Interplay: The Method and Potential of a Cognitive Scientific Approach to Theatre[1]

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   Theatre works on the body and mind of the spectator, changing minds and touching bodies at the deepest level. As a theatre scholar and practitioner, I am driven to understand the nature of that "work": how is it that an embodied story told onstage has the power to "move" an audience? At a time when most people are more accustomed to the dramaturgical and rhetorical simplicity of a television comedy, how do audiences unpack the language and storytelling in a play like *Richard III*? Theatre and performance studies have productively turned to theories of anthropology, psychology, linguistics, and others to seek answers to the questions that drive the field.[2] In a move likely to provide the kind of jolt to the field that Turner and Freud once did, scholars are now seeking—and finding—answers in the cognitive sciences.[3]

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[2] Erving Goffman and Victor Turner provide methods of analyzing the performance of everyday life that remain seminal in performance studies; see, for example, Goffman's *Frame Analysis: An Essay on the Organization of Experience* (New York: Harper, 1974) and Turner's *The Anthropology of Performance* (New York: PAJ Publications, 1986). Scholars and practitioners such as Richard Schechner have worked anthropologically to study performance traditions, rituals, and so on. The influence of psychology cannot be overstated: whether in actor training, performance analysis, or textual analysis, the impact of Freud feels almost impossible to shake off. Performance theory maintains links with the linguistic work of Saussure and Austin, at least as incorporated by Judith Butler or Jacques Derrida. For an excellent discussion of how current thinking in cognitive linguistics challenges poststructuralism, see F. Elizabeth Hart's "Matter, System, and Early Modern Studies: Outlines for a Materialist Linguistics" *Configurations* 6, no. 3 (1998): 311–43, where she argues that, buried in the theories of poststructuralism, is a deeply held belief in the autonomy between mind/brain and language. In her essay for *Performance and Cognition*, "Performance, Phenomenology, and the Cognitive Turn," she challenges attempts to reconcile phenomenology and semiotics in theatre studies since the "collapse" in Saussure of "all aspects of language into sign" (31) has not held up to research in cognitive linguistics. See *Performance and Cognition*, ed. Bruce McConachie and F. Elizabeth Hart (New York: Routledge, 2007).

[3] Although the field is in its infancy, *Performance and Cognition* contains illuminating essays by Rhonda Blair, Jon Lutterbie, Tobin Nellhaus, McConachie, and Hart, among others. In their "Introduction," McConachie and Hart cite Fauconnier and Turner's work as one of the "possibilities for future research," suggesting that "conceptual blending theory . . . offers a material and experiential explanation for the inherent doubleness of theatricality" (18). Phillip B. Zarrilli has provided productive integrations of cognitive science, phenomenology, and acting theory; see his introduction to *Acting (Re)Considered: A*

As David Saltz has helpfully pointed out, it is important that an integration of cognitive science into theatre and performance studies should not simply "use" research from the sciences to "validate" our theories.[4] Just as an essay on *Richard III* or the use of prosthetics in the performance of *Richard III* is valuable insofar as it produces answers and questions for the laboratory of the rehearsal room, scientific research should provide new ways of questioning assumptions within our home discipline and illuminate new readings of text and performance. Interdisciplinary work requires that scholars be bilingual—it does not require them to be converts. Statistics and lovely fMRI images should not tempt us to abandon the authority of our knowing. A "theoretical" position (whether within the sciences or the humanities) is not less valid for lacking empirical data, but it should be responsible to and refutable by a network of studies and theories with which it remains in dialogue.[5] Cognitive linguistics links language, cognition, and the body in ways that impact practical and theoretical issues in performance and is therefore a good starting point for an interdisciplinary investigation.

In this essay, I will present some of the questions and answers that result from a collision between Shakespeare and science, stage and laboratory.[6] To understand how we understand is to know how to grow or shift our understanding. The research within cognitive linguistics on metaphor and blending theory provides ways of unpacking meaning and connecting it to other images and ideas evoked throughout the play. Understanding language this way allows a dramaturgical analysis of a play to focus on spaces primed though not necessarily overt. Cognitive linguistics reinvigorates textual analysis but, perhaps even more important for the long-term strength of this growing field, provides a link between speaking and thinking, words and neurons. I begin with an introduction to the linguistic theory that has proved most useful in my textual analysis, then move to the neuroscience implicated by the performances of that text.

Blending Interplay

Since language works on the body/mind of the listener, a method of processing this language seems imperative to theatre scholars. It is not difficult to understand *what*

Theoretical and Practical Guide (London: Routledge, 2002), 1–22, and "Toward a Phenomenological Model of the Actor's Embodied Modes of Experience" *Theatre Journal* 56, no. 4 (2004): 653–66. McConachie's *American Theater in the Culture of the Cold War: Producing and Contesting Containment, 1947–1962* (Iowa City: University of Iowa Press, 2003) reads the theatrical period through the containment metaphor as explicated by George Lakoff, Mark Johnson, and others within cognitive linguistics. Although from a primarily literary background, Mary Crane, in *Shakespeare's Brain*, uses cognitive science to understand the "materially embodied mind/brain" (4) that authored the plays; see also her "What Was Performance?" *Criticism* 43, no. 2 (2001): 169–87. Within literary studies, the "cognitive turn" (to borrow McConachie and Hart's term) began with Mark Turner's *Reading Minds: The Study of English in the Age of Cognitive Science* (Princeton, NJ: Princeton University Press, 1991), and continued with work done by Donald Freeman, Margaret Freeman, Alan Richardson, Francis Steen, Blakey Vermeule, Lisa Zunshine, and others.

[4] David Z. Saltz, "Theory/Philosophy/Science" (paper presented at the annual conference of the Association for Theatre in Higher Education, New Orleans, 27 July 2007).

[5] This concern about the relationship between the humanities and the sciences was shaped by conversations with Rhonda Blair, Tobin Nellhaus, John Lutterbie and others at the Cognitive Studies in Theatre and Performance Working Group, ASTR 2007.

[6] I focus on Shakespeare's plays because they are a cultural and theatrical shibboleth; any theory that does not illuminate Shakespeare (the text, the popularity, the historical moment, and/or the productions) is not worth applying to anything else.

