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BRAINS WITH CHARACTER:
READING AND WRITING NEURONARRATIVE

TIMOTHY YACZO

**BRAINS WITH CHARACTER:
READING AND WRITING NEURONARRATIVE**

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctor

aan de Universiteit van Amsterdam

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Prof. Dr. D.C. van den Boom

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*For my sister Vic,
the strongest character I know*

Contents

Introduction	3	Brains in Character
Chapter One	34	Reading The Brain that Writes (Its) Self
	37	<i>Writing Plasticity</i>
	46	<i>Reading Plasticity</i>
Chapter Two	52	God Has Metastasized
	55	<i>Transforming Genre</i>
	61	<i>Metastatic Movements</i>
	65	<i>Morphing Plasticity</i>
Chapter Three	73	Fear and Panic in Iowa City
	74	<i>Situated Sensations</i>
	77	<i>“She Is Not Emotionless, But Rather Fearless”</i>
	81	<i>Quoting Cultural Anxieties</i>
	86	<i>The Laboratory as Literary Space</i>
Chapter Four	91	Wonder Under the Bridge
	95	<i>The Wonder of Sex</i>
	100	<i>Abridging Brains</i>
	107	<i>Character Matters</i>
Chapter Five	112	Your Brain in 140 Characters
	116	<i>The Spy Who Thought Me</i>
	124	<i>Context Re-Hashed</i>
	131	<i>Cooperative Brain Narratives</i>
Afterward	142	
Works Cited	146	
Acknowledgements	162	
Summary	165	
Samenvatting	168	

I think I will find some theory about fiction; I shall read six novels and start some hares. The one I have in view is about perspective. But I do not know. My brain may not last me out.

V. Woolf, *A Writer's Diary* (7 December 1925)

Introduction:

Brains in Character

In early 2000, a forty-year-old Virginia schoolteacher began visiting child pornography websites and soliciting sex workers at massage parlors. His activities, which he attempted to keep secret from his wife, were entirely out of character for him. Eventually arrested and convicted of sexually assaulting his prepubescent stepdaughter, a court ordered him to inpatient rehabilitation for sexual addiction or incarceration. Expelled after a short stint in a Sexaholics Anonymous program because he was unable to restrain himself from seeking sexual favors from employees and other patients there, he now faced lockup. The night before his prison sentencing, he came to the University of Virginia Hospital in Charlottesville complaining of a headache. Magnetic resonance imaging (MRI) of his brain “revealed an enhancing anterior fossa skull base mass that displaced the right orbitofrontal lobe” (Burns and Swerdlow 438). In other words, neurologists identified an “egg-sized” tumor growing inside his skull, which distorted the area of his brain “known to be tied to judgment, impulse control and social behaviour” (Choi). According to “orbitofrontal lesion research,” the case therefore “suggests that sociopathic behavior results from a loss of impulse control rather than a loss of moral knowledge” (Burns and Swerdlow 440). The tumor had caused his otherwise-normal sexual and social behaviors to malfunction. After removal of the tumor, his pedophilic behavior ceased, and he returned home after seven months. One year later, in October 2001, “he developed a persistent headache and began secretly collecting pornography again” (438). An immediate follow-up MRI, it turned out, “showed tumor regrowth” in the same area as before (438). The tumor re-resected, the man’s pedophilic behaviors again ceased, and he, as well as his brain, were once more back in character.

The tale of the man and his brain traveled promiscuously in culture. After the University of Virginia neurologists Russell Swerdlow and Jeffrey Burns presented their findings at the annual meeting of the American Neurological Association, many news outlets reported the curious case. A fascination common to those reports poses a question of character. The pedophilic character he became—which, especially because of the relapse, Burns and Swerdlow’s report made so clear—had nothing to do with a repressed childhood, a dodgy family life, the exercise he did or did not take, any violent video games played, or his socio-economic situation. Instead, the brain featured squarely as the cause of and solution to

the man's criminal activities. A brain therefore focalizes this narrative of mental health. But the links between the man, his brain, and an abstracted brain character grows more complex, and more storied, over time. Enfolded with a few fictional characters from John Cheever and Donald Barthelme, Daniel Akst recalls the Virginia man's fateful two years as a parable in *Temptation: Self Control in an Age of Excess* (2011), neuroscientist David Eagleman popularly relays the character as "Alex" in *Incognito: The Secret Lives of the Brain* (2011), and he features as the character "Michael" in Adrian Raine's *The Anatomy of Violence: The Biological Roots of Crime* (2013).

What is this connection between brain and character? Given pseudonyms like "Alex" or "Michael" to extract characteristics from a person, writers and reporters alike deposit those brains into cultural literature. Often didactic, brain characters instruct us about the state of our contemporary. Here, the cultural fascination with and circulation of the tumor-induced pedophile story insurrects many psychologically grounded plot arcs commonly ascribed to pedophilia. This function of the narrative tests our atlases of 'mental health' by familiarizing us with a different archetype characterized by neurobiology. As Akst teaches, in an age of neuroscience "behaviors once seen as issues of character...have been medicalized," which risks "subtly absolving us of responsibility and thereby denying our power over an ever broader range of human action" (9). In addition, brain characters instruct us about state-of-the-art scientific knowledge. Concretized by the optics and rhetoric of brain scans, the Virginia man familiarizes us with something called the right lobe of the orbitofrontal cortex, which, as the story goes, is evidently—and universally—determinant for impulse control, judgment, and social behavior. Finally, as Akst provokes, stories of brains with character ultimately compel us to reassess other cultural characters: those that populate the fictional worlds of Cheever and Barthelme, but, certainly with the Virginia pedophile, Nabokov's Humbert Humbert or even Thomas Harris's Mason Verger.

If certain accounts produce brains with character, what are the stakes of those accounts? What kinds of accountability do they offer or neglect? To what extent do accounts of brains with character shape how we inhabit our contemporary and the history of our contemporary? Crucially, how do accounts of brains with character bear on the accounts we give of ourselves? As the neurosciences unsettle autobiography and biography, how do we inhabit those accounts, and what literacies do they freshly shape?

The question of reading and writing those accounts focuses this dissertation's analysis. How can one write or read about the brain when it is one's brain doing the writing or the reading?

Two aspects with particular weight strike me about the question above. First, the slippage in crossing amongst 'one's brain' and 'the brain': this convergence and possible overlap of 'one's brain' and 'the brain' enacts both the rhetorical concerns and the material interests involved when speaking about and thinking through neurological issues today. The latter noun—'the brain'—brings to mind a hunk of wet tissue, while the former recalls that cantankerous old term 'the mind': one's personality, imagination, character, history, and relations. To speak of a distinction between them keeps at arm's length the idea that consciousness and experience matches up with neural activity. But does it? Is there always already a neurobiological basis for all experiences? That is, does brain activity equal consciousness? Neurophilosophy calls this the "hard problem of consciousness," and it has its archival routes back through the seventeenth-century writings of Descartes, and his positing of the mind-body dualism, and beyond to Plato (Weisberg). The problem is "hard" because even if science might exhaustively describe the functional, structural, and dynamical properties of the brain, a question remains: *why is it conscious?* To recognize the problem is to recognize how it marks the limits of what neuroscience—in the vernacular of science—is able to explain. Indeed, that question exceeds the theatre of neurology: *The Hard Problem* is the title and theme of Tom Stoppard's most recent play, which premiered at the National Theatre in London in January 2015 ("Tom Stoppard's"). Further, when I configure 'my brain' in my opening question as possibly distinct from 'the brain,' I depict a related problem of qualia: those "(first-person) feelings of phenomenal experience and the question of their integration within a (third-person) materialist, neuroscientific account of the mind" (Gaedtker 185). That is, even if neuroscience can comprehensively map out the architecture and functions and possible experiences of 'the brain,' is that the same thing as explaining 'my brain'? Noting this rhetorical and material gulf between first- and third-person accounts of experiencing the world, we can further ask what the limits are of imagining others' experiences: is one always already writing about one's own brain when writing about 'a' brain? 'The brain,' as evidenced in culture, certainly does not—and cannot—mean one thing alone. It is both a concept, where ideas of what the brain comes to mean in culture are constantly emphasized and understood differently, and an object, where the contours, capacities, and

comprehensions of that roughly one-and-a-half kilo collection of cells suspended in cerebrospinal fluid fall under the shifting scrutinies of scientists, scholars, and artists of many ilk. To riff Carver, what are we talking about when we talk about brains?

Secondly, of what do I speak when I speak about “writing” or doing writing? Are we to think of the inscription of signs and symbols as a mere byproduct of cerebral activity, the inky detritus of just-completed thoughts? The imperfect transcription of electro-chemical commotion? When, for instance, does it actually help to know that, when writing, “not only the sensorimotor and visual areas” are “active,” but also “the bilateral dorsolateral prefrontal cortex, left inferior frontal gyrus, left thalamus and inferior temporal gyrus and left basal ganglia” (Erhard et al. 19-20)? How does that spatial string of nouns and adjectives move one closer to grasping the energy implied in the activity of writing? At the risk of understatement, writing is a technology of communication that has undergone many renovations in the past six or so millennia. Tools, techniques, and terminologies change writing, and further writing changes the impressions those writings leave. Yet, from stone tablets to Twitter, writing can involve many body aspects: muscle pressure, calories, a chin to scratch, eyes, fingers, ears, and, if one writes like Dorothy Parker or William Faulkner, a heroic liver. The brain, too, is required for both motor control and imagination. But whose brain, or brains? As Roland Barthes imparts, the conceit of the sovereign writer is a fantasy: “a text” produced by a single scriptor is “a multi-dimensional space in which a variety of writings, none of them original, blend and clash. The text is a tissue of quotations drawn from the innumerable centres of culture” (“Death” 146). A single scriptor or a single brain neither nourishes nor manages a particular text, for one always conscripts others’ thoughts and previous inscriptions. (The bibliography bringing up the rear of this dissertation probably best attests to Barthes’s assertion.) More recently, and with a head for neurobiology, Daniel Dennett describes this narrative condition:

Our tales are spun, but for the most part we don’t spin them; they spin us. Our human consciousness, and our narrative selfhood, is their product, not their source. These strings or streams of narrative issue forth *as if* from a single source—not just in the obvious physical sense of flowing from just one mouth, or one pencil or pen, but in a more subtle sense: their effect on any audience is to encourage them (to try) to posit a unified agent whose words they are, about whom they are: in short, to posit a center of narrative gravity. ...Like the biological self, this psychological or narrative self is yet another abstraction, not a thing in the brain... (418)

Dennett figuratively teaches that we are not just creatures of narratives constituted by and through our communications, but that as we weave stories, stories weave us. The story of neural selfhood inspires the quest to localize the self *in* just one brain. To pan out a bit, one measure of the seduction of neuroscience is the sense that we can get beyond storytelling, beyond culture and cultural contexts, to discover truth in nature because (as the story goes) the material brain speaks a truth that culture conceals; upholding this conceit, then, is the fantasy that the body and the brain do not lie, and that a correctly calibrated technological instrument will reveal what subtends the self.

At least with regard to a single person writing and doing writing, part of what the new neurosciences contribute to critical discussions is that question of to what degree a brain balances mediation between motor control and imagination. Some neuroscientists rephrase the classic mind-body problem by subtracting the problem: creativity is part of cerebral activity, and cerebral activity is part of creativity. This rephrasing underscores cooperation rather than duality. But if the Cartesian binary is no longer such, when does the brain write and when does it merely type? One response comes from Semir Zeki, professor of Neuroesthetics—his bespoke discipline—at University College London. He announces that any distinction made between these activities is false, for “Art is a human activity and, like all human activities, including morality, law and religion, depends upon, and obeys, the laws of the brain” (“Statement on Neuroesthetics”). He frames art, and the function of art, as an extension of the functions of the brain, “through which all art is created, executed, and appreciated.” That the brain is sovereign, and that *all* human activity obeys the brain—that is quite a claim. Zeki asserts a logical hierarchy: because art is an expression of the brain, and, hence, neurobiology administers peripheral cultural activity, “the artist” therefore “is in a sense, a neuroscientist, exploring the potentials and capacities of the brain.” His “in a sense” smells of ideology, and my suspicion is bolstered by his anachronistic assertion that “in executing his work, Michelangelo instinctively understood the common visual and emotional organization and workings of the brain.” For the textual instead of visual, it is safe to say Zeki would, with great redoubt, avow something similar for Shakespeare, Tolstoy, or James Baldwin. Suparna Choudhury and Jan Slaby recognize a bold anachronism like Zeki’s as part of “the scientific reformatting of discourses on human nature” currently underway (9). Affirming Zeki’s creed might represent the extreme conclusions in the humanities egged on by the neurosciences: that the humanities operate, “in a sense,” as the applied neurosciences.

Novels and epic poems become a byproduct of a cerebral activity called writing/motor expression. Here, scientific reformatting anatomizes consciousness and culture in the same gesture: the cortex, the amygdala, and the hypothalamus displace the 'I' of the self, rather than commune through a relation with and within others, as with Barthes.

This reformatting presents a final aspect to the problem of writing, which concerns the role of the reader. If, according to Zeki, the brain is also the appreciator and creator of art—the actor doing the appreciation and creation—then what consequences for creating neuroscientific writing might that arouse? Neuroscientists labor under the premise that the laws of science dictate the results of their investigations as well as the ways they read and articulate those results. But if brains are the investigators as well as the investigated, then who reads whom? And when might encultured storytelling practices, therefore, betray neuroscientific 'reports' of the brain crafted through them? In the exchange amongst motor control and imagination, "the laws of the brain" transparently depend upon, and obey an art of interpretation.

Both of the concepts 'reading' and 'writing' begin to buckle under all the operations they attempt to contain or manage, such as scanning, mining, coding, decoding, translating, and arranging. Asking how one interprets reading and writing, and with what agenda one interprets readings and writings about the brain, demonstrates an array of artful practices in our contemporary. These preceding few pages condense the field of questions supporting my points of departure in this dissertation.

Neurophrasings

Asking the above questions may have begun as a cottage industry a few years ago, but they are now some of the most pervasive issues in culture. Succinctly, we are currently "in the face of neuroscience's expansion and unquestioned cultural and institutional capital" (Slaby and Choudhury 3). If knowledge is increasingly traded in the currency of neuroscience, how can we begin to track the effects of this?

Take universities as a metric. One observes a proliferation of interest in how the brain, or cognitive studies, implicates disciplinary canons and approaches. The frontiers of departments of neurology are changing, for the stakes today in knowledge acquisition and research are about more than the anatomy of axons and dendrites or the therapeutic treatments for neurological and medical diseases. Those concerns certainly still exist, but

evermore in universities, research questions reposition law, economics, education, philosophy, literature, politics, and other activities and disciplines through the prism of their purported neuropathological bases. In fact, the choices for degree programs depict this spreading out of thinking and learning. There is currently the (Orwellian-sounding) Center for Neuropolicy at Emory, begun in 2008; the Law and Neuroscience program at Vanderbilt, and Purdue's recently founded Center for Cognitive Literary Studies further demonstrate this. And if none of those particularly piques an interest, one can always be on the lookout for the follow-up to Georgia Tech's 2012 Neuro-Humanities Entanglement Conference to voice any remaining concerns. One might interpret this sea change in university departments as an auspicious sign that the speaking terms between the "two cultures" of science and humanities C.P. Snow identified in 1959 have finally warmed. Yet, as Choudhury and Slaby point out above, in this possible conversation the neurosciences speak much louder, "reformatting" classic disciplines by co-opting them. Duke's Institute for Brain Sciences (circa 2007) offers degrees in 'neuroengineering' (as has the University of Minnesota now) and also encourages students to apply neuroscience to their majors in order to "benefit from the synergy of interdisciplinary collaboration."¹ One example is a Duke student wanting to neuro-up the study of economics. Traditional "economic models leave room for questions—they don't explain the irrationalities we witness in the markets every day," the undergrad reports; she adds: "Neuroeconomics, on the other hand, could get there" (qtd. in Lawal). The "there" for which this undergrad yearns remains an unclear land of "irrationalities," but what is clear for her is that the primary vehicle for exploring whatever happens "there" will be found through the guiding dialect of "neuro." The rub: refashioned disciplines like Neuro Lit Crit and Cognitive Literary Studies, as well as objects of Neuroaesthetics, help one determine the velocity and direction of the neuro turn, and what this operation exposes is the increasing ways 'the brain' authors authority.

Grammatically and conceptually, then, the dominant framing is the 'neuro-' prefix. In both academia and popular culture, "the prefix 'neuro-' now occurs with startling frequency" (Jack 405). One of the main ways the 'neuro-' prefix gets its gusto—as noted above by the Duke undergrad—is by operating as a wield job for outmoded descriptions. For instance, "neuropsychanalysis, as its name indicates," remarks theorist Catherine Malabou, "is a bridge concept, a hyphen, between neurology and psychoanalysis" (*Wounded* 12). Take 'neuropsychanalysis,' then: the initial trochee brûléés the original pursuit, adding a sweet

¹ See <http://www.dibs.duke.edu/education>, accessed 14 July 2013.

new layer to that already well-yoked disciplinary endeavor. It retextures the familiar household name into something that promises more nutrition. Whether parted by hyphenation or thoroughly sutured to its antecedent term, ‘neuro-’ does work by framing and orienting interpretations “of what we thought we already knew” (Ellis 191). It inspires a cognitive, physiological, and metabolic scrutiny by propagating those various meanings, intensities, and qualifiers in different—seemingly limitless—contexts. ‘Neuro-’ corrodes previously held conceptions and polishes newly coined ones. When Dickinson poets that “the brain is wider than the sky,” one senses the arousal: the simultaneous capaciousness and concision that a ‘neuro-’ awareness affords. Truncation is practical too: Neuro*, written in a Boolean, internet search-term way followed by an asterisk, returns all the possibilities that prefix provides, and demonstrates the manifold cultural operators related to the concept.

And there are many *au courant* mixes on the march: neurophilosophy (Churchland), neuromarketing (Renvoise and Morin), neuroweapons (Noll), “neurojuridical tools” (Drobac and Goodenough), neuronarratives (Johnson) and neuronovels (Roth; Gaedtke), neuropolitics (Connolly), neuroplasticities (Malabou), and neuroeducation (Rich and Goldberg)...just to invoke a few. In short, there is a lot of “neuromania” about (Legrenzi and Umilta). Further, methods proposed to appraise this neuro-ness, and methodological possibilities to intervene in its cultural and power effects, also take diverse approaches: from analyzing “neurorhetorics” (Jack and Appelbaum), understanding screen culture’s “neuro-images” (Pisters), accounting for contemporary “neurocultures” (Ortega and Vidal), exposing science and art’s “neuromolecular gazes” (Rose and Abirached), to crafting an alternative “critical neuroscience” in response (Choudhury and Slaby). Widely heterogeneous questions asked, tasks undertaken, works experimented, and texts produced account for the work done under a ‘neuro-’ banner. With ‘neuro-’ the riches are vast; it is the stuff of a thousand dissertations and library shelf space measurable by the mile; today, it can bequeath clout, university press imprints, medical miracles, marketable commodities, degree-granting programs, tenure tracks—not to mention news coverage time, documentary film interests, derivative popular publishing, policy programs, etc. Its queer ability to touch almost anything remains one of the most exciting—and tiresome—things about ‘neuro-’.

So this dissertation draws in a long, deep breath. As ‘neuro-’ tends to reorder, redraw, and rethink the taken-for-granted in media, literature, life sciences, and everyday experience, I apprehend the appearance and usefulness of ‘neuro-’ as a species of knowledge within a

dominant, and contemporary, cultural frame. I pause, asking both how certain stories begin to frame, and even determine, our understandings of the brain, as well as how certain neurobiological narratives begin to discipline and to characterize our understandings of science's pursuits. Central to this thesis are analyses of how both neuroscience's articulations and articulations of neuroscience shape and address us: the ways we enter those scenes of address, how we inhabit them, and therefore how we proceed to make uses of them to shape what is given when we enter and re-enter those scenes. The critical task I take up is not just to analyze narratives themselves, but to explore this cultural work of shaping that makes them possible.

Legibilities and literacies are on my mind. To what do narratives of the brain reply? What might they hold in question, or hold as questionable? As the neurosciences survey more territory, often led by a vanguard of specialist scientists, some scholars apply it uncritically while others draw attention to its invasive qualities. I seek to analyze those stretch marks, to heed the margins of circulated stories, and to interrogate the shared characters and characterizations among narratives of neuroscience and narratives from neuroscience.

Narrating Brains

Why text? That is, why the 'narrative' part of this dissertation? At a moment in our history where pictures of (what are taken to be) the brain appear nearly everywhere, why intervene at the level of texts, instead of, for example, images or algorithms or scanning machines?

First, literary theorist Stephen Burn regards my central question of how we read or write the brain if it is the brain reading and writing as "the recursive curve built into neuroscience—the fact that the brain can only be understood by using the brain," and he understands its utterance as the "cognitive analogue to the textual concerns of postmodernism" (36). I take seriously Burn's paradox that the brain's burden of writing the brain is partly a legacy of the textual concerns of postmodernism. But there is another reason for my insistence on literature as well.

In the conclusion to his essay, "A Short History of Photography," Walter Benjamin makes the observation that at some point captions "must step in" to produce a photography that "literalizes the relationships of life" in order to unstick photography from "the approximate" (25). Most of us who have witnessed the pixelated red or blue or pastel bits and bytes displayed on a functional magnetic resonance imaging (fMRI) scan are likely at a

complete loss for meaning without further context, without some guidance on what to make of those images. *Where is the map's legend?* I find myself asking. One must be instructed that those colored zones are meant to convey areas of a brain doing work: cranial postcodes that 'light up' or 'fire' or are 'activated' when recording a certain task under certain circumstances using certain mathematics with certain machines. Now, certainly, equating fMRI images with photographs for the sake of my argument does not come without problems, and that uneasiness is analyzed elsewhere quite thoughtfully (Fitsch; Neely; Chelnokova). For one, neuroimaging does not rely on knowledge of angle or aperture or f-stops; rather, it requires specialized knowledge of nuclear physics, physiology, parametric statistics, and graphical rendering software: because of this complexity, there is "widespread heterogeneity among the design and results of neuroscience" images (Neely 3). Things become visible—they "light up"—on a brain scan only when objects measured (typically, blood oxygenation) cross a pre-encoded algorithmic threshold determined by a computer engineer. Thus, they are much closer to diagrams or schematics than photographs. And yet the appeal of brain images is commercially and popularly pervasive: "like photographs, neuroimages seem to provide evidence about real, recognizable objects: visual truths even their own producers cannot refute" (Neely 4). These visual "truths" must neighbor with written "truths," the accounts given of them. For instance, when arriving at the crucial passage in Tobias Wolff's short story "Bullet in the Brain"—whereupon the titular slug "ploughed through" the protagonist's brain "and exited behind his right ear, scattering shards of bone into the cerebral cortex, the corpus callosum, back toward the basal ganglia, and down into the thalamus"—one practically scurries back to those colorful brain maps to make some sense of the visual trajectory of it all (203-4). Stories like Wolff's animate, give context, and provide clues as to how to read images of the brain and think through what they aspire to narrate. It highlights the cooperative literacy required to mobilize the cultural work neuroscientific "truths" portend. "Will not the caption become the most important component of the shot?" Benjamin asks (25). Here, I argue that it is the narratives themselves that do the work of announcing neuroscience. After the advent of photography, this is the task Benjamin urges cultural critics to take up.

My interest in texts, therefore, comes from the sense that those who cannot comprehend or those who cannot 'read' brain scans are the new illiterates. But how *do* we read them? What types of literacies do they demand of us? What can we speak of when we

talk about legibility in this context? And how do the frames we encounter these narratives in—the scientific journals, blog posts, advertisements, policy initiatives, everyday conversations—speak back to the neurosciences, caption them? To reason that stories about the brain, or stories that make aware some crucial engagement with neuroscience, are just a pale ekphrasis of the native art of science, is to dismiss the cultural politics at work as well as unhelpfully interject a hierarchy of knowledge. When a scientist announces that their “findings describe distinctive signatures of brain networks,” the phrasing reflects the underlying metaphor of the brain as a text inscribed by sensory experiences (Chennu et al. 11). The proposition energizing this metaphor is that scientists can ‘read’ minds or ‘read’ brains, as if their experiments letter an unmediated transcription of a brain rather than a collection of disciplined data requiring interpretation. “Such usage, along with references to regions of the brain such as an ‘emotion center,’ ‘neural architecture,’ or ‘god spot,’ also involve spatial metaphors, which, like textual metaphors, seek to fix brain functions in particular spaces,” observe Jack and Appelbaum (426). The work of localization is able to take hoary, nebulous metaphors—like psychoanalytic “drives”—and give them form: for instance, Ariane Bazan and Sandrine Detandt from the Université Libre de Bruxelles announced in November of 2013 that the cerebral residency of Lacanian *jouissance* was the “mesolimbic accumbens dopaminergic pathway activation,” part of subcortical nuclei “circuitry” at the base of the forebrain (7). (Imagine the bliss of finally pinning that one down.) Moreover, in taking those spatial metaphors of brain regions seriously, we might be tempted to ask “do assemblies of neurons form a ‘text?’...the way Freud said the unconscious could be read like a text?” as Catherine Malabou indeed does (and later dismisses) (*Changing* 59). The real work of commentary and politics, given this situation, is not the advent of brain images but the process of describing, interpreting, and foraging for meaning in the wake of those images. Brains that produce cultural meaning are more than pictures, they are atlases of instruction, and some narrative orienteering is required today.

Mapping Neuronarrative

What kinds of stories are brought into being through the popularization of neuroscience, and what kinds of scientific interest are brought into being through stories? How do we write and read them? And, if distinguishing them from other types of stories is important, what do we call them? From the heroine struggling with a brain tumor, or the pharmaceutically

transformed profile of a sibling, to the villain whom we come to discover acts out of a neurochemical imbalance, these stories play out cultural, technological, and highly personal excitements and anxieties about the place and importance of brain knowledge today. They demand we learn from the vocabulary of scanning machines and the latest anatomies, they petition us to reconceptualize the neurological ‘health’ of historical and contemporary figures, and they encourage us to think through and with accounts of everyday life that centralize the importance of brain activity.

Specifically, we can identify a certain level of neurological focalization weaving its way through story frames. “Happiness and elation aren’t simply happiness or elation—they are the meta-effects of a prompted ‘dopamine-like receptor,’” observes Michael Sayeau on the neurosurgeon in McEwan’s *Saturday*. As interest increases for this type of introspection—frighted less by psychology and more by cellular chemistry—melancholy becomes a serotonin deficiency, attention becomes the noradrenalin-induced modulation of stimulus-processing, love is marked as a consequence of the secretion of centrally acting bonding hormones, emotional responses become serotonin re-uptake, and the difference between introverts and extroverts is a measure of neocortical arousal. Terms are newly brokered, and broken-through, by other terms, other vocabularies.

In 2008, Gary Johnson wrote an article for *Mosaic* entitled “Consciousness as Content: Neuronarratives and the Redemption of Fiction.” Johnson’s piece is casually regarded as one of the first uses of the term neuronarrative. In it, he discerns a new type of text, and describes these neuronarratives as “a work of fiction that has cognitive science as a, or the, main theme” (170). For him, neuronarratives “constitute an emerging subgenre of literature that can provide us with a glimpse of how authors are responding to scientific advances concerning the nature of human consciousness” (171). Johnson finds that as more and more neuroscientific pursuits and conclusions circulate into cultural discourse (171), authors are forced to rethink consciousness: both in the psychology of their readers and in the practice of writing it for their characters. “Neuronarratives,” Johnson argues, “allow readers to see the early results of this new way of thinking about consciousness” (172). He asserts that narratives of science generally, and neuronarratives specifically, serve two epistemic functions: they legitimate science as useful, and they translate scientific knowledge to a popular public (178-80).

At its most expansive, neuronarrative imagines a federation of stories and storytelling practices regarding the brain. Johnson reviews a group of qualifying texts under the term he coins, and his analysis focuses on the challenges neuroscience provokes for the craft of writing. This umbrella term may include, for instance, the collection of Dutch-language works published by the Uitgeverij de Brouwerij Brainbooks, which, as its brand-name mission suggests, publishes “Brainbooks” by authors who deal with themes or experiences of Alzheimer’s, ADHD, Urbach-Weithe syndrome, schizophrenia, depression, and many other topics. I write that these titles “may” participate as neuronarratives because the term is currently broadly descriptive rather than critically rigorous. More stringently, the term might apply to a limited group of stories where the storyteller feels compelled “to inform his or her audience about the current state of neuroscience” (Johnson 174), or where a character’s actions are optimized, essentialized, or legitimized by particular neurological conditions, ailments, changes, or enhancements.

Working after Johnson, and staging a critical attack on the appearance of so-called neuronarratives, Marco Roth, in 2009, writes that “Ian McEwan’s *Enduring Love* (1997) effectively inaugurates the genre of the neuronovel”: the first-person narrator, Joe Rose, “is a decent guy who has the bad luck to become the object of a love with no cause but the deluded lover’s neurochemistry” (“Rise”).² For him, widely mediatized information on neuroscience in general, and interest in neurochemistry in particular, “has transformed” “what has been variously referred to as the novel of consciousness or the psychological or confessional novel” “into the neurological novel, wherein the mind becomes the brain” (“Rise”). Roth takes it that “a neuronovel is a novel featuring a character with an identifiable neurological disorder according to contemporary medical science” (Interview). Disorder is the key term, here, for Roth’s umbrage at neuronarratives—or, in his parlance, neuronovels—stems in large part from the uncritical induction of character normality—their everydayness—from science’s study of abnormality: “Where the science is right now is in a very exciting place for scientists, ...but there’s still a lot we don’t know about how a normal brain functions at the molecular level. And so to me a lot of these novels end up short-changing the vast array of normal brain

² Stephen Burn disputes Roth’s chronology and considers Don DeLillo’s *Great Jones Street* as drawn “from the increasingly intense cultural power of neuroscience in the early 1970s” (38). “DeLillo provides a particularly vivid example of postmodernism’s engagement with the sciences of mind,” writes Burn, “precisely because his novels are so rarely recognized as cutting-edge neuronovels” (42).

function that's still out there—that we would call consciousness, and that used to be the purview of writers” (Interview). Yet he is not overly nostalgic about the classic twentieth-century novel of consciousness. As he points out, “You could say that the first neuronovels were useful correctives to, for instance, the range of trauma-based fictions that were coming out in the early 90s in the United States in which everything was explained by childhood sexual abuse” (Interview). Here, at best for Roth, neurobiology gifts clarity and vivification to abstract psychologies in characterization, even if Roth voices a territorial dispute over their scientific reformatting.

For Andrew Gaedtke, a “neuronovel” is a “category of fiction... distinguished by its sustained adaptation and assessment of recent work in cognitive science—an expanding interdisciplinary field that struggles with its own conceptual dualisms and therefore becomes a useful vehicle for revisiting the ‘two cultures’ question” C.P. Snow first forwarded about the cultural gap between science and the humanities (184-85). Its salient feature for Gaedtke is that it is a platform to engage both the cultural products of science and science’s cultural appeal (184-85). Gaedtke interrogates how well neuronovels deal with qualia in order to reconcile the humanities and the sciences. As I note in the opening, the problem of understanding qualia lies in reconciling the personal, phenomenal experience(s) of consciousness within the third-person, observational, and ostensibly objective sciences, and is taken up in philosophy (e.g., recall Thomas Nagel’s “What is it Like to Be a Bat?”) and the natural sciences (notably by Erwin Schrödinger in the 1950s).³ The taste of licorice or the feeling of frustration, for instance, is not readily readable as a neural cipher; what I mean is that ‘frustration’ is not like neural activity of intensity 77.5 in region 94a of the brain under condition MF/C5. ‘Frustration,’ is best describable by the one who experiences it, and even

³ Schrödinger writes: “The sensation of colour cannot be accounted for by the physicist’s objective picture of light-waves. Could the physiologist account for it, if he [sic] had fuller knowledge than he has of the processes in the retina and the nervous processes set up by them in the optical nerve bundles and in the brain? I do not think so. We could at best attain to an objective knowledge of what nerve fibres are excited and in what proportion, perhaps even to know exactly the processes they produce in certain brain cells whenever a mind registers the sensation of yellow in a particular direction or domain of our field of vision. But even such intimate knowledge would not tell us anything about the sensation of colour, more particularly of yellow in this direction the same physiological processes might conceivably result in a sensation of sweet taste, or anything else. I mean to say simply this, that we may be sure there is no nervous process whose objective description includes the characteristic ‘yellow colour’ or ‘sweet taste’, just as little as the objective description of an electro-magnetic wave includes either of these characteristics” (155-56).

then the term ‘frustration’—the feeling’s linguistic condition—is sometimes too general and too borrowed for the emotional specificities one attempts to make it convey. The contours of a precise sense of frustration at a certain time for a particular person has such informational, temporal, and cultural complexity that it would be impossible to deduce and to reproduce by deliberate technological investigation. ‘Frustration’ requires narrative, not measurement. And yet, simultaneously, ‘frustration’ for that person *materializes* somehow: thoughts and emotions require voltage, and sodium and ion channels, and glutamate to even arise to the level of conscious feeling. But to gerrymander that emotion into a database of neural and synaptic contrivances would be both an abuse of the term and of the person experiencing it. To risk an oversimplification of the problem of qualia: while ‘frustration’ is not witnessed without synapses, synaptic connections cannot exhaustively witness ‘frustration.’ Gaedtke analyses how this persistent problem in the (neuro)sciences productively problematizes narrative style in the neuronovel, and thus, the relationship is one of “mutual influence” (187). For Gaedtke, the problem of consciousness and the mind-body problem revealingly collide in narratives. Literature allows one to proverbially step into another’s shoes, to empathize; neuroscience cannot account for the sensation of empathy even when it attempts to resolve its mechanics. The “state of the art” in the neurosciences for dealing with questions of empathy are “mirror neurons,” which is the neurological “motor system” that “is involved in understanding the actions and intentions of others” (Ferrari and Rizzolatti). But as Roth reminds us, “There’s a difference between what is happening at the chemical level and how we experience things. And our experiences of things may be chemical experiences but we still don’t really even want to have the language to describe them chemically” (Interview). To riff E.M. Forster, if the queen died of grief, knowing that the queen died of mirror-neuron-induced grief does little by way of adding depth to the plot. For Gaedtke, though, whether decorative or distracting, brain-inflected neuronarratives in literature and culture that ricochet and speak back to the narratives of science represent a fruitful way to appraise the contemporary circulation of knowledge.

Ava Easton and Karl Atkin try to understand neuronarrative more expansively and historically by taking into account the non-fictional medical narratives of physician write-ups as well as autobiographical patient accounts. In this approach, “the origins of the neuronarrative begin in the early 19th century with often a single case history of someone with a neurological disease, written for the science of understanding the brain, thereby

contributing to medical knowledge of disease” (35). Contra Roth, they write that “these neuronarratives resulted not in the victimization of the subjects therein nor in reader judgements, but in curiosity, understanding and empathy” (36). Here, Alexander Luria and Oliver Sacks are precious to them, for they “created a new genre of literature describing people who had amazing abilities or limitations” (36). But those neuronarratives that are the published accounts of people’s own neurological ordeals can do further cultural work by speaking back to the sciences. They “set their own agendas, ranging from promotion of understanding and political activism, to records of last testaments for those with degenerative disorders,” and in doing so “health professionals can explore and engage with the experiences of people affected by neurological conditions” (36). Here, what Easton and Atkin contribute is an acknowledgement of a discursive loop, where medical sciences read neuronarratives both to texture experiential contact with individuals and in an effort to bring greater precision to neurobiology.

Stephen Burn identifies literary criticism’s watchfulness of neuroscience in narratives as too “often conceptualized purely at the level of plot” (36). He spurns Johnson’s thematic model of neuronarrative as “a schema” that “neglects the novel’s larger (and non-narrative) bandwidth and overlooks one of the most important aspects of the neurological revolution: its invasion of nearly all areas of contemporary existence” (36). Instead, he favors analysis through what he (and others) calls the “syndrome novel.” For him, these literary objects are both a subgenre of postmodernist writing and the inevitable outcome of postmodern concerns and emotions. Emphasizing the psychological poetics of neurological ailments through their oblong approaches and self-reflexive skepticism, syndrome novels “dramatize behaviors...that are attributed to the brain’s physiology and that fall within the extreme bounds of normal cognitive function” (40). His object of analysis therefore engages much further into cultural history than Johnson, Roth, or Gaedtke, and is located after Easton and Atkin’s developmental chronology. Don DeLillo’s oeuvre becomes the touchstone for his argument. Aided by the syndrome novel’s attention to neuroscience, Burn finds that “neuroscience shapes the architecture” of DeLillo’s novels in the styles of parts of books like *Great Jones Street* and *Ratner’s Star*, which “adds a further dimension to DeLillo’s treatment of character” (40). Similarly, “*Underworld’s* division into two halved circles suggests the split-hemisphere structure of the brain,” which makes for “encouraging the reader to ask ‘what is the connection between Us and Them, how many bundled links do we find in the neural

labyrinth?” (41). Here, Burn offers how his model picks up on DeLillo’s novels’ self-awarenesses, which are “designed to remind the reader that their own experiences take place within biological constraints” (40). To this end, DeLillo’s work has “a polyphonic effect, its vectors simultaneously arcing toward the cultural and historical specificity prized by contextualist studies and the abstraction of what Patrick Colm Hogan calls ‘universal human properties’ conceived at ‘higher levels of explanatory generalization” (42). It’s a move away from indexing authors or works for their particular practices or nods to contemporary issues. Because “DeLillo’s syndrome narratives build plots around individual characters’ psychologies,” Burn’s theory would appear to redeem Gaedtke’s interests to some extent (42). That is, for while scientific and “psychological theories offer usefully clear and systematic accounts of how the mind works in the abstract,” it imparts how “literary fiction pulls us away from abstractions and towards specifics, reminding us of the complexity of every individual mind” (Tate). The critical promise here, as Burn might agree, is that perhaps DeLillo, for instance, can help us understand something about neuroscience as equally as (or more than) neuroscience can help us understand DeLillo.

