
Editor's Introduction

Cognitive alterities: From cultural studies to neuroscience and back again

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The art of our lives is the art of the meaning of the body. In some people, it is a beautiful art.

Mark Johnson, *The Meaning of the Body: Aesthetics of Human Understanding*

This issue of *postmedieval* offers an experiment in the use of neuroscience and cognitive theory to explore what might be termed ‘cognitive alterities’ in post-modern medieval cultural studies. With ‘cognitive,’ I follow F. Elizabeth Hart, who defines it from a literary perspective as ‘an interest in exploring how both the architecture and the contents of the human brain/mind – both in terms of its on-line processing of information and its evolutionary history – may contribute structurally to the writing, reading and interpretation of texts’ (Hart, 2001, 319). I say ‘alterities,’ given the differences between contemporary and medieval cultures, and ‘post-modern,’ referring to those cultural studies from which post-modernism in its earliest and most fundamental form has engendered feminist theory, gender and sexuality studies, queer theory and post-colonialism, among others: by means of the image of the ‘trace’ of the female as representing an essential difference (or an ontological otherness) from the masculine norm (with essentialism as necessary to social constructionism) (see Fuss, 1989).

Alterity, or otherness, is key here. Essentializing those characteristics of an Other different from us, as Lisa Zunshine has pointed out in *Strange Concepts and the Stories They Make Possible* (Zunshine, 2008, 12–13), may lead to

stereotyping – a necessary process of generalizing from the particular that allows us to form inferences about strangers, those who are new to or different from us, and one that our Pleistocene forebears depended upon for survival. Yet when we essentialize – if we stereotype – we may suppose that ‘we are simplifying and making manageable our overwhelmingly complex social world – when, in fact, we are severely limiting our mental and social horizons’ (Zunshine, 2008, 12). Indeed, we do so as part of a specific culture that has its own ‘instantiations of essentialism’ (Gelman, 2003, 283). Our individual national (ethnic, racial or in-group) identity allows us to perceive another as ‘an intending subject, parallel to oneself,’ often through similarity of face, thus activating the medial prefrontal cortex, according to Patrick Colm Hogan in *Understanding Nationalism: On Narrative, Cognitive Science, and Identity* (Hogan, 2009, 30, citing Mitchell *et al*, 2006).

‘Cognitive alterities’ may, then, also refer to differences between groups of like individuals, individual differences among members within a group, or differences within the individual herself over time for other, more biological or experiential reasons: whatever the fundamental condition of the individual and that which makes us each unique, we change, given our particular life experiences. Whereas contemporary neuroscience learns from normative brain function as reflected in fMRI (functional magnetic resonance imaging) scans of the brain at different ages and stages in life, it also records differences or impairments in cognitive processes in individuals as a result of epilepsy, attention deficit hyperactivity disorder (ADHD) and other neurological disorders, Alzheimers and dementia, brain injury and psychological dysfunctions. How to transfer the understanding of neuroscientific research to art, specifically, to narratives situated within a particular culture and written at a particular historical moment – narratives that may offer the description of behaviors other than the normative and possibly reflective of such change or injury – is a daunting task, but one that merits our attention.

Cognitive Studies, Theory of Mind and Neuroscience

In cognitive studies the common denominator is our humanity and how we are human, defined not as *homo rationalis*, perhaps, but as ‘an embodied-brain human,’ the Cartesian mind-body split or Platonic duality having been discarded in preference for the complexity of an Aristotelian materialism. Cognitive theorists in philosophy, by means of their analyses of memory as a cognitive process, have inspired the formulation of a Theory of Mind (simply, putting yourself in someone else’s place) within various situations by means of reader response and identification with characters. The embodied brain cannot be directly equated with the mind (although one might say the brain represents the physical form of the mind) because of the mind’s function



(Merzenich and deCharms, 1996; Blakeslee and Blakeslee, 1999): it mediates between the senses and emotions of the body, it is involved in the process of cognition, and it responds consciously to material objects and experiences in the outside world. These two entities, the physical brain and the concept of a mind, have begun to be distinguished in studies that focus on the self and its consciousness (Damasio, 1994, 1999, 2003, 2010; Ramachandran and Blakeslee, 1998; Gibbs, 2006; Ramachandran, 2009, 2011; Ramachandran and Rogers-Ramachandran, 2010).