"[n]ow is the winter of our discontent / Made glorious summer by this sun of York / And all the clouds that lour'd upon our house / In the deep bosom of the ocean buried" means; what is challenging is to understand *how* it means that. Conceptual metaphor theory and conceptual blending theory both counter traditional assumptions of an inherited grammar structure that parses sentences such as "the cat is on the mat" based on memorized definitions and rules of word placement. Cognitive linguistics now generally agrees that language and thinking are creative and embodied and use metaphors, models, and blends. In *The Way We Think*, Gilles Fauconnier and Mark Turner expand upon metaphor theory to argue that meaning is often constructed not simply from source to target, but as blends of mental spaces.[7] Information is projected from two or more input spaces to a blended space, such that the blended space contains information and structure from more than one domain. Importantly, the blended space contains emergent structure not available from the inputs; the collision is synergistic. I would like to use "social lie" to exhibit how *conceptual blending theory* (CBT) can step in where metaphor theory ends.

If a "lie" is a deception meant to cause harm and "social" pertains to the group, friendly relations, or polite society, then the modifier "social" does not simply add to our understanding of lie. In this case, "social" subtracts information from the category "lie." As George Lakoff himself says: "The category of social lies is not the intersection of the set of social things and the set of lies." Instead, "social lie" is understood by selectively projecting some information from the "social" input space and some information from the "lie" input space into a third space. In the "social" space, interests of the self are subjected to the importance of the group; in the "lie" space, inaccurate information is given in order to cause harm to another. The blended "social lie" space creates a new idea, one not wholly available from the inputs: deception for the benefit of the community.[8]

In the textual analysis that follows, I hope to unveil a method of unpacking the process of making meaning, though the meanings themselves may not be new. The power of a great play is not located in what it means, but in how its meaning is made and remade over time and generations. Unpacking Richard's construction of the state of affairs in England using CBT provides a rich and theatrically fruitful analysis. What follows, however, will not be a complete unpacking, but an initial collision between the sentence and blending theory. I hope to use my brief analysis to raise more questions than are answered, as an invitation to future work.

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[7] Gilles Fauconnier and Mark Turner, *The Way We Think* (New York: Basic Books, 2002). For more on mental-space theory, see Fauconnier, *Mental Spaces: Aspects of Meaning Construction in Natural Language* (Cambridge: Cambridge University Press, 1994). Fauconnier defines mental spaces as packets of information constructed and framed on the fly in which information is organized. This is the information needed to understand the current situation. Mental spaces can be "built" in discourse; in the following sentence, "John thinks" is a space builder: "John thinks we are going to the movies." The mental space here is then John's belief about our going to the movies.

[8] George Lakoff has proposed that we have *idealized cognitive models* (ICM) based on which we categorize and organize our knowledge in order to be more efficient. For more on this, see his *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind* (Chicago: University of Chicago Press, 1987), 70–75. Cognitive linguist Eve Sweetser's ICM for "ordinary communication," cited by Lakoff, says: "(a) If people say something, they're intending to help if and only if they believe it. (b) People intend to deceive if and only if they don't intend to help" (73).

> Now is the winter of our discontent
> Made glorious summer by this sun of York
> And all the clouds that lour'd upon our house
> In the deep bosom of the ocean buried.[9]

Richard of York sets the tone, foreshadows the future, and provides most necessary exposition in one sentence. Indeed, I would argue that most of what follows in the play can be seen in this first sentence in a stunning display of what Fauconnier and Turner call "compression." The complicated state of England at the start of *Richard III* is compressed by Richard to human scale, wherein the listener understands the end of the York family strife in terms of a changing season, with the clouds of misfortune being buried deep in the ocean. Rather than saying that things are going well, Richard tells us that bad things are happening to bad things. Richard's language invents grief structured like seasons, a maternal ocean/graveyard, and a king that is both son and sun. Shakespeare's imagery relies on a succession of blends that facilitate a prompting of future blends; the language stands on associations that it builds along the way. Shakespeare's language is cognitively generative: the blends he weaves through the play create concepts as they go.

When I hear "[n]ow is the winter of our discontent," I assume Richard's discontent is at the height of its chill, rather than ending due to the warmth provided by a new king. Partially this is because there is nothing cheery or summery about portrayals of Richard, but partially this is because it is only after he adds "[m]ade glorious summer by this sun of York" that the image changes to accommodate the idea of seasonal change. "Now is the winter of our discontent" is a metaphoric blend, where the information projected from the "winter" mental space is selected based on understanding "discontent" as having a cycle and the winter is the coldest part of it. When Richard then says that their discontent has turned to summer, it is necessary to project information from a conception of a *year* as having seasons in order to explain the current state of affairs as changing as ineluctably as time: The war is over, things are changing. Richard also wants to evoke the coldness of winter—things are both changing and also inhospitable—the last section of a cycle and the frozen-over mystery of what is to come. As it turns out, England's discontent will remain wintry until the end of the play, when Richard is dead and Richmond (Queen Elizabeth I's grandfather) is crowned.

In Richard's first sentence, the clouds of the family's misfortune are "buried" in a grave figured both like an ocean and a bosom. This "watery grave" contains the misfortune, as the ocean might contain a dead body or the bosom might contain a shared secret. There is both intimacy and danger in this image. The dynamism of the blending structure allows room for the meaning to accrete throughout the play. The deep bosom of the ocean is capable of nurturing and suffocating—an idea explored further in the next scene. In his seduction of Anne, Richard uses "bosom" twice: the first time it is to ask to live for an hour *in* her "sweet bosom" (1.2.125), and the second is to suggest that she "hide" the sharp point of his sword *in* his bosom if she believes him responsible for the death of her husband. These bosoms, like the bosom of the ocean, are containers for life and death. After starting the play with a darkly gleeful image of an ocean that buries discontent, Shakespeare includes a long poetic description of

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[9] William Shakespeare, *King Richard III*, ed. Anthony Hammond (London: Methuen, 1981), 1.1.1–4. This and all subsequent quotations from the play are from this edition.

