CHAPTER 7

NEURAL IMPLICATIONS FOR NARRATIVE IN MULTIMODAL PERSUASIVE MESSAGES

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Narrative is very much a part of persuasive rhetoric in both a traditional sense and a multimodal sense. Aristotle observes a relationship between narrative and persuasion, albeit very late in his work on *The Art of Rhetoric* (it is discussed only within the last five sections of the entire work), and Thomas Newkirk (2014) details links between narrative and persuasion. Also, scholarship in neuroscience related to persuasion articulates its value as well (Boudreau, Colson, & McCubbins, 2011; Dooley, 2012; Nahai, 2012; Pillay, 2011). Narrative engages the audience with a way to assimilate with the speaker, and recent research in neuroscience has found that there are neural dynamics at work when an audience experiences any kind of rhetoric. I wrote previously about neural processes that occur with multimodal instructional messages (Remley, 2015) as well as persuasive messages (Remley, 2017), and my intent in this chapter is to encourage the integration of specific concepts of neuroscience into instruction and rhetorical analyses of persuasive messages, particularly those that include multiple modes of representation as characterized by The New London Group (1996) such as visual, print-linguistic, and aural. I show how teachers may connect neuroscience concepts to rhetorical principles, especially relative to persuasion and narrative, in instruction. This includes providing an example analysis that could facilitate demonstration of application and ideas for other related activities.

There are many attributes of a message that activate neural responses (Nahai, 2012; Pillay, 2011); for example, as a speaker compares him or herself with an audience, trying to make themselves seem like a member of the audience, mirror neurons are activated in the audience; the audience wants to be like that person represented in the narrative or feel some connection with him or her. Further, if an outcome of value to the audience is part of the narrative, reward neurons may be activated as well. For example, depending on who is providing the narrative or who is being used as the persona of the narrative, it may also elicit reward neurons if that person is esteemed in an audience's perception: "If I am like that

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person, I will have the same lifestyle and rewards he or she has;" or "That person has helped other people who are like me to gain something of value; so, he or she can help me, too."

Much has already been written on persuasive rhetoric within print-linguistic forms of composing; however, much less has been written about the neuroscience of persuasion in multimodal forms of composing. I acknowledge in this chapter that several concepts of neuroscience relate closely with those concepts of persuasion commonly understood by scholars of writing and rhetoric, and this link should be pursued more explicitly in instruction.

I do not expound on the full variety of stimuli that generate neural responses that affect an audience's perception of a message; such a text could overwhelm the reader with biological terminology requiring an extensive glossary. I limit this discussion to three relatively well-known attributes that have already been discussed to some degree in rhetoric and writing scholarship and are involved with persuasion: "mirror neurons," "reward neurons," and "plasticity."

Concepts from rhetoric such as logos, pathos, and ethos are closely connected to these concepts; and an evolving corpus of scholarship on multimodal rhetoric informs how to compose effective messages with different media and modes relative to various combinations. For example, researchers have found that certain colors elicit certain neural responses in viewers (Nahai, 2012). The goal of this chapter is to show why traditional principles of multimodal persuasive rhetoric may work, integrating a biological perspective and encouraging others to include such a perspective in discussion of such rhetoric. That is, the mirror neurons, reward neurons and elements of plasticity contribute biological concepts to an understanding of why a particular message is persuasive.

Pedagogy in rhetoric does not currently integrate this biological perspective. My suggestions at the end of the chapter encourage teachers to include this discussion in instruction and analytical practice to help explain why traditional concepts of persuasive rhetoric may work. I describe a specific commercial application to illustrate such integration; commercials can be used in composition coursework to illustrate points of persuasive rhetoric. I, also, encourage further research into these dynamics, how they can affect the design of persuasive messages and their efficacy in enhancing student learning of multimodal persuasive rhetoric.