Neurophilosophy has already received attention as an interdisciplinary subfield of philosophy that centralizes the ‘new neurology’ in examination of the emotions and the mind (Churchland, 1986; Solomon, 2008, 11b). From a *psychological and ethical* standpoint, the basic question about emotions, which is the same in relation to human behavior, is whether or not they are moral (Tangney *et al*, 2007). Of course, how the brain creates inner imitations of the outside world through memes is key to the faculties of memory and ratiocination as well as to *artistic* vision (Blackmore, 1999). From an artistic standpoint, the concept of an *embodied brain* is requisite, whether cognitive processes are the focus, or the construction of an aesthetics, a concept of beauty – and, if an inner vision is posited, both, often understood in neuroscientific terms (Zeki, 1999; Changeux, 2008). The sense of sight, which allows us to visualize, and its neuro-processing have impacted the philosophical field of *aesthetics* in cognitive theory and Philosophy of Mind by means of various experiments. Barbara Maria Stafford (2003) has formulated a ‘combinational aesthetics’ dependent on neurobiology; she focuses on how images get processed in the brain as ‘echo objects’ (Stafford, 2007; for imagery and the pathways to visual consciousness, see Kennedy and Knoblauch, 2005). From a *musical standpoint*, the brain registers the notes of music as a pleasing sound that tells a tale (Sacks, 2008), music and language functioning similarly and proximately within the brain (Patel, 2008), as do music and mood reactions, such as happiness, pleasure and even obsession (Levitin, 2008).

In relation to the study of literature, empathy has been examined by Suzanne Keen (2008), who draws on cognitive science, narrative theory and psychology to question its impact on society in the nineteenth-century novel in relation to the advance of altruism. Jonah Lehrer (2009) examines various aspects of subjective experience – feeling, taste, memory, sight, hearing the self – in modern artists, notably, novelists Marcel Proust and Virginia Woolf. Venturing into newer and more scientific territory, Lisa Zunshine has followed her studies of Theory of Mind in fiction (2006) and cognitive difference in relation to stereotyping in modern and contemporary film and literature (2008) with the formulation of a paradigmatic *Introduction to Cognitive Cultural Studies* (2010) predicated on the concept of an evolutionary cognitive science. Returning to Raymond Williams’s *The Long Revolution* (1961) as the founding of ‘cultural studies,’ Zunshine calls for a cognitive cultural studies based on a

‘cognitive-evolutionary’ theory of individual and cultural change that will comprehend the workings of the human mind in its various complex environments (Zunshine, 2010, 1–33); equally necessary is this theory’s integration into what has now become a most varied body of different theories and forms of criticism in current Cultural Studies.¹ Ellen Spolsky, in her extension of Zunshine’s evolutionary cognitive studies to post-structuralism, ‘Darwin and Derrida: Cognitive Literary Theory as a Species of Post-Structuralism’ (in Zunshine, 2010, 292–310), concludes that, ‘taking due precaution and always taking care not to confuse the analogical or metaphoric use of data from cognitive science with its analytic use, cognitive literary study is uniquely positioned to carry forward the advances in understanding made by the post-structuralistic critique of representation; to understand, that is, the simultaneous good enoughness and instability of meaning’ (in Zunshine, 2010, 310).

Very recently, literary scholars have turned from cultural history and cognitive psychological studies of narrative to the implications of neuroscientific research – what has been popularly termed the ‘feeling’ brain (Ledoux, 1996; Damasio, 1999). To this end, recognizing the sciences and the humanities as ‘one world,’ editor Frederick Luis Aldama in the collection *Toward a Cognitive Theory of Narrative Acts* (2010) has urged interdisciplinary approaches to art and narrative, from the early modern to the contemporary filmic, founded on cognitive and neuroscience, neurobiology, Theory of Mind and appraisal theory (the study of how emotions derive from our assessment of specific events). The seminal first essay in Aldama’s collection, Herbert Lindenberger’s ‘Arts of the Brain; or, What Might Neuroscience Tell Us?’ (Lindenberger, 2010, 13–36), describes how Aristotle’s definition of tragedy, as an imitation of an action arousing pity and fear that causes their purgation, when viewed according to the simulation theory of Theory of Mind can be seen to involve the portion of the brain known as the amygdala (Lindenberger, 2010, 13, citing Phelps and Ledoux, 2005). In Lindenberger’s charting of the reception of different forms of art in the brain, he notes that, despite cultural differences, all viewers of the film *The Good, the Bad, and the Ugly* (1966) responded to moments of emotional intensity in the same areas of the brain: for those instances involving facial close-ups, in the fusiform gyrus (in the ventral occipito-temporal cortex known for recognition of faces), and for those involving hand movements, in the middle post-central sulcus (Lindenberger, 2010, 30, citing Hasson *et al*, 2004, 1636–1638). Given the infancy of what Lindenberger calls ‘our knowledge of how the arts and the brain engage with one another’ (Lindenberger, 2010, 34), he frames the question of whether brain science might enhance an understanding of the effects that art may have on us, given our cultural and individual differences.