Francisco Ortega and Fernando Vidal take stock of the wider renovation in the academy as well as in particular texts. As noted above, they observe that burgeoning “neuroliterary field” of “neurodisciplines,” which are marked by “the assimilation of a neuroscientific idiom into literary narrative and the neurologization of literary analysis” (329). And while Ortega and Vidal probably capture Burn’s eye-rolling and gravitation toward postmodernism as a master frame and giver of subgenres when they detect a “larger ‘neurocultural’ context” of neuronarratives, they eschew an investigation of those engagements in favor of assessing “the coincidence between the emergence of [the discipline of] Neuro Lit Crit and the publication of novels that neurologize consciousness and represent characters in neurological terms” (338). To be sure, Ortega and Vidal explain that “the neural turn of mind is as such a recent phenomenon”; although, when “considered in the *longue durée*, the realism of neuroliterary interpretations is a late avatar of an extremely ancient tradition” they identify as going back “at least to” Homer (331). But neither can they quite resist the temptation to draw larger conclusions about a cultural moment when they pursue neuronovels’ generic emergence as “a recent phenomenon.” For Ortega and Vidal, neuronovels “turn brain mechanisms into a constitutive part of the characters rather than using them only as an explanation of their psychology and behavior” (337). To this end, they

reason that this sustained focus “is also why giving them a collective name with the prefix *neuro* is justified as a means of differentiating them from earlier fictions” (337). Their conclusion fits a precarious consensus of sorts in literary analysis whereupon the motif of brains-in-literature and literature-in-brains now warrants distinguishing some texts from others. However, identifying certain texts as a means, or even a method, of analysis may leave one little but taxonomy by which to understand our contemporary.

What precedes above constitutes a brief exploration of the current archive of neuronarrative. I will not follow, redistribute, or sharpen that archive in this dissertation, but, instead, will follow objects that sometimes converse with that archive in order to understand the cultural work of shaping at play in its very formation of our neurobiological contemporary. Part of what distinguishes my analysis of neuronarrative is a skepticism that the concept itself distinguishes, as a move away from, other narratives. My interest in neuronarrative—generic or historical—arises from an awareness that storytelling practices, critical practices, and neuroscientific practices today *rehearse* all of the conversations, doubts, excitements, and proscriptions noted above. I therefore wish to explore the idea that texts or practices one might desire to call a neuronarrative is a strategy for coming to terms with an always-shifting theatre of humanness architected by technology and text. How to talk about them, what gives each their energy, believability, and relevance therefore guides my exploration.

Narrating Neuronarrative

Johnson, Roth, Gaedtke, and Ortega and Vidal all use the word “new” or “recent” to describe the work of neuronarrative. But how true is that?

Launching a recent lecture in Amsterdam, A.S. Byatt posed the question of “when did the novel become scientific?” (Byatt). It was not a rhetorical question for Byatt, and she answered herself with a date and a name: mid-nineteenth-century George Eliot. Byatt reasons that the descriptions of farm life in *Middlemarch: A Study of Provincial Life* appear so meticulous because scientific novels “are novels about order.” In Eliot’s *Middlemarch* “the language has rhythms quite other than the language of earlier novels” because the scenes with an “I” narrator take on an “authorial voice” and because Byatt feels the passages devoted to Lydgate discovering his “scientific vocation” are some of the strongest. “Scientific ideas did not merely filter through into the metaphors and images of [Eliot’s] work,” writes Sally

Shuttleworth, “scientific ideas and theories of method affected not only the social vision but also the narrative structure and fictional methodology of her novels” (ix, x). Eliot famously described her own writing as “simply a set of experiments in life,” particularly interested in attending to, conversing with, and contesting dominant scientific proclamations and theories, such as August Comte’s ideas of “social physics” (Postlethwaite 103, 106). The theory of “organicism,” through which, for instance, psychology and biology were fused by Comte and G.H. Lewes, was the determinism of her day, and “Eliot employed scientific theory to achieve narrative resolution of the problems addressed by the organic social metaphor” (Shuttleworth 17-19, xiv). Eliot’s early interest in the natural sciences, for Byatt, demonstrates a paradigm shift in literary media.

Tracking the productive, leveraged connections amongst science and art highlights other historical routes. Gertrude Stein befriended William James at Radcliffe and published two papers on “motor automatism” in automatic writing before completing her undergraduate study; at the new Johns Hopkins School of Medicine she studied neuroanatomy, specifically the nucleus of the posterior commissure, before dropping out and immigrating to Europe (Golden 55-56). Virginia Woolf claimed that the “psychology” within her novel *Mrs Dalloway* “should be done very realistically,” for “one wants the effect of real life” (qtd. in Wussow 420). Walt Whitman worked in US-American Civil War hospitals and corresponded for years with Weir Mitchell, the neurologist and writer who coined the condition ‘phantom limb’ syndrome (Cervetti 172-74). Whitman also kept up with phrenology, the—pardon the anachronism—brain science of his day, and even appropriated its terms “arnativeness” and “adhesiveness” for his own writing (Mullins 170). Samuel Taylor Coleridge, when probed as to why he attended so many public lectures on chemistry in London, replied: “To improve my stock of metaphors” (Nichols 220).

I do not wish to belabor the point. Through a certain accent to speaking about the arc of the history of literature, there are not too many ‘new’ things about which to report when it comes to questions of the interaction between narratives and sciences. ‘Influence’—or the anxiety of it—is made apparent in a brief history like the one above. Contamination anxiety is another way to read this dialogue, and it happens to be the way Roth prefers to frame his criticism: the neuronovel is “part of a migration from crime genre fiction into literary fiction. Thrillers have used more medically precise vocabulary for serial killers, but I’m more interested in literary fiction” and the ways neurochemical characters have become “a trend or

a tendency in novels” today (Roth, Interview). I could shuttle Byatt’s question into something like ‘when did the novel become neuroscientific?’ and I might arrive at a name and date the way Roth has, or an affect and a critical-theoretical movement the way Stephen Burn has, but those answers would be stable in ideological archival practices alone, requiring additional hierarchy and bracketing of literature.

Given the above, the seduction would be to claim that there is a certain ebb and flow over time amongst literary practices and scientific practices, whereupon the novel emerges each time renewed in light of a scientific revolution as the most advanced contemporary technology. It is an idea that closely edges the recognition of neuronarrative as a “late avatar of an extremely ancient tradition,” as Ortega and Vidal do. While Ortega and Vidal are in the right state of mind on this question, their analysis, like the one I offer above, unfortunately favors tracking literature as it poaches varying sciences of the day throughout history (333-37). Instead I’ll insist on a phrasing I use earlier in this Introduction: cooperative literacy.

David Lodge elucidates the cooperative literacies—literary conventions and devices that inspire and write scientific accounts, as well as sciences that instigate new modes of description in literature—in his essay “Consciousness and the Novel.” Historically tracking the different crafts of representing experiences of consciousness in literary forms, Lodge shows, demonstrates that distinguishing the scientific-driven influences from their larger cultural incubations is an untenable analysis. Lodge tracks representations of consciousness as a cooperative art apart from and across the sciences in several forms. From lyric poetry (10) to focusing on the habitual and quotidian “stream-of consciousness fiction, where it is called interior monologue—in Joyce and Woolf” (35), or even “colloquial confessional mode—in Nick Hornby’s *How To Be Good*” (35), literary forms constantly confronted their own limits. Lodge compares Henry “James’s use of a technique known as free indirect speech, or free indirect style” (37), which “Jane Austin discovered” while rewriting *Elinor and Marianne* as *Sense and Sensibility* (46), to Daniel Defoe’s and Samuel Richardson’s early attempts to intimate “empirical forms of narrative like autobiography, confessions, letters, and early journalism” (39) in order to demonstrate that writers influenced other writers and conventions of linguistic presentation of character thoughts. When referring to the sciences, Lodge reminds us that Freud’s “science” writing is more illuminating as a key development in narrative “literary skills” because it “encouraged the idea that consciousness had a dimension of depth, which it was the task of literature, *as of psychoanalysis*, to explore” (60-61; my

emphasis). Linking not the sciences but technology to storytelling, Lodge writes that dialogue-heavy stories became possible, after the influence of cinema, to describe all the surfaces of events “beneath which there is a huge mass of invisible subjective emotion which the reader gradually apprehends” (70), employed by writers like Evelyn Waugh and Ernest Hemmingway. Waugh compares his own dialogue-heavy surface stories to “cinema films in which the relation of caption and photograph is directly reversed; occasionally a brief vivid image flashes out to illuminate and explain the flickering succession of words” (qtd. in Lodge 73). Instead of issuing an analysis that frames the history of consciousness-in-the-novel as a literary ‘evolution’ that progressed in tandem with scientific and technological developments, Lodge shows that literary concerns with consciousness and scientific concerns with consciousness cooperatively inscribed and cooperatively read one another’s frustrations, successes, and discoveries across different times.

My interest in the concept of neuronarrative comes from the hypothesis that it can offer a way to read the history of our contemporary by acknowledging the cooperative entanglement of science and literature. What do I mean by this? Let me offer an analogy to another, previous, cultural infatuation: DNA. Speaking of genetics today often recalls a rusty ‘nature versus nurture’ binary so pervasive to popular conversation and critical theory of the 1990s. DNA proved an exciting idiom, and accounts that explore DNA (or rely on it for explanatory needs) certainly negotiate our misunderstandings, and our fantasies about it (think of Crichton’s *Jurassic Park*, Caryl Churchill’s play *A Number*, James BeauSeigneur’s popular *Christ Clone* trilogy, or Jeffrey Eugenides’s *Middlesex*). The temptation today might be to claim that the neurosciences supplant the idiom of DNA by way of ‘neuronarrative.’ To this end, consider Dorothy Nelkin and M. Susan Lindee’s *The DNA Mystique: The Gene as a Cultural Icon*. An excerpt:

One of the most important entities in the search for an essential, unifying biological principal, then, has been DNA, the so-called “secret of life.” In the 1990s geneticists, describing the genome as the “Bible,” the “Book of Man,” and the “Holy Grail,” convey an image of this molecular structure not only as a powerful biological entity but also as a sacred text that can explain the natural and moral order. Former director of the Human Genome Project and Nobelist James Watson has proclaimed that DNA is “what makes us human.” “Is DNA God?” asks a skeptical medical student in an essay in *The Pharos*, a medical journal: “Given [its] essential roles in the origin, evolution and maintenance of life, it is tempting to wonder if this twisted sugar string of purine and pyrimidine base beads is, in fact, God. (39-40)

Today, unfortunately for Nelkin and Lindee writing in 1995, scientists have read that secret-book/grail/divinity entity/text. And its appendices. “Within the limits of today’s technology, the human genome is as complete as it can be,” reports the Human Genome Project, adding that “quite a number of additional goals not considered possible [when research began] in 1988 have been added along the way and successfully achieved.”⁴ The task remaining, according the consortium, is “to interpret the human sequence.” Twenty years later, the everything-will-be-determined-by-genetics rhetoric Nelkin and Lindee engender above comes off as too conspiratorial and too melodramatic. But while Nelkin and Lindee’s book was concerned with the ways by which the concepts of the gene and of DNA altered everyday life, they focused their most interesting analysis on the ways by which popular imagination influences the direction and velocity of research. Thus, the critical intervention provided by the sociologist writers, however, can still find relevance today: in chronicling how cultural conventions and idioms (which previously may have relied on an ethics of and decoding through blood or ‘seed’) are updated to contemporary vernacular and appeal, they demonstrate that biotechnology does not just cause a rephrasing of knowledge, but a re-imagination of it.

The above analogy prompts the critical promise I am persuaded to worry over through the objects this dissertation encounters: that the self-reflexive “difficulty of writing a neuronovel” Roth identifies (“Rise”), or the “recursive curve” interior to both neuroscience and neuronarrative Burn pinpoints, do not allow us to read what we know about ‘nature’ or consciousness with more veracity, but “give us a new sense of all that we don’t know” (Turchi 226). This point of departure tests the possibility that neuronarrative renegotiates a privileged hermeneutical instrument not by displacing it through a process of “literary Darwinism” but retexturing and rewriting the archaic to allow contemporary legibility (Pagan 159). This thesis does not audit the distortions, omissions, and convenient oversimplifications of neuroscience research as it irrigates contemporary culture in literature. Cooperative literacy implies other operations than idealizing disciplinary texts that ‘work together’ by seeking out how literacies parody and/or cross-examine each other’s intellectual property. Through particular objects I will analyze, the wager is that brains with character provoke new atlases of

⁴ See <http://www.genome.gov/11006943>; accessed 13 Dec. 2014.

instruction and that holding narratives that orient us in question enables productive scrutiny about the stakes of cooperative literacy that neuronarrative invites.

A hint that this promise is a viable one comes through in a narrative of neuroscience that is now “perhaps the most globally appreciated prank to ever make use of an fMRI scanner” (Margulies 282). It is referred to as the ‘salmon of doubt’: researchers at Dartmouth placed an Atlantic salmon in an fMRI machine and scanned the fish while showing it “emotional pictures,” like “a triumphant young girl just out of a somersault” (Sanders 16). While the researchers “could clearly discern in the scan a beautiful, red-hot area of activity that lit up during emotional scenes,” there was a key problem: “the fish was dead” (16). What the experiment reveals, rather than the limits of (postmortem) piscine empathy, are the limitations of neuroscientists’ technology: the limitations of their speech. There are two impacts to this: first, the exposure of the experiment teaches the public about the inscription techniques used by neurosciences to calibrate ‘the brain’ into something legible, and, second, this particular “methodological controversy” of scientific communication pressured neuroscientists themselves to rethink how to better caption their findings and reappraise the “independent reliability” of their own technology’s ability to communicate conclusions (Margulies).

Genres of Neuronarrative

Discussants of neuronarrative, or neuronovels, cannot escape the taxonomy noted above. “A growing list of narrative works, including [Richard] Powers’s recent *The Echo Maker*, Ian McEwan’s *Saturday*, Jonathan Franzen’s *The Corrections*, and A.S. Byatt’s *A Whistling Woman*, follows suit in foregrounding the emerging fields of neuroscience and neurobiology,” writes Johnson (170-71). “Since 1997, readers have encountered, in rough chronological order, Ian McEwan’s *Enduring Love* (de Clérambault’s syndrome, complete with an appended case history by a fictional ‘presiding psychiatrist’ and a useful bibliography), Jonathan Letham’s *Motherless Brooklyn* (Tourette’s syndrome), Mark Haddon’s *Curious Incident of the Dog in the Night-Time* (autism), Richard Power’s *The Echomaker* [sic] (facial agnosia, Capgras syndrome), McEwan again with *Saturday* (Huntington’s disease, as diagnosed by the neurosurgeon protagonist), *Atmospheric Disturbances* (Capgras syndrome again) by a medical school graduate, Rivka Galchen, and John Wray’s *Lowboy* (paranoid schizophrenia),” as Roth catalogues (“Rise”). “Novels such as Powers’s *Galatea 2.2* and *The*

Echo Maker, McEwan's *Enduring Love* and *Saturday*, [David] Lodge's *Thinks...*, and John Wray's *Lowboy* adapt the discourses and debates that have structured cognitive science for the last several decades while demonstrating their implications for the form of the contemporary novel," Gaedtke reiterates (185). "Among other instances [in addition to McEwan's *Enduring Love*] of the same genre, we could mention Rivka Galchen's *Atmospheric Disturbances* and Richard Powers's *The Echo Maker* on Capgras syndrome, Mark Haddon's *Curious Incident of the Dog in the Night-Time* on autism; Jonathan Lethem's *Motherless Brooklyn* on Tourette's syndrome; McEwan's *Saturday* on Alzheimer's disease and Huntington's disease; and John Wray's *Lowboy* on paranoid schizophrenia," Ortega and Vidal repeat (333).

Apparently, scholars both supportive and critical of neuronarrative all troll the same skinny shelf at the bookstore. Were literary theory a democracy, the votes would be in on an inventory of neuronarrative. But how does one come to greater understanding about the stakes of writing and reading by tabulating genre?

In what is likely the queeniest retort to nearly all spats over literary genre, Henry James snaps "There are bad novels and good novels, as there are bad pictures and good pictures; but that is the only distinction in which I see any meaning" (68-69). Even so, his adjudication of generic distinctions draws attention to both the falsely objective and vacuous nature of the endeavor. "Delimitation, classification, typology, it is all very nice as a remedy to chaos-anxiety, but what insights does it yield?" imparts Mieke Bal (226). Finding the right folder to file away neuronarrative-like literature might provide balm to skeptical scholars or writers or readers, but it does little to encourage an engagement with a particular text's specificity when addressing the fact that today's literature is cooperatively written with, against, through, and in spite of the neuroscientific revolution. Forging the genre neuronarrative and piling up stories one deems fitting underneath that moniker (or discarding ones that do not) is rather a circular way of reasoning: the gesture becomes one of classifying texts as a method of analysis rather than understanding texts on their own terms. "There is no direct logical connection between classifying and understanding texts. And understanding—if taken in a broad sense that encompasses cognitive as well as affective acts, precisely, not distinguished—is the point," Bal adds (226).

Further, it occurs to me that the act of partitioning content reproduces the scientific impulse of domesticating chaos (into a philology of genre), and encourages an orientation of

understanding to what texts are rather than what they do, respond to, celebrate, or shudder at. Taken to an extreme, in an attempt to master the archive of neuronarrative, one might be seduced (as Brenda Elliot, I argue, has) to follow a line of argumentation that concludes with a decision that, “Art is, among an infinite variety of other definitions, the human expression and record of experience and movement through the liminal. Art is a neuronarrative archive of liminal experience, holding up a mirror to both subjective and objective features of the experience, allowing us to revisit it, speak about it, and learn from it” (97). In her account, art is squarely the accumulated residue, the traces, of human brain activity. I find her claim extraordinary in that she retrospectively re-territorializes cultural expressions and practices to accord with a vision of culture dominant in a passing present. I see her conclusion, which privileges coherency of artworks as colorations of brain processes, as a chief risk in allowing neuroscientists and their eager scholars in the humanities to domesticate myriad artwork and texts and music as examples of a genre. As John Frow writes, the current “understanding of genre [is] as [a] prescriptive taxonomy and as a constraint on textual energy and thus the shaping of accounts” (“Reproducibles” 1627), because “to speak of genre is to speak of what need not be said because it is already so forcefully presupposed” (*Genre* 93). In short, classifying texts as they obey a logic of neuronarrative threatens to reduce what can be known about what work they do within culture to what is already known about that generic logic.

Instead, this project tracks the concept of neuronarrative through several objects. These objects help me inquire into the ways the forging of a genre is also a foraging for genre, a way of coping with the anxieties and demands that the neurosciences—and their itinerant discourses in cultural productions and exchanges of dialogue, philosophy, desire, chemicals—imbue on livable life. Following Frow, the more culturally productive lines of question ask “what do we do with genre classifications?” (*Genre* 2) and, with regard to specific objects in culture, he inspires analysts to ask of texts “what kind of world is brought into being here?” (“Reproducibles” 1633). The prevailing assumption holds that to speak of genre is to speak of genre limitations. Crucially, however, thinking and uttering those limitations also re-adjusts them. By gathering information, fantasies, data, observations, and sensations to form a text, texts also gather readers who form observations, fantasies, sensations, information, and data as a result. As transfer points and exchanges, texts do cultural work to negotiate the presence of information collected in neuroscience as well as to negotiate our collective present in neuroscientific information. Genres discipline but this exchange also disciplines them.

Taking the effort to closely read texts and the ways we inhabit them allows us to appreciate that “texts—even the simplest and most formulaic—do not ‘belong’ to genres but are, rather, uses of them; they refer not to ‘a’ genre but to a field or economy of genres, and their complexity derives from the complexity of that relation” (*Genre 2*).

Although cognizant of its place within a history of dealing with and representing consciousness in texts, Johnson, Burn, and Ortega and Vidal all suggest that the concept of neuronarrative in literary theory is a relatively recent phenomenon. To this end, the opportunity that Frow’s exploration of genres promises is a set of analytical tools to work with genre as “a framework for processing information and for allowing us to move between knowledge given directly in a text and other sets of knowledge that are relevant to understanding it” (*Genre 80*). He compels us to productively rethink the “implicatures”⁵ of genre only after we approach individual texts as uses and abuses of narrative conventions, and that each work can generate “a much larger structure of meaning which is not ‘contained’ in what the text explicitly says” (77). Frow offers a retexturing of the place of theory today, for he is aware that there is really nothing new to debates about genre and nothing about the dubbing of genres to add to debates about newness and contemporaneity. Yet, the inability for scholars like Johnson or Elliot to resist sketching grander conclusions about a cultural moment through recourse to genre is precisely why his tools for intervention are analytically apt.

Chapter Summaries

When I began my PhD project, Dick Swaab had just published *Wij Zijn Ons Brein* [*We Are Our Brains*], and it seemed to me that his perspective of writing though “neurobiography”—the premise that brains write biography—was on everyone’s lips in Amsterdam. Shortly thereafter, Sebastian Seung’s *Connectome: How The Brain’s Wiring Makes Us Who We Are* entrenched this feeling. About halfway through the research and writing of my dissertation came the reactionaries: Sally Satel and Scott Lilienfeld published *Brainwashed: The Seductive Appeal of Mindless Neuroscience*. Preparing for my defense this year, Louise Barrett’s *Beyond the Brain: How Body and Environment Shape Animal and Human Minds* caught my eye at the Atheneum bookstore. If the whim of what is publishable is any indication of a cultural conversation about our brains and their place in culture, it has already

⁵ Frow’s investment in this term is a nod to Paul Grice.

proven a rocky relationship. From disciplinary eavesdropping to craving all-things-brain as a balm to questions about identity, disease, psychology, economics, law, spirituality, warfare, and anything else to help our passing present feel more contemporary, relevant, and interesting when crowned with a ‘neuro-’ prefix, one may not be misguided in the assumption that we quickly wished to distance ourselves from that fashion.

Thus, this dissertation arrives at a curious time. It intervenes after most of the hype, after George H.W. Bush’s “Decade of the Brain,” and after the establishment of Barack Obama’s BRAIN Initiative and the EU’s Human Brain Project. It takes place when both ‘brains’ and ‘neuro-’ are already full-fledged Things On The Internet, and when both ‘brains’ and ‘neuro-’ enjoy special tags in online bookstores and blogs. But it also takes place before the sentiments supporting the ‘neuro-’ prefix—becoming overwrought, tired, and marched across too much territory—are discarded, and before the pre-frontal cortex becomes passé, yesterday’s academic fashion. It intervenes before a vantage point is squandered, before the possibility that neuroscience, so infused and instrumental in culture, powers away unnoticed in our everydayness. And yet it also arrives through the academy, a place not unaccustomed with watching grant-minded scholars rush out to genuflect at neuroscience as it passes by on its litter. Here, now, an excavation of the reading and writing of those different presents.

Several pursuits help organize this dissertation. First, each chapter holds in question what, or who, is a brain with character. Analyzing the means by which each object possibly produces a brain with character stimulates the cooperative literacy investigated within each chapter. Second, the choice of exploring contemporary objects—objects made after the emergence of digital neuroimaging technologies—grounds my analysis. This choice demarcates my work from other critical work that takes up historical objects as neuroscientific or literary-theoretical problems, but it also functions as a way to keep contemporariness as an analytical issue itself. The historical forces of neuroscience’s cultural influence through literature remains a concern, but only insofar as certain contemporary narratives produce acts of recall in the present in order to write accounts of the present. Third—it now occurs to me in retrospect, is to think alongside Catherine Malabou. A likely outcome of both the timing of her work published in English as well as of a topical resonance with my own interests at the collision of neuroscience and cultural theory, her voice in this dissertation cross-examines my analyses, prompts lines of inquiry, and provides moments of dispute. While this dissertation does not take up Malabou’s writing as an aspect of neuronarrative or

neuronarrativity (see *Afterward*), I do set aside time to inquire into the ways critical-theoretical writing participates to cooperate in neuroscientific literacy.

This analysis progresses in the following way. It begins close to home, as it were, from two stories popularly and critically inventoried as examples of neuronarrative, and then moves outward from the pull and perimeters of that possible genre to explore the margins of that concept and the presuppositions that motivate it. I look to the sensations of a neuroscientific report, the ontological crafting involved in popular science self-help materials, and a social media story that toys with the immediacy and intimacy of neurological activity. In doing so, I excavate the concept of neuronarrative through a diverse collection of texts by exploring what we are willing to accept, suspend belief in, and rewrite about our understandings of ourselves in a neuroscientific contemporary. Positioning the brain, issues of storytelling, and theory close to one another comes from a desire to change the conditions of both neurophilia and neurophobia. My agenda is to move the concept of neuronarrative, if only a little, by enfolding practices of reading and writing as I work through my analyses. I continue to find my thinking challenged when the ideas in the preceding sections of this Introduction converse with the objects of each subsequent chapter.

This thesis will worry away at materialism, too, no doubt. Highly charged, but ultimately an empty container concept, I concern myself with how matters of ‘matter’ are made to matter when different people encounter different objects. Both wary and weary of the prospect of a unified account of consciousness, where life becomes reduced to a story of electricity and chemicals, I work through balancing this notion of matter against its extreme, where metaphysics retakes its throne.

Chapter One reads a character in Richard Powers’s novel *The Echo Maker* to problematize the concepts and practices of reading and writing engendered by a ‘typical’ neuronarrative. As noted above, *The Echo Maker* features on many critics’ lists of neuronovels. Yet, by looking closer at one character, a neurologist, who, over the course of the story, rewrites himself by confronting a neurological disease, I find a productive way to encounter both the literary conceit of inscription and the neuroscientific—and philosophical—theory of material plasticity. My encounter with the novel questions the basis of cultural and scientific literacy in a pursuit to understand—through the interface of fictional characters and moldable selves—how neurologic narratives engage storytelling today.

Chapter Two analyzes a character who undergoes a change in character as a result of a surgically removed brain tumor. It engages the concept of metastasis as a productive way of revisiting the trope of metamorphosis in literature. The nun protagonist Sister John of the Cross in Mark Salzman's novel *Lying Awake* has a brain tumor, causing both temporal-lobe epilepsy and a deeply spiritual connection with God. After surgical removal of the tumor, she loses this connection with God. While this narrative plays into the emergence and imbrication of neurobiology in modern narrative fiction, the novel engages the tricky transformations and cultural negotiations marshaled to write with and through contemporary neurobiology and psychology. Reading the concept of metastasis in dialogue with the text challenges what *Lying Awake* does to and for a tradition of writing about metamorphosed characters in literature. Rather than classifying it as part of the genre of 'neuronarratives' or as an example of neural plasticity, an approach that questions the contemporary stakes of literary metamorphosis inspires questions about the novel's affiliations and deteriorations with politics, religion, psychology, and history as well as challenging the new forms of literacy neuroscience demands of narrative today.

One way of approaching the stakes of genre is to think through the work they perform as affective conventions. The third chapter, "Fear and Panic in Iowa City," closely reads the character of Patient S.M., a scientific patient-character pathologized as a woman who feels no fear. Patient S.M. features in a recent neuroscientific report from the University of Iowa, which destabilizes that previously stable neurological understanding of fear. This chapter takes up the concept and presence of fear as a productive problem for both neuroscience and affect studies in the humanities. The concept and mechanics of fear proves a productive point of departure to think about affect and the careers that affect studies enjoys in contemporary scholarship. Reminding myself of Daniel Dennett's image of weaving and woven stories, I also find in the report an instance of slippage in neuroscientific storytelling that exposes the affective and literary conventions interior to scientific texts. Noting the rich disciplinary cross-contaminations, the chapter questions how particular narrative patterns shape scientific research agendas about fear, as well as the methods by which neuroscience propagates and solidifies inquiries of affect in critical analyses by way of narrative conventions. What the chapter discovers is how the habits of scientific case studies themselves, alongside popular scientific and philosophical appropriations of scientific material, can be determined by affective responses formed in relation to narrative.

One cluster of work building my interest in narratives that materialize the disparate data of neuroscience into characters or personas is popular science accounts written in the service of educational and political activism. Chapter Four looks to a particular character introduced through the widespread appeal of popular science advocacy, and tracks its materialization from metaphor to corporeality. I analyze how popular psychologist and corporate spokesperson Michael Gurian’s creation of the persona “bridge brain”—to describe, diagnose, and nurse parental anxieties about gender conformity—functions as pedagogical tool and neurological foil to so-called “male” and “female brains.” Gurian’s use of therapeutic anecdotes vivifies the “bridge brain” character, which exposes that ways neuroscience then writes that brain into a cultural archive of brain literature. His metaphoric ontology of “bridge brain” focuses my analysis as a way to understand the science/culture divide as well as a tool to speak back to character conventions that make use of neuronarrative.

Chapter Five locates a distributed brain with character from Jennifer Egan’s tweeted short story “Black Box,” which appeared serially on the *New Yorker’s* Twitter feed in 2012. “We could think of genres as clusters of metadata—information about how to use information—that help define the possible uses of textual materials,” writes John Frow, and in this chapter I approach the metadata that a particular brain with character produces (“Reproducibles” 1631). Twitter is a noisy and fractured forum for narrative, but it nonetheless engages many readers’ screens and thoughts with immediacy. Egan takes advantage of this aspect to deliver her story as if each tweet is the recorded mental thoughts of her protagonist. Archived outside of the text of the object—the cascade of tweeted neural bursts describing the experiences of the focalized character—are users’ own re-tweets, hashtags, and networked conversations. Thus, the narrative afterlives of Egan’s story and their method of distribution through popular social media complicate direct readings of brains with character and interrogate contemporary communication of neural-based information. Revisiting the concept of neuronarrative in a final way helps analyze the cooperative reading required to make meaning from the brain that ‘writes’ this particular story.

This project has a particular thrill for me in moments when the recursive curve in this Introduction’s central question defies my own skills as a writer and researcher. The struggle with that recursivity in each chapter, however, also produces moments that test its impasse. As stories that convey certain flavors of knowledge about plasticity, synapses, chemical

transmitters, and electricity alter the very recognition of reading and writing, they also lubricate a critical awareness of neural alteration as a contemporary mode of recognizing knowledge creation. Therefore, while the communally held premise of neuronarrative holds that we are literally made of this genre, that premise portends its built-in promise: plastic alteration is a lived, inhabited realm of characterizations and characters. A realm that we make. One that makes me set forth in this dissertation to seize objects made in and making the struggle of living with 'neuro-'. Living with these objects over the past four years and the struggles they make through me both obstructs my ability to write and provides the urgency to pursue the writing of this dissertation.

Chapter One

Reading The Brain That Writes (Its) Self

Karin Schluter first encounters the neurologist Dr. Gerald Weber not in person but on the page. Weber's books, *Wider Than The Sky* and *The Three-Pound Infinity*, "compiled a travelogue of every state that consciousness could enter," and "from his first words" she immediately feels "the shock of discovering a new continent where none had been" (Powers, *Echo* 117). The accounts Weber writes "of split brains fighting over their oblivious owners," "of a man who could speak sentences but not repeat them," and of "a woman who could smell purple and hear orange" reveal to her "the brain's mind-boggling plasticity and neurology's endless ignorance" (117-18). Taken by the stories, Karin "read every word of both books, her synapses changing as she devoured the pages" (118).

Karin's encounter is accidental—her boyfriend, Daniel, gives her Weber's texts—as well as the result of an accident: driving his truck late one night outside of Kearney, Nebraska on an empty road, her twenty-seven year-old meatpacker brother Mark Schluter gets into a nasty skid-and-flip that lands him—alive, but with severe head trauma—in the hospital. Mark slips into a coma, and Karin, the only other family member Mark has, quits her job to come and care for him. Mark regains consciousness weeks later and, although he cannot remember what caused him to lose control of his truck, begins showing signs of recovery. One crucial detail emerges, however: Mark cannot recognize his sister Karin. He constructs "everything else: who he was, where he worked, what had happened to him," but Mark insists "Karin was an actress who looked very much like his sister" (75). The hospital's doctor, Christopher Hayes, diagnoses this brain-damaged Mark as "manifesting a condition called Capgras syndrome," and explains the symptoms to Karin: "He knows he has a sister. He remembers everything about her. He knows you look like her and act like her and dress like her. He just doesn't think you *are* her" (75-76). Months pass, Mark's body heals, but he continues to consider Karin "an imposter" (86). Witnessing Karin's distress over Mark's continued refusal to recognize her and Dr. Hayes's inaction—"How did that man ever get certified? He won't do anything. 'Wait and watch,'" Karin bellows (116)—Daniel brings Karin to Weber's books. Inspired by reading them, Karin concludes that "Dr. Weber had never visited any land quite like the one her brother now inhabited" (117). So she writes an email about Mark's Capgras to the "apparently well-known cognitive neurologist from New

York,” pleading for his attention and intervention in the face of Hayes’s inattention (118). Dr. Weber does visit Nebraska, but what he encounters through Mark’s condition transforms his own literary habitat, driving him to rewrite and re-inhabit the meanings between narratives of neuroscience and neuroscience’s narratives.

From this deceptively straightforward premise, Richard Powers launches his ninth novel, *The Echo Maker*, published by Farrar, Straus, and Giroux in 2006 and winner of the National Book Award the same year.⁶

Powers’s neurologist-writer character Dr. Weber in *The Echo Maker* is a figure self-consciously aware of the stakes of constructing brains with character in culture today. His books (within the world of Powers’s book), which animate his own pseudonymous patient-characters for the purposes of narrating popular tales about the wonders of neuroscience and the connections that readers have to those abstract characters (much like Oliver Sacks), wield a power to change readers’ brains by making readers aware of the brain’s powers of transformation. As Karin’s “synapses [were] changing as she devoured the pages” of Weber’s tales, so too marks the wager that Powers’s brain with character—Dr. Weber—makes on its readers.

The crisis that Dr. Weber faces, a crisis that also turns outward toward a reader of the *The Echo Maker*, is how to write one’s self if it is one’s brain that writes the self. Weber becomes a character who cannot write his own sense of self because of an increasingly clear threat that his brain out-writes or overwrites his sense of self. The threat is less of a problem of hierarchy than it is about the plastic links between the page (reading and writing narrative

⁶ The title derives from the Cherokee name for the Sandhill Cranes, whose migration through Nebraska’s Sandhill region provides location for the novel as well as thematic partitions for its five sections. The cranes’ annual convergence at the Platte River and its numerous lakes and ponds in the Sandhills—one of the most important wetland ecosystems in the United States that covers an area ten- to twenty-thousand square kilometers larger than the Netherlands—has happened for “sixty million years,” and feeds the novel’s central metaphors of memory, evolution, and habitation in the face of environmental destruction through human development (Powers, *Echo* 4; Powers, Interview). Memory, evolution, and habitation work their way through the plot of *The Echo Maker*’s two main mysteries. Solving the riddle of what (or who) caused Mark’s accident drives much of the many characters’ actions in the novel. The second mystery sprouts from Mark’s brain damage, which incites Weber’s own inability to distinguish himself from his deteriorating sense of brain-composed self in the world around him. This mystery is not built around matters of fact resolved in the catharsis of procedural information recovery, but instead builds matters of concern into which readers are implicated and whose synapses change as pages are devoured.

characters) and the prefrontal cortex (reading and writing brains with character). Weber's character in *The Echo Maker* performs the struggle of acknowledging and articulating neural plasticity through one's sense of self, in one's self-composure. "Since meeting his ruined Nebraska meatpacker," Weber realizes, he "could no longer tell the difference" between "science" and "stories" (452-53). From his medical training and his writing career in the academic genre, "He lost himself in lobes and lesions" (460). But from his encounter with Mark, "the world had broken out in Dickens and Dostoyevsky," and he struggles to re-compose his sense of self, grappling with a 'neuro-' awareness that "The self was a mob, a drifting, improvised posse. No self without self-delusion" (453). The precision of neuroscience leaves Weber alienated from the narratives he previously wrote about patients and the narrative he once thought described his consciousness. Weber "begins to sense things with his emotional intelligence that his cognitive processes have previously hidden from him" (Powers, Interview).

A master of the game of fiction, Richard Powers stages *The Echo Maker* through an extended meditation on this impasse of alienation regarding the brain. Enfolded topics like brain damage and plasticity with neuroscientist characters comfortably locates the novel within the scope of neuronarrative, whose definition, Marco Roth prescribes, is a "novel of how brains can take themselves as objects" (Roth, Reply). Indeed, as I note in the Introduction, *The Echo Maker* features on many critics' lists of neuronarratives (see pages 25-26). But my own encounter with the novel, and especially with the character Dr. Weber, discovers more than an example of neuronarrative. The complex narrative trajectory that both describes and enacts Weber exposes the plastic conditions of reading and writing brains with character. "Powers is so important," Bruno Latour observes, "because he refuses to situate fiction in an easy position *in addition or in contrast* to science. ...fiction is not what he is after, but rather the common source of fiction and fact" (10). The plasticity performed through Weber in *The Echo Maker* bequeaths a parable about genre in a neurobiological contemporary: that we do not only adjust ourselves to inhabit the received frames of genre, but that we also adjust those receptions to innovate the generic frames of those inhabitations. "Powers asks what it is for a character to exist at all," writes Latour, "when so much of existence depends upon the things one is attached to—the most important connection being the biological basis of life itself" (3).