BASICS OF MULTIMODAL RHETORIC

The New London Group (1996) identifies five different, unique modes of representation: print-linguistic, visual, audio, gestural, spatial; and they acknowledge that any two or more of these can be combined to form a multimodal representation. They acknowledge that,

> we argue that literacy pedagogy now must account for the burgeoning variety of text forms associated with information and multimedia technologies. This includes understanding and competent control of representational forms that are becoming increasingly significant in the overall communications environment, such as visual images and their relationship to the written word—for instance, visual design in desktop publishing or the interface of visual and linguistic meaning in multimedia. (New London Group, 1996, p. 60)

Subsequent to this call from the New London Group, researchers have been considering various combinations of modes of representation that can affect meaning-making. Further, scholars realize that pedagogy needs to integrate instruction in composing with these different modes of representation (see Selfe, 2007, for example). The importance of graphic images in these literate practices is noteworthy because of the different kind of literacy at work relative to each—print-linguistic text and image; though, both represent communication systems (Murray, 2009).

In the past fifteen years, another focus of study within literacy studies has emerged that focuses on effective combinations of multiple modes to communicate and related practices. Studies pertaining to this analysis seek to understand rhetorical attributes of mixed modes and when and under what conditions certain combinations are most productive (e.g., Lemke, 1998, 1999; Richards, 2003). Joddy Murray (2009), for example, indicates that a given combination may be meaningful for some people while the same combination will not be as productive for others because of differing personal backgrounds (p. 16).

RHETORIC AND NEUROSCIENCE OVERLAP

Rhetoric involves understanding one's audience toward presenting a message that will encourage the audience to act upon the information in the message relative to its purpose. An instructional message needs to engage the audience with the information in a way that enables the audience to understand it and be able to perform the task instructed. A purpose of persuasive messages is to move the audience from thinking about a given topic or issue to taking particular action on it.

Aristotle connects an audience's biological attributes to rhetoric. He acknowledges that a one must consider an audience's disposition when developing a message for it; this disposition may include social disposition and physical or biological disposition. He states that an audience may have "limited intellectual scope and limited capacity to follow an extended chain of reasoning (1991, p.

76). Even though, Aristotle makes this statement in *The Art of Rhetoric,* little of the scholarship in rhetoric and writing studies does much with that connection.

The Gestalt effect is involved in multimodal persuasion and considered in scholarship in both rhetoric and neuroscience. This is the idea that the whole is greater than the sum of its parts. One can understand an image when looking at the entire image rather than trying to piece together its different parts. The effect is identified in much of the scholarship on visual rhetoric, especially, (Arnheim, 1969); yet, it is also included as a term/concept in the neuroscience scholarship (Wallace, 2004). Mark T. Wallace (2004) states broadly that one of the roles of the brain "is to synthesize this mélange of sensory information into an adaptive and coherent perceptual Gestalt . . . this sensory synthesis is a constantly occurring phenomenon that is continually shaping our view of the world" (p. 625). A few studies find that as an optimal combination of senses is engaged the brain is able to process the information faster (Bremner & Spence, 2008; Keetels & Vroomen, 2012; Lewkowicz & Kraebel, 2004).

Crossing Terminology

As I mentioned above, there are a few terms not found in writing and rhetoric studies that contribute immensely to understanding persuasive rhetoric relative to neural processes. These terms are used regularly in neuroscientific scholarship. I provide information about them and briefly indicate their connection to persuasion here.

Mirror Neurons

Vittorio Gallese, Morris Eagle, and Paolo Migone (2007) and Giacomo Rizzolatti, Luciano Fadiga, Leonardo Fogassi, and Gallese (1996) first reported on the existence of neurons that appear to facilitate cognition of movements and behaviors that one observes another perform while doing a given task. Even before the observer tries to perform the same task he or she observed, he or she has acquired a sense of how to perform the task through a mental visual mirror. Further, they observe a connection between these neurobiological phenomena and social science. Rizzolatti et al. state

> Suppose one sees someone else grasping a cup. Mirror neurons for grasping will most likely be activated in the observer's brain. The direct matching between the observed action and its motor representation in the observer's brain, however, can tell us only what the action is (it's a grasp) and not why the action occurred. (p. 135)

