 2007) make the point. These popular accounts present rhetoric scholars with numerous opportunities for interrogating scientific understandings of the brain and their development through the discourses, practices, and materials of neuroscience. However, a strictly deconstructive approach, as Bruno Latour (2004) notes, can be viewed as intellectually hostile to the efforts of scientific researchers (p. 225-228). Because neuroscience is a relatively new and diverse field, it is important to

consider both scope and audience when striving to make a contribution to a critical tradition in the humanities and social sciences. Such a contribution, we believe, entails not only sharing observations within one's immediate research community, but also promoting truly interdisciplinary interactions between neuroscientists and rhetorical scholars. In what follows, we offer a brief and general summary of the contemporary neurosciences. We then make a call for collaborative scholarship wherein neuroscientists and rhetoricians partner in order to examine the constitutive nature of language, perception, and consciousness. We close by advancing a four-part agenda for research at the intersection of rhetoric and neuroscience.

### ***Contemporary Neuroscience: Context And Practices***

Although the study of the nervous system dates back to antiquity, the second half of the twentieth century witnessed a dramatic expansion of investigations of the nervous system, emotion, and cognition. This growth is in large part due to the invention of axial X-Ray imaging, the electroencephalogram (EEG), positron emission tomography (PET), magnetic resonance imaging (MRI), and functional magnetic resonance imaging (fMRI), offering researchers the ability to conduct experiments on living individuals and to visualize processes occurring at different levels beneath the skull. These developments, combined with the experimental methods of cognitive psychology, led to advancements in understanding the tie between brain functions and mental activities (Raichle, 2009). It also moved the study of the brain from a largely structural one to a joint focus on structures and processes (Van Horn, 2004; Brown, 2010). This is pragmatically demonstrated in the work of Voss and Schiff (2009). As a result of these recent advances, researchers have launched multiple investigations of the nervous system, emotion, cognition, and the interplay between them, establishing a multiplicity of new disciplines with names such as neuroengineering, neuroinformatics, and neuroeconomics.

Indeed, neuroscientists are now “breaking bread” with those outside of the biological and medical disciplines, as

the editor of *Social Cognitive and Affective Neuroscience* put it in the inaugural 2006 issue, and are seeking to develop multiple lines of investigation in tandem with emerging imaging technologies (Lieberman, 2006). This disciplinary fertility and availability of methods has pushed neuroscientists to explore a bevy of brain phenomena, from “neural mechanisms for mate choice” (Fisher, et al., 2005) to “neuroanatomical sites for eating behavior” (Führer, et al., 2008) to the brain’s mechanisms for “perceptual decisions about complex visual forms” (McKeeff and Tong, 2006). The result of so much high-profile research, as Jordynn Jack (2010) notes, is that “neuroscientific research findings are only gaining in popularity” (p. 412). Indeed, neuroscience studies have become a persuasive cultural form regularly “touted for their potential to transform advertising, political campaigns, and law,” while “... seem[ing] to offer concrete, material proof of concepts previously considered ephemeral, especially when claims are supported with showy, multicolored brain scan images” (Jack, 2010, p. 412-413). Given neuroscience’s suasive capacity, rhetorical investigations of the texts, contexts, practices, and materials of the neurosciences are well-poised to help citizens, humanistic and social science researchers, and neuroscientists alike understand what is at stake in the processes of “coming to know” the nervous system, brain, affect, and cognition.

A rhetorical perspective is not only valuable for revealing the “important, if not indirect way in which rhetorical considerations define the shape of modern science” (Ceccarelli, 2001, p. 169). It is also valuable for helping to uncover how such science is interpreted, understood, and made meaningful by varied audiences. Lisa Keränen explains that “whereas other branches of science studies consider the historical, philosophical, and sociocultural dimensions of science, the rhetoric of science focuses on how language affects scientific processes and understandings” (Keränen, 2010, 23). Scott Graham offers a slightly different viewpoint, suggesting that material objects can exert persuasive influence and that rhetorical agency comes from a “material-semiotic network” (Graham 2009, 400). Whatever falls beneath the rhetorical umbrella in a given context, however, there is little doubt that discursive practices and material structures work together to express values, shape institutions, and offer

conceptions of what it means to be human. Accordingly, the neurosciences supply a rich set of data for rhetoricians, ranging from intra-scientific debates about the nature of synapses to popularized accounts of brain functioning.