This chapter's first section analyzes how *The Echo Maker* stages and incorporates neurological plasticity in the character of Dr. Weber. I dialogue with Marco Roth over a neuronarrative classification to forage for more operations in the accusation of genre than limits on reception and expectation. I probe Weber's narrative trajectory to discover a mode of knowledge creation that does work to create knowledge about what we can do with our brain. In the second section, I analyze the involving cooperative literacies needed of readers to imagine and constitute meanings from the narrative of plasticity *The Echo Maker* opens up. Central to this is asking what the work of—both reading the knowledge of and negotiation with—plasticity does. Catherine Malabou helps clarify the relations of genre with cultural questions of plasticity, and offers a theory of plastic reading.

Writing Plasticity

Plasticity designates the activity of neural structures to change neural structures. This activity, according to the “considerable evidence for plasticity at chemical synapses,” structures both human behavior as well as the further neural behavior of this activity (Kandel et al. 37). Plasticity portrays the ability of the brain to form new connections and edit previous connections, and, in turn, describes the ability of these formations to edit the brain (37). The burgeoning neurosciences in the past decades have taken to this keystone concept of brain activity, which promises that “Behavior will lead to changes in brain circuitry, just as changes in brain circuitry will lead to behavioral modifications” (Pascual-Leone et al. 379). “It is this functional plasticity of neurons,” that neuroscience explains, “that endows each of us with our individuality” (Kandel et al. 38). Plasticity, in this regard, is “an intrinsic property of the nervous system retained throughout a lifespan,” and therefore implies how “it is not possible to understand normal psychological function or the manifestations or consequences of disease without invoking the concept of brain plasticity” (Pascual-Leone et al. 378). Invocations of the concept of plasticity abound,⁷ and the good news now entreats critical theory. “Talking about the plasticity of the brain thus amounts to thinking of the brain as something modifiable, ‘formable,’ and formative at the same time,” observes Catherine Malabou (*What Should* 5). “From this perspective,” Malabou continues, “to talk about the plasticity of the brain means to see in it not only the creator and receiver of form but also an agency of

⁷ The concept is now the “dominant motif” in the neurosciences as well as being culturally “in the air” (Malabou, *What Should* 4; *Changing* 63).

disobedience to every constituted form, a refusal to submit to a model” (6). In Malabou’s celebrated phrasing: “Humans make their own brain” (1).

The Echo Maker is a novel that both attempts to describe and perform plasticity by emphasizing the power of plastic narratives. Dr. Weber’s books change Karin’s synapses (Powers, *Echo* 118), the idea that “the brain was a set of changes for mirroring change” enters Weber’s thoughts (484), characters tackle the prospect that “the brain itself was a wash of one mood-altering substance or another” (413) or that the concept of God is a chemical and cellular dynamism open for modification (529), and the possibility that Mark’s psychological reaction to his head trauma changed his brain into recognizable symptoms of Capgras hovers over the entire novel (e.g., 259). What I need to ask, given this thematization of plasticity in Powers’s novel and its related debate over neuronarrative, is whether the trope of plasticity is merely an incorporative gimmick or whether it might do something more. And might this something more at work in the character Dr. Weber tell us about reading and writing the trope of plasticity itself?

Let me redouble for a moment to that debate on neuronarrative from the Introduction to which Marco Roth is particularly antagonistic. The use of neurobiology in narratives, and especially in characterization, for Roth, aggravates “a ‘readerly *meaning impulse*’ by which the reader would typically generalize experiences in fiction to make them compatible with his [sic] own” (qtd. in Birge 92). “*Any possibility of the necessary interpretive leap is disavowed by the pathological premise of the novel itself,*” he argues (Roth, “Rise”; my emphasis). The mere circumstance of authors exploring brain pathology in design or characterization “threatens” to incite a “mystery-banning total explanation of consciousness.” He resolves by writing that “The very act of medicalization marginalizes the experimental impulse” that narratives ideally explore in their creation of consciousness,⁸ because neuronarratives “load almost the entire burden of meaning and distinctiveness onto their protagonists’ neurologically estranged perceptions of our world” (“Rise”).

This is where Roth’s essay winds up a little confused in my estimation. If we really are living through the decline of the cultural authority of psychology and psychodrama that signals “the new reductionism of mind to brain,” then I would regard that as an apt and rather lively topic for a work of narrative art to undertake (Roth, “Rise”). The fact that

⁸ This impulse Roth locates in “The stylistic novelty and profound interiority of *Ulysses* or *To the Lighthouse*,” as well as in his laurels for Eliot, Dickens, and Nabokov (“Rise”).

Powers's novel deals explicitly with this decline and represents those complications affectively—Weber asks himself, “What would he say [to his students] the following week, to sum up a discipline drifting away from him? Long after science delivered a comprehensive theory of self, no one would be a single step closer to knowing what it meant to be another” (Powers, *Echo* 462)—demonstrates a sign of awareness in contemporary literature about the stakes of this decline. That awareness, which involves *The Echo Maker* and into which it engages through struggle,⁹ cuts against the idea that “any possibility” for an author to invite neuroscience in works necessarily abandons the experimental impulse “in favor of stark biological determinism” (Roth, “Rise”). Powers's preoccupation with this awareness throughout *The Echo Maker* offers a literature where we deal with science and culture more honestly and ask more questions as opposed to calling for either more scans and more data or their banishment for our favorite *Middlemarch* passages. “Roth fails to take sufficient notice of these ‘neurologically estranged perceptions,’ which represent and enact the process of self-making that occurs in every brain, disordered or not,” Sarah Birge adds (92). By fighting against what he sees as the “new genre” of narrative—which, “have in them very little of society, of different classes, of individuals interacting, of development either alongside or against historical forces and expectations”—what Roth eschews is the most interesting part: the differences between art enacted “in the idioms” of neuroscience and art that thoughtfully engages those “historical forces and expectations” that are allegedly “now the property of specialists writing” (Roth, “Rise”). How *The Echo Maker* contributes to the latter engagement by enacting cultural debates about writing in the wake of the neuroscientific turn is what piques analytical interest in this chapter.

The issue of writing shapes important parts of *The Echo Maker*, and the referents “literature,” “story,” and “case” emplot this issue throughout the novel. “There are only a couple of cases in the literature,” Dr. Hayes tells Karin when diagnosing Mark's Capgras (75). Literature, for practitioners of science, constitutes the body of data and information

⁹ “Something in him did not like where knowledge was heading,” Weber reflects (Powers, *Echo* 240). Weber's thoughts then turn to implicate the capacity for storytelling in the face of neuroscience: “The rapid convergence of neuroscience around certain functionalist assumptions was beginning to alienate Weber. His field was succumbing to one of those ancient urges that it was supposed to shed light on: the herd mentality...When the cognitive counterrevolution broke, some small operant-conditioned part of him held back, wanting to insist, *Still not the whole story*” (240).

about human bodies as data and information. Weber, to students at the medical center, gives a lecture on Patient H.M., “the most famous patient in the literature of neurology” (454). Upon first venturing to Nebraska to meet Mark and appraise the situation, he gathers that “He had enough material now, if not for a write-up in the medical literature, at least for a haunting narrative case history” (203). The idioms that distinguish writing for medical literature and writing a case becomes a point of confrontation between Dr. Hayes and Dr. Weber in one scene:

[Hayes:] “So you met [Mark] yesterday. Eerie, isn’t it? I’m still disconcerted, talking to him, and it’s been months. Of course, our group will be writing him up for the journals.”

Bow shot. Weber held up his hands. “I don’t want to do anything to...”

“No, of course not. You’re writing for a popular audience.” Broadside. “There’s no overlap.” (162)

Weber’s writing, for Hayes, represents a foil to the academic genre of writing in journals. But trained by this genre and still befuddled by Mark’s condition, Weber later pores over “all the medical indexes, exploring every clinical reference in the literature,” and deduces that “no real literature existed” about “Mark’s story,” for “what few cases he had found bore no direct bearing” on the complexities he encounters in Nebraska (393). Because of his encounters with Mark over time, Weber becomes “torn between the clinical, non-narrative, pure science, on the one hand, and hermeneutic, narrative popularization on the other” (Herman and Vervaeck 409). Science, Weber laments, is “written in chemicals” (Powers, *Echo* 484). Neurological cases, Weber realizes, are what becomes of those people chemically written into the literature of science. Cases that populate Weber’s own books—like “Adele” (259), “Maria” (235), “Edward” (288), “Jeffrey L.” (328), “Sarah M.” (135), and “Rita V.” and “Lionel D.” (329)—begin to haunt his thoughts about the practice of writing neurology. A memory of “Neil,” whom Weber “dramatized” in *Wider Than the Sky*, particularly unnerves the way Weber had “reduced him to story”: “He’d left ‘Neil’ behind in the prose looking glass, lost somewhere, off in an imperceivable direction, an unreachable place deep inside the narrative mirror” (159).

Documenting plasticity constitutes an important part of writing the literature of neuroscience today. *Neural Plasticity*, for instance, is the title of a prominent academic journal. “Plasticity is an integral property and the obligatory consequence of each sensory

input, motor act, association, reward signal, action plan, or awareness,” write Pascual-Leone and his team at the Harvard Medical School (379). “In this framework,” they continue, “notions such as psychological processes as distinct from organic-based functions or dysfunctions cease to be informative (379). Malabou takes many cues from neuroscientists, such as Jean-Pierre Changeux and Marc Jeannerod, in order to confront plasticity theoretically (e.g., *Plasticity; What Should*). In addition, non-fictional neuroscientists, like Ramachandran (494) and Giacomo Rizzolatti (449), pop up in *The Echo Maker* as part of the characters’ varying awareness of this literature. Because plasticity holds that behaviors continuously change the brain while that constantly modified brain changes behaviors, the stability of purely psychological accounts of consciousness are thrown into question (Pascual-Leone 378). One early scene between Dr. Weber and Dr. Hayes discussing Mark’s Capgras stages a central doubt in *The Echo Maker* over the new primacy of neurological accounts that subtract psychology:

[Weber]: “I don’t doubt the contribution of lesions. Right hemisphere damage is no doubt implicated in the process. I just think we need to look for a more comprehensive explanation.”

Hayes’s tiniest facial muscles betrayed incredulity. “Something more than neurons, you mean?”

“Not at all. But there’s a higher-order component to all this, too. Whatever lesions he has suffered, he’s also producing psychodynamic responses to trauma. Capgras may not be caused so much by the lesion per se as by large-scale psychological reactions to the disorientation. His sister represents the most complex combination of psychological vectors in his life. He stops recognizing his sister because some part of him has stopped recognizing himself. I have always found it worthwhile to consider a delusion as both the attempt to make sense—as well as the result—of a deeply unsettling development.”

After a beat, Hayes nodded. “I’m...sure it’s all worth thinking about, if that interests you, Dr. Weber.”

Fifteen years ago, Weber would have launched a counterstrike. Now he found it comical: two docs marking their territory, ready to rear up and batter at each other like bighorn sheep. *Ram tough*. Wellbeing coursed through Weber, the simple poise of self-reflection. He felt like mussing Dr. Hayes’s hair. “When I was your age, the prevailing psychoanalytic bias had Capgras resulting from taboo feelings toward a loved one. ‘I can’t be feeling lust for my sister, ergo she’s not my sister.’ The thermodynamic model of cognition. Very popular in its day.”

Hayes rubbed his neck, embarrassed into silence. (167-68)

The scene comically demonstrates literature’s weaponized uses in the history of science. The arc of this history articulated by Weber dulls the sharpness of prevailing modes of thought

that both shape the ‘body’ of literature and the bodies (ours, as well as characters) that literature shapes. *The Echo Maker* makes a point to readers that how one inhabits literature’s models of cognition is up for grabs: no one genre can claim primacy when the genre under scrutiny concerns the primacy of cognition.

Importantly, Dr. Weber is also part of the ‘literature’ of neuroscience, and his complicated participation with that relation shapes much of the way *The Echo Maker* implicates the plasticity of a brain with character. Weber has just published his third book, *The Country of Surprise*, when the actions of *Echo Maker* take place (125). A literati of the science world, *Harper’s* reviews his book (278), he embarks on a promotion tour of readings, radio spots, and interviews (287), and appears on television (233). During the televised reading, Weber recites a passage that embodies his conflictive relationship with writing and reading characters. The scene also provokes a reader to reflect on the plasticity of brains with character: “Consciousness works by telling a story, one that is whole, continuous, and stable. When that story breaks, consciousness rewrites it. Each revised draft claims to be the original. And so, when disease or accident interrupts us, we’re often the last to know” (234). When an audience member questions him about violating the privacy of the people in his case studies, he answers by saying that “sometimes one case history actually combines two or more stories, to bring out a condition’s most salient features” (236). The audience member retorts, “You mean they’re fiction?” (236). The slippery distinctions of literature from story, or story from case, or case from fiction when it comes to neuroscientific characters challenge the stories of consciousness Weber tells himself and Powers attempts to articulate to others. Weber’s medical students during lectures are infuriated with his inability to continue articulating neurology in the academic genre they expect: “They wanted science, not stories” (452). This impasse of articulation—of sharing common literature—in the face of his students implicates the work of plasticity in the novel. “How could he tell them?” Weber reflects (460):

Matter that mapped other matter, a plastic record of light and sound, place and motion, change and resistance. Some billions of years and hundreds of billions of neurons later, these webbed cells wired up a grammar—a notion of nouns and verbs and even prepositions. Those recording synapses, bent back onto themselves—brain piggy-backing and reading itself as it read the world—exploded into hopes and dreams, memories more elaborate than the experiences that chiseled them, theories of other minds, invented places as real and detailed as anything material, themselves matter, microscopic electro-etched worlds within the world, a shape for every shape *out there*, with infinite shapes left over: all dimensions springing from this thing the

universe floats in. But never hot or cold, solid or soft, left or right, high or low, but only the image, the store. Only the play of likeness cut by chemical cascades, always undoing the state that did the storing. Semaphores at night, cobbling up even the cliff they signaled from. (461)

A “play” that reads itself as it reads the world, a play of informational material, a play that constantly undoes the “state that did the storing”: “No hope of showing them that,” he reconciles, “He could at best reveal the countless ways the signals got lost” (461). Weber cannot even properly express these ideas in relation to the “matter” that involves them and that they involve. The theory of evolution, of which he is aware his students understand give them ground, does not write or determine or even adapt the work of innovation, and of plasticity, that characterizes its signal. Stories and cases form countless signals within the commotion of neurological literature which (in)form Weber (that he, too, forms). How can he describe a sense of unity from all of these possible dimensions? The story of his self that consciousness writes, and the stories that proposition that narrative, “explode” into a manic scene that grapples with how to become conscious of all those shapes and neurons and memories and experiences. The scene ultimately brings readers to a consciousness of his struggling brain, one that challenges what it is for a character to exist at all given our received practices of reading and writing “semaphores” that otherwise constitute literary characters.

“It is no longer important to ask whether the brain and consciousness are one and the same thing—let us put aside this old and specious debate,” writes Malabou; “Instead we must constitute this strange critical entity, at once philosophical, scientific, and political, that would be a *consciousness of the brain*. It is to the constitution of this new genre—open to everyone—that the question *What should we do we our brain?* invites us” (*What Should* 2). With “his epistemological crisis feeding into an ontological crisis,” Dr. Weber confronts this question in *The Echo Maker* just as the text of *The Echo Maker* forces confronts readers with this question (Hawk 21). “The structural bond,” writes Malabou, “between brain and history...here is so deep that in a certain sense it defines an *identity*” because the brain “*is a history*” (*What Should* 1). Weber is invited to this question—“the human brain musing on itself,” he tempts (Powers, *Echo* 343)—and invited to the constitution of this genre called “identity.” But the bond between a reader’s consciousness of their brain and the written consciousness of the character Dr. Weber is also opened to reconstitution: “What self-image would be left to us, in light of the full facts? The mind might not endure its self-discovery” (344). How can we create a brain with character’s existence at all, the novel pleads. He or his

brain may or may not endure, but his revelation of the consciousness of the brain demands his work and guides the work of Powers's novel. "The work proper to the brain that engages with history and individual experience has a name: *plasticity*," writes Malabou (*What Should* 4). Engaged by the call of plasticity, Weber focalizes working through that work as a reader focuses on the work the novel brings into one's consciousness.

The work of constituting a consciousness of the brain is not easy, and Weber struggles with the meaning of doing that work throughout the novel. The initial impulse "for Weber to write" Mark's story he comes to abandon (Powers, *Echo* 241). He persists in working through the work of writing as one form of constituting a consciousness of the brain. Later on, Weber recognizes his prior arrogance as an 'objective' writer of brains with character: that writer, "Famous Gerald" (445), whose type performs a "desperate scramble to make a continuous story out of chaos," utterly alienates him (465). Then,

A feeling came over Weber, a desire to supplement genuine neuroscience with half-baked literature, fiction that at least acknowledged its own blindness. He would make [his students] read Freud, the prince of storytellers...He would give them Proust and Carroll. He would assign Borges's 'Funes'...He would tell them the story of Mark Schluter. Describe what meeting the boy-man had done to him. Make some motion that their mirror neurons would be forced to mimic. (463)

This second approach to writing, one that would supplement neuroscience both with fiction and with the implicated attitude of its storyteller, is what, at this point, Weber considers "a neurological novel" (464). But the idioms of what he sees in that genre still claw at him, for he realizes that he still plays the observer in the form of writing (Hawk 22). Finally, in one of *The Echo Maker's* most self-reflexive moments, Weber reads himself as a brain with character:

Once, he knew a man who thought that telling other people's stories might make them real again. Then others' stories remade him. Illusion, loss, humiliation, disgrace: just say the words and they happened. The man himself had arisen from doctored accounts; Weber had invented him out of whole cloth. The complete history and physical: fabricated. Now the text unravels. Even the case's name—*Gerald W.*—sounds like the feeblest of pseudonyms. (Powers, *Echo* 524)

This parable, of and from the character's perspective, embedded in Powers's novel is a vantage point that crafts a consciousness of writing brains with character. For Weber, his struggle with writing a sense of self through narrative "catalyzes his dependence on narrative

to survive the crisis” (Hawk 24). This is why, in the end, the character Dr. Weber fails to vehicle an effectively plastic brain with character. On some of the final pages of the book, Weber is at a loss for words, and can barely connect with himself or others at all: “He struggles to place the words, written by someone who was once him...” (Powers, *Echo* 539). He appears to have become completely undone by his confrontation with a plastic consciousness of the brain. The brain successfully out-writes Weber. The brain also overwrites his character: the final paragraph of the novel depicts him walking zombie-like through an airport terminal before a reader confronts a blank page.

If this particular brain with character fails, in the fictional world of the novel, to read or write its own consciousness of the brain (to constitute that “genre” in Malabou’s terms), how does the *The Echo Maker* fare overall? Perhaps the failure of the character speaks to the success of the novel precisely because the novel refuses to gift readers with a formula for that question of genre. Visiting Mark a final time before flying back to New York, Weber listens to questions Mark asks him and finds himself declining the impulse to shape coherent, neurological narratives. Weber appreciates at this point that the work of thinking through what do to with one’s brain means that writing the genre is up for grabs, and thus he thinks to himself, “Nothing anyone can do for anyone, except recall: We are every second being born” (567). Weber, in this denouement, is still at a loss for words and immobilized by a lack of narrative. But the compulsion to share the work of plasticity propels *The Echo Maker* forward. “Destroyed and remade with every thought,” is the work open for others, to heed with others (569). Weber’s received genres of academic writing fail him, yet *The Echo Maker* impels cooperative literacy through literature, science, and reader participation to animate the crisis of constituting brains with character.

The trope of plasticity at play in *The Echo Maker* teaches that the commitment to the writing of this trope requires inhabiting new genres, and forging new operations of writing. The very struggle of writing plasticity that Weber engenders and the novel performs becomes a mode of knowledge creation that does work to create knowledge about what we can do with our brain. The ‘we’ to whom the novel addresses itself demands cooperative participation to make legible the question of character. And the writing of plasticity involved by the novel participates in the construction of meaning that my own analysis constitutes. How might we interpret, or read this participation?

Reading Plasticity

How does reading the trope of plasticity engage readers of *The Echo Maker*? Recall that when Karin first confronts Weber's books about "the brain's mind-boggling plasticity," she reflects how her own "synapses [were] changing" through the act of reading them (Powers, *Echo* 118). I want to ask: how might *The Echo Maker* hail us when we read about the neural plasticity it involves? If, according to Malabou, "the brain is a work, and we do not know it" because "our brain is plastic, and we do not know it," what are the promises of coming to know this work (*Changing* 1, 4)? What might an extended narrative meditation on the challenges of coming to know this work, like Powers's novel, offer that a scientific paper or philosophical manifesto could not?

It is safe to say that Richard Powers did not write a novel of plasticity out of cultural fashion or literary ornamentation. Bruno Latour notes that Powers is "the novelist of 'science studies,'" and is "the most rewarding source of philosophical inspiration" to "circumvent the pitfalls of critical or subjective discourse" (2). Notably, all of Powers's other novels to date "are organized around a particular scientific idea or technological innovation" (Taylor 75).¹⁰ Powers, Latour fawns, "connects and fuses domains of reality, takes the *uncertain* deployment of what a computer is, the *controversial* multiplicity of what a brain is, the *wavering* achievements of psychology, and then tries to relate them in a narrative that does *not* imply the existence of a character silhouetted out of a background and inserted into a story" (3). The cultural, political, scientific, and technological energies at work in Powers's writing "cantilever" the problematic split between exhibiting and representing ideas of science (Dennett, "Astride" 151). In fact, "It is the emergence of plausible fleshy characters, things, and stories, that is the very topic of several of his books," writes Latour (3). Powers delicately

¹⁰ *Three Farmers on Their Way to a Dance* (1985) takes up "photography and the assembly line"; *Prisoner's Dilemma* (1988) explores of "game theory" through mathematics and alternate reality; *The Gold Bug Variations* (1991) dramatizes molecular biology and the "genetic code"; *Operation Wandering Soul* (1993) deals with "psychological and surgical technology"; *Galatea 2.2* (1995) stages a confrontation of literature and "artificial intelligence"; *Gain* (1998), Taylor writes, is about "market mechanisms and industrial pollution"; *Plowing the Dark* (2000) problematizes "virtual reality"; *The Time of Our Singing* (2003) explores "the relation of physics to medieval, baroque, classical, romantic, and modern music, including jazz and blues"; *Generosity: An Enhancement* (2009) Taylor considers a reflexive novel treading issues of neural augmentation and "psychopharmacology"; *Orfeo* (2014) questions pathogens, tweets, and amalgamating music into DNA (Taylor 75-76).

arranges Weber's own failed consciousness of the brain's consciousness, and thereby invites his readers to this 'genre' (in Malabou's terms) by throwing its meanings up in *The Echo Maker*.

So much of *The Echo Maker* concerns itself with the construction of narrative, the plausibility of writing oneself through story, and making meaning from the activity of reading oneself through stories. Gerald Weber's story is of a writer who loses confidence in the ability of stories to produce meaningful reception in receivers: his story is of an author in crisis over the crisis of narrative consciousness. In this sense, Powers 'reads' a contemporary cultural crisis about the authority of neuroscience's authorship. Reading that authorial crisis—perhaps unsurprisingly—delivers us back to the recursive curve: evidence in 'the literature' of neuroscience tells us that building awareness of brain plasticity improves brain performance, promotes positive attitudinal change, and inspires interest in the neurosciences (e.g., Blackwell et al.; Fitzakerley et al.). Powers delivers the novel from within the thicket of cultural relations concerning plasticity because we, too, read it within that flux.

"I am thinking of the novel as a means for modern societies to describe themselves, not from outside or above, but from within a system of social relationships of which the novel is a component part," writes Nancy Armstrong (443). Is this not the work of constituting a consciousness of the brain in a nutshell? "At stake in our relationship to the biopolitical protagonist is the possibility of a possibility, namely, the possibility of imagining that one can bridge the gap between the restricted dialogue of first and second persons and the kind of somatic intelligence that might enable us to live together," Armstrong continues; "Given the generic expectations that we bring to the world imagined by contemporary fiction, this is no simple matter" (463-64). Crucially, for Armstrong, it is "our" relationship with characters as well as our living-together-with those characters that urges a cooperative "imagining" of constituting "somatic intelligence." If we relent to Roth for a moment: even if neuronarrative 'is' a genre, a genre that produces characters neurobiologically, then what becomes possible by reading and imagining the possibility of neurobiological characters is a consciousness (a "somatic intelligence") of the genre(s) of consciousness collectively made legible. In the game of text, reading exchanges, debates, and works "within" social relationships. Characters inhabit that genre because we inhabit it. That genre and the work we cooperatively do to form and inform us is "open to everyone" in Malabou's phrasing (*What Should 2*).

To be sure, this is precisely the gamble I see in Malabou's own textual work. "I ask that you read my books as formulating a single, continuous attempt to situate the *symbolic rupture between the plastic and the graphic component of thought* for each face of the philosophical works or problems under consideration," she writes (*Plasticity* 3). While Powers allows his characters to do the searching, to do the work of thinking plasticity, and feeling the effects of that work, Malabou cuts through all that and gives her readers instructions on how to read her. According to her, "plasticity is the metamorphosis of writing," because "plasticity *configures the traces, erases them in order to form them, without however rigidifying them*" (*Plasticity* 61). The consequence, she points out, is that "Writing is no longer the privileged hermeneutic stylus of the epoch" (*Changing* 55-56). So how do we approach 'reading' plasticity if plasticity insurrects the inscription and reception of texts?

"For Malabou," writes Alexander Galloway, "writing refers to the graphic, to the sign, to inscription, or to the trace—any aspect of mediation having to do with fixity" (10). Therefore, "this style, this plasticity, also produces its own form of reading" (11). This "plastic reading," requires a "regenerative force," according to Malabou ("Following" 22). She describes her practice of plastic reading:

To read or understand a text may very well mean, *even today*, drawing out its structural nucleus. But this structure, as we will know forevermore, is not originary; it erupts in the text as a result, as the result of its own deconstruction. Structure, or the structural nucleus, thus arrives in some sense after that which it structures. Structure would then be that which remains of a text *after* its deconstruction. Structure therefore names that element of a text which survives its own deconstruction, something I call form, and which comes to light like an a posteriori metamorphosis. In this way, for example, I was able to read Hegel, or Heidegger, in the days that followed their deconstruction, beginning with or following on from that deconstruction, so as to see develop, through a work of *generation—that is, an a posteriori engendering*—if not something like a reconstruction (which would, strictly speaking, be nonsensical in this context), then something like a scar, tugging the skin of the text to distribute its meaning differently, to reveal within it a new organization, to make possible in the very text different movements and different effects of truth. It is precisely this regenerative force of reading that I call plasticity. ("Following" 21-22)

There are a quite a few "somethings" in the quote above that plastic reading "reveals," namely the plastic structure of a text after deconstructive analysis has been worked through by a reader. "Structure is the thing that remains. It is not the 'truth' of the text, nor is it a 'skeleton' that holds the text together. Rather, it is a trace or fossil left behind by the text as it changes,"

observes Galloway (11). Malabou proposes a practice called plastic reading “to see develop” a text’s plasticity.

Might a plastic reading of *The Echo Maker* show what “remains” of a consciousness of the brain after the brain with character Dr. Weber fails to read and write it? First, for Malabou’s theory, Weber senses the plasticity left behind after the work of writing the self (as a brain with character):

Story was the storm at the cortex’s core. ...Then the story changed. Somewhere, real clinical tools rendered case histories merely colorful. Medicine grew up. Instruments, images, tests, metrics, surgery, pharmaceuticals: no room left for Weber’s anecdotes. And all his literary cures turned to circus acts and Gothic freak shows. (524)

From this vantage point, “All his sense of work was gone. Only the summary judgment remained” (409). If this constitutes the trace that remains of the ‘story of consciousness’ Weber once told himself, it might express to us something about how the work of constructing a consciousness of the brain takes place not just through reading (in the form of analysis or deconstruction), but in spite of it, alongside it, after it. “After years of trying to see others from the inside, Weber at last commits to seeing himself from the outside,” Powers writes (Interview). And second, after a deconstruction of *The Echo Maker*—one that would read the relations the novel has with other texts or discourses (both literary and non-literary); examine the intractable conflicts between meanings of different types (like ‘brain,’ ‘self,’ and ‘character,’ for instance); analyze the ways the novel offers an implicit critique of categories, like ‘neurological novel,’ used to describe it; and question how Power’s writing of a brain with character is itself organized by cultural conventions of writing brains with character—comes the plastic reading of the novel. The trouble I identify here is that whatever trace that remains to document—that perhaps the novel has different relations with other texts over time, that conflicts over meaning have changed with subsequent readings, or that the conventions of writing brains with character have altered since its publication—can only ever be a documentation of change. How a text distributes its meaning differently in a way that “reveals within it a new organization” is a good question to keep in mind, but it’s an unhelpful approach to *The Echo Maker* for two reasons. One, today, a plastic reading of the novel will only ever tell us about change, because its plastic reading only describes the genre of change. Two, if the goal of Malabou’s theory is to “construct a philosophical non-space from which to

point out, criticize, and correct the normative claims of other discourses,” it leaves little room for the cooperative readings invited by the novel itself (Samson 32).¹¹ At stake in our relationship to a brain with character like Weber is that possibility of imagining the kind of “somatic intelligence” that might enable us to live together with others. Realizing that possibility requires a cooperative reading and writing about the ways we inhabit our contemporary.

Where *The Echo Maker* succeeds in bringing a consciousness of reading and writing the brain to its reader is in disallowing Weber to fully write the plasticity of brains with character for us. The novel, while giving us the resources, the questions, and several helpful characterizations to confront a consciousness of the brain, leaves this work of constituting that consciousness open to readers. While the brain ultimately out-writes Weber, readers arrive at a blank page from which to dialogue and theorize other ways of constituting a consciousness of the brain together. One of Weber’s reflections late in the novel asks us to read our means of survival given the knowledge of plasticity, how to find ways to live in the consciousness of consciousness we must go on to inhabit:

Lying, denying, repressing, confabulating: these weren’t pathologies. They were the signatures of awareness, trying to stay intact. What was truth, compared to survival? Floating or broken or split or a third of a second behind; something still insisted: *Me*. Always the water changed, but the river stood still. The self was a painting, traced on that liquid surface. (Powers, *Echo* 483)

That image is a painting on liquid. Similarly, Malabou writes of her own text *Plasticity at the Dusk of Writing*, that “This book is a portrait. It paints the portrait of the concept of plasticity” (Malabou, *Plasticity* 1). Malabou’s own utterances of plasticity operate on narratives—portraits—of plasticity. In turn, *The Echo Maker*’s portrayal of the struggle of plasticity, a genre we inhabit, invites us trace our habits provisionally, which pigments the narrative of the novel. This plasticity of receiving ideas, common to Malabou and Powers,

¹¹ “There is an almost *clinical* quality to Malabou’s approach to reading,” Galloway claims (12). “She does not wish to ‘intervene’ in a text like her poststructuralist forebears... Malabou simply seeks to be a witness to this event and reconstruct the metamorphosis taking place beyond it all,” and this individualist objectivity is why Galloway considers Malabou “our last living structuralist” (12). In identifying a similar lack of cooperation, Kate Flint wonders whether plastic reading might “be, indeed, a form of reading that does nothing to the reader,” and concludes that one might “say that such reading distances a reader from emotional engagement and deliberately shuts down empathy” (20).

suggests its own proclivity to connect, forge, sever, and destroy inscriptions of those images through cooperative work.

Powers's and Malabou's two narratives of plasticity hail us to insurrect received genres that inhabit knowledge of the brain (whether academic writing, fiction writing, writing for a public audience, or philosophical writing). Our struggle with acknowledging plasticity becomes the work of writing, thinking, and reading together. This novel's central brain with character, Dr. Weber, does not get the final word on constituting a consciousness of the brain. What the book requires is cooperation between this character and readers. This open invitation both challenges and illuminates how neuronarrative can work to produce meaningful cooperation from the knowledge of plasticity. *The Echo Maker* finds its thrust in this thicket of debate and challenge to narrative, in its challenge to read and write brains with character as well as in its challenge to readers to craft ways to live with other brains—fictional and non-fictional—today.

Chapter Two

God Has Metastasized

Mutation, an apostate neoplasm, an assembling of cells, a presence: when or whence, exactly, does an unexpected, uninvited growth arrive? Tumors wound a body, but not exhaustively: the acknowledgement of their existence—that is, the knowledge that a body is and has already been working on, for, and against one’s sense of self, place, and presence in the world—also wounds the stability of autobiography. Here, the work of acknowledgment reveals a movement above or beyond the possibility of a fixed temporal location: from the site of growth to the sensorium of already having ‘been with’ that growth. A metamorphosis. One might say that one’s journey of overcoming a tumor inaugurates a new present, a new self. Especially with brain tumors, neuroscience and the mission to capture the brain now shape how we deal with uninvited cranial cell growth (Duffau et al.; Jones; Landsborough), how we imagine brains in our contemporary cultural gaze (Vrecko; Rose and Abi-Rached), as well as how governments meet and approach health, innovation, and population (Obama). Stories about brain tumors—from laboratory write-ups to pulp depictions—are entangled in this moment, both shaping and being shaped by contemporary conventions, questions, and quests. They therefore imagine curious confrontations between neurobiology and narrative, and exemplify problems of change and of dislocated senses of self through ruptured accounts and accounts of rupture. In this chapter, I explore what is freshly demanded of readers to understand the conceit of metamorphosis in an age of neuroscience.

Mark Salzman crafts a complicated tale of a heroine negotiating a brain tumor in his novel *Lying Awake*, published by Knopf in 2000. Focalized through the protagonist Sister John of the Cross, the novel narrates her twenty-eight years spent cloistered in a Carmelite convent in contemporary Los Angeles. While the book opens with a scene of deep devotion, described as Sister John drifting “up toward infinity” (5), her story is disclosed through flashbacks and fragmented presents. In the fateful scene of diagnosis, her oncologist, Dr. Sheppard, informs Sister John she has a “small meningioma—about the size of a raisin—just above [her] right ear” pressing on her brain and causing temporal-lobe epilepsy (68). He adds that the particular tumor is easily removable, and that, after surgery, the prognosis is for a “complete recovery” (69). Although excited upon first joining the convent, the initial twenty-five years of her time in the compound—a part of her narrative occurring much later in the

novel's sequencing—is marked by a curious distance from God. Only after twenty-five years when she has her first seizure—which is not recognized by her as such, but experienced as a deeply psychedelic change, an “understanding... as if a dam had burst in her soul”—does she feel finally a connection with God (115). For the next three years, she prolifically writes during these tumor-induced epileptic states, described as “light [being] poured out of her onto the pages” (116). This initial epiphany—a transformation for her—belies the real struggle awaiting. While the character's medical ailment is a meningioma, the tumor simultaneously sprouts a different psychic and spiritual infirmity: made aware that her connection to God has a biological culprit, she knows post-surgery she will not experience devotion, divinity, and herself the way she has only recently (both narratively and chronologically) come to acquire them.

The narrator, by partitioning her story, searches her past for meaningfulness in the present, and thus present concerns firmly root the text. After some existential soul-searching, she undergoes surgery to remove her tumor in the novel's final quarter. Her ecstatic seizures, as well as her intense spiritual connection to God, stop. Her response to the surgery complicates the doctor's cheerful outlook of “complete recovery,” for Sister John learns she cannot recover the person or the piety that that cell growth pressured into existence, into experience. Someone else, a different Sister John from the ones who preceded both the epilepsy and the surgery, would appear to emerge by the novel's close. “No matter what she did in the cloister from now on, it would always be followed by an asterisk and questions about the nature of her relationship to God,” the narrator relays while Sister John is in hospital after surgery (153). That asterisk—simultaneously the character's, the novel's, and the tumor's scar tissue—exhibits how *Lying Awake* triangulates a contemporary struggle amongst neuroscience, narrative, and the experience of metamorphosis. Sister John's benign fictional tumor departs, but what arrives—or looms—is the malignant “nature of her relationship to God.” That the novel ascribes her senses of self and one's experience of God as materially localized rather than simply psychological alibis engages a version of metamorphosis reliant upon biochemical and neurological believability. What about the notion of ‘materiality,’ here? Salzman's text helps me to problematize how that promiscuous concept comes to matter for practices of reading metamorphosis in this narrative: first, material refers to the physical medium that, here, stores her data of God (carrying the corollary implication is that this is *rewritable* data); second, matter indicates that her cerebral

architecture at a given moment has probative value in a legal sense of being evidentially material to her disposition toward a divinity (because the design of the novel partitions her life story, it endorses a suspicion that her tumor perjures her own autobiography); third, material from the philosophical sense inspires a rejection of supernatural cosmologies and a metaphysical soul by dignifying a physical world.¹² How can readers now apprehend and make sense of this distinctively material metamorphosis, with its interrelated psychic, physiologic, spiritual, and textual complexities? Here, God metastasizes to commensurate with a contemporary literacy of the brain.

A sense of metastasis—the migratory entangling of decay and growth, transference and modification—is why I consider the text’s ‘asterisk from now on’ an interesting and challenging proposition. In the frame of neurobiology, how do we come to hypothesize and to account for changes in personality? In the game of fiction, how do we come to believe narrative devices that illustrate transformations and anchor tales of metamorphosis? The text’s cultural circulation begs a critical interstitial question: how do accounts of change transform our accounts of change?