Mirror neurons facilitate much cognition associated with experiences. However, they also contribute to persuasion in that an audience wants to mirror some aspect of the speaker or the speaker may want to resemble some aspect of the audience as a way to assimilate with it more. This is a basic principle in Chaïm Perleman and Lucie Olbrechts-Tyteca's (1969) *The New Rhetoric*. The speaker must always adjust to the audience's values and beliefs among other attributes. An audience's common experiences contribute to defining its understanding of reality (Perleman & Olbrechts-Tyteca, 1969; Schiappa, 2003). As a speaker positions him or herself closer to that reality and shared experiences of the audience he or she mirrors that audience and the audience understands that mirroring, eliciting empathy and favor from the audience.

This is echoed in Irene Clark's chapter in this collection. She states that one's identity can be influenced by elements of which one is conscious. As a speaker identifies closely with an audience, mirror neurons are more actively stimulated such that the audience feels as if he or she is the same as the speaker.

Reward Neurons

Several studies related to dopamine, a neuro-transmitter, recognize that the stimulated neurons are associated with perception of rewards and motivation. Activation of these neurons helps to enhance attention by conveying some kind of motivation to behave a certain way to the audience affected. Reward neurons play into persuasive messages when a speaker acknowledges some benefit the audience may experience.

There are many ways a reward may be experienced. For example, I may receive some financial benefit—a bonus; or I may feel that I am even more a part of a certain social group; or I may feel good about helping someone else. All of these act to motivate me to act a certain way because I perceive I will be rewarded somehow.

Neural Plasticity

In cognitive neuroscience, plasticity pertains to the ability of neurons to change their composition and behaviors relative to the information they process and experiences. Giovani Berlucchi and Henry Buchtel (2009) define neural plasticity as

> changes in neural organization which may account for various forms of behavioral modifiability, either short-lasting or enduring, including maturation, adaptation to a mutable environment, specific and unspecific kinds of learning, and compensatory adjustments in response to functional losses from aging or brain damage. (p. 307)

Plasticity can be affected by learning of one's culture as well as one's own experiences and social interactions generally. As such, plasticity is a biological aspect of one's social disposition. Neurobiologists recognize, much as humanities scholars such as James Paul Gee, Glynda Hull, and Colin Lankshear (1996), Steven Pinker (1997), and Richard A. Mayer (2001), that experience plays a role in learning and cognition. What one understands of a given bit of information and how they tend to best learn information affect how they learn new information. As a function of social interaction, this learning and cognitive development, also, affect what people value, impacting dynamics associated with reward neurons.

Studies related to plasticity tend to examine how one responds to a series of subsequent experiences of certain modal combinations after first exposure, especially related to cognitive development. Generally, the brain is able to process information more quickly as it learns more about that information and rewards associated with certain actions and values are re-enforced.

Because plasticity is affected by social interaction over time, culture also impacts persuasive rhetoric; a particular message may have a better persuasive effect in one culture but not another merely because of social expectations and perceptions of rewards or attributes of the product itself. A member of a particular culture may value something that a member of a different culture does not. This can affect how persuasive an audience perceives a given message. Considering that different audiences may have different social dispositions, two different audiences may not respond the same way to the same message.

THE RHETORIC OF NARRATIVE

In writing courses students learn a variety of modes of communication, including narrative. Narrative can be used in such coursework to help students learn various elements of writing and rhetoric because of narrative's versatility. Several years ago, Nancy Blyler and Jane Perkins (1999a) devoted an entire issue of the *Journal of Business and Technical Communication* to detailing the value of narrative in professional and scientific practice. Blyler and Perkins (1999b) also presented a compilation of works regarding how professionals in business and technical fields use narrative. Stephen Denning (2005) advances their work, calling attention to the use of narrative to move people to action, share values, and build trust. According to Blyler and Perkins (1999a), narratives help "align and consolidate activities" (p. 246) and "are vital to scientific invention and discovery" (p. 248). Blyler (1995), also, asserts that professional narratives can acculturate students to professional writing. Consequently, in addition to serving multiple purposes in practice, it can serve several purposes in business writing and technical writing pedagogies as well.