Given this knowledge, how might neuroscience be useful to literary critics, in particular, to poetry critics? asks G. Gabrielle Starr (2007). She answers, in ‘the exploration of poetic form when such explorations make use of the areas of strength of cognitive science,’ areas identified as the connection of ‘distant

1 Among the theoretical and critical cultural approaches listed as ‘Cultural Studies’ by Zunshine, drawing on Leitch and Lewis (2005), are those of Marxism, feminism, anthropology, media studies, postmodernism, social semiotics, postcolonialism, rhetoric, race and ethnicity, visual culture, gender and body, and the sociology and history of culture and science (Zunshine, 2010, 7). One might add disability studies (see Corker and Shakespeare, 2002); that disability may also reflect a *cultural cognitive* approach is exemplified by the biomedical dysfunctions caused by the globalization of American culture (see Watters, 2010).



processes' by cognitive theories; an emphasis on time sequence in mental activity; and, most startlingly, the processes' 'ability to account not just for why and when we are able to think certain things, but perhaps more surprisingly, *why and when we cannot think them*' (Starr, 2007, 50, my emphasis). Because the brain has limits on how much information it can process, cognitive science offers theories about its constraints – overload, interference and inhibition – by means of terms such as 'cognitive load' and 'limited capacity.' Indeed, recent neurophysiological findings have provided some credence to these two theories (of load and capacity) by means of fMRI, EEG (electroencephalogram) and MEG (magnetoencephalogram) research. Starr argues that cognitive science allows readers to understand sensory failure and limitation in relation to the close reading of some Romantic poems, in particular, by means of their formal attenuation and disinhibition (that is, 'when two related stimuli are mutually inhibiting': Starr, 2007, 57).

Although literary cognitive and cultural theorists have begun to explore the brain and forms of cognition in various periods of literature and art, especially the modern era, given twentieth-century experiments with different narrative forms that emulate cognition (such as stream of consciousness), only occasionally have scholars viewed as especially significant related cognitive expressions in the literature of the medieval and early modern periods. Mary Carruthers published her seminal work on memory as visually incarnated in the Middle Ages in 1990 (revised edition, 2008), followed by Robert Pasnau's (1997) discussion of medieval theories of cognition, Woolgar's (2006) study of the senses in medieval England, and, in the early modern period, Mary Thomas Crane's (2001) book on the 'embodied mind' of Shakespeare. Although there have been few advances in understanding what might be termed the 'medieval brain,' Paula Leverage has recently traced different aspects of memory, cognitive study and Theory of Mind in genres of narrative literature ranging from the medieval *chanson de geste* (2010) to the modern and contemporary novel (2011). In her coedited collection *Theory of Mind and Literature* (2011), Leverage has specifically moved into neuroscience and disability studies: in her article on the Old French Arthurian romance *Perceval* by Chrétien de Troyes, she exposes the hero as possibly cognitively disabled ('Is Perceval Autistic? Theory of Mind in the *Conte del Graal*'). Leverage provides a window into how biomedical studies can be used to tease out cognitive alterity from its medieval narrative contextual complexity. In relation to late medieval religion and its narratives, Jill Stevenson in *Performance, Cognitive Theory, and Devotional Culture: Sensual Piety in Late Medieval York* has also touched on the affective response to late medieval devotional objects and performances in terms of the neuroscientific research on mirror neurons (Stevenson, 2010, 23–25, 39–40, 53, 62, 130, 137, 146, 169, 175–177).