Salzman’s novel does cultural work to register the interconnectedness and interdependency of neurobiology and narrative in order to describe the character’s metamorphosis. The novel’s narrative skillfully moves both from one type of rhetoric to another as well as from one temporal location to another without privileging any single form or emplotment: it metastasizes. The book challenges Sister John’s behavior, outlook, and sense of being in the world yet to come. Therefore, a closer reading of the book through the concept of metastasis is helpful to open up with what the novel closes: the future-tense growths, changes, and transitions yet to be enacted on both her forthcoming experiences and bygone memories. While this chapter argues that metastasis registers the biological work culture does in knowledge transformation, it also seeds the biological and biographical conceits readers produce and reproduce in storytelling. Likewise, the ‘asterisk from now on’ acknowledges a post-lesional mutation that informs impending metamorphoses, versions, and transformations. At a time when neuroscientific claims are moving and relocating knowledge so rapidly, slowing down to take stock of the transformations and mutations they imply at

¹² The narrator describes Sister John’s outlook post-surgery: “Now that the brilliance of her seizure had faded, doubt lost its shadow-appearance and became solid again. The horizon between reality and illusion—between the spiritual and the material, between faith and self-interest, between love and self-love—vanished” (Salzman, *Lying* 137).

large and impart in objects like novels is an apt analytical task. In this chapter, I track how neurobiology disrupts the metaphorical conceit of metamorphosis in *Lying Awake*.

First, I look to the disciplinary tools available to confront metastasis and Salzman's text in a plea for interdisciplinarity. Here, the suggestion is that the brain enters literary fiction not merely as a biological or vital phenomenon with the neurosciences as the singular maven of neuro-rhetoric, but as a collection of imaginative possibilities, characterizations, and discursive complexities shared and negotiated. Appreciating the density of the text on its own terms enables an enriched reading while maintaining a disavowal of neuro-rhetoric as always already enthroning the neurosciences. An approach to the object considered in this section is the emerging genre of 'neuronarrative,' whose possibilities and uses for interdisciplinary analysis are at stake. While neuronarratives apprehend certain stories as adopting neuroscience's causes and debates as relevant to literary concerns, the act of classifying texts as such falls short of enriching understandings of what Salzman's text culturally engages.

The second section offers a different way of approaching metamorphic transformation in a neurobiological age. It takes up the concept of metastasis and tracks it to read the spiritual legacies, affiliations, and deteriorations of meanings important to analyzing how *Lying Awake* may implicate a contemporary understanding of metamorphosis through biography and biology.

The chapter concludes with an analysis of Catherine Malabou's theory of 'destructive plasticity' alongside the concept of metastasis. It questions the popularity and privileging of neural plasticity as a catchall to explain change in literary characters. This section analyses the two concepts of plasticity and metastasis to address where and how the sculptural power of metamorphosis is enabled or constrained in its relation to depictions in fiction.

Transforming Genre

The metamorphosis at issue that Mark Salzman's *Lying Awake* presents does not offer any solitary psychological, environmental, social, or biological culpability. Although published some fifteen years ago, the text takes up contemporary anxieties and struggles over the increasing territory the neurosciences survey (here religious, spiritual, and cerebral-subjective), and the subsequent biomedicalization of everyday life, as well as its emotional and affective atomization.

With the emergence and imbrication of neurobiology in narrative fiction taken up in this chapter, a particular line of questioning emerges from apprehending a text's emphasis on neurobiology for the ways by which that emphasis may challenge the form of narrative. Recall from the Introduction that several scholars offer analyses in the last decade to account for the motif of brains-in-literature and literature-in-brains, and that, when invoked as genre, neuronarrative describes how a character's actions are energized by particular neurological conditions, ailments, changes, or enhancements (see pages 14-20). Against this taxonomy, I discern that Salzman's text itself is not easily diagnosable as any one narrative genre or approachable from any acute angle. It unexpectedly transforms conventions of form and meaning. Moreover, the novel's appearance and interest in such myriad journals, periodicals, and online outlets attests to both the wide appeal and intermedial travel of the textual material (e.g., Kidd, Berlinger; "Famous Tumors"; Glannon; Wendorff). The object itself presents literature, psychology, politics, history, and devotion as relevant frames of reference, and as arbitrators to accomplish an engagement with cultural, political, medical, and religious concerns central to contemporary struggles and autobiographical anxieties.

First, Knopf categorize the text as Fiction/Literature. Sister John is not a real person, and the narrative certainly fabulates a nun-in-crisis story. The Sisters of the Carmel of St. Joseph, within which Sister John takes her vocation and with whom she "prayed from the very heart of Los Angeles," does not exist (Salzman, *Lying* 8). And yet the text pushes back against its encapsulation as mere fiction. The pivotal event at the Vatican near the end of the novel, to which Sister John is personally invited but cannot attend on part of her hospitalized recovery from surgery, is the proclamation of St. Thérèse of Lisieux as a Doctor of the Catholic church; that event and its date—October 1997—precisely align with the novel's calendration (John Paul II; Salzman, *Lying* 154-55). Additionally, the informational materials Dr. Sheppard provides Sister John upon diagnosis of her tumor identifies historical figures, such as Dostoevsky, Van Gogh, Tennyson, Proust, Socrates, and the apostle Paul, as likely candidates who suffered from temporal-lobe epilepsy (*Lying* 120-21). While the literary strategy of incorporating non-fiction into fiction tracks a broad trend in post-War US-American writing, one that goes back as far as Capote and Mailer and forward through DeLillo and Powers, Salzman's scene with Dr. Sheppard differently engages non-fiction: history and historical figures are not merely incorporated (to give readers spatial and temporal coordinates) but retextured and rehistoricized in an effort to reposition and ratify a

neurobiologized contemporary story. It represents an “act of memory” in the present, “in which the past is continuously modified and redescribed” through invention and imagination “even as it continues to shape the future” (Bal, Introduction vii). Here, Salzman appropriates neuroscience’s contemporary specificities to rewrite and redistribute history in an act of cultural memory.

Salzman’s strategy of cultural memory neighbors with interesting frames of recent academic writing. Paula Leverage, for instance, anachronistically re-reads Chretien de Troyes’s twelfth-century Arthurian knight of *Percival, Le Conte du Graal* as “struggling with a very specific cognitive deficit” in her article “Is Percival Autistic?” (134). For Paula Leverage, the autism she reads in the fictional Percival is authorized by the French poet’s “fine psychological portrayals of his characters and their relations,” which compels her to compare de Troyes “today to novelists such as David Lodge and Ian McEwen, who consciously explore the workings of their characters’ minds” (134). What one can take from this extraordinary rewriting of history and contemporaneity, is that its varying practices indicates one of the ways that the history of characters within the literary community does not necessarily correlate with histories within other communities and intellectual subcultures. In general today, this type of speculation, in the form of academic historicism, is widely “accessible via PubMed” to researchers (Belinger 690; cf. Glannon; Landsborough) as well as from more neurobiologically incisive scholars: for example, Orrin Devinsky, director of the epilepsy center at New York University, can claim that “Whatever happened back there on Sinai, Moses’ experience was mediated by his temporal lobe” (Hagerty). Finally, in a different way, in some of the last pages of the book another moment tugs at the margins of fiction. Sister John asks Dr. Sheppard why a police officer stands guard outside her hospital room when a new patient, with whom she now shares the space, is admitted. Sheppard tells Sister John that the patient, a teenage girl in a coma from a gunshot wound to her head, “was involved in a crime at the time of the shooting. The guard is there to be sure she doesn’t walk out of the hospital and disappear,” adding, “You don’t have to be Oliver Sacks to know that’s not going to happen” (Salzman, *Lying* 162). Though simply the butt of a joke, the reference positions the real Sacks and his work in the fictional world of the characters as a type of common knowledge from the non-fictional. The book exceeds and dislocates the boundaries of fiction, not simply by integrating non-fiction but by hailing and changing neuroscience as

well as the legacy of popularly narrating parables from the neurosciences through its textual delivery.

Secondly, the approach to *Lying Awake* as a medical story falls short of full explication. It plumbs the exciting abilities of brain-imaging technology, lends space to expositions of neuro-oncology (through the utility of the Dr. Sheppard character), and stages the overcoming of a tumor from which Sister John, without surgery, “would eventually fall into a coma and die” (Glannon). Underscoring a didactic quality, Ava Easton and Karl Atkin observe the prospect that “through [neurological narratives], health professionals can explore and engage with the experiences of people affected by neurological conditions in a way that it would not be ethically appropriate to do in conventional consultations” (36). Further, Nancy Berlinger writes about Salzman’s novel as part of this increasing trend to use religious figures to teach medical researchers, found in published medical articles like “A Differential Diagnosis of the Inspirational Spells of Muhammad” and “Joan of Arc, Creative Psychopath” (691). Berlinger observes that more than half of the total medical schools in the United States “address issues of spirituality in their curricula” (683). She adds that the pursuit of the “process of telling and retelling a story *in accordance with genre conventions*—whether they are the conventions of the prophetic narrative or the bioethics case study—fictionalizes the story to the point where it is no longer possible to determine what the real facts of the case are” (691; my emphasis). What one may take from her argument is that medical narratives themselves enfranchise an assembly of cultural practices that situate the psychic in pathology as well as anxieties where spirituality is successfully managed. These narratives “offer some insight into how ‘religiosity,’ as a form of religious spirituality, may be viewed by clinicians and clinical researchers” (691). To quarry *Lying Awake* for neuro-medical analysis partitions knowledge in a way that falsely distinguishes the narrative involved from its cultural histories in the present. The novel outsmarts this by insisting on the medical aspects thrown up as always already medical *story* complicated by medicine-*through-story*.

Third, framed as a spiritual or devotional novel, the book finds itself in a company of texts that interrogate historical and contemporary practices, rituals, and beliefs in the Catholic Church as well as the general perceived fissure separating religion and science. Emphasizing this genre, the novel indeed takes part in the tradition of storytelling the journey, the spiritual awakening, the overcoming through struggle, and all the metaphors of light and germination that accompany it. Sister John speaks her central, crucial choices in the

novel this way: “Should I automatically assume my mystical experiences have been false, or should I stand behind what my heart tells me? Is God asking me to let go of concerns for my health, or is he asking me to let go of my desire for his presence?” (Salzman, *Lying* 124). Though an “or” shrilly separates each question here, by the evening before her brain surgery, Sister John comes to submit not to the clauses on either side of the “or” but to the “or” itself. The narrator demonstrates how she resigns herself on the eve of surgery with a chapter-closing, italicized “*Into thy hands*”; yet, the non-capitalized “thy” promotes an entangled predicate: does she surrender herself to God’s hands and/or yield to the surgeon Dr. Sheppard’s hands (Salzman, *Lying* 148)? What productively complicates the set of expectations accompanying a typical spiritual novel is the enfolding of science and religion through the character of Sister John. The narrator communicates that she would have been “automatically rejected” from her application for cloistered nunhood had she known before taking vows that her spiritual devotion was mediated by a brain tumor (67). Rather than privileging one genre over another, the novel participates in contemporary debates about science *and* religion, typified by academic tomes like Patrick McNamara’s *The Neuroscience of Religious Experience* (2009) or Anne Runehov’s *Sacred or Neural?* (2007).

Sharing this textual company, the book as simply a religious novel might waver under the question of whether science and medicine can localize and diagnose religion. But the novel does more and different work than that: by focusing on the protagonist’s struggle with information and experience while not dodging the question of science’s threatened occupation of religion, the novel engages the cultural transformations of writing contemporary negotiations of neurobiology and psychology. Rescuing this aspect of the text’s “mystery” as inspiring for contemporary Catholicism, Thomas Wendorf writes for the Catholic journal *Logos* that “Salzman’s novel locates all the ways of knowing within faithful service and of mystery that characterizes Christian life” (62). Acknowledging medicine’s role in the text as a challenge, Wendorf concludes that in representing the “extraordinary religious experiences and the competing voices provoked by them,” the novel “provide[s] us with analogies for meeting mystery in ordinary life” (62). From this interpretation it is possible to read that Sister John’s confrontation with both her tumor and Dr. Sheppard ushers in one set of skills of knowledge, but not exclusively. Sister John’s Christian concepts also shepherd other models of knowing presence and life. *Lying Awake* does not empower one form of text or one sermonizer of knowledge. The novel privileges a sense that neither a strict fidelity to

her Catholic faith nor a sole surrender to a surgeon “recovers” her; rather, the space of growth *in the exchange* amongst neuroscience and religion transforms her.

Finally, the book may also welcome a reading as a patient case study. In the tradition of clinical writing, traceable through writers like Hippocrates, Luria, Freud, and Oliver Sacks, Salzman’s *Lying Awake* may fit comfortably. If one is to believe the author, Salzman reports “the history of the beginning of the idea” of the novel retroactively: “It started after I read an essay by Oliver Sacks about temporal lobe epilepsy where the person would experience an intensification of interest in religion and spirituality” (Salzman, Interview). As noted above, Salzman directly references Sacks in the novel. Further adding to a curious intertextuality, Oliver Sacks himself references *Lying Awake* as both “evidence” and “theme” of ecstatic, “religious or mystical” seizures in a chapter entitled “The ‘Sacred’ Disease” in his book *Hallucinations* (161-62). As a bit of a confession here, my interest in Salzman’s book initially occurred while listening to a segment of National Public Radio’s *Radiolab* entitled “Famous Tumors.” The hosts interview Mark Salzman between other stories of tumors, such as the one that killed nineteenth-century US President Ulysses S. Grant and the tumor cells from Henrietta Lacks’s biopsy that were crucial to medical advancements like polio vaccines and chemotherapy drugs. Though the show notes Salzman’s case study is fictional, the story of Sister John’s tumor in *Lying Awake* fits seamlessly in this series of real-life patient stories. Yet, even this desire to focus on the object as illustrative of a clinical case study—whether from Oliver Sacks or MacArthur Fellow and co-host Jad Abumrad on *Radiolab*—evinces how the text’s characters and issues breach the barrier of a case-study text and are already engaged and enfolded in competing cultural questions.

The interest here is to explain how the text on its own terms parries an urge to classify the novel through any one disciplinary or generic approach and to demonstrate how it precludes disjointed and facile conclusions about fiction, medicine, spirituality, and psychology. By overwhelming any single location in genre or form, *Lying Awake* problematizes and contaminates cultural conventions and expectations of narrative. And identifying certain texts as a means, or even a method, of analysis leaves one little but taxonomy by which to understand how specific texts implicate an understanding of contemporaneity.

As noted in the Introduction, genre typology as a methodology for critical reading offers little to encourage an engagement with *Lying Awake*’s specificity when addressing the

fact that today's fiction has evolved in dialogue with the neuroscientific revolution (see pages 25-28). Murat Aydemir, on the other hand, finds Clifford Geertz's contributions to a cultural analysis useful at this juncture, underscoring that Geertz's study through "thick description" reminds scholars that he "approaches his objects as densely textured: they don't reflect contextual givens but condense multiple frames of reference, [such as] discursive, social, aesthetic, economic, political, and so on" (39). Densely textured, "overdetermined" objects of culture challenge "full 'possession' by contextual and conceptual articulation," which is why they "can never be 'just an example'" of a theory or a political attitude or a literary genre (39). "Objects problematize rather than illustrate," insists Aydemir, which is why an analysis that ends with diagnosing texts as neuronarratives, therefore, is not an approach that helps understand what the stories and the characters in the story are a response to, an attack upon, a cherishing of, a transformation through, and so on (39).

This section displaces a convenient framework—genre classification—to highlight the productive contaminations the text performs: how different disciplines play their part in Salzman's text, and, adjacently, how the novel engages different methods of reading by resisting the exhaustibility of any single disciplinary approach of interrogation or exploration. Idealizing the text as a neuronarrative of metamorphosis sequesters neurobiology from narrative in order to distinguish the novel's particular tale from its cultural incubation. What the text engages and what engages the text do not follow a through-line of cultural concerns; rather, those engagements are marked by growth and decay, dislocation and migration, as well as the cooperative literacies necessary to read them. Salzman's uses of neurobiology interpenetrate the genre of metamorphosis by imagining new interstitial literary figures involved in the crafting of biography, recollection, and experience. The book metastasizes the site of genre and narrative, embracing different questions, forms, explanations, and cultural anxieties.

Metastatic Movements

In the space between the bodily operations of what benign and malignant signify the term metastasis finds its fuel and motility. Sister John's tumor is a "small meningioma ... in an excellent position for removal," but the act of removing the mass of cells does not recover a previous pre-epileptic state or produce an easy spiritual recovery in any psychic or narrative sense of the term (Salzman, *Lying* 68). She seems to become a different person, twice, in fact:

once from the moment of diagnosis, and once again post-surgery. Her brain lesion demonstrates the contemporary shift to underscore the biological-as-more-believable account of characterization. There is something about the movement and exchange among the biological and biographic—revealed only through her simultaneous physical and psychic wounding—that *Lying Awake* proposes as a central question throughout. I suspect this something is a transformation of the site of metamorphosis in stories, a conversion not marked by the mere integration of neurobiology into literature, but one which resituates the traditional literacy required to read metamorphoses.

In one way, this observation sketches the fortunes of the concept of metastasis: travelling back and forth between rhetoric—where it is first used—and medicine, where it now visualizes movements of illnesses. The term today generally connotes the insidious movement of cancerous cells from the site of neoplasm to another location in the body. Yet, in another way, the term denotes other movements as well. For Quintilian in the first century, *metastasis* usefully describes narrative resetting, a “removal from the scene”; Euripides, in the drama *Iphigenia in Tauris*, invokes the term to indicate a “change of course” (“μετάστασις”). In a contemporary diction, it is possible to submit that the term’s appearance in language was itself a type of metastasis: *meta* and *stasis*—together, gesturing a movement above or beyond a site or location—arrives conjoined in the English of rhetorical scholars in the mid-1500s after being enucleated from the Greek components and cultivated in the late Latin (“Metastasis”). Metastasis denotes a mutation of meaning across and beyond lexical components through a dislocation: an abrupt change, possibly an accident, but always unexpected. The sense of disease and cancer are first recorded in Boyle’s writings only in 1663, while the concept’s motility—its verb form, *metastasize*—is first trafficked in 1907 (“Metastasis”).

Metastasis also registers the spiritual legacies, affiliations, and deteriorations of meanings important to analyzing how *Lying Awake* implicates a contemporary readability and understanding of metamorphosis. *Lying Awake*’s narrator importantly positions Sister John’s dilemma by situating a history of religion (and art) within a newly inaugurated history of science. Recall that Dr. Sheppard’s informational materials for Sister John upon diagnosis put her in the company of others, like Teresa of Avila, Van Gogh, and the proselytizer Paul, who, we are told, likely had temporal-lobe epilepsy (121). By suturing her experiences with theirs, we are asked to balance the materiality of their conversions with a different historical

account of their metamorphoses.¹³ Aptly, Paul famously and suddenly converted his spiritual outlook and then turned to encourage others to transform likewise. In a letter to the church in Rome later attributed to him, the speaker pressures: “do not be not conformed to this world, but be transformed [*metamorphousthe*] by the renewing of your minds” (*New Revised Standard Version*, Rom. 12:2). Jesuit scholar Luigi Rulla’s exegesis of the “metamorphosis or transformation” in the epistle “is to be understood in the sense of ‘let yourselves be transformed’” in the context of the “idea of totality” (297). Unpacking the admonition “emphasizes the relationship of ‘mind’ (*nous*) and ‘body’ (*soma*)... [and] does not shrink away from addressing the physical aspect of the audience” (Bayer 43). The physical and mental become interconsequential in that document’s exhortation. Here, “transformed”—*metamorphousthe*—is unique in the Christian Bible, and is first traceable to *reformamimi* in Jerome’s Vulgate; however, this Latin verb form resonates with transform and reshape, both of which still suggest a biological and biographical plasticity, a sculptural power of psycho/somatic resetting. That *Lying Awake* intervenes to enfold these transformations through the narrative devices of a tumor and a God beckons questions of their contemporary trajectories. That is, new biographies of change—here, articulated through neurobiology—transform previous biographies of change.

To take this further, the issue of travel and translation that the concepts metamorphosis and metastasis describe *and* undergo resonates with the form and act of writing literature through media itself. In a scene near the close of Umberto Eco’s *Foucault’s*

¹³ Balancing accounts of their conversions is a tricky matter, not just in relation to the discussion of materiality I offer earlier, but because it involves reading several layers of historical-cultural inscription in the present. As Mieke Bal suggests, “the memorial presence of the past takes many forms and serves many purposes, ranging from conscious recall to unreflected re-emergence, from nostalgic longing for what was lost to polemical use of the past to shape the present” (Bal, Introduction vii). That the fictional character Dr. Sheppard encourages a reader of *Lying Awake* to infer that Paul, for instance, suffered from a neuropathology does indeed risk conflating a set of texts for the person himself. Yet, to retreat from that risk of inter-influence invites an unproductive line of questions about what texts are instead of asking what texts do. The ability for a reader to imagine that neuropathological possibility demonstrates that the diverse forms and purposes of memorial presence are often simultaneously present in one text. Because “memory is active and it is situated in the present,” I argue in this section that the potential for texts to transform what we thought we already knew of histories of narration is what makes them both exciting and analytically productive (viii).

Pendulum, the character Casaubon, a publisher, narrates a final exchange between a dying Diotallevi and Jacopo Belbo about the possibilities and pitfalls of “remaking our body through language” (565). It is the interaction between the language of sacred texts and one’s body and one’s mind that concerns Diotallevi. The two protagonists, also both publishers, affirm the idea that “What our lips said, our cells learned” (566). Diotallevi speaks to Belbo:

Have you ever reflected that the linguistic term ‘metathesis’ is similar to the oncological term ‘metastasis’? What is metathesis? ... The dictionary says that metathesis means transposition or interchange, while metastasis indicates change and shifting. How stupid dictionaries are! The root is the same. Either it’s the verb *metatithemi* or the verb *methistemi*. *Metatithemi* means I interpose, I shift, I transfer, I substitute, I abrogate a law, I change a meaning. And *methistemi*? It’s the same thing: I move, I transform, I transpose, I switch clichés, I take leave of my senses. (566-67)

The question of metastasis Eco’s novel observes does not strictly align with medical/biological or purely rhetorical/literary; like Salzman’s text it engages those contours by interpenetrating them. While the scene above plays into a crisis of academic postmodernism *Foucault’s Pendulum* takes up as a theme, I emphasize here the movement, the *metastasis* of the terms themselves: in translation, practice, and, with *Lying Awake*, devotion.

To be sure, this chapter also appropriates the concept of metastasis to describe my encounter with a shift, or a supplement, in generic clichés of metamorphosis. But highlighting this re-conceptualization propagates a metastasis of other assumptions, other deteriorations, and other promises. For instance, Diotallevi’s example of *methistemi* (in Col. 1:13) is translated variously across the New Testament as “transferred” (*New Revised Standard Version*, *New Living Translation*), “translated” (*American Standard Version*, *King James Version*, *Wycliffe Bible*), “brought” (*Contemporary English Version*, *Good News*), and even “re-established” (John Bertram Phillips’s *New Testament in Modern English* Anglican translation). Metastasis conceptualizes change and narrates movement. The concept helps one move across, or beyond, the acceptable perimeters of categories, and asks one to consider new locations, new sites of biological and biographical growth.

In other words, the concept metastasis is not culturally or historically benign, nor is its relations to the ways it is used to illustrate metamorphosis. It yields notions of transformation, change, mutation, and conversion. Its medical, and later oncological, appropriation transforms the very imaginaries the term’s invocation invites. And appreciating

the concept's density narrates its history in the present to deliver types of change—here, in Salzman's novel—as a site of cultural coincidence that enfolds rhetoric and religion. His novel helps me understand how our present shifts the place of metamorphic speech. This is what I find precious about metastasis through *Lying Awake* and would have missed in a cursory reading through metamorphosis: that we transform culture and history in our contemporary writing of changes of scene.

The analysis above underscores that while metamorphosis invokes a history of transformation in narratives—a sort of through-line from Ovid to Kafka—metastasis, rather, transforms histories of narration. Its presence transforms our understanding of biography and how biographies are articulated in culture. Not monopolizable by oncology, and more than a mere literary figure, metastasis makes neurobiology literate through contemporary biographies of metamorphosis.

The sculptural power of metamorphosis—currently embedded in the concept of plasticity in critical theory—and its relation to literature is the final aspect I wish to explore in *Lying Awake*. The following section asks what sort of mileage a metastatic literacy might clock.

Morphing Plasticity

Catherine Malabou opens *The New Wounded* with an anecdote about her grandmother's Alzheimer's disease. As Malabou phrases it, she watched Alzheimer's "operate" on her grandmother (xi). "Operate" is the verb of choice, because "it seemed to me that my grandmother, or, at least, the new and ultimate version of her, was the work of the disease, its opus, its own sculpture. ...Behind the familiar halo of her hair, the tone of her voice, the blue of her eyes: the absolutely incontestable presence of *someone else*" (xi). Malabou describes the strange sculptural power of the neurodegenerative disease changing her grandmother. While family and close friends might interpret the newness of her grandmother as a type of transition through the Alzheimer's, a mere difference of form, Malabou recognizes—and opts to theorize—this movement as the "presence of someone else," a difference of being. Thus, for Malabou, if brain wounds operate, they also transform, metamorphose through the annihilation of a previous presence. One transforms, it would seem, to inaugurate a new present, a new self. Plasticity is the name of this modification and the action of this modifiability.

Malabou located the concept of plasticity in reading Hegel's exploration of spirit, and brought it later to encounter the emerging brain sciences, who also make use of this concept as a biologically acting force. Biology, and specifically neurobiology, is neither (a) given nor hardwired. Adaptation, creation, and annihilation are plasticity's three fields of action Malabou identifies. The third, annihilation, is her object of interest in two recent books in English (*The New Wounded* and *Ontology of the Accident*), and is etymologically correlated to the term itself: *plastique*; the capacity to annihilate form, in the sense of plastic explosives: "destructive plasticity." Out of destruction, an entirely new subject emerges. Those with head trauma, epilepsy, tumors, autism, Parkinson's, Alzheimer's, people with post-traumatic stress or brain lesions, or those who chemically mutate their selves, she argues, have not regressed to some previous state psychoanalysis can alleviate. They are new people, the "new wounded," metamorphosed biologically and psychically. The brain, for Malabou, becomes the privileged site for the conceit of metamorphosis today. Malabou's theory of plasticity provides a useful set of questions to think through the philosophical implications of the neuroscientific revolution; however, my interest in her here is with regard to narratives and literary media. Her extensive and unique contributions deserve more analytical time and space than simply grouping her with literary critics who work with 'neuronarratives.'

Rather than the possibility of traces, or even asterisks, remaining as a result of brain wounds, Malabou insists on destructive plasticity's complete annihilation—characters severed from their history—as a way to radically rethink both psychoanalysis as a discipline and psychological representations of brain-wounded characters in fiction. Malabou considers narrative through her concept of the "neurological novel," and her focus is on "how to do justice, in the very writing of the cases, to the rupture of narrativity that ultimately characterizes each one, to the destructive power of the plasticity that they each manifest" (*Wounded* 55).

Malabou argues that there is no amount of therapy that would alleviate these altered identities, for there is no history to these new brains. She writes, "There is a postlesional plasticity that is not the plasticity of reconstruction but the default formation of a new identity with loss as its premise" (*Wounded* 48). Indeed, Sister John's experience of herself and her relationship with God as "followed by an asterisk" resonates with the idea of transformation premised by loss. Events like these reveal that we have a "sculptural power that produces form through the annihilation of form" (49). Malabou's theory of destructive

plasticity, she argues, demands that “we must all of us recognize that we might, one day, become someone else, an absolute other, someone who will never be reconciled with themselves again” (*Ontology* 2). This new self appears outside of history, shreds biography and autobiography, and begins a new way of being in the world while continuing to exist in a prior, but wounded, body.

Malabou’s theory about narrating a wounded subject is sharp, but slightly too seductive. An objection when regarding narrative literature: Malabou coins a term—destructive plasticity, or the “plastics of death” (*Wounded* 20)—and consequently everything we know about neurobiology and narrative is different, crystallized, tidied. As Hannah Proctor points out, “Malabou’s insistence on the homogeneity of the post-traumatic subjectivity risks suffocating the specificities of psychic damage beneath a singular conceptual blanket” (42). And while acknowledging and appreciating the metastatic operation this chapter’s take on her concept of destructive plasticity implies, I want now to test the image of biological and biographic traffic it resolves and stabilizes by analyzing destructive plasticity alongside the concept of metastasis made available in *Lying Awake*.

This question of how to do justice—how to *do* writing—to the personal, intimate, and immediate experiences of the world through neurobiology recalls Ramachandran’s argument toward the “need to reconcile the first person and third person accounts of the universe” (qtd. in Gaetdke 187). Neurobiological characterization now demands a departure from the speculative third-person and author-mediated first-person perspective, but it is unclear that “destructive plasticity” gifts the ideal prism for doing so. I read Malabou’s general looking backward—to the fiction of Beckett, Kafka, Ovid, and others—as an occupying gesture, one where she conscripts “neurological novels” in order to stabilize the story of her theory, where she can claim, for example, a scene in *Happy Days* “is the privileged expression of affective impoverishment and destructive metamorphosis” (*Wounded* 55), or that “Gregor’s awakening at the beginning of [*The Metamorphosis*] is the perfect expression of destructive plasticity” (*Ontology* 15). The risk in locating *Lying Awake* in concurrence with her theory, as an instance of it, is to universalize plasticity, to laud any cathartic outcome for a literary character as *mere* emergence or metamorphosis, and to foreclose Sister John’s asterisk in favor of diagnostic psychobiology.

In the account we read, Sister John’s sense of self and presence is not entirely overhauled. Her history is not erased; her autobiography does not vanish. She changes, is re-

established, but does not become ‘unrecognizable’ to herself. Her memories, the new account she gives of herself, and her recollections of her previously intense connection with God—though deteriorated and greyscale—now inform the very asterisk that *remains* with her. While this remainder certainly does not approach neuronal recovery or outright spiritual resurrection, there is residue in the forms of memories and practices she continues post-surgery, however stale or uninspired the narrator suggests they may be. “A normal adjustment? For three astonishing years she had lived and prayed from the inside of a kaleidoscope. Everything fit into a design of feeling, a pattern linking all souls and minds together,” the post-surgical passage reads; “She felt God’s presence in the design, and nothing seemed out of place. Every person was like a piece of glass in a giant rose window. Now the pattern was gone” (Salzman, *Lying* 158-59). Dr. Sheppard may have excised the pattern’s presence, but the memory, according to the narrator, transfers to a new presence, the type of transferred, re-established transformation *Lying Awake* itself proposes when saluting Paul. Further, Salzman’s pun, when Sister John prepares for surgery, is that she “removed her habit,” which acknowledges an undressing of the character’s textile and text (147). Upon exiting the hospital, however, she puts it back on and catches a glimpse of herself in the shiny elevator door, and thinks: “The garment she had cherished for so long looked strange, like a costume” (159). The scene’s setting in front of the mirror-like door is telling, for Sister John sees *herself* even if it is a recognition of a different self. Her change—here, a “strange” transformation—narrates the psychic dislocation and cerebral movement delivered by her surgery. Metastasis registers this metamorphosis as reorganization through growth more particularly than regarding it as the creation-through-“annihilation” that underpins Malabou’s concept of destructive plasticity in “neurological novels.”

Importantly, *Lying Awake* does not end its narration of Sister John’s story as she exits the hospital, for neither the tumor, nor Dr. Sheppard, nor God have the last word. In a sense, all three deliver Sister John’s emerging identity and future self. Notably, destructive plasticity as a result of brain trauma, for Malabou, “has the power to form identity through destruction—thus making possible the emergence of a psyche that has vacated itself, its past, and its ‘precedents.’ In this sense,” she continues, “such plasticity has the power of creation *ex nihilo*, since it begins with the annihilation of an initial identity” (*Wounded* 68). *Lying Awake* begets a different type of emergence, a creation from something already there. After returning to the Carmel, Sister John’s time in the compound’s infirmary is described as

“convalescence,” “a prolonged examination of conscience,” which implies to some degree a recuperation, a reterritorialization, a shift in scene after having taken leave of one’s senses (Salzman, *Lying* 170). Thus, her new identity is predicated on the very fact that she *has* a history, and is compelled to deal with it as it informs her present and presence. Her connection with God, inaugurated by tumorous cell growth, is severed, but remains a trace, not the radical break or “absolute other” Malabou considers a prerequisite to formation. Though the narrator acknowledges her estrangement from her epileptic and pre-epileptic self, it is clearly a dislocation and transference of her identity, from one space to another, and occurs *through* the knowledge of her previous self. This metastatic emergence registers a *mode* of emergence less discernable in Malabou’s model of “creation *ex nihilo*,” and is ultimately preferable because it makes readable the sculptural and psychic powers of biographic residue that remain with Sister John’s sense(s) of self.

Modes of emergence, through the traces that persists in identity, constitute a final encounter of Malabou’s theoretical treatment of the neurological novel with the concept of metastasis. Malabou’s agenda in *The New Wounded*—the book’s “principal wager”—is that “cerebral eventality will replace sexual eventality within the psychopathology to come” (xix). Psychoanalysis, in other words, requires an overhaul to remain useful and relevant in a neurobiological present. Though she valiantly succeeds in making this case with regard to Freud, her arguments are only narrowly tailored to a rebuttal and rethinking of Freud, which puts pressure on her more adventurous speculations about literary fiction. What Malabou’s approach obscures, in the instances where she warrants her claims through analysis of neurological novels, are the ‘novel’ aspects themselves: the narrative and narratological take a backseat to the ‘neuro-’ and the psycho. By emphasizing the stakes of psychoanalysis, “her references to literal brain injuries seem to serve as a metaphor for all disjunctions in subjectivity” (Proctor 42). Rather than remaining at the level of metaphor, *Lying Awake*’s narrative takes up a very specific drama—itsself an impossible premise without the presence of neuroscience—as a way to think through the contours of cultural projects like biography and autobiography today. Cerebral emergence is not coterminous with narrative and rhetorical emergence, a nuance to which “destructive plasticity” remains mute and to which metastasis makes audible.

For example, looking to Luria and the role of clinical case studies, Malabou observes “a very close relation between the metamorphosis of an identity that survives a wound and the

story of this metamorphosis—as if the plasticity of writing supported that of systems; as if writing itself repaired the wound that, as it repairs itself, nourishes writing” (*Wounded* 187). Writing itself appears as a mode of emergence, of identity- and world-formation, from neurological wounding. As if to comically puncture this image, while Sister John prolifically wrote in her epileptic fits before acknowledging her brain wound, Salzman’s narrator conveys that Sister John ceases writing *after* her tumor’s removal. The convent’s most senior nun, Mother Mary Joseph, tells Sister John, “God showed you what heaven could be like, and you shared it with others. Now you can do something even better. ...Walk in faith even though heaven seems out of reach. Think how good it would be if you could write about that” (Salzman, *Lying* 175). Not missing a beat, Sister John replies to the head Mother: “I need to *read* that book, not write it” (175).¹⁴ Here, emergence comes from her recognition—like Diotallevi—of taking leave of her senses. A politics of discourse, or narrating experience in order to articulate, share, and make sense of a dislocated and transformed self, arrives not from the “absolute break” of a brain wound but, for Sister John, from the recovery, from the *history* that wound both produces and acknowledges.

Without the need to psychoanalyze Sister John, what Salzman gifts readers in his narrative is the very complex entanglement of neurobiology, narrative, and identity through the conceit of a tumorous wound. The idea that narratives are world-forming is an idea I certainly cherish here. But “destructive plasticity” does not add anything new to an insight many, such as A.S. Byatt, David Lodge, or Nelson Goodman, have previously offered. Even

¹⁴ Keeping Sister John’s earlier hallucination-induced devotional writing in mind, this particular exchange summons the (textual) concerns in Gustave Flaubert’s *The Temptation of Saint Anthony* (eventually published in 1874) as analyzed by Foucault in “Fantasia of the Library.” For Foucault, the opening scene of *The Temptation* depicts Anthony turning to text the very moment his devotional connection with God falters: “Flaubert’s Saint Anthony seizes his book to ward off the evil that begins to obsess him and reads at random five passages from Scriptures” (94). Reading scripture only serves to trigger the nightmarish temptations Anthony experiences throughout the rest of *The Temptation*. The implication, Foucault notes, is that “evil is not given as the property of characters, but incorporated in words” (95). Flaubert’s *Temptation* is “a self-reflexive commentary on the dangers of books” (Thomas 137), where reading, according to Foucault, risks “dissipating” one’s “energies by telling” a reader “what they must do” rather than inspiring different forms of existence, or, in this case, devotions (108). Foucault writes: “The imaginary now resides between the book and the lamp. The fantastic is no longer a property of the heart, nor is it found among the incongruities of nature; it evolves from the accuracy of knowledge, and its treasures lie dormant in documents. Dreams are no longer summoned with closed eyes, but in reading; and a true image is now a product of learning...” (90).

deeper in literary theory, Bakhtin's analysis of how life-worlds produce a text, Jaus's formulation of the succession of life-world(s) in which a text is received, or, more broadly, Harold Bloom's theory of socio or cultural genesis, all relay in various ways the power of literature and emergence without recourse to capturing and codifying that insight into a matrix of neurons. At best, Malabou keeps Kafka, Duras, Ovid, and others in cultural circulation; she re-writes them to accord with a theory of neurobiology: a type of metastatic dialectics that only narrative, here, can make visible. Thus, while "destructive plasticity" skillfully reworks the present shortcomings of psychoanalysis, it is maladroit to help a theory of emergence in narrative.