Professionals recognize narrative as a powerful rhetorical tool in business writing and technical writing settings. Ranging from its use in proposals to persuade readers to action to its use in resumes to move the reader to have interest in an applicant and use in other kinds of documents, narrative provides descriptive accounts of events while offering critical reflection to move an audience to action.

Narrative includes precise details of an event that occurred in the past which are reported in the same order in which they occurred, as well as an observation or evaluation of the information by the narrator (Rentz, 1992). This evaluation facilitates action based on the relationship between the events reported and that analysis. Narrative, generally, is distinguished from argument in its concern with the particular instead of with generalizations.

Much scholarship argues the rhetorical value of narrative in professional writing settings (Blyler, 1995, 1996; Blyler & Perkins, 1999; Denning, 2005; Jameson, 2004; Popken, 1999; Rentz, 1992; Rodgers, 1989).

NARRATIVE AS A MIRROR

Professional narratives integrate many of the attributes of personal narrative. While there is less focus on the individual who is writing the piece, the writer must be able to articulate a sequence of events and offer critical reflection about the relationship of those events to some particular issue or concern. Although such passages are shorter than those found in academic essays, they perform similar rhetorical functions.

Further, professional narratives offer insight into professional discourses. Students exposed to such narratives can learn the discourse of professionals within a given field toward mirroring that discourse (Blyler, 1995, 1996). Blyler (1996) acknowledges that narratives are valuable because they are related to the communities in which we live; as such narrative has ethnographic qualities about it, and social organization is maintained through stories (p. 295).

Indeed, the more one can establish himself or herself as a member of the audience's community the better one can persuade the audience to act on a message. Such a message activates mirror neurons. This may be through sharing an experience the speaker had that the audience is likely to have had or by posing as a member of that community by wearing clothes members of that community frequently wear. Consider the politician on a campaign trail who visits a local restaurant. He or she is more likely to be wearing informal shirt and pants than a suit more appropriate for the office to which he or she is vying for election. Herbert Simons and Jean Jones (2011) note that this is an effort to affect the audience's mirror neurons. The speaker/candidate is mirroring the target au-

dience's appearance (Simmons & Jones, 2011, p. 166). A narrative can, also, establish mirroring of values, re-enforcing cultural disposition between speaker and audience.

Another attribute important to persuasion is establishing agreement between the speaker and audience to facilitate understanding and action. Srinivasan Pillay (2011) calls this "facilitated consensus." He states that, "an important part of the mirror neuron system (shared emotion) is implicated in the art of persuasion" (2011, p. 79). Pillay and others (Boudreau, Coulson, & McCubbins, 2011; Dooley, 2012; Simons & Jones, 2011) note that the ethos of the narrator can also affect neural processes associated with persuasion. Specifically, trust and expertise are very important attributes of ethos that affect the audience's perception of the message, including narration. Pillay, in particular, notes that expertise may affect reward neurons (2011, p. 79).

Nathalie Nahai (2012), also, notes how narrative can be used to elicit empathy. The more one knows another's "story" the more they are to sympathize with that person's plight. Legal scholarship has found that "juries often empathize with plaintiffs" (Pfaff & Sherman, 2011, p. 420). Again, the mirror neurons are at work in such instances; the audience comes to understand why the plaintiff did something and consider a similar situation when they were affected similarly though may not have acted upon that feeling. Consequently, narratives elicit intersections of neural dynamics associated with mirroring, rewards and plasticity. In the next section, I describe a practical application of this intersection relative to principles common to persuasive rhetoric.

PRACTICAL APPLICATION

As indicated above, a "multimodal" composition includes any combination of print-linguistic, visual, aural, and spatial modes of representation. An automobile advertisement showing an image of the specific vehicle, someone driving it, and print linguistic text describing its features combines visual and print linguistic modes of representation. A commercial can integrate those as well as sound.