Rhetoricians have not always had such optimism for the possibility of collaborating with the cognitive and brain sciences. Traditional rhetorical problematics surrounding agency, choice, deliberation, and identity have until recently most often put rhetoricians starkly in the position of critical or even skeptical hesitation. Since scientific discourses were often considered, as Alan Gross once famously remarked merely “rhetoric without remainder”, it did not seem that there was much room for rhetoric and the sciences to collaborate (Gross, 1997, 6). That little more than ten years later one finds rhetoricians such as John Lynch asserting a need to resist “a logic of representation that undermines a full examination of materiality and the complexity of scientific practice” (Lynch, 2009, 435) indicates a promising move toward recognizing both the legitimacy of current scientific research in this area without accepting it uncritically. This more nuanced realignment among rhetoricians of inquiry, as well as a more receptive attitude among neuroscientists themselves, suggests that scholars in both disciplines may now find significant territories of mutual interest to explore together.

### ***Mutual Contribution: Engaging With Neuroscience***

It is our view that a specifically rhetorical engagement of neuroscience should be an engagement *with* neuroscience and should, therefore, be built as much as possible on cooperation and mutual exchange. The point is at least implicit in Jenny Edbauer Rice’s exploration of multidisciplinary works on “affect” (Rice, 2008). She cites Lawrence Grossberg suggestion that “texts may have other effects than meaning-effects” and subsequently explains that rhetorical theorists ask many of the same questions as those individuals studying meaning using the tools of neuroscience (Rice, 2008, 201-202). In addition, Diane Davis points toward the possibility of engagement with neuroscience by expanding on Kenneth Burke’s appeal to neurobiology in his well-known formulation of

“identification” (Davis, 2008). The discovery of mirror neurons, Davis argues, leads to a rethinking of Burkian identification as compensatory to division and recognizes, instead, the always already sociality of human being (Davis, 2008, 131-132).

Of course, the extent to which rhetorical critics could or should mingle in the field of neuroscience will likely be debated well into the future and may face concerns about biological reductionism and essentialist thinking. Yet, it would be a mistake to ignore the materiality of bodies in the constitution of perception. Rhetorical scholars who take the advice offered by Jordynn Jack and L. Gregory Applebaum to “carefully analyze the work with a rhetorical as well as scientific lens” (should steer clear of these pitfalls (Jack & Applebaum, 2010, 414). Alternately, they should avoid “throwing out the baby of materialism with the bathwater of vulgar reductionism” as Cary Wolfe (1991) once said (Wolfe, 1991, 66). In short, neuroscience research holds the potential to add a new dimension of understanding to traditional rhetorical concepts and may very well prove useful in helping transform or contribute to the exploration of meaning production and human identification.

The call informing this paper—to avoid what may seem like an assault on neuroscience coming from the outside and to remain open to the potentials of neuroscience—does not require abandoning rhetorical principles or epistemological positions that rhetorical critics understand as integral to the analysis of science. In fact, given the current cultural import of neuroscience and the tendency for fMRI investigations to be situated as “uncritically real, objective or effective in the eyes of the public” (Racine et. al, 2005, p. 160), we affirm the need for a rigorous cultural rhetorical criticism. Nevertheless, by partnering with neuroscience researchers, critics will better understand who has a stake in the advancement of this research and why, while positioning themselves to explore the professional practices that allow neuroscience research to hold together and produce socially significant work.

In addition, we believe that rhetorical scholars have a disciplinary perspective that may help neuroscience researchers to consider their unique goals in tandem with an audience’s expectations. On this point, however, it seems preferable to discuss strategies of scientific

communication from as local a position as possible; we hesitate to treat neuroscience monolithically and to broadly speculate in this paper about the “right” or “best” ways to communicate different kinds of neuroscience research agendas that each have what James Paul Gee calls their own big-C “Conversations,” or their own situated language patterns tied to specific social issues in particular cultural contexts (Gee, 1999, 94). In fact, David Gruber (2010) has argued that different neuroscience research agendas receive different treatment in the popular press and manifest different patterns of communication (Gruber, 2010). It is perhaps sufficient to say that rhetorical critics will likely find productive partnerships with neuroscience researchers who desire to investigate persuasion, appeal, ethics, and similar concepts in their work.