Richard's brother Clarence's dream about drowning in the ocean. In this dream, as Clarence recounts, Richard has pushed his brother into the "tumbling billows of the main" where, despite a desire to die, Clarence finds that the ocean has "[s]topt in [his] soul" and "smother'd it within [his] panting bulk" (1.4.38–40). The ocean and bosom are containers that suffocate even when they are meant to nurture and resemble the all-powerful womb that Richard, in his first soliloquy, blames for (mis)shaping him: "sent before my time / Into this breathing world, scarce half made up."

Both Linda Charnes and Madonne Miner have written about the womb/tomb connection in *Richard III*. Charnes deconstructs *Richard*'s womb/tomb language: "Richard replaces a language of overgestation, of prodigious belatedness, with one of underdevelopment, of rude and untimely prematurity."[10] Miner argues that the birth metaphor is central in the play and that birth and killing are conjoined in *Richard III*, and although I agree, I suggest that blending explicates how this linking occurs.[11] Richard is not the only character to blame his mother's womb for his evil shape; Margaret calls him the "slander of thy heavy mother's womb" (1.3.231). Later in the play, she locates the womb that produced Richard, and should have buried him, as the doorway to hell, telling Richard's mother that "from forth the kennel of thy womb hath crept / A hellhound that doth hunt us all to death" (4.4.48). At the end of the play, Richard returns to the image of the womb as a nexus of birth and death. Shortly before the battle of Bosworth Field, Richard speaks to his brother's widow about marrying her daughter, sister to the two princes he has killed. She reminds him that he murdered her sons and he replies: "And in your daughter's womb I bury them: / Where in that nest of spicery they shall breed / Selves of themselves, to your recomforture" (4.4.424–26). In another gruesome image of burial and rebirth, Richard makes explicit the womb as burial tomb: Elizabeth's daughter's womb will be the breeding ground for the birth of a better future.[12]

Chris Hasel Jr. has argued that the final victory of Richmond over Richard at Bosworth Field is presaged in his more powerful oratory to his soldiers. Hasel's analysis does not suggest what makes one more powerful than the other, however. CBT illuminates where Richard's oration failed and Richmond's succeeded. Attempting to rally his troops for the final battle against Richmond, Richard calls his opponent a "milksop" (5.3.326), which his men probably understand as a "man or boy who is indecisive, effeminate, or lacking in courage," but may also have heard "piece of bread soaked in milk" or "an infant still on a milk diet"—two definitions from the 1500s listed by the

[10] Linda Charnes, "The Monstrous Body in *King Richard III*," in *Critical Essays on Shakespeare's* Richard III (New York: Hall, 1999), 276.

[11] Madonne Miner, "'Neither Mother, Wife, Nor England's Queen': The Roles of Women in *Richard III*," in *Modern Critical Interpretations: William Shakespeare's* Richard III, ed. Harold Bloom (New York: Chelsea House Publishers, 1988), 45–60.

[12] I have chosen to omit other critical accounts of the play not because they are not helpful or important, but because I want to focus on the language in the context of CBT without addressing the differences in critical paradigms. Barbara Hodgdon looks at the semiotics of the actors' body in Al Pacino's *Looking for Richard* and Ian McKellen's *Richard III* ("Replicating Richard: Body Doubles, Body Politics," *Theatre Journal* 50, no. 2 [1988]: 207–25). While I am persuaded by her argument that each actor uses his body to "trouble" the relationship between character and actor, I find that blending theory offers a more productive method of unpacking the network of meanings in the play, as explored by Bruce McConachie. For psychoanalytic readings of the play, see Marjorie Garber's "Dream and Plot," in *Modern Critical Interpretations*, 5–14, and Peggy Endel's "Profane Icon: The Throne Scene of Shakespeare's *Richard III*," *Comparative Drama* 20, no. 2 (1986): 115–23.

Oxford English Dictionary. Shakespeare probably wanted his audience to hear all three. Richard, the master rhetorician, can think of nothing worse than falling prey to the lure of maternal love; his speech goes on to warn the soldiers of the plundered wives of defeat. Before he lacks a horse, Richard lacks a vision of procreation that is not seeped in danger or betrayal. Richmond, on the other hand, emboldens his soldiers by connecting their wives' wombs to future generations that will provide immortality through progeny: "If you do free your children from the sword, / Your children's children quits it in your age" (5.3.262). Richmond's vision requires that his soldiers first call up the mental space of a threat to one's children, and then blend that with the space of future children of the threatened children: children rescued from the sword produce children who are able to repay their life's debt. In this blend, the soldiers are alive, well, and comforted by grandchildren—an image much more likely to instill courage for battle than an image of raped wives and daughters. Richmond reminds his army that who they are right now depends in part on how they will be remembered.

Blending theory does not aim to predict the exact blend constructed from any given set of evoked mental spaces. A historical perspective might inform the way a Ptolemaic cosmology would impact the composition of meanings associated with the "suns / sons" in the play, for example. What interests me here is the way the language structures meaning throughout the play—the way mental spaces evoked to understand "bosom" or "womb" (*whatever* information an audience member calls up on hearing the word) are then accessed and shifted as the play goes along. Fauconnier has argued that while any particular blend might vary from individual to individual, the network of spaces prompted in a given situation is more powerful as a process in flux, a series of variables, than simply a final blend. Almost by design, a complete description of the spaces within a network built by a blend is impossible, since there are an infinite number of possible associated spaces. The value of applying blending theory to a text or performance does not lie in its taxonomic abilities, but rather in how it maps the likely spaces and uncovers connections not immediately apparent though maintaining power even in dormancy. Blending theory offers theatre practitioners and scholars a tool to improve staging and design because it provides a way to understand what is meant when we say one thing "works" and another does not.