What is wonderful about Malabou's theory is that it welcomes the possibility for radical, unexpected change. Like Gregor Samsa in Kafka's *Metamorphosis* Malabou ventures to the extreme to find important implications of a new understanding of neurobiology: the emergence of a new person from a brain wound—the absolute break, or the distance of an Alzheimer's patient—where the character does not recognize a previous self. However, different modes of emergence, and different metamorphoses, become possible to recognize through a metastatic reading she forecloses. Intervening in Malabou's theory by reading the concept of metastasis accounts for a type of propagation that registers the biological work culture does in knowledge transformation, and seeds the biological and biographical conceits readers produce and reproduce in stories. Rather than only theorizing shredded, "vacated" characters with no history, the critical promise of metastasis in narration is to read dislocated, emergent, metamorphosed characters beyond abstract psychology and authorial fiat (*Wounded* 68). Where microscopes and fMRI machines abstract and obscure, and where the notion of plasticity and the practice of psychoanalysis flattens and universalizes subjects, metastasis might help us account for and feel transformation and metamorphosis in particular lives. As the narrator in *Lying Awake* imparts, Sister John's "path was not to be a straight line after all, but a comet's ellipse" (177).

Metastasis, therefore, is a productive problem for narrative. It conceptualizes change, characterizes movement, and dialogues with notions of transformation, mutation, and conversion. Although rooted in rhetoric, its travels and implications in oncology and philosophy transgress those frames and speak to the narrative mediations those frames produce and shape. Though colloquially a pretty nasty vision of destruction, a slow, insurgent, cancerous spread of death, it analytically re-establishes an emergence of (cellular)

life as form and change. Life which is not centered on the stability of a 'soul' or a single identity, but a vision of life that pluralizes subjects figuratively and metabolically. Metastasis is the non-strategic travel of cellular growth, and an economy of material growth, pruning, forging, etc., constitutes both cancer and inscriptions of knowledge.

Through an analysis of *Lying Awake* that confronts metastasis, this chapter proposes a closer affiliation with the literary, social, and spiritual anxieties in our contemporary neuro-rhetoric. Rather than genuflecting to neurobiology or classifying the text as an integration of neuroscience, I take *Lying Awake* conceptually on its own terms to engage a more textured analysis. Unable to fully materialize Sister John's metamorphosis psychologically in the wake of neurobiology, the novel forces cooperation with narratives of neuroscience for the character to become legible. But this legibility dislocates a once-benign history of metamorphosed literary characters. Not a mere incorporation of neurobiology, Salzman's text transforms a history of narratives that depict character transformation: the trope of metamorphosis metastasizes. The concept and practices of God are dislocated, yet synaptically, electrically, textually, and narratively re-established. If God has a cranial postcode, as some neurosciences would have it, Salzman's character outwits this localization. The site of God and the engine of transformation metastasize a materialization of character. God is present before and after Sister John's brain wound, but the gravity, form, and meaning, are changed, and, importantly, are changing for the reader's imaginative projection of a future Sister John as well as a history of transformation.

Chapter Three

Fear and Panic in Iowa City

In the spring of 2013, a group of researchers at the University of Iowa enthusiastically reported fear (Feinstein et al., “Fear and Panic”). Their joy stemmed from the unexpected occurrence of their research subject’s fear, for they gave fright to someone in the laboratory they had been trying to scare for over two decades, someone whom they believed was constitutionally fearless. The group, led by Justin Feinstein, upended decades of conviction about a part of the brain thought essential to the affective formula for humans experiencing fear and panic.

That part of the brain is the amygdala. A typical human has two amygdalae, each of which is a relatively small group of clustered neurons deep within each side of one’s temporal lobes. Suspicions about what operations the amygdala perform or mediate are widespread, and thus the research questions the amygdalae provide for neuroscientists are legion.¹⁵ Yet, the amygdalae studied in Iowa City for the past decades, for instance, by John Wemmie, Daniel Tranel, and Antonio Damasio, furnished the claim that an absence of amygdalae creates an absence of fear.¹⁶ The 2013 report overturns this rule.

At the center of the Iowa team’s 2013 report is Patient S.M. She has neither of her amygdalae. The 49 year-old mother of three—known as Patient S.M., and sometimes written up as SM-046—has been of neurological, neuroscientific, psychological, and experimental focus at the University of Iowa in some way since 1986 when she was 20 years old (Tranel and Hyman 350). She is diagnosed with Urbach-Wiethe, a genetic orphan disease with varied dermatological and/or neurological symptoms. In this instance, both of Patient S.M.’s amygdalae calcified, hardened, and eventually became lesions in her brain by the time she had finished her teens. Back in 1995, for example, Damasio, Tranel, and others

¹⁵ The amygdalae are recruited to project various explanations for human behavior. In addition to studies associating one or both of the amygdalae with emotions, fear, anxiety, or panic, R.J.R. Blair links a compromised amygdala function with psychopathy, for instance (2557), Dick Swaab believes volumetry and functional amygdala connectivity correlates with sexual orientation (10274), and Kevin Bickart et al. sustain that amygdala volume “correlates with the size and complexity of social networks in adult humans” (163).

¹⁶ A smaller Iowa team in 2011, also with Feinstein as the lead author, reported that “the human amygdala plays a pivotal role in triggering a state of fear and that the absence of such a state precludes the experience of fear itself” (“Human Amygdala” 34).

at Iowa continued to reaffirm that “SM-046 does not experience fear in a normal way, as we have found no convincing evidence that she feels frightened given the appropriate stimulus, and...she fails to exhibit the full range of psychophysiological responses to fear” (Adolphs et al. 5887). Just recently, in 2011, Justin Feinstein and colleagues subjected Patient S.M. to several affect-loaded environments: “an exotic pet store with snakes and spiders, walking through a haunted house, and watching film clips of scary movies” (Feinstein et al., “Human Amygdala” 34). Predictably, for the researchers, Patient S.M. experienced no fear. And while “nearly a century ago, it was discovered that CO₂ inhalation can trigger panic attacks,” this possibility was never attempted on individuals with amygdala lesions (Zieman et al., 1013). So, in the 2013 lab experiment, the Iowa team exposed Patient S.M. to 35% carbon dioxide gas, which, according to the report, “evoked” observable fear and panic (Feinstein et al., “Fear and Panic” 270). What I wish to question in this chapter are the ways scientific case studies themselves, alongside popular scientific and philosophical appropriations of scientific material, are determined by affective responses formed in relation to narrative.

Patient S.M.’s relation with scientific patient-characters demonstrates an extraordinary narrative cooperation between science and the humanities that, here, converge through the study of affect. Her particular brain, this chapter explores, acquires character not exclusively through technological precision or sober scrutiny in Iowa City, but by arousing allusions to historical accounts that stir affective investments in laboratory reports. I first follow the text of the Feinstein team’s 2013 report and consider the conventions of genre that frame it. The second section looks to the consequences of a narrative analysis of science writing for studies of affect theory in the humanities. This leads me, in the third section, to contemplate the history of patient-characters in scientific case studies as a practice of writing that enfolds cultural parables. Finally, I return to one famous neuroscientific case study in order to hear an echo of Patient S.M. and to demonstrate how narratives based around patient-characters determine both scientific agendas and conclusions, as well as their recirculation in critical-theoretical analyses in affect theory today.

Situated Sensations

Feinstein and the Iowa team were greatly surprised by the experiment and its results, but a casual reader might fail to sense that from the report eventually published in *Nature Neuroscience*. Entitled “Fear and Panic in Humans with Bilateral Amygdala Damage,” the

2013 report ostensibly observes just that, and overturns the amygdala-as-essential-for-fear precedent. But something was flattened between the Iowa team's reporting and its final publication. In the author manuscript, publicly accessible from the National Institutes of Health archive, the affective experience of the experiment on the scientists is still audible, but is silenced in the "final edited form."

"If there were any hint of qualia in a scientific report," says Nobel Prize-winning neuroscientist Gerald Edelman, "it would be edited out" (qtd. in Lodge 11). In fact, the author manuscript shares with readers how Patient S.M.'s fearful reaction to the carbon dioxide caused the authors to become so "surprised by this result" that they only then went on to test the setup on two others with bilateral amygdala damage (monozygotic twin sisters). The final publication reports only—in response to S.M.'s reaction—that the authors wished to "further explore this issue," as if already an element of the experiment's design. Initially, the experiment's affective incitement led the authors to characterize the laboratory situation by way of its "surprisingly" abrupt reversal of their steadfast hypothesis in the abstract of the report, but that sensation is simply stricken from the final abstract. "Even more strikingly, CO₂ triggered a panic attack in all three amygdala-lesion patients," write the authors when originally describing their core results. Yet, the *Nature Neuroscience* editors replace the sentence's subordinate clause with the more affectively depleted and austere "notably." The editorial decision to alter the Iowa scientists' first-person accounts—the qualia in their first-hand interpretations—exposes both the affective and narrative conventions undergirding S.M.'s cultural inscription in the report. Had the original manuscript been let to stand, a reader might have been alert to the affected sensitivities and proclivities of the researchers themselves as they attempted to accord what they witnessed in the experiment with narrative fashion and expectations for a larger public.

Considering this, I get the feeling that there were many different emotions and intensities in effect for all the players involved before, during, and after the experiment: anxiety, surprise, elation, fear, concern, distress, and accomplishment, amongst others. On the one hand, the scientific rigor, historical interest, and personal connection between the Iowa researchers and Patient S.M., if nothing else, testify to the powerful role that emotion plays in disciplinary practices of inquiry. On the other hand, the report satisfies the previously open conclusion of the lengthy tale of Patient S.M., and provides her ideal foil: not scared by

the exterior, affective world of snakes and spiders and scary movies, a gaseous cocktail inhaled in the space of a laboratory finally disarms her steeliness.

What most intrigues me in this scenario is not that the Iowa team's practices of science for the past twenty years were necessarily 'wrong,' but that their declaratory tales about the brain's mechanics of fear turned out to be. Now, in retrospect, their publications represent not a progression of facts culminating in a veridical outcome, but an ensemble of misreadings of the brain and misreadings of fear. This rerouting of affect matters. In the most recent narrative, S.M.'s story arc—her seemingly non- or extra-human fearlessness thwarted—legitimizes the Iowa group's neuroscientific work by penning a narrative resolution fit for widespread interest in media outlets, such as *The Guardian* (Costandi), the *New York Times* (Gorman), NPR (Zeilinski), and *Time* magazine (Szalavitz). One effect of negotiating all of the emotions and intensities involved is that it compels writers—scientists, journalists, and academics alike—to forage for a genre that situates S.M. within the sensibilities of our contemporary moment. Different communities make sense of the experiment in various ways. The Iowa Scientists, surprised by the need to exchange their paradigm of neural fear circuitry, reshape the archive of S.M.'s story as a historical misplacement, and write the 2013 report as a redemptive clerical gesture—she now belongs *here*, not *there*, with *these* understandings of fear and not *those*. Other media, coping with reporting the ambiguous character S.M., frame the Iowa laboratory as a space of relief, of neuroscientific resolution and clarification and of overcoming struggle.

“All genres are affective conventions that allow readers to expect to feel held by a world, even for a moment,” imparts Lauren Berlant (Berlant). I propose that reading the 2013 Iowa report in conversation with the concept of neuronarrative invites a productive analysis into both genre studies as well as the place and role of science in theorizations of affect. Amplifying the affective conventions “being absorbed and enjoyed” exposes the “implied affective and code-sharing” narrative worlds that something like a scientific report suggests (Berlant). A reading of the Iowa team's report allows one to hear the narrative in the neuroscientific research, an approach that disturbs the sense that the brain can only be announced, known, and heard in the technologized and biologized vernacular of science. It exposes the role of the scientist as storyteller, bringing its narrators within earshot of neuronarratives (or the “auditory grasp” of those mobilities and engendered effects of which Derrida speaks in “The Law of Genre”) (220). While the use of the term neuronarrative

might describe a type of storytelling that advantages neurobiology when explaining setting, action, plot, or characters, that limited use misses the genus of writing where neurobiology itself becomes characterized: laboratory write-ups that depend upon the use of patients as emotive organisms that orient neuroscience explanations. Here, the patient S.M. intertwines with the narrative quest to solve the riddle of the Iowa team's protagonist S.M.; this entanglement determines the science that scientists translate into publications. As I analyze later, the history of using stories of patient-characters frames the very parts patients play in writing science.

Thus, while one might protest that the report is not, on its face, embraced within the possible genre of neuronarrative, for that exact reason, it partakes in it: "a sort of participation without belonging," interjects Derrida (224). It makes use of the genre for explanatory purchase. Indeed, the report does important cultural work, not just biologically, but narratively: first, it allows an established (physiological and discursive) neural network to dissolve by un-thinking particular assumptions of cognitive connections and patterns (the amygdala is no longer imaginable as the gateway of fear), and second, it re-envisages Patient S.M. to articulate a tale different from an allegory of fearlessness (the "inhaled CO₂ activated a pathway that had remained mostly dormant up until the point of the experiment," hints Feinstein et al.) ("Fear and Panic" 272). Listening for the affects convened, recruited, and satisfied in the report throws up questions about the ways by which narrative conventions and affective conventions provide a horizon for the limits of neuroscientific investigation. The intervention this chapter proposes, therefore, is not about case studies as pedagogy per se, but about the role of the case who—not *that*—the Iowa team both study and story.

"She Is Not Emotionless, But Rather Fearless"

The takeaway lesson for the Iowa team in the 2013 report is that, "Contrary to our hypothesis, and adding an important clarification to the widely held belief that the amygdala is essential for fear, these results indicate that the amygdala is not required for fear and panic evoked by CO₂ inhalation" ("Fear and Panic" 272). The experiment seems to expose a way to outsmart a particular ideological pathology. For neuroscientists in general, the results problematize claims of a localizable fear mechanism in the brain. That is, it questions the idea that fear could have a universal cranial postcode. With regard to the affects involved, neuroscientist Joseph LeDoux takes umbrage with the Feinstein team's interchangeable use

of the term ‘fear’ “to describe both feelings and brain/bodily responses elicited by threats” (156). For LeDoux, this move represents an uncritical interpretation and deployment of the concept of fear, because the “language implies that the defense mechanisms go hand in hand with the feeling of fear” (156).¹⁷

This particular dispute—whether or not circulating affects register through conscious awareness or unconscious reflex (or, in Feinstein’s language, those “afferent sensory pathways that project” onto brain parts)—plays into the familiar debates on intentionality that both Ruth Leys and Grant Bollmer, for instance, identify in their exposés of affect studies in the humanities (“Fear and Panic” 272). Ruth Leys, professor at Johns Hopkins and author of *Trauma: A Genealogy*, publishes extensively on the appeal and study of affect in the humanities and the sciences, and is critical of the urge (coming particularly from Brian Massumi and William Connolly) to naturalize politics and culture by linking them to the materialisms of the (neuro)sciences. For Leys, “what fundamentally binds the new affect theorists and the neuroscientists is their *shared anti-intentionalism*,” which is “the belief that affect is independent of signification and meaning” and therefore renders affect “a matter of autonomic responses that are held to occur below the threshold of consciousness and cognition and to be rooted in the body” (“Turn” 443). She observes a false binary between mind and matter in this ideology, one that demands that “the way to understand fear or joy is that they are ‘triggered’ by various objects, but the latter are nothing more than tripwires for an in-built behavioral-psychological response” (438). Neurobiology, in the accounts she criticizes, operates beyond and prior to consciousness and the realm of discourse.

Grant Bollmer examines the historical and cultural production of affective and non-affective bodies as part of a larger interest in networks and power at the intersection of biology and technology. Bollmer also scratches his head at affect theorists in the humanities who, for him, seem to evacuate any hermeneutic or phenomenological political possibility in the political project of cultural studies when they embrace anti-intentional ontologies of affect (318). Taking into account Leys’s critique, Bollmer proposes that affect “may have intentional

¹⁷ LeDoux’s writing over the course of his career takes certain care to sequester the study of “fear” from the study of “threats.” LeDoux encourages distinguishing processes that give rise to conscious feelings of “fear” from non-conscious neural automations that respond to “threats.” Where LeDoux and the Feinstein team overlap, however, is a working assumption that neural architecture maintains a one-to-one ratio with the particular vocabulary used to describe it.

or non-intentional aspects; it may be articulated to systems of signification or it may not” (318). He observes: “Affect, in the neuropsychological form appropriated by affect theory, is mobilized not to celebrate some wild free potentiality of the body. Affect is invoked to make the body speak in a way that interpretation and language matter not and materiality—as revealed through medical imaging technologies—yields truth” (311-12). One antidote for the project of what to do with theorizations of affect and theorizations of neurobiology, for Bollmer, is to read those mobilizations and invocations: to understand “how affect is employed” to unite or divide bodies, materials, or discourses “without assuming material, biological force of ‘relation’” that miraculously appears from a non-cultural or pre-cultural conceptualization of nature (318).

Biological pathology is another dispute in affect studies the Iowa team’s report engages. The team’s protracted interest in the link between amygdalae and fear has to do with “S.M.’s abnormality” (Feinstein et al., “Human Amygdala” 36). That is, for Feinstein et al., S.M. is brain-damaged, and experiences a deficit of fear where fear ought typically to occur. She is a “unique case” of brain disorder (37), “immersed in a secure Pollyanna world” (Damasio qtd. in Leys, “How Did” 86). But these normative portrayals instill an unease in me with the ways patient-characters in affect theory are pathologized into character types. From Parkinson’s sufferers to schizophrenics, autistics, epileptics, and, here, the fearless (via a degenerative brain disorder like Urbach-Wiethe), Catherine “Malabou claims that the uniting feature of all of these conditions is an absence of affect, ‘an emotional deficit’, that emerges from the neurocognitive materiality of the brain” (Bollmer 307). Malabou brings questions of phenomenology and materialism through the lens of neuroplasticity to the study of affect. For Malabou “brain damage” always “interrupts the economy of our affects” (“Go” 58). The result of brain lesions “is the formation of ‘someone else,’ a new self, a self that is not able to recognize itself,” since the accident “erases *any* trace and *every* memory, and that destroys *any* archive” (58). “Such a subjectivity,” she adds, “is absent to itself and to its essence as well as to its accidents—a subjectivity *without* affects” (58). And yet, “To say that SM is emotionless or unable to feel emotion is simply false,” the Iowa team pre-empt (Feinstein et al., “Human Amygdala” 37). “She is not emotionless, but merely fearless,” nuances neurobiologist Dario Dieguez. Thus, what to do about how, on the one hand, Bollmer calls out Malabou’s ordering of S.M. as an affectless case within her genre of “the new wounded,” and how, on the other hand, S.M. persists in being affective and affected by ambiguous

understandings of those concepts (and since 2013, as well, with fear it would seem) (307)? Neither version is truly appealing to me, for both co-opt the productive problem of affect as ammunition for disciplinary turf wars. At this point, I am not interested in offering a neurological methodology or an ontology of affect; rather, I want to invite a theorization of narrative to determine the ways cultural objects productively problematize rather than illustrate those existing ideological frameworks.

The seduction, I fear, for cultural critics of affect studies, is that an object like the Feinstein study is recruited to service a wider ontological argument. Constantina Papoulias and Felicity Callard, for instance, investigate the recently fashionable interest in affect in the humanities. They discover that “the turn to affect in cultural theory” is “accompanied by a dependency on particular citations from neuroscientific and developmental psychology literature” (“Biology’s Gift” 31). In fact, like Leys points to Eve Sedgwick, Papoulias and Callard find work that imports neuroscience into ontologies of affect as “emblematic” in current affect studies and “indicative of an increasingly common position taken by cultural and social theorists” (Leys, “Turn” 246, 247). What I wish to avert is to position the Feinstein study as exemplary or emblematic of a particular theoretical argument, to risk flattening the object into ‘just an example’ of a grander theory or theorization rather than reading the study as an object on its own terms. This point of departure more closely aligns with an investigation into how, within “cultural theory’s narratives, by contrast, affectivity becomes a placeholder for the inherent dynamism and mutability of matter,” that Papoulias and Callard observe (“Biology’s Gift” 29).

On its face, the Feinstein study exposes a previous ignorance. But it also describes how it is possible to expose someone to fear and panic. That is, even if one naïvely understands carbon dioxide as affective—that it is literally in the air—then one can think about the circulation of affects as a type of exposure. Exposure, in this case, defines how the version of fear offered functions, and that is achieved through narrative exposition particular to the literacies required for its readability.

Mieke Bal, in her work *Double Exposures*, suggests that the triple meaning of the verb ‘to expose’—exposition, exposé, exposure—constitutes the field of cultural analysis, for it “defines cultural behavior if not ‘culture’ as such” (5). The verb refers to “the action of ‘making a public presentation,’” where the exposure involved “is an act of producing meaning” (2). Exposure acquires intelligibility, therefore, in exposition, in the public telling and sharing

and reproduction of ideas. Jonathan Culler contextualizes this practice in describing how “stories...are the main way we make sense of things, whether in thinking of our lives as a progression leading somewhere or in telling ourselves what is happening in the world” (82). Extending this departure, Giorgio Agamben includes writing and technologies of storytelling as Foucauldian apparatuses connected with power, those things that have “in some way the capacity to capture, orient, determine, intercept, model, control, or secure the gestures, behaviors, disciplines, judicial measures, and so forth” in cultural negotiations (14).

Therefore, I approach the 2013 Feinstein report on its own terms, as my interlocutor in a conversation about fear and affect before interpreting its implications for the neuroscience of fear and affect studies. This nexus of narrativity, power, and articulation ushered through exposure cues my analysis of the peculiar narrative politics densely texturing the object. Here, I want to press that a neuroscientific explanation engages the logic of storytelling: to understand fear and its operations is to grasp a narrative showing how one affect leads to another, and how one affect can overcome something else to produce a similar exposure (i.e., activating “a pathway that had remained mostly dormant up until the point of the experiment”) (Feinstein et al., “Fear and Panic” 272). The concept of fear is at play in the Feinstein study, and the plot of fear is what narratives shape.

In the next section, I look at the ways the Iowa team’s textual crafting of Patient S.M. quotes character-based case studies from medical literature within a history of ideas. The concluding section argues that the specific citations embedded in the report are freighted by a politics of storycraft, which exposes the narrative entanglements that cultural critics of affect studies *and* neuroscience researchers perform.

Quoting Cultural Anxieties

First, a little storytelling about neurobiological stories. Just outside Cavendish, Vermont in the summer of 1848, a man named Phineas Gage prepared a bed for the Rutland and Burlington Railroad by placing explosive powder into holes drilled into rock. Gage used a tamping iron to pack the explosives, and at one point in the late afternoon, as a result of accidental explosion, the roughly meter-long iron blew completely through his head. It entered through his face under the left cheekbone, exited the top of his skull, and landed some twenty-five meters behind him (Macmillan 47). Gage survived that day, and continued to live for another eleven and a half years before dying of epilepsy in San Francisco.

The accident obviously left a severe lesion in Gage's brain. Psychological changes are reported to have occurred as a result. The physician who treated Gage in Cavendish wrote some twenty years after the accident, that Gage's "mind was radically changed, so decidedly that his friends and acquaintances said he was 'no longer Gage'" (Harlow qtd. in Macmillan 65). In concurrence with a progressive history of neuroscience, interest in Patient S.M. was part of an interest in studying a damaged brain (or deceased brain) for its insights into how the healthy brain functions.¹⁸ Gage's situation became popular for didactic purposes. Thus, in his afterlife, Phineas Gage enjoys a long history of appropriation. Stories of Gage have been taken up as a morality tale of alcoholism, associated with yarns about a carnival freak show, contained in medical illustrations, featured as an anthropological object tutorial, and utilized as union worker story, to name just a few. In 2000, Malcolm Macmillan took up the uses and abuses of Phineas Gage stories as an object of cultural study in its own right. He found that Gage "appears in nearly sixty percent of the introductory textbooks of psychology" published between 1983 and 1998 (Macmillan 47). Each publication does not recount the same story, however; each appearance becomes an instance of cultural (and scientific) memory for a particular present to carry a particular message. Science resources the patient-character Gage as needed to warrant and texture wildly varying conclusions, and figures of Gage therefore operate from a reservoir of imaginative explanations.

Second, consider similar reverberations of literary influence in scientific agenda setting. Rodrigo Quian Quiroga, a neuroscience researcher and reader in bioengineering at the University of Leicester, published *Borges and Memory* in 2012, which is a reflexive text that chronicles the way the work of twentieth-century Argentinian writer Jorge Louis Borges explicitly motivated Quiroga's scientific agenda, investigations, and conclusions about the brain ("Borges"). "I discovered Borges as a teenager and was fascinated by the mathematical precision with which he describes what defies every logic," writes Quiroga, adding how, "I rediscovered a story of his, 'Funes the Memorious,' ... which with astonishing clarity ended up sorting the pieces of the [research] puzzle I had been working on" (*Borges* 5). Quiroga cautions that he is "not trying to force a link or suggest that Borges foresaw modern

¹⁸ This linear history draws a line from the study of anatomy through nineteenth-century neurologists, such as Paul Broca (who, in observation of the speech-impaired 'Patient Tan,' discovered the brain area regulating speech production named after him) or Carl Wernicke (who, studying brain-damage in patients, localized aphasia in a brain area also named after him).

neuroscience,” yet admits how “Borges is perhaps the catalyst that persuaded me to tell a story” about “Funes’s roots and his relation to the principles of neuroscience” (*Borges* 7, 8).

In this way, narratives—and adolescent stories explaining later interests—frame disparate elements, stray observations of scientific subjects, as well as motivate the questions by which one approaches their scientific pursuits. Narrative fiction operates as a conversational partner for neuroscience: “Borges gave me a much-needed chance to take a pause and to think in depth and debate (in my mind) with Descartes, Bishop Berkeley, and [William] James,” writes Quiroga; “How misguided we scientists are when we think we are the first to deal with the big questions!” (*Borges* 7). Quiroga emphasizes the conversational, affective space that fiction invites for his neuroscientific analysis when he claims how “having these imaginary discussions with Borges and following his thoughts and his readings gave me the break I had long needed to step aside for a while and see things in perspective” (*Borges* 207). Here, narrative fiction and narrative characters serve to anchor, unclutter, and tidy disparate science.

Third, consider the intertextual and cultural influences of patient-characters. In March 2011 in *Harper’s* magazine’s “Readings” (a section regularly featuring a diverse collection of reprints of interesting documents and artworks), three paragraphs from Feinstein et al.’s 2011 *Current Biology* report (describing a fieldtrip S.M. took with Feinstein to a haunted house as part of the snakes and spiders episode) appear under the heading “The Woman Who Felt No Fear.” The verbatim reappearance of the text into a literary frame exposes a neuronarrative architecture entangled with the curious and storied life of this patient-character. Even Quiroga (like the writers and scientists who use Gage), in his pausing to rethink neuroscience through Borges’s fictional character Funes, cannot help but resource the reservoir of other neuroscientific characters in order to share his research and make it audible to contemporary ears. Quiroga’s book recalls how, in 1953, neurosurgeon William Scoville removed both the right and the left hippocampus from the severely epileptic twenty-seven year-old Henry Molaison’s brain. “The surgery, which indeed managed to stop his seizures,” details Quiroga, “radically changed the history of neuroscience and our knowledge of memory, but unfortunately transformed Henry Molaison into Patient H.M. forever” (*Borges* 52). Scoville’s procedure left him with a bilateral hippocampal lesion, and therefore “H.M. was incapable of forming new memories, a condition known as anterograde amnesia” (*Borges* 52-53). He could remember things and events from before the surgery, but

was unable to generate new memories, like the meaning of new words, or his new postal address after moving house, or that he had just eaten lunch. Patient H.M. became a hit for researchers of all types, and the several hundred articles relating to studies of him—which, like the Iowa team with S.M., were mainly conducted by a few key people—are widely cited and circulated today (*Borges* 64).

I recount the three nested stories above to call attention to their significance for the crafting of our contemporary. Like Phineas Gage and Patient H.M., Patient S.M. stars in contemporary scientific pedagogy. She, as with her medical-historical male counterparts, enjoys similar appropriations of her story and studies about her in an effort to ascertain, deal with, and manage contemporary problems. Several recent 101-level psychology textbooks employ her as a character device to witness evidence of the amygdala's role in emotion.¹⁹ I will volunteer one instance to demonstrate the conclusion I take from it. In one book, the story of Patient S.M. appears in a pull-quote bubble entitled “Neuroscience Applies to Your World: Is Fear Good For Us?” The excerpt teaches students how “On the surface, you might think that living a fear-free life might be great, but a closer look at S.M. shows the darker side of fearlessness” (Pastorino and Doyle-Portillo 60). The bubble story goes on to briefly report how, one evening, Patient S.M. could not be bothered when held at knifepoint in an Iowa car park. In light of the legend here shared, I have to smirk, recalling Starbuck aboard the *Pequod* when he implies to the crew that “an utterly fearless man is a far more dangerous comrade than a coward” (Melville 111). That narrator positions a lack of respect for the white whale—for what is dangerous—as nothing short of foolish. The psychology textbook would seem to enable and sustain that politics of foolishness. While I pause at a tale here about the consequences of having superhuman abilities, what is interesting is that the 2011 Feinstein study—the one with snakes and scary films—reported this attempted knifing episode as an anecdotal aside. The Iowa team were certainly not present collecting data when this occurred to Patient S.M., but they felt this self-reported memoir important enough to further evidence their findings about the amygdala.

As it happens, the authors—that is, the “we” who narrate the 2013 Feinstein report—internally focalize the story's action by way of observing “self-reported levels of fear and

¹⁹ For examples, see Rod Plotnik and Haig Kouyoumdjian's textbook (362), Ellen Pastorino and Susann Doyle-Portillo's *What is Psychology?* (60), and Kenneth Carter and Colleen Seifert's *Learn Psychology* (429).

panic,” “anecdotal accounts,” and what “the patients reported” (Feinstein et al., “Fear and Panic” 270-71). Although the report’s story strives to incorporate three biomarkers (respiratory rate, heart rate, and skin conductance), the supplemental denouement describing the study’s methods note that most of the biomarker data for S.M. and the other two amygdala-damaged subjects was unrecordable or corrupted, and that the researchers in fact went to great lengths to inductively include publishable graphs and charts. The researchers themselves chronicle the climactic moment—Patient S.M.’s response to the CO₂—as “gasping for air, [showing] distressed facial expressions,” and displaying “escape behavior (for example, ripping off the inhalation mask)” (271). In other words, what provides the 2013 report’s thrust is not a summarizing of data, but a first-hand account of the “feelings induced by the CO₂,” the “emotional changes” experienced, and the reactions S.M. expressed in that laboratory room in Iowa City (270-71). Here, only narration exposes fear. It is in these stories in which the fearful, panicky events can ultimately *be* exposed.

While S.M. may indeed be an exceptional person, the inscription of the exceptional person is a tradition in science that both precedes and determines the conditions of her narrative. The argument here is that the quotation of character sketches, whether through Phineas Gage, H.M., or Patient S.M., enfolds and condenses cultural parables. The 2013 Feinstein is an exposé of the amygdala, but it is not *only* that: it engenders a crafting of medical pedagogy, patient-characters, psychology fashion, thriller anecdotes, and journalism in its inscription. That is, in declining affect as a stable, independent, and quantifiable variable, hearing the narrativity involved exhibits an arc of affectivity that interrupts, shapes, and instigates scientific inquiry. As Bollmer observes, “If we start from the position of history, refusing to accept affect as an eternal, transcendent guide for cultural politics, we can observe that there are categories produced by psychology, with reference to the brain, made visible with medical imaging technologies, which serve to marginalize and exclude specific bodies from humanity” (321). What is exposed in this regard is that “specific bodies are placed into apparatuses”—narrative apparatuses in the register of Agamben, I argue—that inscribe “contingently produced ways of dividing and shaping possibilities for bodies and political agency” (322). Political formulations are organized *through* affect, in relationships that have more to do with feelings, anxieties, and desires than an autonomous, impartial rational thought often coded and read as a ‘scientific report.’

The Laboratory as Literary Space

In this final section, I want to press Malcolm Macmillan's study of Phineas Gage as a way to return to scholarship on affect by thinking about the scene, or event, of affective relationality as fractured and multiply temporal.

Only a few primary documents exist of the Gage case, but "the only picture of Gage that we have" comes from the reports of John Harlow the physician who treated Gage in Cavendish and Henry Bigelow, a Harvard professor and surgeon who reported the case (Macmillan 47). To Macmillan's dismay, "much of what is contained" in the contemporary textbooks featuring Gage "is strikingly at variance with" the few extant primary documents (47). Of the five dozen or so books to which Macmillan looks, he reserves space in several places for an analysis of Antonio Damasio's book *Descartes' Error: Emotion, Reason, and the Human Brain*. Here, it ought to be noted that Damasio, until 2005, was professor and head of neurology at the University of Iowa and co-authored many of the publications on Patient S.M. out of that University's research team. Macmillan cites Damasio's book as one of several dozen "erroneous accounts" of Gage that demonstrate "an ignorance of what ... our primary sources say about circumstances of the accident" (49).

First, Macmillan observes that "The Gage of fable" narrated by Damasio has it "that [Gage] 'never returned to a fully independent existence,'" whereas no evidence exists to warrant that assertion (55). In fact, Gage went on to work as a stagecoach driver in Chile for seven years, where "he [and his mental faculties] would have had to adapt to the challenges of the routes travelled while at the same time dealing politely with passengers' demands" (Macmillan and Lena 644). Macmillan adds, "It seems unlikely that a Phineas still disinhibited by his accident would have qualified" (644).

Second, Damasio distorts Gage's post-accident engagement with friends and family to the point that "as A.R. Damasio has it," writes Macmillan, "Gage virtually became a psychopathic personality who lied and could not be trusted to honour his commitments" (Macmillan 54). This is at odds with Harlow's report in 1868 that describes how Gage "was accustomed to entertain his little nephews and nieces with the most fabulous recitals of his wonderful feats," and another report of Gage performing various kinds of farm work up until the day he collapsed (Harlow qtd. in Macmillan 66).

Third, Gage's "supposed ... lack of concern for matters he had formerly cared about ... and his showing little emotion, losing his former values, and becoming unreliable in his

personal habits,” Macmillan writes, “almost certainly seep in” as characteristics “from the brain surgery and psychosurgery literature” of the twentieth century (Macmillan 58). Macmillan, here, exposes a discursive feedback, where scientific investigations reported and written about in the 1930s and 1960s became (anachronistically) rewritten into Gage’s nineteenth-century circumstances, and, in the present, now become the source material for further narratives in neuroscience.

Lastly, Damasio’s retelling of Gage as a “degenerated character” with an affective deficit is an ideological commitment made clear in his book’s agenda (12). His “message” in Gage’s case is “that observing social convention, behaving ethically, and making decisions advantageous to one’s survival and progress require knowledge of rules and strategies *and* the integrity of specific brain systems” (17). Grant Bollmer identifies this rhetoric as one that recuperates vitalism in studies of affect. The discourse frames individuals *as* their neurobiology—the killer, the addict, the deviant, the wounded—through which normalcy is maintained in its difference. Here, parables of lessons-learned help neural lesions supplant psychology when ordering humans.

Thusly historicized, Gage is made utterly contemporary and conversational with S.M. Indeed, Damasio himself explicitly connects the affective deficiencies of Patient S.M. and Phineas Gage in that book *Descartes’ Error*. He introduces S.M. not by her pseudonym, but as “a woman with a lifelong pattern of personal and social inadequacy” and who “has little concern for the problematic situations into which she gets herself” (69). “The ‘folly’ of her behavior,” writes Damasio, “is not unlike that found in Phineas Gage” and “cannot be blamed on poor education or low intelligence” (69). When one takes into consideration the corollary write-ups of Patient S.M., which describe her as one whose “social behavior remains relatively intact ... is married, raising children and is able to hold down a job... [and] is able to carry out a fairly normal social life ... [without] any impairment in reciprocal social interaction,” Damasio’s caricature seems not just more fabulous, but entirely devoted to shoehorning S.M. into his own favored diagnostic pattern, where broken brains equal broken affects; specifically, a broken amygdala translates to a broken or missing fear response (Amaral et al. 299). The thicket of stories that both give occasion to a patient-character like S.M. and that specifically capture, regulate, and orient Patient S.M. in the literature exposes the layered narrative operations that guide its reading.

Writing in 2013, Malabou, when inquiring into the destructive work of neural and psychic disconnection, invokes “the famous case of Phineas Gage, which is related by Damasio in *Descartes’ Error*” (Malabou, “Go” 57). The event of the accident is “purely contingent, external, and totally unanticipated,” in her reading of Damasio’s version of Gage, and “cannot be assimilated or interiorized by the psyche or by the brain”; somewhat predictably, given Malabou’s storied source, the cerebral event “is not a partial modification but a complete metamorphosis of the personality” (57). As noted earlier, the lesson Malabou takes from Damasio’s parable of Gage is that “brain damage” always “interrupts the economy of our affects” (58). To buttress her interpretation of Damasio’s story, and to nourish her conclusion that “All the cases of brain damage Damasio exposes are cases of absent subjectivity. ...a subjectivity *without affects*” (58), she flips back to “*Descartes’ Error*, in chapter 3, ‘A Modern Phineas Gage.’ This modern Phineas Gage is named Elliot” (59). The story—or Malabou’s retelling of Damasio’s retelling—is that Elliot had a brain tumor removed and therefore “Elliot was no longer Elliot,” according to Damasio-via-Malabou (59). The intertextual reference to Harlow’s phrasing that ‘Gage was no longer Gage’ is not innocuous. It demonstrates a contiguity of narratives that converge on an ability to recruit medical characters in the service of narrating coherent ontologies of the affective subject, and to support the ideology that “the ‘absence’ of affect is assumed to indicate a reduced capacity of the body to experience a natural, vital force essential for the lived embodiment of the biological organism” (Bollmer 308).