In relation to Stevenson's work, it is surprising that few other medievalists have grasped the potential importance of a cognitive theoretical and neuroscientific approach to the late Middle Ages, particularly given the

significance of the rise in affective spirituality beginning in the thirteenth century. Accompanied by a new vernacularity in France, England and Italy and an increase in works by lay authors, especially women, this cultural change suggests a revolution in thinking was taking place, in theology and philosophy, in society and culture, and, of course, in the church and the university. Phenomenology and epistemology began to reflect a new understanding of the human soul as mortal and, because of this, flawed by its very embodiment.

The Medieval 'Material Intellect' and the Modern 'Feeling Brain'

The medieval soul, post-Aristotle and Avicenna, bears a remarkable resemblance to what neuroscientists today call the feeling brain. This anticipation of what humanists refer to as *subjectivity* began to take place in the thirteenth century at a time when interest in the material world and, in particular, the body – previously marginalized by Neoplatonic philosophic scholasticism and patriarchal theology – was brought into mainstream philosophy. This event occurred in part because of the reintroduction of Aristotelian empiricism and materialism into Western culture and philosophy. This reentry, during the Crusades, occasioned translations of Aristotle's *De anima*, *De memoria* and *De animalium generatione* from Greek into Arabic and then into Latin. Aristotelian questions about ontology so frequently centered not just on traditional concepts of human nature, specifically, the simple Platonic binary dualism of body and soul, but on the more complex issues concerning boundary transgressions of body and soul, or how body and soul interrelated as a result of phenomenology – that is, the perception of the senses.

According to a thirteenth-century Avicennan commentary on Aristotle's *De anima* titled *De anima et de potenciis eius* (*On the Soul and Its Faculties*), the human soul has two parts, 'one inseparable from the body, the other, separate. The inseparable part is said to be rationality. And it is also called the *material intellect*, which Aristotle describes as passive and corruptible' (quoted in Gauthier, 1982, 30; my translation). This 'incorporated soul' means a soul with powers, or faculties, attuned to the material or earthly world – that is, an *embodied soul*, with between three and five faculties receiving input from the senses: vegetative, sensitive, appetitive, motive and intellectual.² This material intellect is, however, 'passive and corruptible' because it apprehends (or discerns) from the material world what the commentator terms the *species* (the type, the essence or idea, considered to be a *phantasma*, and presumably unreal because it does not, in fact, exist).³

Like the cognitive scientist's 'sentient self' (Craig, 2010), this material intellect acts as mediator between the world outside and what it perceives through the senses and the separable intellect, extrapolating from the external images and

2 Although Aristotle names five, Avicenna names only three, the *vegetabilis*, or invigorating (or 'causing to grow'); *sensibilis*, or sensible; and



the types (species). The Avicennan commentator on *De anima* notes that this idea of the incorporated soul is itself artificial, as if an ‘idol’ or an ‘image’ (or what today might be termed an idea – rhetorically, an allegorical personification).⁴ According to this rather amazing definition of the human, differences exist among us because the incorporated, inseparable soul has been influenced (contaminated) by the individual’s moment of conception and eventual birth in a human body after seven months of progressing on a journey through the planetary spheres and being physically and temperamentally affected by the specific conjunction and opposition of planets.

Interestingly, modern neurobiologists Damasio and Damasio (1996) have studied the layering of ‘sensory modalities’ (sounds, movements, visions and the internal visceral) in the construction of subjectivity in the conscious self. They define the self as the ‘neural structure and neurobiological states that help us know, without the help of inferences based on language, that the images we perceive are our own rather than somebody else’s’ (Damasio and Damasio, 1996, 22). Put more basically, we each experience from a ‘consistent point of view’ uniquely our own. Images are created in our minds by the brain, the Damasios argue in this uniquely theoretical article, as ‘spatially and temporally organized patterns’ formed by means of perception and from memory; they are organized topographically, sent to memory ‘in the form of non-topographically organized dispositional representations,’ and then put away in dormancy in storage sites described as ‘both cortical regions or subcortical nuclei’ (Damasio and Damasio, 1996, 19, 20) for future use. In the Damasios’ argument for a concept of the ‘nonhomuncular self’ (one that both receives and interprets images, that is, a ‘cognitive-neural self’), they imagine a body (parts, operations) constantly signaling to the brain and ‘the stable aspects of our autobiography’ stored as indelible images easily ‘reinstated’ (Damasio and Damasio, 1996, 22, 23). Body structure and the basis of one’s identity in activities and relationships represent core components of a self that changes early on in childhood and adolescence and less so thereafter, so that the essence of, or the anchor for, the self remains in two features, body states and neural mechanisms. These ‘visceral states’ signal incessantly to ‘brainstem structures and to the complex of somatosensory cortices in the insula, parietal operculum and post-rolandic parietal cortices (the signaling is bilateral, but a right hemisphere dominance effect exists in humans)’ (Damasio and Damasio, 1996, 23). The neural mechanisms that regulate biologic processes are represented in the brain core (the hypothalamus and brain stem).