Companies can use multimodal persuasive messages in a variety of media and for various audiences—internal and external. Gordon Shaw, Robert Brown, and Philip Bromiley (1998) acknowledge 3M's use of narrative in business planning, using it to present "strategic stories" behind items in bullet-point listings. David Fleming (2001) acknowledges the importance of organizational leaders being able to assimilate with employees and encourage reform through narratives. He explains sense-making and sense-giving, two important functions of leadership, as "providing the insights and raw materials necessary to reform mindsets and practices essential to the newly emerging opportunities" (Fleming, 2001, para.

5). He goes on to explain that, "few tools are as powerful and readily available to the leader as the use of personal and organizational narrative. Learning to listen to, tell and interpret stories within the organization helps leaders to maximize their sensemaking/sensegiving role" (2001, para. 7). Such narratives trying to persuade employees toward organizational change can be delivered in writing or video or through live presentations.

One needs only to look at commercials and advertisements on television and the Web to find examples of multimodal persuasive rhetoric for external audiences. Consideration of rhetorical principles applied within advertising and commercials is often used within writing coursework instruction and practice—from composition-level courses to professional writing courses. One that I will use to illustrate the neuroscience associated with persuasion comes from the marketing materials of the law firm of Friedman, Domiano & Smith Co., LPA (2015). The law firm addresses several kinds of legal cases, including personal injury. One of the main purposes of advertisements, of course, is to persuade the viewer/reader to buy or use the advertiser's product or service. However, there is a unique dynamic within the advertisements of this law firm that is very uncommon among such advertising. These attributes and the neuroscience behind them bring about a certain perception of the law firm's ability to represent clients in personal injury cases especially.

Jeffrey Friedman is the face of the law firm in almost all of its advertisements and commercials, and he is paralyzed from the waist down (https://www.fdslaw.com/). In the commercials and advertisements, he sits in a wheelchair; and this is clearly visible to the viewer. In several commercials, in a gentle, sympathetic tone, he talks about his own experience in a car accident that caused the injuries that have put him in the wheelchair and how he can represent injured clients better than other attorneys could because of that experience. Several attributes of the multimodal forms in this narrative come together to make for a persuasive message: these include the speaker himself—physical appearance and ethos; the narrative he provides, and the tone of voice he uses (audio).

The visual appearance of this man in a wheelchair immediately elicits empathy and understanding from the viewer, who may be so injured. This activates mirror neurons, consequently; and the viewer identifies closely with the attorney. Even if one is not injured, one feels a connection to the speaker because he has some degree of expertise with the situation they may be experiencing—as an attorney specializing in personal injury and as one who actually experienced it. As an attorney trained in personal injury law, of course, he is considered an expert in personal injury law and litigation. We are conditioned to have a certain respect for professionals trained in a specific field. That conditioning affects, and is affected by, the elasticity of neurons that have been conditioned toward re-

specting such authority figures. Each time we learn more information about the kind of training one needs to earn a certain professional license and learn about one's professional successes, it causes more neurons related to that respect to develop. We, subsequently, learn to recognize that person as an expert who can be considered a credible source of information. Consequently, one knows that he is a credible source for legal knowledge and practice. However, he is also "expert" in the experiences one who has been severely physically injured one may have. Through neural plasticity, one who experiences certain injuries can not only sympathize with but can empathize with others who have experienced similar injuries. This empathy is socially constructed. As someone who has experienced such suffering, the viewer immediately understands that he can empathize with potential clients who have been so injured. The effect of this enhances the mirroring dynamic; he has actually experienced the pain and suffering a potential client is experiencing; as such, he is like the injured person.

The narrative further places him on the same level as anyone who has been injured in any kind of car accident. Depending on how long the commercial is he provides a certain amount of detail about the accident. The gist is that he suffered permanent injuries because of a driver's negligence. There is a detailed video and text on a particular page of the firm's website that more fully explain the accident.