I expose Damasio’s work in this chapter not for purposes of culpability, but to complicate a story about fear from Iowa City that, on its face, would seem coherent and whole. Damasio’s writing, as a direct result of the extended experiments he and his colleagues at the University of Iowa perform on Patient S.M., speaks to the way power becomes focalized through narrative characters in multiple frames of reference at various times. From this perspective, the 2013 Feinstein report can be read not as an instance or example of the neuronarrative genre but as a use of it: an allusion to the conventions that shape it, which allows us to feel held by its world. Among the questions this reading forces me to ask is how a text generates a much larger structure of meaning that is not contained or constrained by what the text explicitly says. Stories—here, the affective ones in science—depend on other stories for coherence and intelligibility, and therefore determine affective responses formed in

relation to narrative. Further, when Emily Martin appraises the motivation and potential resourcefulness of affect studies in the humanities via neurobiology, she proposes that

the affect/intentionality system is a set of arrangements by which a society transforms neurological processes into products of human activity. Affects are a social effect rather than the result of human biology. Intentions in this regard are conceived as the remainder—the material brain and those neurological interactions that are necessary to reproduce it. Looked at this way, what we see as the affects are the product of a social process that has separated them from larger contexts rather than a new entity we have discovered in nature. (S156)

Here, she suggests a resonance of practices between the neuroscientific laboratory and critical theory in the humanities, and a possible antidote to both analytics' moving away from the social, culture textures that prompt inquiry in each. That affects are better understood as a “product of social processes” that include narrative demonstrates how questions through the frame of neuronarrative make audible a concern for what kind of world is summoned into being through intertextual affective scientific writing.

Felicity Callard and Constantina Papoulias are thrilled to point out that humanities scholars like William Connolly, Andrew Ross, Nigel Thrift, Eric Shouse, and Elizabeth Wilson all cite Antonio Damasio to buttress their own theorizations of affect (“Biology’s Gift” 52). The stakes, as they see it, are that the humanities write their stories of affect by quoting the neurosciences. As I demonstrate, however, the trafficking of ideas—and characters—is a bit more complex, involving the politics of history, a history of political and social anxieties over what it means to feel human, as well as how best to express that. Excavating the exposition published by Feinstein and his colleagues demonstrates that even neuroscience’s citationality struggles to account for the arc of its own narration. Here, what is seen and described as fear in Feinstein’s report turns out to be a caricature of fear that only arrives by traveling through anatomical expectations, the literary laboratory, mediated medical recollections, thriller scenarios, and displaced scientific observations. Thus, my reading of the positioning of affect in that report shows that the neurosciences and the humanities both invite and decline certain narratives to structure the very research agendas and questions they each pursue. It exposes the powerful work that certain available narrative plots do in various practices of inquiry on their quests for capturing, understanding, and theorizing affects.

This entanglement demonstrates how the report implicates an understanding of our contemporary through a history of the present. It also demonstrates the literary cooperation aroused in science and the humanities as scholars in each narrative domain characterize each another's brains when those brains are taken up as objects of analysis. I underscore the anxieties—dare I say fears—over how certain accounts of affect participate in culture: as fable, as evidence, as intellectual capital, as characterization, as discipline, and as ideological duties that narratively prompt both theorizations *and* experimental accounts of affect.

Chapter Four

Wonder Under the Bridge

Consider the following anecdote:

I am disturbed that my son, a nine-year-old fourth grader, does not fit the mold of most boys. ... He is not athletically inclined and so he doesn't pursue sports. ... He is not competitive in a typical sense. ... My son is very imaginative. He loves to draw, to write stories, to act things out with his toys. He'll occupy himself with those make-believe stories for hours. He's sensitive and concerned about others; also he has a lot of fear. Others take advantage of him. He says the fifth graders bully him and even kindergartners throw rocks at him. My son is not gay. We've seen him get crushes on girls in his class. But he is very sensitive, very artistic, very gentle by nature. ... I want guidance on how to help my son be who he is in a world where sports, aggression, and dominance are common denominators among his peers—but don't fit who my son is. (qtd. in Gurian and Stevens, *Minds of Boys* 284-85)

This is “Leigh” emailing about her son’s difficult time in school and life. It is also Leigh emailing about her own difficulty, as a caregiver, to reconcile the persona of a young-adult son against the figure of any nine year-old who ought to “fit the mold”—that is, “fit the gender”—of “most boys” today. She postures her disturbance as one not concerned with how to deal with “a world where sports, aggression, and dominance are common denominators,” but about how to ensure her son’s “mold” might adapt to that preexisting world. That is, her rhetoric invites one to consider how to account for her son in the world, and not how to consider changing the social relations of that “world” in which her son must participate.

How individuals conclusively “fit” or fail to fit their gender requirements in cultures is an attrited topic. Yet, I offer the anecdote to demonstrate the unique opportunity another has drawn from it: Michael Gurian—therapist, author, entrepreneur, and corporate spokesperson—responds to Leigh by assuring her that her son “is simply, by nature, different from the mass,” further confiding that his “nature” captures “the very interesting brain difference between the sensitive boy and the more masculine male” because he is “a bridge brain” (285f.). Gurian’s response to nine-year olds fitting a “mold” therefore also appeals to a need to describe psychosocial participation through a gaze and grammar of brains: their contours, structures, connections, and relationships toward other brains. Literally, in and through other words, there is a biological explanation awaiting Leigh’s son’s gender misbehavior.

Leigh's letter is in fact addressed to Michael Gurian, and the exchange is staged in one of his books (coauthored with Kathy Stevens) entitled *The Minds of Boys: Saving Our Sons from Falling Behind in School and Life*. As noted, he uses the correspondence opportunity to establish Leigh's son as a "bridge brain," a term he coins and which he hopes "describes these kids of boys (and girls who also don't fit the mass of girls)" (286). After all of the entreaties in the twentieth century to "bridge the gap between the two cultures" of science and the humanities, here we encounter a writer who crafts a manifestation of the bridge metaphor to solve the ontological crisis gender polarity presents for a mother like Leigh (Collin and Pedersen 66).

Michael Gurian, who produces various types of media materials on education, relationships, and corporate leadership with a mind toward the physical and biological substrates informing gender roles, is not himself a neuroscientist, biologist, or professional educator. Gurian engaged in some post-graduate work in educational psychology for a year, but his formal education includes a bachelor's degree in English and philosophy, some graduate coursework in English and semiotics at the University of Washington, and an MFA from Eastern Washington in creative writing. According to his website, Gurian "is the *New York Times* bestselling author of twenty-eight books published in twenty-two languages and co-founder of The Gurian Institute,"²⁰ which, according to the Institute's website, "conducts research internationally, launches pilot programs and trains professionals" in "learning through a gender lens"; the site adds: "Michael Gurian has been called 'the people's philosopher' for his ability to bring together people's ordinary lives and scientific ideas."²¹ Gurian contributes to media outlets, such as *The New York Times*, the *Wall Street Journal*, *Forbes*, and *Time*, and has appeared in interviews on "Good Morning America," the "Today" show, CNN, PBS, and NPR (Rivers and Barnett).

While Gurian's appeal is widespread, interpretations of his work are mixed. The Institute's largest clientele is school systems, and by 2001, the Institute had trained "more than fifty thousand²² teachers in more than two thousand schools and districts" in applying "gender science on a large scale to the education of children" (Gurian and Stevens, *Boys and*

²⁰ See michaelgurian.com; accessed 12 May 2012.

²¹ See gurianinstitute.com/media; accessed 12 May 2012. The "gender lens" training is "the critical training missing from most post-secondary education related to how boys and girls learn differently."

²² The Gurian Institute website updates this number today to 60,000.

Girls 1). By 2008, around 300 of the 360 single-sex public school programs in the US were approaching their curriculum from a neuroscientific “basis” (Weil 42). On the other hand, some scientists and theorists consider Gurian’s and the Gurian Institute’s rhetoric, as an example of “peddling junk science” (Rivers and Barnett), as employing “unreferenced” scientific claims and with “no attempt to look up real data” (Eliot, “Single-Sex” 365, 372), as “dressing up stereotypes in neuroscientific finery” (Fine 157), and “illustrative” of “specious neuroscience explanations that construe gender differences as innate, static, and unavoidable” (Busso and Pollack 8-9).

His alleged uses or abuses of neuroscience are of secondary interest to me. For me to analyze Gurian’s texts by contesting the accuracy or authority of the ways he integrates “brain science” into his work would be to enter a surgically narrow debate about concerns that neuroscience determines, adjudicates, and lays out in advance. To that end, Rebecca Jordan-Young’s book *Brain Storm: The Flaws in the Science of Sex Differences* (2010) is more comprehensive and procedural than what I could ever hope to offer. In contrast, for me to elucidate only the misogyny (and misandry) within his project of “gender science” would be to embark on a moralistic and paranoid criticism that seeks to negate his claims at the level of sex and sexism alone: that what he claims is “a fundamental misunderstanding of biology” and gender, or that the take he offers is symptomatic of “popular interpretations of neuroscience” that are “cherry-picked” and “not the whole story” (Eliot, *Pink* 9, 291, 8). This second option also happens to take on an inflection that renders his readers unintelligent consumers-at-the-trough. Cordelia Fine, in the otherwise well-researched and well-written *Delusions of Gender*, condescends Gurian’s target audience as “unwary” readers (157), and that, without her guidance, are likely unobservant (109) or imperceptive (63), too. I think at face value, Gurian writes for a general audience, under the assumption that a general audience is capable of caring about neuroscience and the rearing of children if an advocate makes it sound like something worth caring about. And that should be okay; in fact, both the wide appeal and wide circulation of his ideas makes the task of analyzing how his neuro-based narratives work to shape an understanding of our contemporary all the more apt. Neither the genuflection to neuroscience carried through the former analysis nor the critical-theoretical elitism contained in the latter gets me closer to understanding these implications. What interests me, however, is the character Gurian creatively introduces to the story world of neuroscience: “the bridge brain.”

However easy it may prove for scientists and theorists to peel away Gurian's neuroscientific populism as low-hanging fruit concerning contemporary debates on neuroscience (e.g., Busso and Pollack; Eliot; Fine; Halpern et al.; Williams), it is precisely for this reason that I wish to take his appeal and advocacy seriously. Gurian's publications, DVDs, keynote speeches, and training seminars not only attest to a superior communicative ability, but also to a widespread allure for set of ideas calibrated to negotiate the "low level of neuroscientific literacy among the public" (Busso and Pollack 12). When Gurian founded his Institute in the 1990s, a perceived illiteracy of neuroscience prompted its creation. "Currently, we do not know enough about brain development and neural function," writes John Bruer in 1997, "to provide useful insights for educators about instruction and educational practice" (4). "Scientifically," he adds, "it's a bridge too far" (5). The need to make sense of both neuroscience and a perennial educational crisis drive the distribution of Gurian's rhetoric, for he fulfills that need by furnishing literature for the perceived neuroscientific 'illiterates.' Employing elements of reportage, social commentary, and unapologetically "self-taught" sidewalk smarts, he entertains a topical issue for a mainstream readership (Heller). And the impact of his communication is important: he, often with a co-author, has published no fewer than nine articles on "gender science" as an "Education Resource" in the repository of the Institute of Education Sciences, which, as the primary research arm of the US Department of Education, provides information for school boards, teachers, and administrators in the entire country.²³ His connection—through narrative—to neuroscience, educational policy, and parenting psychology speaks to the importance his creativity can have in shaping economic, scientific, and social forces.

More relevant to the concerns this dissertation takes up, I sense that the attraction his stories and recommendations about neuroscience and society occasion is intimately linked to conceptualizing the power effects that neuronarrative operationalizes in culture. For reasons

²³ These include "Single-Sex Classrooms Are Succeeding" (2009, with Kathy Stevens and Peggy Daniels), "Gender-Friendly Schools" (2010, with Kathy Stevens and Kelley King), "How Boys Learn" (2006, with Kathy Stevens), "Teaching to the Minds of Boys" (2006, with Kelley King), "The Brain—His and Hers" (2006, with Kelley King), "With Boys and Girls in Mind" (2004, with Kathy Stevens), "Boys and Girls Learn Differently! A Guide for Teachers and Parents" (2001, with Patricia Henley), "The Good Son: Shaping the Moral Development of Our Boys and Young Men" (1999), and "A Fine Young Man: What Parents, Mentors, and Educators Can Do To Shape Adolescent Boys into Exceptional Men" (1998).

just noted, his oeuvre of texts and media objects represents an extended interpretation—a captioning—of neuroscience data and images for mass circulation. His work resides in the interstitial space of scientific reporting and literary writing, and, therefore, provides a productive opportunity to investigate a narrative expression of neurology that does work on cultural understandings and uses of neuroscience.

This interstitial space, itself a type of narrative bridging, demonstrates the cooperative literacy at play that this chapter analyzes. Gurian cites neuroscientific writing in order to make “bridge brain” a legible character for his readers. However, a closer look at the narrative operations involved shows that the neuroscientists with whom the Gurian Institute cooperate also inscribe the “bridge brain” character into the visual rhetoric of brain scans. This chapter’s first section recites some of Gurian’s translations of neuroscience in conversation with Catherine Malabou’s insights on ‘difference’ in order to situate the “gender science” that informs the characters Gurian’s books and media animate. After examining his conceptual foundations, the second section reads Gurian’s use of “bridge brain” to ask what kinds of character formations Gurian’s narrative implies, sediments, or staves. Finally I return to the notion of matter, and propose some consequences a materialization of “bridge brain” bears on neurological narratives circulated in culture across the concept of ‘neuronarratives.’

The Wonder of Sex

Taken together, the titles of two of Michael Gurian’s main books, *The Wonder of Boys: What Parents, Mentors and Educators Can Do to Shape Boys into Exceptional Men* and *The Wonder of Girls: Understanding the Hidden Nature of Our Daughters*, pose the question of apprehending masculinity and femininity as what it means to do or shape children according to a nature that awaits the reader’s understanding. Hailing one to *wonder*, here, is immediately bound by the pledge of understanding: acknowledging, appreciating, and actively *shaping*. Nature, already present and hidden, tarries for the reader’s wonder. One might therefore ask by what terms wondering becomes coextensive with “understanding” as a disclosure. Wondering “of boys” and “of girls,” then, would be to invite a revealing, a disclosure of an understanding awaiting audience. It might therefore also be argued that the grammatical void abutting the call to wonder—in the titles, a distinction between *Do* and *Understanding*—works to privilege an ability to shape sons over a sense of simply revealing the disposition of daughters.

“Wonder is the first of all the passions. It has no opposite, because if the object presented has nothing in it that surprises us, we are not in the least moved by it and regard it without passion,” writes Descartes (qtd. in Malabou, *Changing* 11). If one presses Gurian’s grammar, the call to wonder is therefore a beckoning of surprise, of astonishment, at the presence, appearance, and constitution of boys and girls. But they are also already opposites, or at least with opposition to each other, if the treatment of this wondering through a partition and separate publication can attest to anything. “To wonder is to open oneself up to difference before granting it a value or establishing hierarchies,” Catherine Malabou adds (11). Crucially, Gurian does not hail one to wonder at children but to wonder at brains-as-minds (as the themes and titles *The Minds of Boys* and *Boys and Girls Learn Differently!* also evidence); but where might this opening to difference be found in Gurian’s wondering? Moreover, *how*?

“Where It All Begins: The Biology of Boyhood” and “How Her Mind Works: The Secrets of the Female Brain” each, respectively, constitute some of the first chapters to *The Wonder of Boys* and *The Wonder of Girls*. While it is curious and unsettling to me that women are spoken of as “hidden” or containing “secrets,” what is pertinent to the present analysis is this initial narrative scene: wondering, as an opening up to difference, is here styled not as differences among boys *or* girls, but differences between boys *and* girls. “The” brains are different from each other, not from one another.

If Gurian’s project is to carry an understanding of neuroscience through sex and gender relations, and to teach how to properly manage them to his clients, one may ask how his dualistic logic orders the molecular gaze of the psychosomatic self. Who is the other in this encounter? Though Gurian is not directly the addressed, Malabou presses this interpretation, yet rebuts that one ought to view “wonder precisely as the opening to gender difference” (*Changing* 11). Thus, in the dualist view according to Malabou, the Gurian texts ought to function to open oneself to gender difference before interpretation, before determining relations of value and hierarchy. Further,

The other strikes us first through gender. Or rather, what is other in all others is gender, which is neither determined nor judged, since wonder suspends predication. Gender can only appear through its difference from another gender. Consequently, wonder, ‘the point of passage,’ allows the sexes to maintain a degree of autonomy grounded in their difference; it thus offers a space of freedom and desire, a possibility of separation or alliance. (12)

Wonder precisely suspends an ordering and an othering of gender and sex against itself. If the gaze prioritizing gender polarity operates under the auspices that the mind is a manifestation of the brain, then wonder prevents assimilation or alterity of difference.

Interestingly, the other for Gurian is the void itself: the “unnatural,” the point of passage where gender and sex are not grounded across difference but through difference. “This [book] is needed, because it reveals the *nature* of your daughter,” writes Gurian in the opening to *The Wonder of Girls* (xiv). In parallel, Gurian explains at the outset of *The Wonder of Boys* that “we stop feeling as if we’re fighting against boys and masculinity” if “we start realizing how to work with boys and maleness” when one acknowledges how “a boy is, in large part, hardwired to be who he is” (5-6). Wonder here is gender and sex as differences and differentiation, rather than possible difference *within* gender and sex. Putting aside the tautology of “be who he is” and its feminized reciprocal for a moment, Gurian’s urge for one to wonder—to be curious, to step away, to be surprised at the extraordinary and unfamiliar—is already vitiated by these first few pages: the reader is in for a biology lesson of development. To wonder, here, is predicated upon *arresting* the point of passage, the space of play, contradiction, and mutual reinforcement; for gender and sex are not only collapsed but appear only through their difference from each other. “Nature” contains nothing unexpected.

The concept of nature is by no means a stable one. *Nurture the Nature* is both another recent title from Gurian as well as the governing pedagogy toward his clients. Gurian recognizes nature independently of culture: children have “core natures” and parents “must focus on the positive and negative pressures that try to mold, change, or even destroy that nature” (*Nurture* 4). Cultural influences (including self-help books, one would presume) are positioned outside this core nature, which one must “observe and appreciate as it unfolds before your eyes” (12). Nature for Gurian is pre-scripted. To nurture the nature of a subject(ivity), or to take a “nature-based approach” to masculinity or femininity, is to nourish it into its ideal, already recognizable form. Indeed, tilled throughout his many narratives, “core selves” only find their nutrition through their now-possible-to-understand neuroscientific blueprints (Gurian and Stevens, “With Boys and Girls”).

To revisit to the opening anecdote, how Leigh understands and interprets the cultural legibility of her son against “most boys,” and the category’s relation to “male” as a scientific object of investigation through history, is an imperative point of departure for giving context

to Gurian's derivative notion of "bridge brain." Increasingly, the desire to see "the" brain *in vivo* accelerates the determination for many researchers in and outside the neurosciences to characterize cohorts of people—the addict, the serial killer, the liar, the male, the female, the genius, the Republican, etc.—in terms of "neural signatures," by calculating oxygenation levels of neural cells or higher "activity" of electro-chemical interactions (Choudhury 159). "Such categories, however," writes neuroscientist and history of science researcher Suparna Choudhury, "are not natural kinds; they are often culturally constructed, rather than rooted solely in the body or the brain" (159). Choudhury's use of 'natural' describes a set of cultural practices *and* biological germinations that work to produce personalities: a cooperative literacy. Malabou reminds that belief in the bedrock-like idea of nature is part of a central impasse, writing that, "We must explore closely this connection between sex and the brain that endows both with a degree of *originary suppleness* without which there would in effect be a 'biological essence of beings,' a pure fantasy, which is no doubt hard to shake off, *but only in ideology*" (138; emphasis added). Although Choudhury and Gurian are each speaking of something social and biological, the meanings underpinning their uses of 'nature' and 'natural' could not be farther apart.

Where Gurian fails to wonder is in the very moment he pleads for it. For his detractors—the nebulous authors he pejoratively refers to as practitioners of "social constructivism"—well, "they're in that old model—a feminist model," he says, and "the new millennium needs something post-patriarchal and post-feminist" (qtd. in Jayson). Beset by the naturalness of "man" and "women," Gurian still struggles to account for how maleness, masculinity, femaleness, and femininity could have single, identifiable forms and locations in the brain when they each take such varied forms in people's lives. His remedy is to advocate a change of the emplacement of character in the brain: the "bridge brain," who assimilates any remaining exceptions to gender polarity. Against this, Malabou's work in *Changing Difference* does not evacuate the meaning(s) or usages of "feminine," but delocalizes the *place* of sex and gender as it is 'naturalized' and culturally informed by scientific knowledge of the brain. Choudhury advocates a critical neuroscience that questions the contingencies of the grammar and cultural scaffoldings attending to conclusions that reward easy utilizations of the brain. Critical neuroscience for her therefore brings "an awareness of how the defining features of a category may differ depending on context" (162). In that sense, when Gurian applies "bridge brain" as a conceptual balm to parents or teachers, I am left asking in what

ways might it function as alibi to cultural decisions previously affirmed? Or that need affirmation contemporarily? Upon what does Gurian base this category of knowledge?

In formulating how to “nurture the nature” of men and women and boys and girls (what is referred to in his media as applying “gender science”), Gurian takes his cue from select scientific reports and books as well as the sagacity of his accumulated experiences, both personal and derived from other parents’ and teachers’ stories. Quite forward about his research methods, Gurian explains that:

Over the twenty years I have been researching male and female biology, I have had to develop a method by which to discover what biological research is most helpful and accurate. I begin by learning what primary researchers in various countries have discovered through their clinical trials, then I see if these facts in their hard science fit cutting-edge research in soft sciences like psychology, anthropology, and sociology. I’ve learned that in studying both hard and soft science, it is crucial not to stray too far from people’s real lives or from good common sense. Thus I try to match what we’ve learned in clinical trials and other research with people’s everyday lives. (*What Could He* 270)

The practice of “matching” others’ research with “common sense” is elsewhere confirmed. “Most people find what I say intuitive,” explains Gurian in an interview. “What I do is study the brain science and immediately move to practical application,” he adds, “I’m not purporting to be the scientist. I’m a philosopher and taking what I understand is the science and saying that might explain why boys do such and such. ... I’m...making an interpretation that’s practical” (qtd. in Jayson). Speaking from a place of ‘practical interpretation’ is why I continue to find Gurian’s texts interesting as a cultural alloy: an encounter of science and social studies that fuses to authorize certain forms of life and living as intelligible, and how that is wielded as a concern for management (i.e., proper “nurturing”) rather than the possibility of wonder. The science he interprets and accepts as “practical” further unpacks what type of “nature” he urges clients to “nurture.”

Although narrated in many versions, with an ear to different audiences, Gurian’s project is to diffuse information that argues that the arrival and development of male and female brains yields distinctive organs as biological givens with fixed psychological and physical needs meted out in particular psycho-social situations. The “nature” of boys’ and girls’ brains as a fixed category of inquiry has shifted quite dramatically in the past decade, although “the identification of sex differences in the brain is one of the longest-standing

projects of neuroscience” (Jordan-Young 50). For information asserting biological-material brain and personality differences between males and females (that is, how he understands that “a boy is... hardwired to be who he is”), Gurian selects from research in brain organization theory.²⁴ Similar to Leigh’s concern about men, in *Changing Difference*, Malabou meditates that “If ‘woman’ is to be understood as both a biologically and culturally determined reality, then we must acknowledge that the ‘feminine’ no longer appears linked to ‘woman’” (5). How might one write “as” a woman, or “as” feminine when the terms of those usages and experiences are seemingly incompatible and interdependent in so many articulations? To span the gap between ‘masculine’ and ‘male brain’ and between ‘feminine’ and ‘female brain,’ Gurian bequeaths a notion outside brain organization theory: “bridge brain.”

Abridging Brains

Who exactly is a “bridge brain” for Gurian, and what does this character imply for forms of living and forms of brains? Where or for whom, apart from Leigh and her son, does the characterization “bridge brain” find explanatory power? And, in the first instance, from what narrative or neuroscientific authority does it acquire explanatory power?

In the Biblically inflected parent’s guide *Raising Boys By Design*, Gurian and co-author Gregory Jantz describe the characteristics of male bridge-brains:

²⁴ Succinctly, brain organization theory purports that “because of early exposure to different sex hormones [sic], males and females have different brains” (Jordan-Young 1). Research conclusions upholding brain organization theory tend to have a seductive cultural allure, perhaps owing to the ‘battle of the sexes’ rhetoric they tend to encompass in popular accounts. “Brain organization studies are big news precisely because no such translation [of how the world of science is interpreted in the context of broad social knowledge] is necessary,” writes Jordan-Young; “they seem to tell us something immediately important about how fundamental differences in human sexuality and gender come about” (61). In Gurian’s charts that divide “Brain Gender Differences,” brains “process” and “message,” and nerve cell “filaments” are “‘telephone wires’ of the neuronal network” (*Boys and Girls* 20ff.). Brain elements, and their organic development from chromosomal blueprints, function as communicators within brains and are even conveyed as such in their outward expressions, such as why boys—like Leigh’s son—have difficulty communicating their feelings. Helpfully, Fausto-Sterling’s analysis of hormones and sexing the brain invites one to critically ask how knowledge about the body *acquires* gender, as well as how “gender and sexuality become somatic facts” (235). This perspective provides an insight into the cultural concerns that influenced brain organization theory’s development as well as how those concerns play out as stable categories of biochemical knowledge like “male” and “female.”

This brain-in-the-middle is a bridge between genders. This boy may need extra help and understanding from you [the parent], his teachers, and his support network as he navigates the sometimes cruel world of male testosterone and aggression. He may need you to urge him forward a little more on occasion but also to let him hold back and form his own way of being and doing. This boy might be extrasensitive to criticism. Constant challenge, shaming, and aggressive criticism may feel like traumatic bullying. It can make him dangerously depressed, so it is important to read his nature closely and nurture that nature carefully. (Gurian and Jantz, *Raising Boys* 32)

As discussed in the previous section, the incitement “to read his nature” is a practice that conceptualizes reading as witnessing the ‘unfolding’ of a developmental neurobiology.

‘Reading’ is also freighted by another textual basis of the brain: added to the linear narrative of neurobiological development is a method of optically writing neurobiology. While not entirely reducible to text, the inclusion of brain scans works to further inscribe the characteristics of the “bridge brain” narrative. “A brain scan of his brain structure and neural processing might look more like a woman’s than another man’s,” Gurian and Jantz write (31). The optics summoned helps rhetorically position bridge brains in the parlance of observable neurology:

What research into bridge brains is showing us scientifically is this: (1) every one of us has both our own gender’s and the other gender’s hormones and brain characteristics (hormones and the brain are “human,” and we all share them); (2) yet if we are biologically male, we will tend toward being more male on the brain/chemistry spectrum, and if female, we’ll tend toward female; and (3) some of us are closer to the other gender on the spectrum than others are. Some of us, in other words, are neurological “bridges” between genders. (Gurian and Annis 16)

The tensile strength keeping the presupposition “if we are biologically male” from failing completely compels Gurian and Stevens to build a physical and psychic bridge “in other words” that offers more ductile properties. “The most female [brain] we can imagine,” writes Gurian, has “high serotonin, high oxytocin, large corpus callosum, [and] many language centers. This brain is defined by lack of testosterone surges in the womb. In a woman, this brain might be called, in popular language, ‘very feminine.’ In males, we would call it a ‘bridge brain’” (*What Could He* 19). Note that the brain slips between “male” and “it,” though the conclusion that it “*is*” a “bridge brain” confirms suspicions of the term as a diagnostic device—a way of marking identity by way of the copula-cum-biology. More evidence of this is found when Gurian writes, “You yourself might often see bridge brain

women in the technology sector, just as you might see bridge brain men in the social services sector,” adding that “bridge brain men” are “more likely than other men to multitask, care a lot about verbal and emotional material, and not be as competitive as other men or women around them” (Gurian and Annis 17). Particular anatomy, like the corpus callosum, “Tends to be denser in the female brain, containing more neural connections between hemispheres,” notes Gurian and Stevens in a chart supplementing images of brain scans (*Boys and Girls!* 21). The corpus callosum, they add, “Tends to allow the female brain to process more information more quickly between the two hemispheres, connecting language and emotion processing centers more efficiently.” ‘Seeing’ brain characteristics augments the effort involved in reading brains.

The visual story of a “bridge brain” expands to characterize someone “whose neural functions seem more like and *actually scan more like* the other gender” (Gurian and Jantz 31; my emphasis). Scans play an essential role in inscribing the “bridge brain” character onto the physical material of brains. Gurian supplies these images as evidence:



Figure 1.1. Female at Rest.



Figure 1.2. Male at Rest.

Source: Brain scans courtesy of Dr. Daniel Amen. Used by permission

- *SPECT imaging*, similar to PET and MRI, uses single photon emission computed tomography to provide lower-resolution images; it is much less expensive than PET. As you can see in the SPECT scans in Figures 1.1 and 1.2, the male and female brain look quite different in terms of brain activity. (These SPECT scans appear courtesy of one of the Gurian Institute’s scientific advisors, Daniel Amen, M.D. He and his team at the Amen Clinics have done thirty-eight thousand brain scans.)

Fig. 1. Sex differences are visually established by referring to images as translations of the brain (Gurian and Annis 8).

The book *Leadership and the Sexes: Using Gender Science to Create Success in Business* explains that Gurian created the term in 1998 “to help people understand the exceptions,” and uses it to describe people “whose brains share a number of characteristics of the other gender’s brain, transgendered individuals, and people who just sense their brains may be toward the middle of the gender/brain spectrum” (16). For Gurian, it personifies all that which does not “fit” the contours of a stable “male” and “female” dyad, yet narratively locating “bridge brains” as occupying a place of “exceptions” toward “the middle,” which includes transgendered individuals, forms that character through a description that grounds a biological and psychic cooperation. The following image visualizes a “male bridge brain”:

It is much easier to see male bridge brains than female ones (because the male brain at rest shows up with so little activity, whereas the female's neural web shows up with more activity). If you compare Figure 1.3 to the scan of the male brain in Figure 1.2, you'll notice much more activity in the middle of the brain in this one—in the areas of emotional and verbal expression.

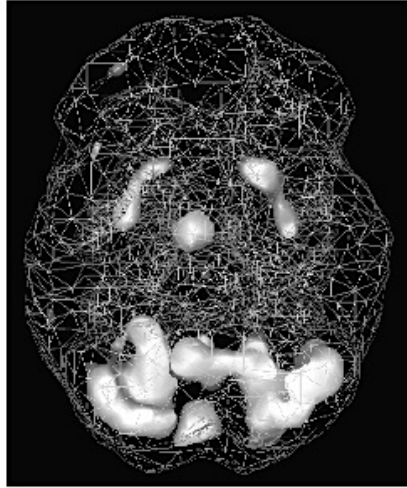


Figure 1.3. Male Bridge Brain.

Source: Daniel Amen, M.D.

Fig. 2. A visual contrast from the previous images establishes the existence of a “male bridge brain” (Gurian and Annis 17).

The triptych provided for readers (Figs. 1 and 2) therefore tells a story about the interstitial space that the character “bridge brain” occupies in narrative. Gurian writes the psychic characteristics of a “bridge brain” textually, but the incorporation of Daniel Amen’s scans also serves to write those characteristics visually. It forms a cooperative narrative that demands we read “bridge brain” through that cooperation. Looking at the triptych Gurian provides, I cannot help but thinking that, for me, they function as a response to the question *what would it look like to scan a metaphor?* Here personality and characterization shape and give form to neurological writing. Gurian’s social-linguistic formulation of “bridge brain” gives form—through the very techniques and conceits of neurological inscription (brain images and recourse to particular anatomies)—to ‘neuroscientific literacy,’ while the quoted images also form literacy of a brain with character by way of Amen’s neuroscience.

Bridges, which conjure images of architectural connections, have various utilities and also find themselves as perennial metaphors for correlation. As passages, conduits, and links, they offer a transitory tie between at least two physical places or associations. Musically, a

bridge is a contrasting section in a performance that prepares for the return of the original section or the refrain. It is transitional, part of a larger whole, such as in James Brown's tease "take me to the bridge / Can I take 'em to the bridge" on many versions of the song "Sex Machine." Idiomatically, we burn bridges to avoid the painful consequences of continued connection with a person or group or idea. But what is the place of the bridge if it is to be understood as the *place* of sex? If one is on a bridge, occupying the site of it, one is offered a privileged vantage point from which to ascertain that which abuts the bridge: the two sides opposed. That is, bridges separate as much as they conjoin. And those who occupy the site of separation-conjunction are generally not favorably imagined in cultural representations. For the otherwise homeless, a bridge can be shelter; to the suicidal, a place from which to end life; or, when a bridge affords a life-saving escape route, it can even provide a point of greedy opportunism, as with the trolls who live under one in the Norwegian fairy tale *Three Billy Goats Gruff*. Or, as Russell Banks explores in *Lost Memory of Skin* (2011), the land underneath a causeway in Miami, Florida serves as an encampment for sex offenders court-ordered to exile themselves from any location children might gather. Gurian's "bridge," however, happily invites notions of a zone of "exceptions," where those who "share a number of characteristics of the other gender's brain" can reflect on their "natures" that are "different from the mass." This ghettoization is achieved by constituting "bridge brains" as the "exceptions...in human evolution": the "other gender's" brains, through his discourse of evolutionary nature, anchor the available cultural categories of "male" and "female" as two biologically coherent, opposing synaptic terrains (Gurian, *What Could He* 9). Those who live life under Gurian's bridge oscillate between being a person under constant "stress" of others' masculine and feminine expectations (Gurian and Stevens, *Boys and Girls!* 227) or being an ideal husband or wife (Gurian, *What Could He* 67-69).

The bridging shaped into existence by Gurian connects a psychic apparition to a physical construction. In a lay way, it answers his clients' questions of why a woman could ever possibly want to build a profession in manufacturing or tech services. In a direct sense, though, for Gurian, "bridge brains" describe a place of negations. The "bridge brain" operates as a fungible concept pegged to an exchange rate of hormones and synapses—that is, "maleness" and "femaleness." As a result, "bridge brain" becomes a heuristic tool, and is wielded as a foil against which the abutments "male" and "female" may maintain their perceived natural foundations.

As an explanatory device and a personified bio-metaphor, then, the place of a “bridge brain” is not only a characterization but also an ontology, describing something originary and transcendent. “Bridge brain” describes a person’s essence. Indeed, Gurian infuses his descriptions of “bridge brains” with the notion of “core self,” a term, for him, synonymous in its operations with the “nature” of a person. As noted above, that one “is” a “bridge brain” or that one “sees bridge brain men” in situations that do not “fit” their gender roles corroborates this bridge core-self ontology (as does Gurian’s analysis of Leigh’s son from the opening anecdote). To provide contrast, in the philosophical genre of the molecular gaze forwarded by Malabou, the slippage between woman and femininity—that is, Being and being—is not something understood as needing to be bridged but to be plasticized. At first, the question is somewhat displaced by the pluralization of sexes and genders: “Beings form many different figures and the question of alterity digs out space for an infinite number of arrivals in the flesh of difference” (*Changing* 36). However, she captures Gurian’s “bridge brain” solution to the quandary of core-self rupture otherwise, writing that, “despite this, the mode of relation has itself never been rethought. The gap is still its only mode of being” (36). What Gurian substitutes in this gap with a neurobiological neologism, Malabou interrogates as the plasticity of difference. She locates an ontic exchangeability in Heidegger via Hegel²⁵ and demands that one consider the plastic structure of essence—the structural potential for exchange (here, the originary suppleness of Being and being as synaptic expressions)—to understand that “Difference is a trader, not a principal for selection or for dual segregation” (39). In the final analysis of this component of *Changing Difference*, Malabou writes that

This point brings us back to the shared etymological origin of *genus* and *gender*: *genos*, genre as essence. If this essence is thought of as “changing,” if transformability defines its ontological status, the problem is no longer that the “feminine” can be reduced to “woman”... The question is that while the feminine or woman (we can use the terms interchangeably now), remains one of the unavoidable modes of ontological change, they themselves *become passing, metabolic points of identity*, which like others show the passing inscribed at the heart of gender. (40; emphasis added)

What Malabou underscores is that the potential for exchange—itsself found in neural plasticity—that lies at the nexus of ontological difference must be affirmed and

²⁵ “Being and being are different but they exchange modes of being,” she writes, “There is no gap without exchange or reciprocal metamorphosis” (*Changing* 36-37).

acknowledged. The very terms “male,” “female,” and “bridge” brains are here revealed as transitory neurological coordinates: both legible and illegible in cultural contexts.