The sense of self in the Damasios’ view similarly changes continually and evolves in terms of individual development (Damasio and Damasio, 1996, 24), a position harkening back to Zunshine’s earlier ‘evolutionary cognitive science.’ Subjectivity, they speculate, occurs in a third stage, after the brain has formed and responded to images of the somatosensory, when it creates a ‘dispositional description in a third-party neuron ensemble’ (Damasio and

rationabilis, or rational (Gauthier, 1982, 30).

- 3 The commentator explains that ‘the sensible power indeed is about the images, the separable intellect about the species [types]; moreover, here, the material intellect examines the species by means of images, so that it apprehends the species by means of accidents [individual characteristics], distinguishing between the species and accidents, while not abstracting; and so prepares the species materially for the separable intellect’ (Gauthier, 1982, 49; my translation).
- 4 ‘And because something of the bodies is artificial, as if an image, the following is said: the *anima* [soul, spirit, breath] is the act of the “physical” body, which is natural, different from the artificial’ (Gauthier, 1982, 28; my translation).

Damasio, 1996, 26), or what they call a ‘convergence zone’ (Damasio and Damasio, 1996, 25). In this hypothesis, the Damasio’s postulate a meta-level that exists after image, response and description are ‘held simultaneously in working memory and are placed side by side or in rapid interpolation in early sensory cortices’ (Damasio and Damasio, 1996, 26). These images become the stuff, the matter, of subjectivity – our own, individualized and unique identity – in our conscious minds, our selves.

What this means, this embodied alterity of the individual, does not differ so very much from Dante’s allegorization of his own persona’s journey in the *Commedia*. We know that Dante did not intend for us to equate him essentially with his blind and sinful alter ego ‘Dante’ in the *Commedia* because his pilgrim-self constantly changes from circle to circle in hell and terrace to terrace in purgatory. For example, in the seventh circle of hell, ‘Dante,’ previously depicted as despairing and suicidal at the opening of the *Inferno*, while walking through the dark wood of the damned suicides in canto 13 callously breaks off the twig of a tree. The sinner incarcerated within who cries out in pain, suicide Piero da Vigne, as an analog for ‘Dante’ as a previous near-suicide, only represents one image for this stage in the persona’s journey toward Mount Purgatory. In this case, ‘Dante’ exhibits insensitivity to others as a function of his own predominant sin of pride: in each circle of hell, as a type of Everyman, he manifests some aspect of each sin being allegorized for which he will receive an appropriate *contrapasso* in the corresponding penitential terrace of the *Purgatorio* and thereby learn a more virtuous behavior.

Such studies as the Damasio’s emphasize the brain’s mirroring of actions and emotions by means of its neurons and by changes in the brain that take place as a result of learning and education and/or brain damage or deterioration as a result of accident, disease, aging or trauma. These two brain processes, both of which involve change – indeed, *depend upon* change, received from the outside and certainly transforming the inside – involve *mirror neurons*, in the first instance, and *neuroplasticity*, in the second. Mirror neurons and, in particular, neuroplasticity allow what might be called the social brain to process emotions intellectually: respectively, to empathize, or to learn by means of visual cues (Rizzolatti and Craighero, 2004; Schwartz and Begley, 2002), as simulation theory in Theory of Mind reveals (see Breithaupt, 2009, for models of empathy). Research into mirror neurons (neuronal responses to motor movement) and neuroplasticity (a change in the brain in response to external output) has yielded empirical evidence that we might use advantageously in looking at medieval literary interactions. Specifically, the flash of mirror neurons produces empathy, ‘an emotional state triggered by another’s emotional state or situation’ (Hoffman, 2008, 440), with five ‘empathy-arousing’ modes having been identified. Three are automatic and preverbal – mimicry, conditioned response and direct association (that is, having experienced similar situations); two are achieved



though language and cognitive development – verbally mediated association and perspective taking (that is, imaging yourself in another’s place) (Hoffman, 2008, 441–442). The second process, neuroplasticity, involves the ability of the brain to change, or allow learning by means of memory, but also, less positively, as a result of brain damage and cognitive impairment.