To provide an example of a cognitive linguistic performance analysis, I want to focus on the casting of Sam Shepard as the ghost of King Hamlet in Michael Almereyda's *Hamlet* (2000). Almereyda borrows Shepard's film-star persona to tell the story of this *Hamlet*.[13] Through the confluence and clashes between the mental spaces evoked by Shepard and the ghost of King Hamlet, Almereyda relates a rich story of high and low art, dead and alive, father and son, film and video, and stage and screen in an

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[13] In *The Haunted Stage: The Theatre as Memory Machine* (Ann Arbor: University of Michigan Press, 2002), Marvin Carlson argues that all performances are "ghosted" by other performances. I find the blending methodology of mapping the genealogy of the "ghosts" in this casting choice to be a more acute analytical tool. Michael Quinn's semiotic reading of casting says only that there is "something about dramatic performance that causes spectators to seek information about the personal life of the performer" ("Celebrity and the Semiotics of Acting," *New Theatre Quarterly* 22 [1990]: 154), and he finds that celebrities intrude on the "creative genius" of the author or director, without examining the creativity of the casting or the rich ways in which a director can use the "intrusion" to complement his own "genius." Bert States's phenomenological explanation is to find in the "competition" between actor and character a kind of electrical charge. While I find States's work to be rich in beautiful and insightful descriptions of theatrical events, I cannot map the language to a methodology or analytic tool.

instant. In *Hamlet*, the ghost maintains elements of the dead king (his appearance, his memory, his intentions), but not others.[14] The ghost takes the shape of the body it once resided in, but not its physical materiality: "In the same figure, like the King that's dead" (*Hamlet* 1.1.44).[15] It can talk and walk, but cannot effect material change directly—that is, the ghost cannot get his own revenge.

Although each casting choice carries meaning based on the elements of the actor automatically brought to the screen with him (age, race, physical type, vocal mechanics), not all actors come with the precise persona of Sam Shepard. Shepard's biography is free of roles or details that conflict with the image of him as the strong silent type, the cowboy, the astronaut, or playwright. Particularly for a smaller role like the ghost, where audiences are not given the same amount of time with or information about the character, casting Shepard is casting that persona. Casting a star with a precise persona allows a director to enrich a small part by strenuously projecting information from the star's real life onto the character. It also allows actors to reify their persona by playing their persona in a movie.[16]

While the blend of Shepard/ghost[17] is constrained by the context provided by the script and film—"ghost," "king," "father," "artist," "CEO"—the more information one has about Shepard and Shakespeare's play, the richer this blend becomes. For example, Shakespeare is thought to have played the ghost of King Hamlet, and Shepard is both a playwright and actor. With these mental spaces evoked, Almereyda's King Hamlet is the specter of greatness temporarily walking in the shoes of a bit player. Familiar with Shepard's work as a playwright and his reputation for eschewing Broadway for the Magic Theatre in San Francisco, Almereyda's King Hamlet has been felled by his brother's commercialism and his son's preference for videos over theatre: Shepard/ghost is more than a sum of its parts.

Almereyda does more than just cast Shepard: he primes these associations through how he films him. Almereyda could have filmed Shepard's ghost as a disembodied voice or bellowing spirit; these choices would have primed ghost representation spaces (Caspar, horror movies, history of ghosts in Shakespeare plays). By presenting Shepard full-bodied and not ghostly, the camera can concentrate on his Shepard-ness, not his ghost-ness. Shepard's ghost smokes in a long leather trench coat, recalling the "Marlboro Man" cowboy-type that he has played in the past. Almereyda has Shepard's ghost disappear by walking through a Pepsi machine, which primes the corporation

[14] This is similar to other representations of the ghost blend, as Mark Turner has illustrated in "The Ghost of Anyone's Father," in *Shakespearean International Yearbook*, vol. 4, ed. Graham Bradshaw, Thomas Bishop, and Mark Turner (Hants, UK: Ashgate Publishing Ltd., 2004), 72–97.

[15] William Shakespeare, *Hamlet*, ed. Harold Jenkins (London: Methuen, 1982). This and all subsequent quotations from the play are from this edition.

[16] This helps explain the phenomenon of the cameo, since playing a small role in a film should not be attractive to a star accustomed to being the lead, yet a cameo allows an actor to shore up his/her persona. Directors cast them as shorthand: since the audience has so much information about the particular actor, the film need supply less about the character. The power of the blend is more clearly articulated in these roles because the performance depends on so much more information from the "actor" space to build the "actor/character" space.

[17] Bruce McConachie uses the notation "actor/character" to suggest the presence of both character and actor. See "Cognitive Studies and Epistemic Competence in Cultural History: Moving beyond Freud and Lacan" in *Performance and Cognition* and *Engaging Audiences* (New York: Palgrave Macmillan, forthcoming).

responsible for such product placements and therefore Shepard's persona as outsider, moving through, as if by magic, the constant imposition of commodity capitalism. Almereyda juxtaposes Shepard with Ethan Hawke and thus foregrounds thematic elements in the relationship between Hamlet and his father. When Shepard first appears to Hawke, he charges him, intimidates him, and silences him: Shepard is the strong cowboy to Hawke's disaffected Gen X intellectual; Shepard is action and Hawke is talk. Sam Shepard is only onscreen for a few minutes, yet based on the mental spaces he evokes, he tells the story without speaking a word.

Seeing Shepard in his portrayal of King Hamlet's ghost or understanding that the first line of *Richard III* sets up images and tropes that continue to grow and develop throughout the play are *not* the contribution of CBT. Conceptual blending theory does *not* offer us the analysis that literary critics and dramaturgs have been providing all along; CBT gives us a methodology to unpack meaning again and again, to find new connections in new times or new plays. Cognitive linguistics in general explores how and why language is powerful. If "[n]ow is the winter of our discontent" engages more of the imagination by linking mental spaces in unlikely ways, it follows that it will enrich understanding; it may complicate it, requiring more and more books, footnotes, and exegesis, but it will, as one theorist put it, "make you more fully alive."[18] This is the kind of paean to the value of literature that can be fuzzy and meaningless, but when in dialogue with disciplines investigating and defining what it means to be alive and what it means to engage the imagination, it provides a jolt to the study of the art we value so highly. This is one reason that I find cognitive linguistics to be a useful tool for analyzing theatre: its methodology, language, and results are compatible with work being done in other disciplines.