The ontology of “bridge brain” Gurian also localizes. Images, brain scans, and charts are employed to exhibit the neural signatures of the term (as well as for “male” and “female” brains) to make it graphically available as topography (see Figs. 1 and 2). “Bridge brain” might suggest a productively liminal, transitory space as with Malabou, but Gurian articulates this as fixed and non-contingent, for the organs of gender are visible and measureable. While Gurian does speak to plasticity, he is loath to confront its originary modifiability, its disruption of biological etiology.²⁶ Instead, he writes its fields of action in the brain to coincide with his three characters: male, female, and bridge. Most lucidly in this vein, Gurian writes that,

The gender of the human brain is not plastic, not a new skill to be learned, not a new mode of communication. It is as hardwired into the brain as a person’s genetic personality. In the same way that you cannot change a shy person into an extrovert, you cannot change the brain of a boy into the brain of a girl. (Minds of Boys 60; emphasis original)

According to Gurian, difference is visible, and shape-shifting characters are something outside the realm of possibility in the world he creates. Difference is not only recognizable as fulfilling the terms “male” and “female” but as essential difference in the “hardwired” appearance of those terms against “bridge brain.” The brain may be (somewhat) plastic, but gender has its biological contours; it is a physical terrain, a “genetic personality,” and, by nature, fortified against the encroachment of learning, communication, development, and emergence. Sex and gender constitute a “core self” flanked only by the aberration—the different infrastructure and circuitry—“bridge brain.”

Character Matters

Although Gurian includes transgendered individuals as part of the community of “bridge brains,” the ontology is by no means shorthand for transgender. David Valentine, in his recent “ethnography” *Imagining Transgender*, asks how “sites, places, and people became

²⁶ “Overall neural plasticity” is a “mythical concept,” according to Gurian; it represents “a magical changing device,” and one’s knowledge of plasticity in any other way is the fault of “our educational system” (*Minds of Boys* 60).

comprehensible to activists, social service providers, journalists, public policy makers, anthropologists, and others through the category transgender” throughout the 1990s (14). He positions his analysis as “a call to think about gender and sexuality as political formations: not simply in terms of the politics that attach to gendered and sexual systems, experiences, bodies, and identities but in the very constitution of gender and sexuality *as social and analytic categories*” (19). Thinking through Gurian’s character “bridge brain” over the past few years, I cannot help but be reminded of Valentine’s analysis. In moments where I reflected on the idea that the forging of vocabulary makes personalities comprehensible, Valentine’s genealogy of ‘transgender’ seems to me so close to Gurian’s creation. Yet, what keeps pulling me back from Valentine is the “neurological” abridgement in Gurian’s formation: the material artifice, the synaptic scaffolding interior to the very form “bridge brain.”

Earlier I suggested that discourses of neuroscience—as apprehensible scans of “neural signatures”—characterize cohorts of people, such as the addict, the serial killer, the liar, the male, or the female. The operation I continue to find most relevant at work with the character “bridge brain” is its reciprocal. “Bridge brain” moves from the figurative to the conceptual to the material. My use of ‘material’ above refers to a type of physical, chemical, and caloric evidence, which the glyphs and inscriptions of and ‘within’ the brain—that are only legible through certain technology, such as the SPECT scans Gurian provides and the references to “brain characteristics” he supplies—contain. Gurian’s larger premise in relation to the possibility of brain genres, as John Frow helps me recognize, is that there are “cognitive patterns underlying metaphors” that work to secure those imaginative coordinates (“Reproducibles” 1631). What do I mean by this?

First, “bridge brain” is a figural description used to characterize “boys and girls who possess nearly equal qualities of both the male and female brains” (Gurian and Stevens, *Boys and Girls!* 16). These figures, further, “are, in a sense, the bridge between male and female cultures because their brains are the most ‘bi-gender’” (16). Gurian “coins” the figure of the bridge brain in order to describe a personhood not describable by the neurologically and sociologically debated terms “man” and “woman” that he otherwise wishes to keep secured with references to ‘nature.’ Departing from this figuration, Gurian proceeds to abstract and generalize “bridge brain” conceptually. We are authorized to envision the more-aggressive tech-sector woman, the empathetic primary school male teacher, the multitasking and meek

husband, the emotionally depleted wife who plays soccer and puts shin guards on her birthday list, and even the individual who discovers a better “fit” with their brain by transitioning to another gender. A world of qualities associated with what it means to ‘be’ a “bridge brain”: these contours and colorations provide conceptual mental representations of the categorical character. Crucially, this is not just psychic. For, finally, Gurian engraves the “bridge brain” character into biological material. Rather than simply a social and analytic category, Gurian and neuroscience cooperatively write into form an idea that was previously formless. The characteristics of the character “bridge brain” become properties of the brain itself. We are invited to see the shapes, outlines, and activities of the bridge-brain metaphor *in vivo* through scientific reading machines.

The work that Gurian’s character “bridge brain” does for narratives of neurobiology teaches me something about the catalytic relationship of texts in culture. Characters give form and meaning to neuroscientific culture—by writing the cognitive patterns underlying those metaphors—instead of only receiving form from neuroscience in the shape of characters with brains.

What are the operations behind this work? Recall that Gurian bemoans “social constructivism” as an outdated “model” (Jayson). Theories of social construction (such the idea that gender is culturally acquired) “works against who your child really is—*against the nature of your individual child*” (*Nurture* 10). But how salient is the idea of social construction against which Gurian discovers the ‘nature’ of “bridge brains”? To analyze the matter behind the bridge-brain metaphor, we need to look at Gurian’s advocacy “in place of these conceptions of construction” (Butler 9). It is Judith Butler who compels us “to return to the notion of matter, not as a site or surface, but as a *process of materialization that stabilizes over time to produce the effect of boundary, fixity, and surface we call matter*” (9). Butler’s radicalization of prior social construction theories “alerts us to the fact that the body, not just consciousness, is a crucial link in the circuit of social production and reproduction, both constituted by and also constituting a given social order” (Cheng 112).

The power of discourse, which in the case of Gurian’s “bridge brain” I understand as the power of widely circulated narratives, is central to understanding the social order that bridge-brain characters determine. Specifically, Foucault speaks of “discourses ... as practices that systematically form the objects of which they speak” (*Archaeology* 49). The cumulative effect of Gurian’s invocation and characterization of “bridge brains” is to achieve the

encapsulated self-evidence of them. Narratives—both neurological and anecdotal—materialize “bridge brains” to the point that they become an ontology: a lived inhabited space of personality and physical means. “That matter is always materialized has, I think, to be thought in relation to the productive and, indeed, materializing effect of regulatory power in the Foucaultian sense,” writes Butler (9-10). I take it, through Butler, that the “materiality” supporting “bridge brains” in terms of personhood “designates a certain effect of power” because “power operates successfully by constituting an object domain...as a taken-for-granted ontology,” and therefore “its material effects are taken as material data or primary givens” (Butler qtd. in Cheah 113). The SPECT-scanned brain triptych Gurian provides (Figs. 1 and 2) are meant to be read as “incontestable referents” by its onlookers: they materialize the idea of “bridge brain” by their appearance as “outside of discourse and power,” as supposedly non-cultural and non-socially constructed somatic facts (113).

Yet, science indeed operates both linguistically and as part of socio-cultural activities. “Recognizing that neuroscience is itself a cultural activity that may influence those under study by utilizing concepts and ways of seeing that are culturally and historically contingent,” writes Choudhury, “reminds us that culture is not a ‘thing’ or an essence located in the brain that can be ‘revealed’ by neuroscience” (165). Further, neuroscientists, as we learned in the previous chapter of this dissertation, are not immune from cultural narratives, and, instead, engage their work cooperatively with them and as a result of them. Cognitive linguist George Lakoff and philosopher Mark Johnson argue that “formal scientific theories are attempts to consistently extend a set of ontological and structural metaphors” since these “ontological metaphors” are so often “taken as self-evident, direct descriptions of mental phenomena” (220, 28). To this end they reason that “the power of a metaphor to create reality rather than simply to give us a way of conceptualizing a preexisting reality” attests to the ways that “metaphor plays a very significant role in determining what is real for us” (144, 146). The reality, now read as the ‘nature,’ of a “bridge brain” person designates brain and body, history and futurity, to the metaphor from which Gurian first imagined it.

The character “bridge brain” that Gurian designs is road-tested. It helps Leigh orient the nurturing of her son in relation to a type of brain she had not previously recognized. It shapes the pedagogical perspectives of at least sixty thousand educators in the US. Gurian’s character also cooperates with those neuroscientists with whom Gurian corresponds, like Daniel Amen, by seeking out those characters in SPECT scans and etching their neural

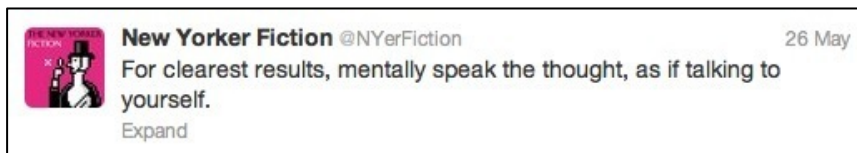
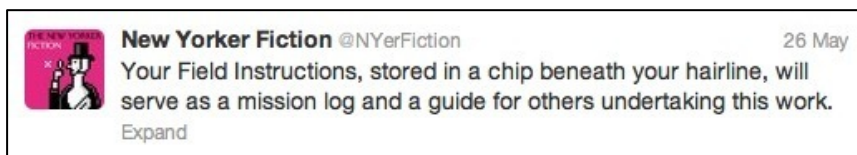
topographies ‘materially.’ Neuroscience, in this sense, comes to characterize this particular brain through its literary effects. And while Malabou’s critical theory helps me understand the stakes of neurological essentialisms,²⁷ Gurian’s materialization of the metaphor “bridge brain” into a character—visually accessible, fibrous and fatty, full of chemical and cellular history, genealogy, and future voltage—also helps me come to terms with its implications for neuronarrative today.

²⁷ “The *biological* quarrel of essentialism and anti-essentialism has no more meaning than the *ontological* quarrel,” she writes. “The plasticity of gender does not refer to the halted evidence of form any more than the plasticity of essence. We must rethink the relation of philosophy and science today, not in order to isolate a ‘feminine’ continent that would be, for example, the mechanics of fluids, but rather to show, always according to the hypothesis of an originary transformability of presence and nature, that *the place of sex has moved*” (*Changing* 137).

Chapter Five

Your Brain In 140 Characters

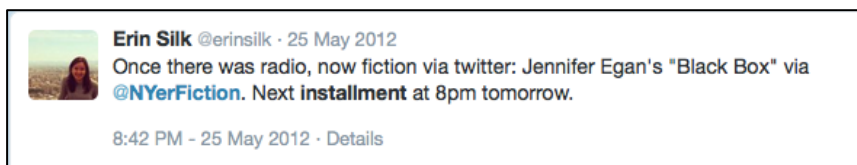
That first night I overhear her manipulating the violent and ruthless man, seducing him out of an abiding love for her country and allowing him to have his way with her on a chalky yellow rock beach next to the Mediterranean. These self-conscious details trickle to me over the course of an hour, one each minute. The second evening, as she returns with the other concubines to the violent and ruthless man's villa, she tells me about the microphone implanted just beyond the first turn of her right ear's canal. What should I make of these traces? I struggle to design a trajectory that produces some sense. Perhaps she has gone to this seaside villa to exact revenge? To execute a heist? For it is not until the third evening that I at least begin to understand how it is I am receiving these terse messages:



A neural implant, I gather: a data recorder embedded beneath her hairline on her frontal cortex. Wirelessly relayed, I receive her thoughts instantly and directly on my screen, encouraging my anticipation of each subsequent one. Communication appears one-directional: the messages are mine to accept, share, and contemplate, but I cannot reply to her. They are not quite just any assortment of thoughts, however: they appear to constitute

the brusque, live-action debriefings of her mission. And so this continues—this stream of thoughts, once a day for an hour each evening—for another seven days, until she eventually engages in direct combat, completes her mission, and a helicopter rescues her from the dark nighttime sea.

This spy's story, to be clear, is staged. Staged by the *New Yorker*, in fact. Author Jennifer Egan wrote the story well before each of her spy-protagonist's thoughts, transferred into bytes of text, arrived to a reader as a tweet on Twitter. Serialized through the *New Yorker's* Twitter channel @NYerFiction, the totality of Jennifer Egan's short story "Black Box" clocks in at roughly 8,500 words, but more curious and exciting is the fact that Egan chooses to atomize the story into 606 tweets, each 140 characters or fewer, to allow delivery through Twitter to thousands of screens simultaneously. From 24 May 2012 through 2 June 2012, for one hour each evening, the story trickled onto the Twitter feeds of anyone subscribed to the *New Yorker's* Fiction channel. One reader, @erinsilk, reacted the event with the following message:



What @erinsilk senses is the episodic fireside appeal of Egan's serialized story: a protagonist's personal thoughts, shared intimately with individuals directly and instantly.

I also stage this spy's story. I stage it here, in this chapter, for the purpose of narrating an analysis of Egan's narrative. This appropriation is not without its consequences, and did not arrive inconsequentially. I first encountered "Black Box" not in the space of Twitter proper, but as a result of my own Twitter illiteracy. One afternoon in late May of 2012, I found a link online and read the story—scrolling downward—in its entirety and at my own pace on the *New Yorker's* website, which was not blocked by a paywall at the time. The story took on the visual design of a coherent collection of stanzas. But then the link to the story on the *New Yorker's* website irretrievably disappeared, and the story, for all I could see, vanished as well. Aware of its Twitter debut, I attempted to locate the cache of tweets on Twitter, but my scouring could not salvage the whole of Egan's tale. And so I reached for the literacy I did know, which involved asking a friend to copy the *New Yorker* magazine at the library, scan the story, and send it to me in an email. I could then 'read' the story comfortably using handy

genres to compass my determinations, and employ the well-practiced literary cues I had at my disposal after some twelve years of higher education. I was fooling myself, of course. “Black Box” continued a life on Twitter that ink and paper, in retrospect, left immobile. The scanned paper version my friend gave me was but one glimpse of an active information stream, and it edited away that which brought it germination and that which it went on to irrigate. One cannot extract a sample of water and claim to know everything about the river from which it was taken, for the river is everywhere at once: at the headwaters and at the delta, in the oxbows and at the rapids, at the dam and in the mountains. The story beckoned me forward to Twitter, forward to an intimidating cacophony of storytelling in which the spy’s voice did divulge its dialogue. I volunteer this anecdote to demonstrate the conclusion I draw from it: that reading and re-reading “Black Box” through various interfaces disciplined what I thought I knew about the story and what I thought I knew about reading. I embraced not just reading upward on Twitter, allowing fresh cogitations to sediment previous ones; “Black Box,” through its play of cerebral communication, insisted I learn how to heed, dismiss, and recalculate hypertextual c(l)ues and dialects, such time stamps, allusive hashtags, semantic severances, coy sub-tweets, ironies, and foul idiocies. A novel regime of semaphores demanded my consideration. Lured on by seemingly inexhaustible enjambments, different trajectories of textual and visual mobilities plied for my brain’s attention. In short, each encounter with “Black Box” re-characterized both the story and my practices of reading.

Throughout this dissertation, my analyses intervene in textual objects in order to understand the ways brains with character implicate reading and writing today. In this chapter, I locate a brain with character produced outside of an object’s textual perimeters. The spy of “Black Box” operates as a distributed brain. For one, although the spy’s brain is what ‘writes’ the actual text of the story, that brain speaks without hearing: communication is one-directional. In all of the 606 tweets that comprise “Black Box” there are no comments supplementing any of those tweets, and there are no ‘replies’ from that speaker to other Twitter users, which might otherwise demonstrate a dialogue with the spy’s brain. Secondly, the distribution of this spy’s brain speech through Twitter (and other media, as noted above) suggests that there is perhaps not a singular or original object to read. The spy’s brain produces legibility only as an effect of multiple readers and readings. That is, the brain with character located as a result of “Black Box” relies on readers gathering to the story and requires extra-textual interpretation. The “extra,” here, expresses the cooperative literacy

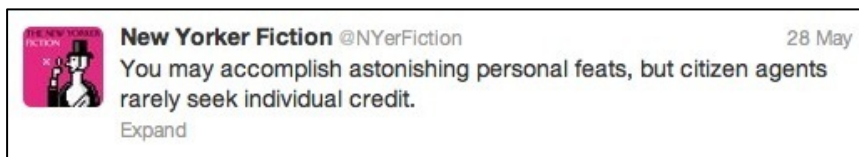
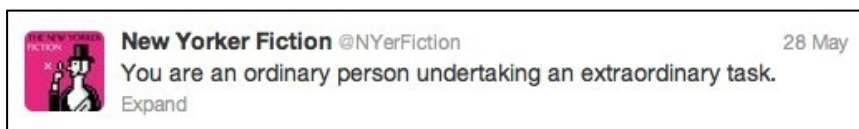
required to make meaning out of this particular brain with character. My analysis therefore pursues a cooperative reading far less than a cooperative writing of the brain from “Black Box.”

Two approaches that decenter the text of Egan’s “Black Box” compel this closing chapter forward. The first approaches the story’s premise: a quest, a data recorder saddled on a brain’s frontal lobe, and a possible future training protocol all announce the narrative and bring a reader toward it. The story positions a reader ‘in’ the brain looking outward. Thus, the way Egan’s story casts the protagonist’s neuroarchitecture—her thoughts emanating from an apparent neuro-prosthetic device implanted beneath her scalp—as both its narrator and the textual content deserves analytical attention. The second approach looks to the relationships “Black Box” acquires and disciplines through the Twitter platform, which engages the way we communicate about brains with character today. My approach does not constitute a critique of Twitter, but of this particular story’s legibility through Twitter. The brain from “Black Box” implicates how we cooperatively read thoughts as well as the consequences and entanglements from sharing them with others. I look closely at the discursive landscapes around Egan’s story to discover an approach to storytelling that manages to interrogate the act of reading accounts of brains with character.

Pressured by and pressuring the concept of neuronarrative one final time in this thesis, my encounter with “Black Box” helps me pluralize the operations behind generic contexts by venturing into extra-textual questions. Rather than categorizing the story as a neuronarrative or as a Twitter gimmick, I provoke insight into how “Black Box” implicates our understanding of science, networks, and storytelling today. To do so, I look to the ways narrative and network both interact and add complexity to science stories in culture. I introduce “Black Box” in the first section and solicit questions about its appearance, circulation, and context. In the second section I rehash issues surrounding the concept neuronarrative in order to question the demands and opportunities this generic ‘context’ bestows through “Black Box.” The final part approaches Egan’s story through the open archive of the internet, which helps to displace both context and genre in favor of new narrative understandings of the cooperative literacies from brains with character.

The Spy Who Thought Me

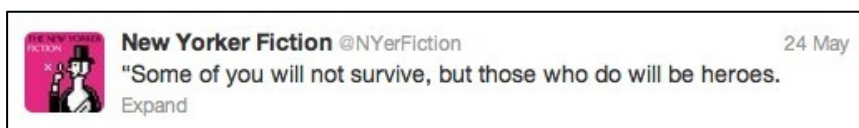
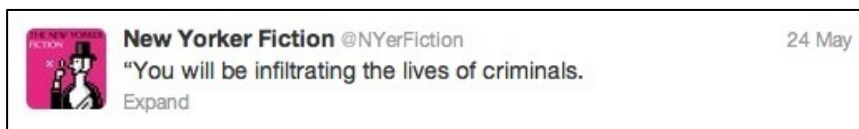
The storyline of “Black Box” follows a one-off espionage mission that takes place over the course of an afternoon and evening, although that knowledge slowly percolates to readers only after several days of the *New Yorker* broadcasting the story. In what the unnamed narrator-protagonist describes as “the new heroism” *in medias res*, readers are alerted that:

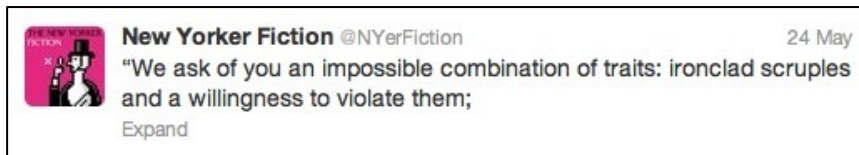


Indeed, the spy considers the gravity of her own ordinariness at one point:

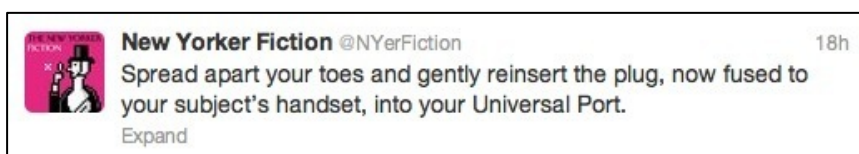


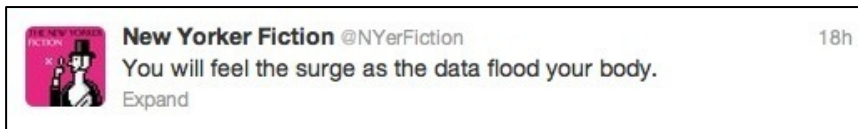
Whatever her professional skills before the point in her life when the story takes place, espionage training and protocol now augment her talents and physical abilities. The protagonist explicitly quotes the training she received from the intelligence-gathering agency within the first evening’s first few dozen tweets:



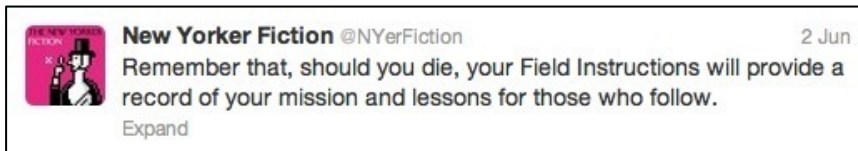
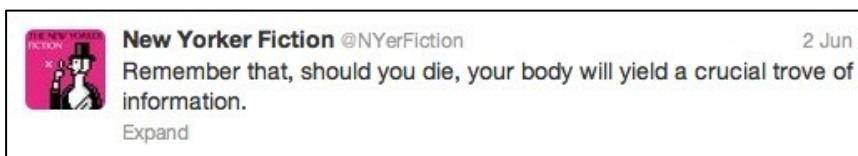


Something in the way of a plot begins to condense out of the hints in the above tweets by the fourth and fifth nights of the *New Yorker's* broadcast. Readers discover that this story's ordinary citizen serves her country (the United States) by allowing data recorders and wireless communication devices to be implanted into her body in order to seduce a high-profile terrorist and extract intelligence (through audio recordings, photos, and, of course, her cerebral debriefings) somewhere in the Mediterranean in southern France. Readers witness the protagonist dodging bullets, outwitting several playboy terrorists and their concubines, and, with her under-the-skin high-tech grafts, pulling off the biotechnical infiltration of a terrorist's opulent and fortified coastal lair. In terms of her mission, the climactic event occurs during the tweets broadcast the evening of 31 May. That night, she gumshoes her way into the bedroom of the terrorist villain while he sleeps and uploads—using a “Data Surge” technique—the contents of his personal device into a data port that is located between the toes of her right foot:





The villain awakes at this point in her task; they engage in a fight and the spy is shot in her right shoulder, but the spy escapes from the lair and she speeds away on a boat before her agency recovers her with a helicopter. Importantly, her physical body is the most vital piece of technological hardware for the intelligence agency because it both houses the information she liberates from the terrorist villain and contains the record of her accumulated thoughts:



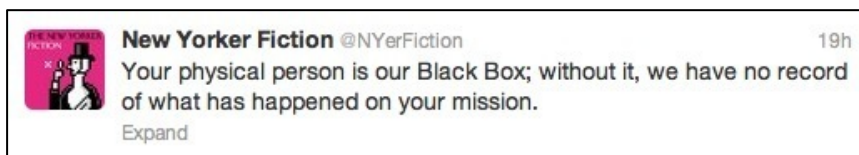
Thus, the Field Instructions from the spy's mission in question *is* the text of Egan's story "Black Box." While an exhilarating pasquinade of the prototypical hyper-masculine thriller, and while Egan's story certainly delivers on the speedboats and sleuthing around and consensually questionable sex so characteristic of spy stories, what I continue to find most interesting is the story's self-reflexive design and method of delivery. Its second-person narration directly addresses a reader, which commands one to 'read' the data impressed upon any Twitter-capable device by the spy's body: here, Egan's use of Twitter bestows the sense that the spy's brain is content, container, and conveyor.

The story frames each tweet as part of a set of mental notes for briefing future ordinary citizen-spies, and, reminiscent of David Markson's novels decades ago, maximizes use of clipped prose now germane to Twitter. As Jennifer Egan reflects in an interview with Deborah Treisman, the *New Yorker's* fiction editor,

the premise is that these [tweets] are the thoughts of the protagonist, which are being recorded as part of her spy mission. But they take the form of lessons, and actually the working title of the piece was "Lessons Learned." The idea was that with each move she makes, or each thing that happens to her, she has a kind of reflection, which has a bit of a didactic quality to it. (qtd. in Treisman)

Implanted under her hairline and upon her frontal cortex, this neuro-prosthetic thought-recording device collects the impressions of her experiences. That is, recipients of this story witness direct thought-to-text speech. To be sure, there are other devices implanted in the spy's body—a Global Positioning System in her leg, a flash-capable camera in her eye, and that data port in her right foot—but it is the neuro-prosthetic device that structures the story's focalization and premise. The device is what tells the story to the reader, who ostensibly reads it on another device. Therefore, the story, comprehensively, constitutes a neural artifact: the ten days of tweets relay one spy's afternoon and evening's cognitive labor.

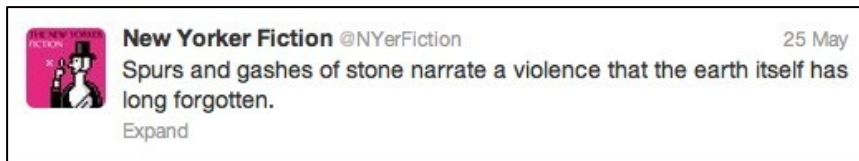
The title of Egan's story—and the significance of the story's second-person narration—eventually finds importance in one tweet occurring late in the narrative, from the evening of 1 July 2012. Just after the spy realizes she has been shot in the shoulder, she recalls that crucial memory told to her by the intelligence agency:



Because the narrator positions herself as a storage unit, a black box logging her mission, the act of reading the story becomes one where viewers are always peeking into, listening in on, or shining a light around her inner perceptions, reactions, and projections in the moment. A type of neural voyeurism. This is particularly salient in moments of text that harbor a haiku-like daydream quality to seemingly mission-irrelevant thoughts:



And, describing a shoreline:



The story explores—by performing—the very personal, internal complexity of espionage otherwise opaque to observation. Coupled with Egan’s use of the second-person “you,” this exploration contributes to “the feeling of virtual ‘presence’” through the text (Bell and Ensslin 312). As Monika Fludernik notes, “one of the more prominent emotional effects of second-person narration” is “its decidedly involving quality, which provokes much greater initial empathy with second-person protagonists than with first- or second-person characters” (Fludernik 286). These feelings of empathy and interiority further create a demand for the reader to “have an active role” in the fiction, because using present tense and imperatives in second-person narratives “create the illusion of being present in a storyworld that is constructed by the reader in creative collaboration with the programmed text” (Bell and Ensslin 313, 312). Importantly, although a reader is positioned inside the black box, this is not the same gesture as opening it. One gains access to the operations of the black box, but the box remains obscure: shy on detailed mechanics, readers are still forced to imagine how the neuroprosthetic device works, how those stored thoughts are actually relayed through networks, and, of course, why on earth the *New Yorker* is playing surrogate to a “stored” communiqué from a US-American intelligence agency. I find this interior obscurity more helpful than typical constructivist approaches to science and technology studies that crave opening the proverbial black box, because Egan’s story from the inside of the box inspires more culturally productive questions of the social and cultural circumstances that enable and constrain literacy of that interior.

While the tweeted story “Black Box” stands on its own, many readers may recognize its protagonist—Lulu—from the motley character network in Egan’s 2010 mixed-bag novel *A Visit from the Goon Squad*, which won the Pulitzer Prize for Fiction the following year. That novel also performs a type of literary mosaic: it contains a collection of linked short stories and tracks over thirty characters—all interrelated through social networks, family histories, or plot actions—throughout the (non-linear) course of nearly five decades. The parts of *Goon Squad* featuring Lulu disclose that she is no virgin to secrecy, espionage, or


dodgy clientele: her character’s mother, Dolly “La Doll” Peale, briefly works as a publicist and public relations choreographer for General B., a Qaddafi-esque genocidal dictator, and she brings a young Lulu along on one memorable chapter in the novel (*Goon Squad* 137-65). In a later section of *Goon Squad*, a twenty-something Lulu discloses that she married Joe, a Kenyan-born man who expatriated to the US and became naturalized there (336). Joe goes to college at Columbia and studies engineering, “becoming an expert in visual robotic technology that detects the slightest hint of irregular movement (the legacy of a childhood spent scanning the grass for lions)”; after marrying, the couple remains in New York, and we are told “he’ll invent a scanning device that becomes standard issue for crowd security.” (62). Details—i.e, stray thoughts from Lulu during her mission—corroborate the connection between the ordinary-citizen-spy of “Black Box” and the Lulu of *Goon Squad*:

 **New Yorker Fiction** @NYerFiction 19h
Your husband is an engineer.
Expand

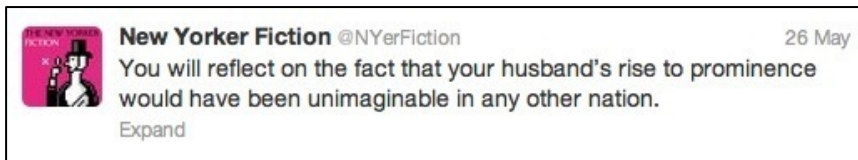
 **New Yorker Fiction** @NYerFiction 19h
Children raised among wild animals learn to detect irregular movements in their landscape.
Expand

 **New Yorker Fiction** @NYerFiction 19h
That particular awareness, coupled with scientific genius, has made your husband a national-security hero.
Expand

More details explain the couple’s relationship to government service, and give background to the drama of “Black Box”:

 **New Yorker Fiction** @NYerFiction 26 May
You will reflect on the fact that your husband, coming from a culture of tribal allegiance, understands and applauds your patriotism.
Expand

 **New Yorker Fiction** @NYerFiction 26 May
You will reflect on the fact that America is your husband’s chosen country, and that he loves it.
Expand



Readers of “Black Box” therefore reunite with a 33-year-old Lulu in her immediate brain-space as she engages in counterterrorism. While this character intertextuality is not crucial to comprehending “Black Box,” it adds strata to Egan’s fictional universe and allows readers to engage in more than one way to read or ‘hear’ particular voices within her network of characters and plots.

“Black Box” is set in a near future, “in about the 2030s,” but the story arc and details are utterly contemporary—both embracing and exploiting a data-saturated everyday life of personal narratives—to a familiar place where information is both means and ends (Egan, Interview). As noted, “Black Box” also appears, printed in a boxy tiled layout, in the *New Yorker’s* June 4 & 11, 2012 issue, which is devoted entirely to the theme of science fiction (a first for the magazine) and to which China Miéville, Junot Díaz, Ursula K. Le Guin, Ray Bradbury, Margaret Atwood, and William Gibson also contribute stories. William Gibson, author of *Neuromancer* and a darling of the sci-fi and steampunk world, observes in 2013—appropriately, in a public tweet—that stories labeled science fiction are not wholly dependent on the premise of “predicting the future,” but do cultural work through a “selective amplification of the present”:



While Lulu’s communiqués invoke a measured, programmatic instructive voice that could be dismissed as amplifying the dystopian sci-fi future of “brainhood”—“the property of *being*, instead of just *having* a brain” (6)—that a theorist like Fernando Vidal warns against with neuronarrative, the story’s content as Lulu’s cerebral “Field Instructions” to future heroines outsmarts this reduction of brain-based conceptions of the self and personhood. It achieves this through its character linkage with *Goon Squad*, retaining the obscurity of the black box, performing the narrative through second-person focalization, and, additionally, through a consequence of its governance from Twitter (we can observe a present and imagine a future

where cerebral activity exceeds 140 characters, for instance). The story's design amplifies instead a cultural fixation with brain telepathy through the type of pointed observation and muted sensation one might gather from the bulletins of a military wire as well as through imitating the networks of ubiquitous status updates that wirelessly roam and inscribe themselves on countless devices today.

The presence of the observed present arrives obliquely, in the manner through which the story is told. Perhaps Marco Roth, Gary Johnson, or the Ortega and Vidal team would not consider the neuronarrative genre to embrace "Black Box": there is no brain wound, no hospital ward to speak of throughout the narrative; there are no fMRI scans or anatomical geographies referenced; no neuroscientific jargon worth mentioning occurs; expositive digressions on the brain are no where to be found; in fact, at no point does Egan even employ the word brain. Yet, undeniably, a presumption of neurobiology frames the very occurrence of the narrative: Lulu's brain 'speaks' the story, and her recorded mental observations drive the action. Egan's literary device—a thought-broadcasting prosthetic appliance—makes use of current cultural fixations of neural enhancements (whether engineered through chemicals, mechanics, or electrical stimulation) that help comment on the conventions of narrative itself. "Texts do not simply have uses which are mapped out in advance by the genre: they are themselves *uses of genre*, performances of or allusions to the norms and conventions which form them and which they may, in turn, transform," writes John Frow (*Genre* 25). "Black Box" uses genres of neural enhancement and neural communication to speak back to the concept of neuronarrative in ways that, as I will analyze, transform conventions of narrativity.

Read discretely, "Black Box" engages many genres: the serial, the thriller, science fiction, trans-humanism, and with the Twitter platform, a contemporary form of interactive or hypertextual fiction. Read collectively, the tweets form the log of Lulu's mission and recall the narcissism of internet tagging, of instantaneous customer complaints, of mobile check-ins, of pithy extracts of blog posts, of citizen-journalists directly recording and sharing news, and the like. When assembled, the story's mission propulsion resonates with the increasing number of experiences and stories live-tweeted, like open-heart surgery, brain tumor excision, and child deliveries (Pappas). The thrill of a following a dicey operation step-by-step through one's mobile device "isn't just to show off what technology can do these days, it's to teach students and help patients," says one surgeon (Stern). Framed by the regulations and expectations of tweeting (through its use of Field Instructions), "Black Box" demonstrates a

way to consider both self-oriented externalized brain memories and community-oriented footprints and guidelines. The cooperation implied in both reading and writing the mental notes suggests a kinship with neuro-technologies already engineered (for instance, at the University of Washington), which allow “information extracted from one brain...[to] be transmitted to another brain..., ultimately allowing two humans to cooperatively perform a task” (Rao et al. 11). In kind, the specific way “Black Box” toys with the recursive curve Stephen Burn identifies in neurological narratives²⁸ (the story is made up of Lulu’s thoughts, and we use our brains to interpret, or ‘read,’ her brain) may help to rewrite this dissertation’s previous conceptions about the narration—who, and within what inhabited conditions—of neuroscientific information through character. I sense more than 140 characters producing narratives of Lulu’s brain.

Context Re-Hashed

Part of the question concerning the alignment of the concept neuronarrative within the parameters of genre has to do with the perception of context: the authorial and cultural crafting that prepares a reader to encounter a text in a particular way. Context here refers to “a system of social norms,” an ecology of conventions, affects, and familiarities into which a reader finds oneself and the story (Schmid). But what are the limitations of thinking genre and context together? John Frow, again, reminds us of the prevailing estimation of genre when he suggests that, popularly, “to speak of genre is to speak of what need not be said because it is already so forcefully presupposed” (*Genre* 93). Context is a term that can designate those presuppositions as one encounters literary objects, and, in turn, perhaps offers a way to reflect on the readers and writers who inhabit them.

The description of “Black Box” I offer in the preceding section—that there is a spy who executes a counterterrorist operation using implanted data recorders and the occasional combat moves—only makes coherent sense if one reads the story progressively, linearly, and unbroken at the time of initial tweeting. That is, if one reads it ‘in context.’ Two observations occur as a result. First, someone reading the story ‘live’ in 2012, as part of their Twitter stream if they had subscribed to (i.e., ‘followed’) @NYerFiction, would have confronted the story in fragments (one tweet per minute, for an hour each day over ten days), interrupted by all of the other tweets on their particular and personalized stream. During first publication, as

²⁸ See page 11.

made apparent in the tweet below, it is possible for one to have not known one was, as it were, reading a larger story:



As the tweet shows, one could have misread the initial tweets of “Black Box” as a technological malfunction, as evidence of a hack, or as general noise. A slippage between the imagined narratee and factual recipient occurs. Here, the idea that an interface and an algorithm could ‘lose its mind,’ as @ArdoOmer puts it, reflects how encountering even just fragments of Egan’s story destabilizes a scene of readiness for reading, and that the cognitive cues we use to mark narratives do not always guide us forward, but are sometimes marked only after initial contact.

A second observation concerning contact and context is that even if one was ‘in’ on the *New Yorker’s* Twitter project with Egan and prepared for its serialized delivery, the task of reading the story could have also incited a malfunctioning of that very task called ‘reading.’ The slowly budding tweets were ripe for interruption by everyday tweets from an individual’s larger Twitter stream: the story becomes shot-through with other ideas, advertisements, observations, and other fragments of knowledge, which reminds us of the difficulty of sustaining attention while being inundated by unrelated contexts.



Except, here, “unrelated” is not quite the correct word, for as user @docsanderson observes, Twitter’s unrelenting archival expansion *creates* unanticipated readings. When “everything becomes part of the story,” it becomes difficult, if not entirely unreasonable, to impose a universal, proper context. But if readers produce the brain telling the story because of the parts they bring to it while reading, it alerts us to the distributive importance of “Black Box.”

How do Lulu’s brain-thoughts become distributed? Importantly, @docsanderson uses the hashtag “#blackbox” to link his observation to a larger conversation about Egan’s piece.