The narrative provided on the webpage featuring his story includes introductory text describing his character: "When you meet Jeff in person, you experience first-hand his kind, hardworking, and genuine character. However, not everyone knows about his lifelong physical battles and how one car accident changed his life and enriched his spirit to become the successful human being and lawyer he is today" (Friedman, Domiano, & Smith, 2015, para. 1). It goes on to describe details of the night on which the crash occurred. He was a passenger in a car. "The driver lost control of the vehicle and veered off the road. He crashed the car into one tree and then another" (Friedman et al., 2015, para. 2). It also includes information about his undergraduate education, professional training and academic and professional successes. The last paragraph of the narrative about the law firm and his story includes the statement, "When Jeff says to his clients, 'I know, I've been there,' it's the truth. He is the real deal." (Friedman et al., 2015, para. 10).

Finally, in commercials and the video on the webpage about his story he uses a calm, sympathetic voice as he talks about his story and the firm. Imagine the difference between being yelled at because you were in a car accident and someone comforting you with a gentle, sympathetic, even empathetic, voice. One is naturally drawn to the sympathetic voice. Consider how we are conditioned from birth to respond favorably to sympathy; our mothers, likely, used

such a voice to calm us throughout our infancy, childhood, and adolescent year. Through our cultural experiences and plasticity, neurons developed to re-enforce the perceived connection between a sympathetic voice and a calming response and feeling reassured. That connection is a social construct. This makes using his firm more appealing an option, too. The perception from the commercial is that he understands his clients' needs and feelings more than a typical personal injury attorney can.

Another attorney in Northeast Ohio uses the statement "I'll make them pay" in his advertising (Misny, 2016). Consider the different reactions we have to Message A: "I understand your pain and needs," and Message B: "I'll make the other person pay" in persuading us to use their legal services. Message A is more about reassuring our own comfort and supporting us emotionally and financially; Message B is more about attacking the person who harmed us, penalizing them. It isn't as reassuring to us or comforting. It actually emphasizes the financial gain, shared by both the injured client and the attorney. Although Friedman et al. (2015) includes some aspects of financial gain in his message, that part of the message is minimized by the narrative of his injury experience that he emphasizes in commercials and advertisements.

The goal of personal injury litigation is some form of financial compensation to assist with life expenses, health care, and "pain and suffering" directly associated with the injury. The Friedman narrative includes information about the firm's successful litigation and specific awards for clients. The webpage, also, includes video testimonials from satisfied clients. These could activate reward neurons, because the viewer would begin to understand how much compensation he or she could receive by using the law firm to represent them. This is also part of the neural plasticity dynamics of the audience the message targets; the general American public is very interested in financial rewards, especially the potential of winning hundreds of thousands, if not millions, of dollars from litigation. When we read in the newspaper or on television or the Internet of such awards given to those who were injured, it becomes part of our culture. As mentioned above, neural plasticity facilitates learning of one's culture and how one understands the world. It shapes their understanding of reality.

If the firm is as successful representing the prospective client as it has been with others, they stand to gain a large amount of compensation. Recall that reward neurons are stimulated by the prospect of a reward, not by actually receiving the award; and they are part of the system that motivates one toward action. So, between appearing as a member of the same community as one who is injured, thereby understanding their needs better than other attorneys, and demonstrated successful litigation, based on previous successes, the advertisement is very persuasive. A viewer would perceive that they could be represented

by one who, not only has their interests in mind, but empathizes with them; and the viewer may understand the likelihood of receiving a large financial reward given the firm's previous success.

This description of a particular multimodal persuasive message (one that integrates print-linguistic text, visual and aural modes of representation) and neural dynamics associated with it (mirror neurons, reward neurons and plasticity) provides an illustration of the kinds of practical applications students and practitioners alike can review to improve their understanding of persuasive narratives. In the next section I discuss how to facilitate such instruction and practice.

SUGGESTIONS FOR EXPLICIT INSTRUCTION OF THE NEUROSCIENCE OF NARRATIVE

Students need the opportunity to hone skills associated with developing effective narratives in coursework (Doyle, 1999). Alice Horning, in this collection, notes that students need to read metacognitively to learn how to compose well and transfer that learning to other contexts. She states that students should learn more about metacognitive attributes of reading in first year writing courses Ellen Carillo, also, notes in this collection the connection between metacognition and transfer. Including explicit instruction in narrative, including neural contents associated with it, in technical writing and business writing pedagogy will help students refine those skills and understand how to use them in the workplace.