George Lakoff, a cognitive linguist from the University of California, Berkeley, and Vittorio Gallese, a neuroscientist from Parma, Italy, collaborate on integrating theoretically based empirical data from their respective disciplines. This work, which I discuss below, would not be possible without a shared respect for both theory and data. Despite the differences between the disciplines' methodologies and definitions of "evidence," they find enough common ground to connect cognitive linguistics and neuroscience in an investigation into the questions each are asking. Similarly, Seana Coulson and Cyma Van Petten recorded event-related potentials (ERPs) from people reading different sentences and found that the metaphoric sentences were read no more

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[18] Philip Davis, *Shakespeare Thinking* (London: Continuum, 2007), 95. Davis suggests that Shakespeare's language is a kind of originary text: it makes us in its image. Further, he argues that Shakespeare's use of cross-sense language or word-class conversion (i.e., making a noun a verb) is cognitively constructive: "Shakespeare's lines are Renaissance brain-scanners, where scanning has to do both with poetic rhythm and neurological patterning. From eye to voice or ear to eye, from text to performance, in the interplay of line and sentence or meter and rhythm between brain and mind: these are the great Shakespearean shifts of mentality, to and fro" (63). While this sounds similar to Harold Bloom's *Shakespeare: The Invention of the Human* (New York: Riverhead, 1998), Davis uses the short book to lay out a hypothesis that he is testing with a scientist at his university using fMRI and MEG (magnetico-encephalography) images of subjects reading Shakespeare's text. Ellen Spolsky's *Satisfying Skepticism: Embodied Knowledge in the Early Modern World* (Aldershot, UK: Ashgate Publishing Limited, 2001) posits that early modern skepticism fostered a comfort with ambiguity and that the artwork of the period evidenced "the very gappiness of the brain's architecture" (4). Her book interrogates the art as data using current cognitive science as an analytical tool.

slowly than the more literal sentences, but called upon more parts of the brain.[19] This suggests that such processing is more involved, not more time-consuming. This study integrates empirical methodology from fields of neuroscience and psychology into questions of metaphor comprehension previously considered not empirically verifiable and even non-scientific. Their work challenges a long-held belief that processing time equals difficulty; in other words, processing metaphoric sentences required more of the brain to participate, but this increased firing did not increase the time spent to process the sentence. Theatre audiences process extraordinarily complex information without getting lost.[20] Indeed, perhaps the reason *A Midsummer Night's Dream* is performed more often than *Knight of the Burning Pestle* is because of, not despite, the fact that the richness of Shakespeare's language requires more imagination and "work"; perhaps research on how we understand language, story, and performance could encourage those who wish to argue for fewer plays that have the ease of sitcoms, and more plays with the complexity of Shakespeare.

Embodied Interplay

Saturday, 26 May

The new crutches arrive; knobbly wooden walking-sticks set into iron tops. Although these are much lighter, there is a new confusing balance—iron at the top, wood below. I realise that Charlotte's old NHS crutches (battered and twisted after weeks of rehearsal) have become, without my noticing, the extra limbs we talked about. It's too late to change anything else now. . . . Simply by living on them for five weeks, they are part of me now—with them I can turn on a sixpence and dance the old fandango. I think that if you pricked them they'd probably bleed.

Anthony Sher[21]

Actors have often reported the importance of the shoes to finding their characters, but how important are the shoes to the spectator's experience of the character? In the quote above, Sher describes finding blood, life, and limb in the battered and twisted old sticks used during rehearsals for his portrayal of Richard; whether or not those sticks would bleed if pricked, do audience members experience them as "part of" Sher/Richard as well? CBT allowed us to parse out the network of meaning in Richard's exposition and Shepard's cameo; to understand how the body onstage impacts spectator comprehension I draw on the neuroscience of mirror neurons and phantom limbs. How does the brain write—and rewrite—its map of the body? Neuroscience is beginning to understand the interplay between sensations, language, self, and other.

Mirror (Neurons) Staged

In a laboratory in Italy, a team of neuroscientists discovered a cell that fired when a monkey took an action (grabbed a banana) as well as when he watched another monkey

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[19] Seana Coulson and Cyma Van Petten, "Conceptual Integration and Metaphor: An Event-Related Potential Study," *Memory and Cognition* 30 (2002): 958–68.

[20] See also F. Elizabeth Hart's essay in *Performance and Cognition,* "Performance, Phenomenology, and the Cognitive Turn," where she focuses on an audience's ability to understand dense storytelling: "What should surprise us (but doesn't) is the idea that all three actors can represent the same character at the same time" (45).

[21] Anthony Sher, *Year of the King: An Actor's Diary and Sketchbook* (New York: Limelight, 2004) 208–9.

perform the same action. They called this cell—located in the F5 area of a monkey's premotor cortex—a "mirror neuron," since its firing reflected an action witnessed in another or the action performed by the self. Mirror neurons do not always fire when an object is perceived or when a tool is used to perform the action; they are specific to hand/object interactions. Some mirror neurons (30 percent) are "strictly congruent" (meaning that they fire when the act observed is identical to the act performed), and about 60 percent are "broadly congruent" (meaning the observed action is similar though not identical).[22] This difference allows for both precise recording of the observed action, and a more generalized conception of the observed action focusing on the goal rather than on the action. Mirror neurons suggest that neurons in the motor cortex do not just code for action, but also a representation of the action; in other words, seeing and doing are not as different as one might think.

In his 1982 book on theatre, Bruce Wilshire argued that selves are constituted at the theatre. He imagined a science that would support his claim, long before the research arrived to do so. Wilshire posits that

> bodies biologically human learn to become human persons by learning to do what persons around them are already doing. The learning body mimetically incorporates the model; it comes to represent the model and to be authorized by it. . . . The actor models modeling, enacts enactment, and reveals it. I think it plausible to hypothesize that since behavior and identity were laid down bodily, mimetically, and together their recovery and recognition may very well be achieved only bodily, mimetically, and together—in the theatre, for example.[23]

Indeed, incorporating the model *does* happen: our brain's mirror neuron system (MNS) links the actions and intentions of others with our own perceptions and actions. When we witness an actor picking up a telephone and moving it upward, it is the MNS that tells us whether she/he does so in order to answer the phone or swing it. When we witness an actor attempting to open a jar, it is the MNS that tells us that the lid is on tightly. This research expands and complicates our understanding of the power of language and the power of the body. Held up to theatre, these mirror neurons might reveal something about the nature of our theatrical selves.