The resultant understanding of the feeling brain and its study has taken two different forms. First, the exploration of the literal brain in neuroscience, through the tools of technology provided by the fMRI, focuses attention on identifying the neural correlates of individual behaviors. As we have seen, the embodied brain may react to sensory input (Llinás and Churchland, 1996), such as ‘touching’ sight (Keysers *et al.*, 2004) or the nature of a sensation (Heller-Roazen, 2007), but also to action representation (Kohler, *et al.*, 2002); it may respond to, or feel, disgust (Wicker *et al.*, 2003), sympathy (Dickert and Slovic, 2009) or empathy (Hoffman, 2008; Iacoboni, 2009). Functional neuroscientific research has mapped physical sites in the brain that isolate the cognitive recognition of an action (Gallese *et al.*, 1996; Clark, 2008), the sharing of action and emotion (Rizzolatti and Sinigaglia, 2008), a state of consciousness (Damasio, 2010), and memory deficit, as in amnesia’s effects on cognition (Hassabis *et al.*, 2007). Precisely, where learning and understanding of language occur in the brain is also being charted, as illustrated by the survey of the best hundred articles on language in 2009 (Price, 2011); especially pertinent is how the brain handles the visualization of language during reading (Wandell, 2011).

In relation to the second approach to the feeling brain – where functional neuroscience and cognitive science begin to meet – the philosophical adumbrations of cognitive theory may interlace with neuroscientific findings, but usually do not, and in fact often challenge them because of the theorist’s distaste for what appears to be a privileging of the brain’s hegemony in functional neuroscience via what appears to be neuroreductionism. This second approach, then, depends upon a separation of the study of the actual brain from a concept of the mind – not just a Theory of Mind, for example, a unified science of the mind, as in the cognitive studies of philosophy. A recent and very useful antireductionist synthesis of neuroscience, cognitive theory, philosophy of mind and neuroethics by Walter Gladden, *Brain, Body, and Mind: Neuroethics with a Human Face* (2011), differentiates among three components of what we designate as the human. These include, first, the *embodied brain* subject to input from the body’s five senses and its many emotions and their combined forms, but also to the changes wrought by life experiences, aging, disease and accident; second, *the mind*, a kind of invisible and essential mediator among the cognitive processes we associate with the brain (ratiocination, imagination, memory, understanding) and the various sensations and feelings of the body; and third, *the outside world*, by which is meant the environmental context in which any individual lives, functions and experiences. What is especially helpful about Gladden’s synthesis of the three elements is that it forces us to consider not

only the individual in relationship to her mind and brain but also within a context, an environment – as part of various social groups in which she can be said to share with its members an identity and, in some cases, common characteristics (for example, facial features: we are now back at the beginning – cognitive alterities).

And Back Again

Reading neuroscientifically and through post-medieval analogy, the following articles on the medieval in this issue relay individual and cultural difference(s) in the creation of its visualized narratives, whether in the form of constructed alphabets and invented languages or in literature that depends on visualization and the visionary. To this end, the articles divide naturally into two main sections, the first, more theoretical and contextual, in terms of the definitions of cognitive alterities and neuromedievalism offered, and the second, more practical, literary or narrative and applied, in focus and by example.

In the theoretical section, the articles argue throughout for a specifically *medieval* cultural cognitive literary studies – necessarily different from that of other historical periods – while also arguing for an underlying kinship between medieval and modern perspectives. Each contextual article tackles one or more of three specific approaches to *cognitive alterity*. First, in terms of a specifically *medieval* cognitive alterity, Ashby Kinch, in ‘Re-visioning the Past: Neuro-medievalism and the Neural Circuits of Vision,’ defines a medievalized approach to aesthetics on the basis of neuroscience and Theory of Mind, one that depends on visual perception and imagination and begins from the ‘intuitive hypothesis.’ Next, Matthew Boyd Goldie, resisting neuroscience’s impulse toward natural essentialization, opts for a second kind of cognitive alterity, the *cultural, national* or *ethnic*. In ‘Neurobiologic Alphabets: Language Origins and the Problem of Universals,’ Goldie examines the visual process that medieval alphabets both early and late appear to trace in the brain (including those of Priscian, Isidore, Hildegard of Bingen, Giovanni Boccaccio and John Mandeville), their specific writing systems culturally differentiated from one another. Finally, Lara Farina couples the third kind of cognitive alterity, that of the *individual* (here, brain *dysfunction*), with a culturally inscribed *gender difference* – an essentialized marker of alterity that cuts across various cultures – in ‘“Once More With Feeling”: Tactility and Cognitive Alterity, Medieval and Modern.’ Farina demonstrates the example of phantom tactility (the sense of touch) in the abnormal sense-perceptions of twelfth-century English anchorite Christina of Markyate as represented in a hagiographical ‘case study.’ Potentially useful to modern cognitive neuroscientists, such miracles in medieval saints’ lives, if read properly, convincingly document mental dysfunctions of various types.