Greg Columb (2010) acknowledges that in writing courses explicit teaching is "intended to bring about identifiable effects on qualities, features or other aspects of writing" (slide 6). He summarizes arguments against explicit teaching in writing courses as indicating that writing does not involve conscious processes and, therefore, writing is learned through subconscious processes (2010, slide 6). However, he challenges this by explaining that parts of writing are consciously understood, including planning, drafting and revising (2010, slide 7). He also acknowledges that "nonconscious processes can be influenced by consciously created dispositions;" that is, if one is aware that a particular rhetorical strategy can work in a given situation, he or she will consciously apply it (2010, slide 8).

Several studies find differences between explicit instruction, implicit instruction, and learning (see, for example, Leblanc & Lally, 1998; Morrison, Bachman, & McDonald-Conner, 2005; Ziemer Andrews, 2007). While none is directly linked to instruction in narrative, they find that students learn complex topics better when they receive explicit instruction in that topic, while there seems to be little statistically significant difference in learning simple topics relative to either approach. Consequently, teachers should make explicit reference to neural dynamics in their instruction of narrative as a means of persuasion, and I

have tried to facilitate an understanding of these dynamics so that teachers can discuss them explicitly in their instruction.

Teachers of writing courses can accomplish this explicit inclusion by:

1. Integrating explicit references to narrative and neural responses in examples of persuasive writing, and
2. Showing examples of narrative-style persuasive writing and discussing rhetorical and neural attributes.

Teachers can encourage students to think about rhetorical and neural attributes of their own persuasive messages within grading rubrics and reflection. A grading rubric for a multimodal persuasive assignment might include a category specifically listing possible neural responses associated with mirror neurons and reward neurons, for example. I provide such a rubric (2017).

Also, many instructors encourage students to reflect on their writing process, especially within multimodal assignments; and such reflections can include description of how the student perceives their message stimulates certain neurons in addition to the other rhetorical attributes influencing its perceived effectiveness. How does a certain attribute of a message elicit mirror neurons or reward neurons? How might an audience's experiences affected plasticity toward learning how to react to a certain persuasive effort?

RESEARCH IMPLICATIONS

This chapter considers pedagogical elements associated with including explicit instruction of neuroscience concepts in writing. Research in pedagogy includes examination of the effectiveness of explicit instruction versus implicit instruction (e.g., Colomb, 2010; Ziemer Andrews, 2007). Research related to such instruction can examine how integrating explicit instruction in these neuroscience concepts affects the efficacy of student learning of multimodal persuasive rhetoric. Such a study may not have to be interdisciplinary in nature; one could design a study that uses different pedagogies—one with explicit instruction, the other without, and review student products to ascertain which seem more effective, the ones from those who had explicit instruction or neither.

CONCLUSION

Composition instructors use narrative in writing classes to help students practice writing skills by engaging them in writing about something they know and understand most—their own experiences. Blyler and Perkins (1999a, 1999b) as well as Kathryn Rentz (1992) assert that narrative acts as a rhetorical tool for use

in professional writing settings, and Blyler (1996) and Daphne Jameson (2004) acknowledge the value of narrative as a tool to help students understand discourse in professional settings and as a tool for ethnographic study. Professionals use narrative in their communications, and this use can vary from print-linguistic to multimodal.

An understanding of the neural processes at work in such messages can enhance learning of application of narrative in them. So, instruction in persuasive rhetoric should include explicit discussion of neural dynamics of multimodal messages. I have attempted to show how three particular concepts of neuroscience can be integrated into instruction of narrative in multimodal persuasive messages along with principles more familiar to writing faculty and scholars.

Further, interdisciplinary research can integrate scholarship from different disciplinary, not just theoretical, perspectives toward enhancing scholarship in rhetoric. As the concepts of logos, ethos, and pathos help to understand ways to present persuasive messages, an understanding of the neuroscience experienced by the audience helps to explain *why* specific details included in a narrative associated with a given approach may work well for a particular audience.

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