During the last five years, interest in and research on mirror neurons has grown exponentially.[24] Since the original studies, scientists have conducted research that suggests that humans have an MNS and that it is probably more robust than monkeys'. Since it is impossible to study the brain of (live) humans at the level of the neuron, studies have had to be devised that search for evidence of a system of mirror neurons. One

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[22] Leonardo Fogassi and Vittorio Gallese, "The Neural Correlates of Action Understanding in Non-Human Primates," in *Mirror Neurons and the Evolution of Brain and Language*, ed. Maxim I. Stamenov and Vittorio Gallese (Amsterdam: John Benjamins, 2002), 19.

[23] Bruce Wilshire, *Role Playing and Identity: The Limits of Theatre as Metaphor* (Bloomington: Indiana University Press, 1982), 16.

[24] For two fascinating books compiling some of the research on mirror neurons, see Susan Hurley and Nick Chater, eds., *Perspectives on Imitation: From Neuroscience to Social Science,* vol. 2: *Imitation, Human Development, and Culture* (Cambridge, MA: MIT Press, 2005), 1–52; and Maxim I. Stamenov and Vittorio Gallese, eds., *Mirror Neurons and the Evolution of Brain and Language* (Amsterdam: John Benjamins, 2002). Individual articles that have proved valuable include: Giacomo Rizzolatti and Laila Craighero, "The Mirror-Neuron System" *Annual Review of Neuroscience* 27 (2004): 169–92; and Giacomo Rizzolatti, Leonardo Fogassi, and Vittorio Gallese, "Neurophysiological Mechanisms Underlying the Understanding and Imitation of Action," *Nature Reviews Neuroscience* 2 (2001): 661–70.

study used transcranial magnetic stimulation to detect motor-evoked potentials—in particular muscles—when subjects viewed actions that would require the evoked muscles to do that action;[25] in other words, even though the action was witnessed and not performed, it exhibited some of the same patterns as the performed action. Additionally, patients with reaching or grasping deficiency have been found to have brain lesions in the superior parietal lobe and the intraparietal sulcus—an area homologous to the F4 and F5 areas of the monkey—suggesting that there are neurons that connect seeing with doing that are damaged. Rarely a group to hyperbolize, scientists have called mirror neurons a "potential bridge between minds";[26] theatre scholars would do well to engage with the scientific discourse concerning mirror neurons.

In their interdisciplinary collaboration, Lakoff and Gallese find that since the neural structures used to do or perceive something are exploited to do more abstract thinking, a connection can be made between a theory of concepts on a linguistic level and a developing picture of cognition on a neural level. They find that the mirror neuron research suggests a "neural theory of conceptual metaphor,"[27] since the activation of the MNS projects information from a witnessed action to a perception, in much the same way that conceptual metaphor theory argues that we think and speak by projecting information from a source domain onto a target domain.[28] The fact that the brain exploits sensory-motor neurons to understand abstract concepts or poetic language suggests that language makes us feel, not by communicating a final feeling-state, but by activating our own experience of that state. *Imagining* and *understanding* are the same thing:

> Consider a simple sentence, like "Harry picked up the glass." If you can't imagine picking up a glass or seeing someone picking up a glass, then you can't understand that sentence. Our hypothesis develops this fact one step further. It says that *understanding is imagination*, and that *what you understand of a sentence in a context is the meaning of that sentence in that context*.[29]

This suggests that language is less a system of *communicating* experience than actually *being* experience; we do not translate words into perceptions, we perceive in order to understand. It is time to begin to imagine the implications for theatre and performance studies of a shared neural substrate linking imagination and understanding, doing and feeling, fact and fiction, actor and character, me and you.

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[25] Cited in Giacomo Rizzolatti, Laila Craighero, and Luciano Fadiga, "The Mirror System in Humans," in *Mirror Neurons and the Evolution of Brain and Language*, 49.

[26] Justin H. G. Williams et al., "'Imitation, Mirror Neurons and Autism," *Neuroscience and Biobehavioral Reviews* 25 (2001): 287–95.

[27] George Lakoff and Vittorio Gallese, "The Brain's Concepts: The Role of the Sensory-Motor System in Conceptual Knowledge," *Cognitive Neuropsychology* 22, nos. 3–4 (2005): 469; see also Jerome Feldman and Srinivas Narayanan, "Embodied Meaning in a Neural Theory of Language," in *Brain and Language* (forthcoming).

[28] For more on conceptual metaphor theory, see George Lakoff and Mark Johnson, *Metaphors We Live By* (Chicago: University of Chicago Press, 1980).

[29] Lakoff and Gallese, "The Brain's Concepts," 456 (emphasis in original).

Staging MimesissisemiM

One of the reasons that MNS has attracted such interest is the stream of abilities that flow from it.[30] Mirror neurons are thought to be responsible for action understanding, intention, emotional attunement, communication, joint action, and imitation. Action understanding, intention, emotional attunement, and communication are clearly pivotal in theatre, since without them there is no fear, pity, conflict, dramatic irony, subtext, or even story. Joint action is the coordination of action across a group—such as lifting a boat into the water or rowing it—and might help to explain the pleasure for spectators of laughing, clapping, and standing together. Perhaps acting in synchrony with others based on the interplay of social conventions and spontaneous feelings unites spectator with spectator as it co-fires mirror neurons. Again, the impact of this research is only beginning to be felt and the research questions just being posited. While there are many ways for theatre scholars to apply and also put pressure on research into our MNS, imitation is a good place to start.

Developmentally, imitation is central to skill acquisition, since it limits the need for trial and error and it also translates sensory information into action, coordinating between what we see and what we do. Imitation begins immediately after birth: newborns imitate the facial expressions of their mothers—a form of communication and shared experience that is believed to correlate with speech development, emotional synchrony, later symbolic play, and acquiring mental-state understanding.[31] If areas of the infant's motor cortex resonate when he sees his mother stick out her tongue, the infant does not have to process the information visually and map it to his motor cortex in order to imitate the action. This kind of "response facilitation" occurs without the infant understanding the action; yet the communication this inspires generates further learning, bonding, and evolutionarily valuable behavior.[32] The brain simulates action in order to understand action; it learns action by imitating it. Gallese connects the MNS to theories of "intentional attunement"; the direct experience of what another is experiencing, which he calls "embodied simulation," allows the subject to feel "as if" he/she were doing what the observed was doing. This transfers perspective on a neural level, since doing the action recalls the intentions necessary for such actions. Gallese describes the attunement as union: "By means of a shared neural state realized in two different bodies, the 'objectual other' becomes 'another self.'"[33]

I have understood Aristotle's definition of imitation as suggesting that what is onstage should seem "as if" the actions were really taking place; but, clearly, Oedipus

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[30] I would also argue that the discovery would not have benefited from the same level of sustained excitement and media attention had they been called "Area F5 Neurons." From Hamlet's mirror to Lacan's mirror, the mirror remains a fascinating critical tool. The association is also a liability, however, since it becomes too easy to generalize the powers of the MNS.