The second section offers four essays of narrative application: cognitive literary criticism and theory exemplifying several kinds of neuromedievalism. They include Ashby Kinch's extension of his prior theoretical article, on the role of the visual in neuromedievalism, by means of an example of 'neuroplastic aesthetics' in narrative: the image of the whirling, wicker House of Tidings at the end of Chaucer's allegorical dream vision *The House of Fame* perceived as the brain's workings or, more neuroscientifically, as an 'echo object.' Mayumi Taguchi then identifies late medieval Gospel meditations, particularly Nicholas Love's mystical imitation of Christ, as a meme – a cultural characteristic transmitted like a gene, comparable to the responses of the mirror neurons to the tactile and visual when an individual plays video games. Kerstin Pfeiffer discusses the intended visual effects of the performance of the Middle English Passion Play on the empathy of its audience through mirroring mechanisms. And Sara Ritchey studies the manual practices involved in the late medieval Netherlandish meditations of John Mombaer and their neuroscientific basis in imagination. All of these articles suggest that medieval cognitive applications offer modern readers and scientists narrative analogs to neuroscientific process through the visual.

At the very end, by way of response to this entire issue, neuroscientist Antony D. Passaro offers a cautionary note to humanists and medieval scholars about the applicability of using mirror neurons and neuroplasticity for literary claims, given the controversies surrounding their very concepts and the fact of neuroscience's infancy. That differences may exist among literary and cognitive theorists and neuroscientists about the science and its applications is a point made by this issue, as Paula Leverage acknowledged about it in her peer review of this issue's contents, involving a fourth, and interdisciplinary, cognitive alterity. Such expansiveness allows for Brian Stock's (2008) 'interpretive pluralism' in reading – a meta-theoretical insistence on an evolutionary literary studies that might embrace a reconstruction of necessary, or essential, reductionism, but optimistic in its refusal of mere reductionism in empirical approaches (and, therefore, heeding Jonathan Kramnick's 'Against Literary Darwinism,' 2011).

If this collection of articles from medieval studies on what Mark Johnson (1987) has called 'the body in the mind' can be said to advance for post-modern medievalists any of these longstanding debates, surely it does so by means of its twin emphases: first, on the individual as inhabiting multiple environments and social groups and surviving incessant change over a lifetime and, second, through the body's effect on the brain as mediated by the mind, on a consciousness of self, a *personalized* epistemology. About the post-human Johnson reminds us that, 'If there is anything that survives the death of your body, it could not be the *you* that we know and love. For *your* experience is made possible by the working of your (human) brain, within the workings of your (human) body, as it engages its (human-related) environments. Any *you*

that survived bodily death would lack your memories, your experience, your emotions, and your grasp of the meaning of things' (Johnson, 2007, 281, 283). What this means for readers of the embodied narratives of the Middle Ages is not so much a rejection of medieval otherworldliness and abstraction but, within that very context, a reaffirmation of its insistent materialism and corporality as themselves cognitively instantiated and represented visually in its literature and art.⁵

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Jane Chance, Andrew W. Mellon Distinguished Professor Emerita of English at Rice University, completed the editing of this issue as a Visiting Scholar at the Institute for Medical Humanities at the University of Texas Medical Branch–Galveston. She is also finishing the third volume of *Medieval Mythography*, on *The Emergence of Italian Humanism, 1321–1475*, which focuses on self-projection and subjectivity in late medieval mythological commentary. Her article 'Re-Membering Her Self: Christine de Pizan's Refiguration of Isis as Io,' on the role of memory, but with a neuroscientific bent, is forthcoming in *Modern Philology* (E-mail: jchance@rice.edu).

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