#### ***Four Areas Of Future Research In Neuroscience And Rhetoric***

From our view, four key areas of research merit attention for rhetorical scholars. Although not exclusive or exhaustive, we see these areas as particularly deserving of rhetorical investigation. We offer corresponding citations as a starting point for interested researchers.

1. The first area concerns how brain scan technologies, such as the CT, the MRI and the fMRI, are applied and interpreted and *how the “interpretive boundaries” for neuroscience studies are configured and communicated*. Anne Beaulieu, for example, describes how scientists use tropes that convert images into pictures of numbers in situations where brain representations seem too “intuitive and unscientific” (Beaulieu, 2002, 76). Kelly Joyce shows how physicians present MRI images with “transparency, objectivity, and progress” when speaking to patients (Joyce, 2005, 439). In other words, an important vein of research will consider how scientific authoritativeness is discursively maintained and how neuroscience studies are taken as more credible than other forms of or claims to knowledge. Of course, neuroscientists also strive to better understand their own research practices (Raichle, 1998; Taber et al., 2005; Weisberg, 2008); indeed, because they are aware of the persuasive impact of their research and images neuroscientists see the value of a rhetorical analysis and are pursuing partnerships with rhetorical studies

(Racine *et al.*, 2005; McCabe and Castel, 2000, Jack & Applebaum, 2010).

2. As Joseph Dumit showed in his three-year study of neuroscience researchers working with PET scans, “brain images make claims on us because they portray *kinds of brains*” (Dumit, 2004, 5, italics in original). That neuroscience studies often compare brains is nothing new; typological practices make up much of the history of the neurosciences and have contributed valuable insights. Nevertheless, *identifying where assumptions about classifications enter into research programs and exploring how grounds for separate classifications are established*, as Dumit did, has serious political and cultural implications and forms a significant area of rhetorical concern (Jack, n. d.).

3. In their 2009 article, “Critical Neuroscience: Linking Neuroscience And Society Through Critical Practice,” Choudhury et al. suggest neuroscience findings are complimentary to capitalist societies and fit with a “cultural focus on the individual and interiority” (Choudhury et al., 2009, 62). Other cultural critics express concern that neuroscience research may serve as a technology of governmentality (Johnson, 2008; Thorton, 2010). *Understanding how neuroscience agendas co-opt or promote larger cultural issues* (Littlefield, 2009) and how they advance corporate or political interests (Slaby, 2010; Choudhury *et al.*, 2009) remains central to critical rhetorical work.

4. A final area of concern lies in exploring how concepts of mutual interest to rhetorical scholars, such as reason and emotion, are defined and operationalized in the neurosciences (Jack & Applebaum, 2010). Engaging research about the extent of interdependency among the human senses is an example (Porter et al., 2006). Another is exploring the entwined relationship between the emotions and the intellect (Bechara, 2004; Tavares et al., 2010). These topics offer rhetorical scholars a chance to ask questions and be questioned, and to identify and question assumptions about the human brain-body relationship.

For each of these “areas of rhetorical concern,” we maintain that neuroscience researchers and rhetoricians will benefit from ongoing, programmatic, collaborative projects. Although Papoulias and Callard have recently

pointed out the dangers of trying to develop a transdisciplinary approach that ends up using scientific work out of context with an insufficient or confusing “composite language,” they nevertheless encourage scholars to pursue disciplinary teamwork and offer an insightful recommendation for doing so (Papoulias & Callard, 2010, 33-34). Papoulias and Callard argue that any encounter with another discipline “is also necessarily an encounter with the methodologies and processes of legitimation characteristic of the natural sciences. Any interdisciplinary gesture must explicitly address, rather than wish away, such supplementary traffic” (Papoulias & Callard, 2010, 50). Because the task of the rhetorician is precisely to “explicitly address” the “traffic” of “methodologies and processes” across various divides we believe that rhetorical scholars are positioned to successfully build bridges across historically divided disciplinary modes of investigation; thus, we situate the advice offered by Papoulias and Callard as a call to enter the foray while staying grounded in a rhetorical perspective.

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