[31] See Gunther Knoblich and Jerome Scott Jordan, "The Mirror System and Joint Action," in *Mirror Neurons and the Evolution of Brain and Language,* 115–24; and Sally J. Rogers, Ian Cook, and Adrienne Meryl, "Imitation and Play in Autism," in *Handbook of Autism and Pervasive Development Disorders* (Hoboken, NJ: Wiley, 2005).

[32] Rizzolatti, Craighero, and Fadiga, in "The Mirror System in Humans" (52), cite a fascinating alternate example of the evolutionary advantage of imitation in shorebirds studied during the 1950s: when a bird detects a dangerous stimulus, it begins to flap its wings, which leads the other birds to flap their wings in response. The action is contagious rather than conscious.

[33] Vittorio Gallese, "Intentional Attunement: A Neurophysiological Perspective on Social Cognition and its Disruption in Autism," *Journal of the American Psychoanalytic Association* 55, no. 1 (2007): 131–76.

does not *really* gouge out his eyes and yet the player king *really* weeps for Hecuba. And just who is imitating whom? If the distance between your act and my act is so minimal, is "imitation" the right way of understanding it? Imitation requires a doer and an observer/imitator; without both sides, there cannot be imitation. The performance of the action might provide insight into what the playwright imagined the character's goal was, just as the MNS connects action performance with action understanding, but an actor cannot imitate a character. Although in one sense it is a question of semantics, since one could argue that here, "imitating" is a synonym for "pretending"—anyone interested in cognitive linguistics knows not to disregard semantics. Moreover, there are key distinctions for acting and performance theory between pretending and doing. In theatre, actors perform actions required of their characters—they do not "imitate" this action, they perform it. As generally conceived, "pretending" or "imitating" creates a circle of interest that omits the audience: the actor attempts to come as close as possible to the character's action. But verisimilitude presumes correctness and is less important theatrically than evoking an image for the audience as powerful as eye-gouging. David Saltz argues that audiences do not go to the theatre to see fiction, they go to see "a real event, to see real, flesh-and-blood actors perform real actions."[34] Actions might be altered for the stage: for example, the script may call for the actor to gouge his eyes out and he instead will do an action while breaking a blood pack. This series of actions is meant to simulate, in the *audience's* brain, the effect of eye-gouging.

A performance that activates imitation in an audience is likely to be (almost literally) moving. Mirror neurons themselves do not discriminate between an act performed and a witnessed act. Since watching is—at least for some neurons—the same as doing, drama *inspires* the imitation of an action rather than *being* an imitation of an action. In some scenes, this imitation might take the form of understanding the goal of the action performed onstage: the broadly congruent mirror neurons alert the spectator to the fact that the character picks up the gun in order to shoot it; in other scenes, such imitation might be the mental simulation required to understand the emotions expressed onstage. And in some scenes, the spectator will find that he or she is tensing muscles, crying, breathing differently, leaning forward, smiling, or turning away—it is the power and pervasiveness of *audience* imitation that is central to theatre. So perhaps the rehearsal of actions and feelings that this generates allows us to respond to current or future experiences *as if* we had experienced them before, even though only a few of our neurons *actually have*.[35]

Phantoms Onstage

The interplay between performance and spectatorship generates distinctions between the two even as it underlines the permeability of the boundaries. In his book on play-

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[34] David Saltz, "Infiction and Outfiction: The Role of Fiction in Theatrical Performance," in *Staging Philosophy: Intersections of Theater, Performance, and Philosophy* (Ann Arbor: University of Michigan Press, 2006), 203.

[35] To be clear: the discovery of mirror neurons does not mean that the perception of an action fires the same neurons as the doing of an action; while there are some neurons that fire in both cases, there are many others that do not. If a "dialogue" between the sciences and the humanities is to be mutually fruitful, it is important for both sides to recognize the limits, as well as the potential, of the theories and findings. The findings on mirror neurons do not support the claim that we are all one or that one can put oneself in the mind of another, but it may suggest some radical rethinking of our categories and definitions.

ing Richard III, Anthony Sher mentions that a physical therapist recommended that the theatre pay for daily massages to help his body release the shape of his twisted king.[36] The body he plays in performance begins to colonize the body of the actor. After weeks of wearing a fat suit for rehearsals and performances, one actress I know said she began feeling sensations in her large padded breasts. Similarly, she would wake up in the middle of the night to go to the bathroom and feel as if she were still in the suit, thinking that a trip to the bathroom was just too difficult in her actor/character's body. After weeks of rehearsing and performing with a prosthetic body or body part, an actor's brain can begin to rewrite his/her sense of self. While it is important to recognize the power of removing the prosthesis/fat suit after a performance, it is equally important to investigate the role of these expansive notions of self and a development of empathy. Even after just two hours in the theatre, audiences leave imitating voices or the bodies of those they have seen onstage; after two hours of simulating the actions and feelings performed onstage, perhaps there is a level at which spectators and performers come together.

This shell, this too, too sullied flesh, is constructed at the intersection of visual and tactile stimuli and genetic body maps; it is open to some negotiation and alteration. Neuroscientist V. S. Ramachandran's work with phantom-limb patients illuminates the mind's ability to rewrite its idea of the body, suggesting a more expansive notion of where we stop and start: "[H]ighly precise and functionally effective pathways can emerge in the adult brain as early as four weeks after injury."[37] Phantom limbs are common in patients who have lost a limb; although the arm (for example) is no longer there, the patient hallucinates its presence, sometimes using it to gesticulate and at other times suffering from pain stemming from the missing appendage. Ramachandran's research countered the standing assumptions within medicine that phantom limbs are "wishful thinking"[38] or a by-product of withered neurons at the site of amputation.

Ramachandran found that the brains of phantom-limb patients had rewired so that cells in the brain corresponding to the missing arm (which was, of course, incapable of sending signals to the brain) would fire when certain areas of the face were touched. He blindfolded a patient who had lost his arm and touched his face with a cotton swab, after which the man reported feeling sensations in his missing arm. Ramachandran reasoned that the brain had rewired so that the area once reserved for registering sensory input from the missing limb had been "invaded" by the area reserved for the face. Every time the patient's face is stimulated, the brain receives stimulation in the area of the brain it still associates with the arm and hence creates an arm that could justify the experience of those signals, despite the lack of signals coming from visual or muscular-skeletal systems from that area. Ramachandran concludes that phantom limbs come from the interplay of genetic and experiential variables; by respecting the reality of these phantoms, he discovered a way to amputate them.

Ramachandran created a box with two holes for arms and a piece of cardboard separating the two areas. On one side of the cardboard wall there was a mirror, so that when a patient put his left arm in the left side and his phantom arm in the right, the

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[36] Sher, *Year of the King.*

[37] V. S. Ramachandran and Sandra Blakeslee, *Phantoms in the Brain: Probing the Mysteries of the Human Mind* (New York: Quill, 1998), 13.

[38] Ibid., 31.

phantom was visible to the patient in the mirror. The reflection of his left arm became a visualization of the right arm. When the patient sends motor commands to both arms, he can now see his phantom move. After sending the patient home to "work" with the mirror box on his own, the patient called to report that he no longer experienced a phantom arm. Ramachandran suggests that when the patient's "right parietal lobe was presented with conflicting signals—visual feedback telling him that his arm is moving again while his muscles are telling him the arm is not there—his mind resorted to a form of denial. The only way his beleaguered brain could deal with this bizarre sensory conflict was to say, 'To hell with it, there is no arm!'"[39] By seeing the invisible, the patient was able to re-imagine his body as it had become since losing the arm; and by re-imagining, he rewrote his brain's story about the limits of his body.

Ramachandran has also done experiments to document the way in which visual information can trick the brain into expanding its conception of the body's limits. In the "rubber hand" illusion, subjects place their hand behind a curtain so that they cannot see it, and a rubber hand is placed where it is clearly visible. The researcher then touches the rubber hand and the real hand at the same time with the same strokes. After a period, subjects claim that they can "feel" the rubber hand and that they experience it as belonging to themselves. Matthew Botvinik and Jonathan Cohen verify the rubber hand illusion, quoting several subjects as saying, "I found myself looking at the dummy hand thinking it was actually my own." They argue that the illusion reveals a "three-way interaction between vision, touch and proprioception, and may supply evidence concerning bodily self-identification."[40] Ramachandran claims that "[t]he illusion illustrates, once again, how ephemeral your body image is and how easily it can be manipulated."[41] The brain relies on stories to organize information ("I see him touching something, I feel a corresponding touch: therefore what I see him touching must be what I feel him touching"), and these stories can be retold.

This research has been corroborated by recent work on "out-of-body sensation." Inspired in part by the rubber hand illusion, scientists have found that information streams from the body's perceptual system usually work together, but if they do not match up, if they are out of synchrony, the sense of an integrated body can fall apart. For example, Dr. Henrik Ehrsson found he could move a subject's sense of where his or her body was by shifting the subject's visual perception with virtual reality and manipulating his or her physical sensations. Dr. Ehrsson had each subject look through goggles that were attached to two video cameras placed six feet behind the subject such that through the goggles the subject saw his or her own back. He touched the subject's chest for a few minutes while simultaneously moving a stick with a hand on it under the camera lens so that the subject "saw" the same thing he or she felt. The manipulated synchrony of this information caused the subjects to begin to experience their bodies where their "eyes" were located. Further, when Dr. Ehrsson swung a hammer near where their imagined body was, the subjects registered huge jumps in their GSR (galvanic skin response) responses and shrieked or generally reacted as if they were watching their own body in pain.[42]

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[39] Ibid., 49–50.

[40] Matthew Botvinik and Jonathan Cohen, '"Rubber Hands 'Feel' Touch That Eyes See," *Nature* 39 (1998): 756.

[41] Ramachandran and Blakeslee, *Phantoms in the Brain*, 60.

[42] Blakeslee, Sandra. "Scientists Induce Out-of-Body Sensation," *New York Times*, 23 August 2007, http://www.nytimes.com/2007/08/23/science/23cnd-body.html (accessed 23 August 2007).

The sense of self can rebuild itself because it was a projection all along. The actor/character body that struts and frets for his or her hour upon the stage can make us feel startling new feelings or jump with fear: Is this because we are worried for the actor/character or because we are worried for us? Again, as Gallese suggests about the union made possible by mirror neurons: "By means of a shared neural state realized in two different bodies, the 'objectual other' becomes 'another self.'"[43] Onstage, every body is a phantom limb.

Conclusion

The interplay between cognitive science and performance theory provides important information about what Louis Montrose has called the "cognitive and therapeutic instrument" of drama and performance.[44] As Fauconnier and Turner argue, our language *develops*, it does not *reflect*, the identity of what is seen: "[I]dentity and opposition are finished products provided to consciousness after elaborate work; they are not primitive starting points, cognitively, neurobiologically, or evolutionarily."[45] If there is "work" to generate "identity," then understanding the nature of this work might lead to new stories, new images, and new blends. How we understand ourselves and our world involves a relationship between body and environment, language and imagination. Conceptual blending theory illuminates images evoked in the background of a scene that are yet central to the comprehension of the whole scene, a character, or the play. The brain's reliance on stories—connected with the evidence that these stories can be altered—suggests powerful implications for an art form that uses live bodies to tell stories, that renders visible new worlds, and that animates the seemingly impossible.

[43] Gallese, "Intentional Attunement."

[44] Louis Montrose, *The Purpose of Playing: Shakespeare and the Cultural Politics of the Elizabethan Theatre* (Chicago: University of Chicago Press, 1996), 40.

[45] Fauconnier and Turner, *The Way We Think*, 6.