However, this hashtag does not—for all time—direct one to conversations solely about Egan’s story. Today, in 2015, the tag #blackbox can direct one to everything from pictures of sushi meals, crashed or lost Malaysian airplanes, minimalist theatre productions, Argentinian films, cancelled US-American television shows, comic books, and, on occasion, Bruno Latour. Hashtags are a type of metadata label; designated through the use of the pound sign,²⁹ they are “a keyword assigned to information that describes a tweet and aides in searching” (Small 875). One does not need to be a Twitter user to follow the specific conversations, topics, or events around which hashtags organize, as they are searchable through Google. Hashtags can function as beacons on the internet, allowing people to find certain themes, locations, concepts, or objects. They can also be employed to express sentiments around a certain idea, such as anger, joy, irony, or sarcasm, which may well act like a grammatical punch line that forks, undercuts, couches, or reroutes the apparent face value of a statement. Their ability to connect and disconnect content and ideas on virtually all surfaces of the internet demonstrates the scalability of a cultural object like “Black Box,” where chatter across time and spaces, too, “becomes part of the story.”

In relation to genre, hashtags on Twitter do two main things. First, these metadata tags both import and refer to a particular database of dialogue as a shorthand way embedding an already-existing database of information. Second, their appearance calls attention to the act of dialogic production and the technological (algorithmic) infrastructure that underlies it. With regard to the question of context and “Black Box,” John Frow helps by writing that “We could think of genres as metadata—information about how to use information—that help define the possible uses of textual materials” (“Reproducibles” 1631). This thinking redirects the idea of reading texts ‘in-context’ from the idea that particular texts are contextually self-defining to one where the practice of reading implicates the very possibility of contexts.

Engagements with “Black Box” on Twitter also occur well after the initial broadcast in 2012. User @CaseyMarieNYC, in the spring of 2014, took two passages from the *New Yorker*’s print version of Egan’s story and tweeted them as a picture:

²⁹ Outside of North America the pound sign (#) may be known as a hash mark, number sign, hex, cross, or an octothorp.



The photo, concerning two lines of text where Lulu somewhat ironically meditates on US-American values of human rights, is prefaced by a single hashtag: #context. Without quite knowing @CaseyMarieNYC's personality—and not quite needing to—drawing attention to the context of “#context” forces a matter of interpretation, which is therefore a re-interpretation of Egan's text. I could interpret @CaseyMarieNYC's tweet as commentary on hypocrisies of US-American foreign posturing, on the “didactic quality” of Lulu's character, on counterterrorism, on a feminism she feels at work, or even on the diary-like delivery present in both utterances. The point I take from this use of Egan's story, is that, while @CaseyMarieNYC may be taking a genre cue from a theme underlying the story she detects, this particular tweet directs a reader to a new purpose adjacent to that story. The many possible contexts of “#context” invite interpretation, which, in turn, invites new narratives and commentary from Egan's narrative source.

Frow, again, helps us out here. “Genre cues act rather like context-sensitive drop-down menus in a software program, directing me to the layers and sublayers of information that respond to my particular and local purposes as a speaker, reader, or viewer,” he writes (“Reproducibles” 1631). Importantly, the directionality of those “context-sensitive” menus “is always a matter of interpretation, not of recognition,” for “choosing between these generic frames makes a crucial difference to how certain key passages are understood” (1631). As with “Black Box,” any passages encountered rest with the reader to decide which frame yields an intelligible and meaningful reading.

Apart from the *New Yorker's* print version and its audio version, other encounters with “Black Box” I discovered on Twitter productively problematize the idea of a scene of

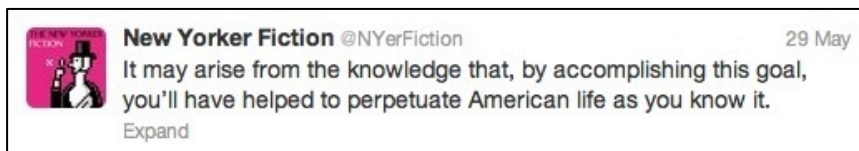
interpretation brokered by a single context or genre. Italian tweeters moved quickly on Egan’s story: about five months after the *New Yorker* tweeted “Black Box,” the Rome-based independent publishing house Minimum Fax tweeted a translation (by Matteo Colombo) of “Black Box” ahead of their e-book launch of the title. It took *Der Spiegel* another year after that to tweet “Black Box” in German, through the Twitter handle @Spiegel_Rezens. The Italian version, for example, took the following form:



The same passage in German:



And, for reference, the same passage in English:



An arm of the Dutch public broadcaster VPRO, VPRO Boeken [“VPRO Books”], tweeted a translation by Ton Heuvelmans (from *De Arbeiderspers*) in early January of 2014. The same passage quoted above, which VPRO split amongst two tweets due to character-length restrictions, appears the following way:



With minor differences in how each translated version partitions the set of tweets (for instance, VPRO Boeken broadcast the story over five nights for two hours each night while *Der Spiegel* stuck to the *New Yorker* format of one hour each night over ten days), the stories maintain a close approximation to Egan’s script while imparting their own trajectories.

These translations, however, urge a curious set of questions about how readers encounter the story. I select the above passage purposefully—concerning the spy’s successful mission as one that helps “perpetuate American life as you know it”—to demonstrate the cognitive friction occurring as a result of the story’s distribution. If one maintains an engagement with the narrative as a readout of Lulu’s direct cerebral thoughts, each translation is entirely unlike a film overdubbed into Italian, German, or Dutch. Maintaining the translations “in context” creates unanticipated readings. How, for instance, did a Dutch-thinking spy come into the employ of a US-American counterterrorism agency? Is that German-thinking agent working for US-American intelligence aware that an Italian agent went through—and recorded—a nearly identical experience with the same terrorist in southern France a year prior? Or it is the same, apparently multi-lingual, spy at work? What kinds of immigrant experiences are going on here? And what sorts of counterterrorism policies are the Americans really up to? Lastly, if we think about the bundled-together experiences of all the spies, it begins to sound like the setup of a familiar genre of jokes (an Italian spy, a German spy, and a Dutch spy all walk into a terrorist’s lair...). Likely punch line about EU cosmopolitanism aside, I want to press that even entertaining the very possibility of this multicultural conjuncture shows me the analytical value of extra-textual contact and interpretation over intra-textual context and recognition. Without doing so, an engagement in-context misses out on the opportunity to critically analyze how genres produce and discipline literacies that help us acknowledge and understand particular stories in our neurological contemporary.

A final, and amusing, unexpected narrative as a result of Egan’s story through Twitter comes from the user @LeVostreGC (better known as Chaucer Doth Tweet). @LeVostreGC is a Twitter user who writes all tweets in Chaucerian English, exchanges conversation with well-know writers (such as Margaret Atwood), and has nearly as many followers on Twitter as @NYerFiction. In May 2012, while the *New Yorker* broadcast Egan’s story, @LeVostreGC used the hashtag #chauceregan and translated “Black Box” into fourteenth-century prose. One early example here:



And, for comparison, @NYerFiction's tweet:



What I love about this endeavor is that—first—I am authorized to imagine a medieval character engaging an allegory of neurological embodiment—and, second—that I can learn to spatially visualize texts as gatherings. By ‘gathering’ I mean a text that operates as a site that welcomes an assembly of readers from different places at any time. Here, the tweet does gathering work to convene a preposterous punctuality. Further, “Black Box,” as ‘new’ content on Twitter, gathers users toward stories related to (and sometimes not related to) this initial text; here, the hashtag #chauceregan situates an invitation for adjacent plots and interpretations to develop (since #chauceregan becomes one part of @LeVostreGC’s oeuvre):



While @LeVostreGC abandoned the #chauceregan project after about two dozen tweets, the opportunity to gather, here, displaces the idea that there is a single way to “read” Lulu’s brain, since 14th-century English (as well as Dutch, German, and Italian) works just fine. Rather than reducing Lulu to a cerebral subject in Vidal’s terms, quite the opposite realization occurs: the immediacy of the neuroprosthetic voice becomes displaced and distributed by the

pruning, severing, and retelling of Lulu’s narrative through the cooperative convergence, interruption, and integration of others’ thoughts.

Therefore, instead of appraising texts themselves as fingerprinted by genre, the above tweets rehashed through Frow cues me to think about reader choices. That is, the act of readers making choices between generic frames as they receive particular passages—whether in 2012 through the *New Yorker*, or today through myriad recycled or repurposed passages—produces differences to how “Black Box” is understood, circulated, re-understood, and misunderstood over time and across spaces. I value these differences because they speak back to the neurological premise and design of Egan’s story: when reading a brain, one makes meanings of that brain, and when reading neuronarrative, one makes meaning of neuronarrative.

Cooperative Brain Narratives

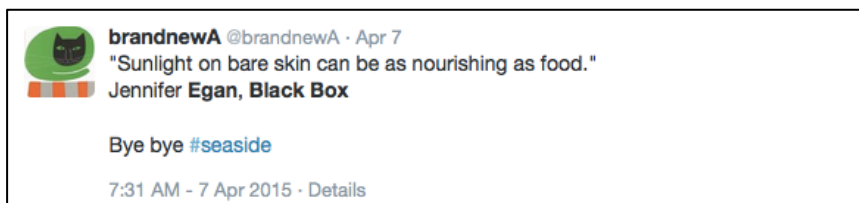
Although the tweeting of “Black Box” adds an appropriate staccato tension to the story, its serialization imparts not just space between thoughts, but time. Time between each tweet, as well as the years that have passed since initial tweeting. The six hundred and six tweets comprising Egan’s original story are now part of the archive of Twitter and the larger internet. Those tweets, which comprise Lulu’s brain thoughts, are now distributed and manipulated openly throughout our cultural archive.

One may retrieve “Black Box” from the internet in parts: by knowing precisely for what one searches on Twitter, or by encountering bits scattered on blogs or captured through partial re-tweets. As noted above, re-tweets perform the curious function of making others’ thoughts, or some archived history, present. That is, one recalls fragments of the story through others’ narratives, as evidence, memory, or interlinked traces.³⁰ In this sense, the contemporary discourse of Egan’s story—invoking aspects of the form, content, or delivery mechanism—converts the story into information, which parallels how the story itself chronicles the encoding of Lulu’s mental thoughts into tweet-sized narrative moments. A conversion into information also marks the consequence of her neuroprosthetic recording device: “The computer transforms the materiality of broken, inscribed pieces into the

³⁰ Apart from this, the *New Yorker* hold a complete version in their own magazine’s online archive, which is passcode protected, and the *Best American Nonrequired Reading* anthologized an ink-transcribed version in 2012, recallable from hands on bookshelves and fingers flipping through paper.

immateriality of information” (Ernst 113). Lulu’s neural testimony of her counterterrorism experience—that is, her deposition of her counterintelligence work—becomes part of the vast information deposit that constitutes the open archive of the internet itself.

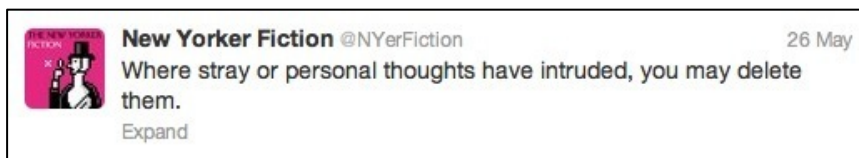
Instead of asking what “Black Box” is (what type of genre classifies this deposit, or what kind of literary modes characterize it), its relationship to the open archive of the internet pressures me to ask what can we *do* with it? What can we do with the brain that focalizes the story? Three tweets below inspire this question:



All three make use of found quotations from Egan’s story two or three years after initial publication through @NYerFiction. Each of the above users then sutures those quotes into new tweets in order to articulate a new story: the first, from @ErikaOnFire, makes a perhaps dark commentary on a junior seminar course at Mercy College (with additional references to the hectic nature of Twitter through the hashtag #toomanyhashtags); the second, an advertisement from an online photography magazine, repurposes Lulu’s own ideations on how technology benefitted her ability to become a spy in order to sell people professional camera equipment and promote the appreciation of photography; and the third, from 2015, quotes another of the daydream-like moments from the story in order for user @brandnewA

to bid farewell to a sun holiday (indicated through the subsequent hashtagged phrase “bye bye #seaside”). These three tweets help me understand the possible uses of “Black Box”: as soon as the story is inscribed as information on Twitter, the master narrative slips away, retreats to web trails and resurfaces to punctuate other narratives. The brain that speaks those tweets connects with other brains using the narrative archive of Twitter. I apprehend these uses as auspicious. @ErikaOnFire’s, @LensCulture’s, and @brandnewA’s repurposed quotations demonstrate a critical promise I find in the hypertextual afterlives of a cultural object like “Black Box”: that narratives converge *after* Egan’s story and create narrative affiliations and cooperative readings limited only by contact and imagination. My use of “imagination” here may be too quick, what do I mean by this?

Part of the risk of crafting a narrative with a character who, as Egan puts it, “has a recording device in her brain implanted by the government” in order to relay “a moment-to-moment record of what’s going on” is that the network of readers “have these elliptical segments floating in and out of their phone,” enabling, constraining, abusing, rearming, and mirroring the story *in* segments (Egan, interview). The moment in “Black Box” when Lulu reminds herself how,



she simultaneously produces a rupture in the narrative that self-reflexively describes the story’s futurity and mobility on Twitter. The “you” in Egan’s story frames Lulu’s memory of her training protocol; the “you” to which the multiplicity of contacted and contactable readers the tweet hails works to discipline the pruning, forging, and severing of the reader’s data over time: you may *use* them any way you can imagine. Lulu’s thoughts enter a database (in the game of fiction, a database for US-American intelligence services), but that database is conspicuously Twitter itself, which creates porosity between the data of the story’s thoughts and data of readers’ thoughts. This awareness begs the following realization:



Funny how closely that sentiment resembles a pervasive metaphor from the neurosciences, whereupon one's brain "stores information" for later retrieval (e.g., LeDoux, *Synaptic* 9, 31, *passim*; Arnold 86; Jackson 18). Further enticing a complexity between the story world and the reader's world, Ed Bullmore, professor of Neuroscience at the University of Cambridge, claims that "Twitter networks can be compared to the human brain network" ("Neuro-tweets"). But how do we 'read' the archives of these database-situated networks of thoughts? If Lulu's Field Instructions form part of a database of Field Instructions for intelligence and other ordinary citizen-spies, what occasions one to track her particular thoughts in the larger, open archive? What I love about "Black Box" is that it engages a strikingly similar question of our contemporary that Lev Manovich identifies: "What is the relationship between the database and another form that has traditionally dominated human culture—narrative?" (*Language* 218). It inspires the corollary question: what is our relationship between Lulu's brain data and the forms of reading we use to understand it?

Patricia Pisters takes up the concept of the open archive in her monograph *The Neuro-Image*. In one chapter, she analyzes "the strange 'archival life' of *The Battle of Algiers*" in order to demonstrate a politics of temporality at work in current digital screen culture (220). "Open archives," Pisters writes, "are characterized by ongoing contestation and extension that is increasingly facilitated by different new media strategies" (220). She tracks the afterlife of Gillo Pontecorvo's 1966 film through its numerous screenings by focusing on the audiences in attendance: in the 1960s and 1970s, "the Black Panthers, the Maoist Weather Underground Movement, the PLO, and the IRA" all "used" the film "as training material, lifting from it specific guerilla tactics against oppression" (230); in the First Intifada, the film was "used in political arguments both for and against the [Israeli] occupation and escalation of violence against Palestinians" during its residency at a Tel Aviv cinémathèque (232); and in 2003 "the film was screened at the Pentagon" because it "was found useful among members of the US government as a tactical lesson for military operations in Baghdad" (232). The remixes and "digital afterlives" of *Algiers* that Pisters identifies "puts" the film "in a hyperhistoric context" (235) of database logic, one which,

on the one hand...allows the opening of the archive to more and revised historical knowledge, and on the other hand...makes history more vulnerable to an overflow of seemingly unconnected data, pure pathos, and "inappropriate appropriations" that

make contextual information (about the various perspectives) all the more important. (237)

Here I want to pause on the notions of “inappropriate appropriations” and “context” that Pisters (rightly, in her object of analysis) identifies as a risk that open archives invite. If the “digital afterlives” of *The Battle of Algiers*, as Pisters poses, rewrites and “forms our imagination of the Algerian War of Independence, other wars of decolonization, terrorism, and counterterrorism in the past and the present,” then the initial ‘context’ of the film—some hypothetical abundance of surface meanings inherent to the film—is indeed important and, in fact, creates a horizon for “the ‘script’ of the film” as “limited in terms of the identification and referentiality it promises” (237, 233-34). Crucially, Pisters writes that the recombination of historical elements the database permits makes “us more conscious of the complex layers of historical events and their relations to the present,” and hence the simultaneous “benefits and risks” of perspectives “in our collective consciousness” (237). However, the meaning of context as well as the meanings taken from contextual information, as I analyze in the previous sections above, depend on how we imagine contact, in time and in space, with cultural objects. Many itineraries produce contact with many contexts. And the possible meanings of ‘imagination,’ as I enticed earlier, depend on how one visualizes, senses, and responds to contact. The “digital afterlives” of “Black Box” demonstrate that each encounter of each appropriation defines each ‘useful’ context. Following this, the question of “inappropriate appropriations” becomes meaningful only if we seek to reinforce traditional conventions of ‘reading’ narrative: that it ought to be sequential, linear, progressive, cohesive, and with an identifiable beginning and end.

The story’s admixture in the open archive permits felicitous possibilities. The crucial aspect of “Black Box” on Twitter is that “tweets are not directed to one particular user but to the whole world” (Kaplan and Haenlein 107). Therefore, “the information pushed to a user’s followers may be read and immediately forgotten; in other cases, it may not even be read at all” (107). Tweets, including Egan’s 606 from “Black Box,” are not directed to a single reader, but are broadcast publicly to any reader who gathers around it (or parts of it). This motility permits an “initial tweet” to “then cascade down from one user’s follower network to another’s, and on the way transform from a simple bit of information to word-of-mouth” (107). Messages open to imagination, to games of re-tweeting, or to artistic and communicative practices like pastiche, parody, satire, and play:

There's potential on Twitter for wild formal invention. Rather than just fiction tweeted, *writers could find narrative in* retweets, faves, blocks, and unfollows, and write in not just words but images, GIFs, emoji, and hyperlinks. Characters might exist as different Twitter handles, put in conversation, or else many characters subtly inhabiting a single account. It would wade into the messiness of parody accounts, anonymous mystery accounts, brand accounts, fake brand accounts, bots, and real people posing as bots. (Crouch; my emphasis)

One *finds* narrative through interaction with the Twitter database and the larger internet database: stories are governed, therefore, by location and allocation, and by the play of context. The foraging for stories and trajectories involved therefore reasserts that “things—artifacts, media, or technologies—can have a cognitive life, with histories often as idiosyncratic as those of the embodied brains with which they couple” (Sutton 189). Contact with existing information in the database of Twitter, and one's responses to that contact, are limited only by the imagination of the user and the limits of possible algorithmic in(ter)ventions. In other words, “users are free to add to stories all throughout Twitter” (Peys 8-9). In addition, “there are also the torrents of comments, video responses, tag-sets,” and other devices to write stories, which “reveals numerous other strata” to the database itself (Alexander and Levine 47). These types of “content repurposing, redesign, and republication can open up problems of version or content control, yet in return, it offers the possible harvesting of the storytelling energies of the creative world” (48). The outcome, in terms of the database logic of Twitter formed by clusters and movements of hypertext, is that “there is no telling how borders between texts will have been reappropriated and reimagined” (Rosello 122). The payoff I detect in this scene of literary world-formation, is that realizing the narrative potential of the digital afterlives of tweets requires us to shed conditioned the reflexes we employ to contextualize practices of reading and writing. The formal, intra-textual way of reading Lulu's brain fails: we read and re-read by way of the distributed links her thoughts have with others' thoughts. Cooperative reading shapes this brain with character.

What implications might these new cooperative reflexes have for an engagement of “Black Box” and conceptions of neuronarrative? The internet, as Manovich puts it, is “now a giant open archive,” constituted by an ever-expanding accumulation of data deposits (*Language* 223). In kind, the tweet occurring early on in “Black Box,” when readers are told how Lulu's Field Instructions (the catalogue of her cerebral thoughts during the mission) are “stored” in her body, finds itself in concourse with that pervasive metaphor from the

neurosciences: appraising brains as black boxes which contain information that investigation alone can ‘open’ or ‘unlock’ in order to read the brain’s secrets ‘within’ (e.g., Wolfe; Carsrud and Brännback; Lajante et al.; Becker, Cropanzano, and Sanfey). The metaphor of the brain as a containerized cache of information within the skull’s chamber fuels many theories, analyses, and stories. From the myth of Minerva emerging from Jupiter’s brain, to Freud’s attempts to open the ‘black box’ of the unconscious and the behaviorism which took that image earnestly, to Assimov’s fictional voyage into the brain in *Destination Brain*, the brain continues to figure as a site of cultural imagining that awaits disclosure of its secrets. Figured as a trove of information that continuously produces, files, and calculates information, the image of the brain collides with the image of the library, whereupon enough rigor given to reading its collected information rewards researchers with new insights about its content’s functions and possibilities. It is important at this point to recall that among the goals driving the neurosciences is an effort to materialize this metaphor: to manufacture storable data from immaterial knowledge of the brain, to organize the brain into information, to accumulate and to inventory a total depository of knowledge of the brain (such as the Allen Brain Atlas, the Human Connectome Project, and the EU’s Human Brain Project). But, then again, we have heard this fantasy before: Borges considers it in “The Total Library” (and “The Library of Babel”) when he speaks of “the fancy or the imagination or the utopia of the Total Library” (“Total” 214). Could “Black Box” offer a glimpse into the writing and reading of that total neural archive through the story of one particular person’s thoughts as they perform the task of writing and reading a portion of their own contribution to the grander “trove of information”? Yes, but therein lies the catch: instead of telling one story—the cohesive 606 tweeted thoughts comprising “Black Box”—Twitter’s archive supports only the evidence of a story—in its deposits, in its detritus—and therefore disciplines users to become readers by inviting each to find a story from it themselves. The “utopia” of an exhaustive archive of thoughts abuts the utopia of an exhaustive comprehension of that archive. Comprehension eludes the sovereign reader and exposes the cooperative literacy “Black Box” reflects.

“Black Box” and the “wild formal invention” of appropriations put serious pressure on a normative understanding of neuronarrative, one that venerates genres as communally held forms of recognition. But if genres are modes of cultural creation and interpretation, they also are shaping forces for articulations of lived experience, which in turn continue to shape those modes. “Black Box” and its afterlives help energize ways through the contemporary consensus

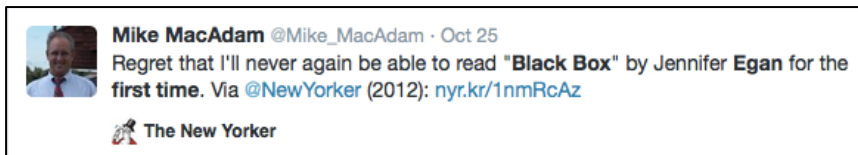
of genres as only a set of limitations on imagination: extra-textual operations of brains with character. The critical promise I recognize as a result is that even if we manage to create a universal database of the brain that both exhausts and reports all possible metrics and measurements, narratives *about* that database are required to make sense of it, to orient us with it. That hypothetical database demands cooperative reading. And ultimately, each reading of the brain—that is, each articulation of the contents of the black-box body (that proverbial body of evidence)—also works to shape the imagined limitations of communally held forms of the brain.

There is, however, a detractor I spy on the horizon. Manovich does not fully share my enthusiasm for the many narrative possibilities of the open archive into which “Black Box” finds itself scattered. Wagering that the “database and narrative are natural enemies,” Manovich asserts that each compete “for the same territory of human culture” (*Language* 225). Here, he is hung up on the term narrative. “Narrative,” he writes, “is constructed by linking elements of this database in a particular order, that is by designing a trajectory leading from one element to another” (231). Narratives are designed carefully. Actually, correcting his sentence to make it active (‘database *users* construct particularly linked elements, and database *users* design a trajectory’) reveals two things: one, the undercover agents doing the hidden work of his theory, and, two, his theory’s predilection for identifying outcomes (orderly narrative) over operations (users who make them). What does he consider narrative, then? He appeals to the authority of Mieke Bal, whom he quotes to police “arbitrary” sequences of data: certain sequences do not “qualify” as narratives if they do not satisfy “a number of criteria,” which hinge on the need for the contents of narrative to be “a series of connected events caused or experienced by actors” (227). If we’re talking about tweeted thoughts, does the term narrative still yield to formalist constraints of structuralist narratology? Or, the better questions, rather: when, and for whom, does the term still yield to narratological constraints? The latter questions clarify that Manovich feels the need to corral narrative into formal constraints when he persists on obtaining context and coherence in texts alone. However, to again rephrase Manovich’s quote of Bal actively: *actors* cause or experience a series of connected events called narrative. At a minimum, both timeliness and “paratextual mechanisms” determine calling them such, which assists to clarify that actors eventalize connections to form narrative (Green). Bal herself provides a rejoinder to Manovich’s guarding of the term narrative:

Like semiotics, narratology applies to virtually every cultural object. Not that everything 'is' narrative; but practically everything in culture has a narrative aspect to it, or at the very least can be perceived, interpreted as narrative. (225)

Where and when “narrative ‘occurs’” for Bal remains a matter of interpretation, not of recognition (225). I cherish that Bal trusts in narrative occurrences not only in media objects, but through mediators who design and construct occurrences around and across objects. What Manovich overlooks—both grammatically and argumentatively—in his desire to qualify texts as self-evidently narrative or not, are those crucial transactions and interactions amongst actors themselves.

Because the “contestation and extension” characteristic of the open archive Pisters identifies is indeed “ongoing,” I suggest earlier—by connecting elements from the neuroscientific quest to fully document the brain—that we must still produce narratives to account for that database. Here, at least, Manovich and I find agreement: “a database can support narrative, but there is nothing in the logic of the medium itself that would foster its generation” (*Language* 228). “We” must generate narratives in order to order, navigate, comprehend, share, account for, analyze, contest, extend, and even obscure an “ongoing” collection of information. And where stray thoughts intrude, we may delete them. I say narratives may “obscure” both the database and other narratives because I want to amplify the narrative uses that imaginative trajectories and linkages allow. My confession near the opening of this chapter of the challenges of staging both my summary of “Black Box” and my analysis of it attests to the many opaque, meaningless, and idiotic trajectories, dialects, and symbols I encountered. Narratives can distribute opacities within the ongoing database. As Michael Toolan interjects, where a text’s, a narrative’s, or “an utterance’s relevance, orderliness, informativeness and truthfulness is not obvious, a search for their covert presence is warranted” (Toolan). The “search” for meaning, which comports with Ian Crouch’s earlier observation that Twitter users may “find narrative” in re-tweets, blocks, follows, hashtags, etc., testifies to the fact that narrative meaning-making takes work and requires interpretation. And it continues to demand this activity:



As one user @Mike_MacAdam, in autumn 2014, publicly yearns to read “Black Box” “for the first time.” Importantly, his tweet’s “regret” terminates with a link to the *New Yorker*’s online record of “Black Box”: the version purified of Twitter’s rowdy involvement, the one that artificially segregates the active database from becoming ‘part of the story,’ the one I first encountered. When Manovich writes that “the ‘user’ of a narrative is traversing a database, following links between its records as established by the database’s creator,” his grammar fortifies a temptation to which I, too, succumbed early on in my relationship with Egan’s story: of understanding database users as passive followers (*Language* 227). It dismisses how we cooperatively read characters. What the persistence of “Black Box” teaches is that this passive role is a fantasy relying on an old, hierarchical paradigm between the browser and the scribe, and the reader and the composer (Rosello 137). Hailed by Lulu’s own “thought,” I ascertain that how “you” work the database—here, Lulu’s brain, Egan’s story, and Twitter’s archive of that brain with character, and where my use of ‘work’ challenges received understandings of reading—promises cooperative ongoing interpretive and narrative complexity.

This closing chapter analyzes how Lulu’s brain from “Black Box” incites cooperative readings to make that brain legible. Egan’s narrative, and the many narrative uses of it, helps engage meaningful questions about what is read, what is written, what is witnessed, and what is integrated in a frame of neuronarrative. The neuroprosthetic conceit that “Black Box” enfold— which allows Lulu’s brain to speak with others’ interfaced thoughts—critically pluralizes the site and event of the cerebral subject, and aids in hearing the multivocal narrative practices that contest, extend, and attempt to account for neuronarrative. This insight implicates the ways neuronarrative users conceptually partition, authorize, and distribute the ongoing cultural and scientific database of neuroscience. Ralf Neumann reports that “papers published between 1996 and 2007 in the 221 journals of *Web of Science*’s category ‘neuroscience’” total 397,534 (Neumann 33). That heart-stopping statistic is already nearly ten years old. A quick search I performed, of PubMed-indexed articles from 1996 through April 2015 that contain “neuron,” “brain,” or “neuroscience” in their titles or

abstracts, offers an astonishing 537,108 available publications. Less a reservoir than an enduring current of information data, for neuroscientists and writers it characterizes the fantastic amount of reading available to inform narrative departures. That database is simultaneously unaccountable (given the fantasy of reading the total archive sovereignly) as well as utterly accountable (given the desire and need for reports, stories, experiments, explanations, and art that both respond and extend it). Narrative is an emergent property in the distributed transactions of neuroscientific knowledge, data, and technology. For Kenneth Goldsmith, poet and instructor of Poetics and Poetic Practice at the University of Pennsylvania, Twitter's database represents a parable of our contemporary "landscape of language," and therefore encourages critics to "call into question the way we write and the environment into which we're writing and distributing our works" (Interview). It strikes me as a way to articulate the work of genre as both tactic and condition of inhabiting knowledge-as-database, one that inspires trajectories of reading and writing the very desires and ideologies that both shape and inform the ways we manipulate those tactics and conditions. When John Frow laments how "genre continues to be considered a matter of the categorization of texts rather than a matter of the textual categorization and mobilization of information about the world," I happily consider the mobilizations of information that the narrative thicket of "Black Box" continues to permit and inspire ("Reproducibles" 1632-33). Here, analyzing the extra-textual operators of Lulu's brain helps transform the opportunities we have to read, and therefore to inhabit, neuronarrative.

Afterward

This dissertation tracks the concept of neuronarrative alongside five brains with character. It analyzes those characters as they propose operations of neuronarrative that implicate the reading and writing of neuroscientific knowledge in our contemporary. This dissertation intervenes in current scholarship by unsettling the thesis that brains are written in the vernacular of science and read popularly through a largely reductive process. I analyze the cooperative literacy at work with neuronarrative where brains and characters enter and exit multiple sites of inscription and description, which shows how brains with character shape neuroscientific knowledge just as much as neuroscience shapes those characters. These particular brains with character show how neuroscientific knowledge enters and circulates in culture through various non-scientific narrative frames that discipline and shape the way we inhabit our senses of self, historical recollections, critical-theoretical utterances, scientific reportage, therapeutic resources, and communicative participations.

Neuronarrative conceptually helps describe how brains with character reorient our cultural atlases of the relationships among biology, biography, medicine, theory, and literature. I work against the invocation of neuronarrative as a diagnostic tool in favor of analyzing those changing relationships for their uses as figures of orientation.

The scope of this dissertation limits itself to an introductory exploration of neuronarrative in order to triangulate reading, writing, and brains with character. From this starting point, I here propose three other possible analyses that this dissertation now enables.

Critical theory and neuronarrative

Catherine Malabou serves as an interlocutor in this dissertation, but I dialogue with her ideas rather than the form through which those ideas circulate. I am interested in the relationships between critical-theoretical writing and neuronarrative operations. For one, she, as well as David Lodge, brings this question to my attention when they analyze Freud's psychoanalytic philosophies as techniques of storytelling. Thus, what is this connection between theory-as-storytelling and neuronarrative storytelling? What are the risks as well as the rewards of considering theory and philosophy as modes of literary writing that, at least for Malabou's texts (as well as for the text of this dissertation itself), transcribe the brain-mediated thoughts of their writers? *Radiant Cool* (2004) by Dan Lloyd, a professor of philosophy at Trinity

College, explores this neuro and psychological border that distinguishes philosophy from literary thrillers that take up the problem of consciousness. Unfortunately, the novel fails not by content but by design: a partition separates the text into two parts. Part one is the fictional ‘action’ of story, and part two is a philosophical “reflection” on that first literary narrative (although transparently Lloyd’s own reflections, readers are asked to pretend that the text comprising part two is the ‘lost’ work of the professor who dies in part one). In attempting to break through genre barriers, Lloyd reinforces it. What I take from an endeavor like Lloyd’s is that there remains significant tension—as well as a perceivable gulf—between narratives that purport to tell about brains and analyze their significance, and narratives that are busy eliciting those significances, line by line, through a medium that does not pretend to be anything other than a story. I do not identify this as the same gap between first- and third-person accounts: for instance, Malabou’s texts and this dissertation’s text tell a first-person account of each of our encounters with neuro-philosophical ideas and objects. A further analysis—and/or story, it occurs to me—of the neuronarrative tensions *interior* to critical-theoretical texts ought to be a fruitful pursuit.

Brains that narrate beyond a reasonable doubt

I opened this dissertation with an anecdote about tumor-induced pedophilia from early 2000. Fifteen years later, the relation between brain and behavior when criminal culpability is at stake has only grown more complex. How narratives of the brain enter the courtroom is an interesting place for analysis.

For instance, when nineteen years old, Dzhokar Tsarnev deployed two homemade pressure-cooker bombs with his older brother near the finish line of the 2013 Boston Marathon. Found guilty of all thirty charges against him two years later, which largely arose from the death of three pedestrians in the area of the explosions, a federal jury sentenced Tsarnev to death by lethal injection. However, during the sentencing phase of the trial in April of this year, the defense called on testimony from Jay N. Giedd, chief of brain imaging in the Child Psychiatry Branch at the National Institute of Mental Health. Alarmed by his courtroom cameo, Sally Satel, lecturer at Yale, and Scott O. Lilienfeld, professor at Emory (who, together, wrote *Brainwashed: The Seductive Appeal of Mindless Neuroscience* in 2013), examined Giedd’s testimony as well as the rhetoric of his very appearance in the court proceedings. Giedd’s statements to the court, Satel and Lilienfeld write, implied “that

Tsarnaev's brain, like all teen brains, was especially sensitive to pressure by peers and loved ones. The approval of his domineering older brother Tamerlan, this narrative suggests, was made even more compelling for Dzohkar because of the way his brain functioned" ("Neuro-Expert"). Satel and Lilienfeld recognize two competing narratives: the archetypical teenage brain versus the Dzohkar brain. I am intrigued by this competition where the introduction of neuroscience into the courtroom produces defenses or prosecutions that innovate operations of neuronarrative. "At least five percent of all murder cases that go to trial feature the introduction of [sic] neuroscience evidence... Ten years ago, that percentage was less than 0.01 percent," Satel and Lilienfeld add; "In all likelihood, the jury will be shown impressive-looking Technicolor brain scans. But what they will see is merely a biological retelling of a well-established behavioral story" ("Immature").

A few other questions to take these connections between neuronarrative and law further are possible. First, although sentenced to death, Dzohkar will likely live out the rest of his life in federal prison. If Dzohkar's 'teen brain' committed the acts to which he is held responsible, how does plasticity pose a certain threat to the idea and practice of rehabilitation (in the system of incarceration)? Second, how does neuronarrative question legal case histories? That is, how do new narratives of brains reorient us to the archive of opinions written by judges and justices about the many other characters that bring questions to the court? Here I have in mind characters like Jane Roe (Norma McCorvey), Dred Scott, or Mildred Loving (as well as the anonymous ones like the Virginia school teacher/pedophile). As this dissertation shows, narratives are required to make sense of the place and importance of neuroscience in culture. How will we make sense of the central components of our criminal justice system as well as the characters that shape the doctrine of precedent in legal narratives?

A new neurohistory?

Extending some of the analysis about historical figures like the Biblical Paul in Chapter Two of this dissertation, how might neuronarrative help understand re-readings of historical figures? Narratives of neuroscientific information instill an increasing consciousness of chemical, electrical, and cellular operations on psychology and accounts of psychology. Accounts of people written in the present, as well as historical accounts of people, are liable to have neuroscience written into those histories. Characters entangled by their cerebral states of action—from Ronald Reagan and the effects of his Alzheimer's on his leadership, Dostoevsky

and the sway of his epilepsy on his writing, to spiritual figures and the possible influences of entheogens on their visions—rupture previous cultural and narrative affiliations with those characters. Neuronarrative work with these historical stories might threaten to redeem them or arraign them. How do these brains with character negotiate accounts of history in the present? Understanding the operations and stakes of neuronarrative on brains with character is a productive point of departure to approach this topic.

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And you can hide under the bed but brain damage is under the bed, and you can hide in the universities but they are the very seat and soul of brain damage... Brain damage caused by bears who put your head in their foaming jaws while you are singing “Masters of War.” ...Brain damage caused by the sleeping revolution, which no one can wake up... Brain damage caused by art. I could describe it better if I weren’t afflicted with it...

Skiing along on the soft surface of brain damage, never to sink, because we don’t understand the danger—

Donald Barthelme, “Brain Damage”

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Summary

“Brains With Character: Reading and Writing Neuronarrative” tracks the concept of neuronarrative by analyzing the reciprocal and catalytic relationships between neuroscience and literary media. Crucial to understanding the contemporary stakes in these two cultural endeavors is how their relationships implicate reading and writing as concepts, operations, and activities. This dissertation examines these implications by analyzing the characters to which neuroscience gives form in culture as well as the characterizations that concomitantly shape scientific understandings of the brain. From the protagonist struggling with a brain tumor, to the villain who one comes to discover acts out of a neurochemical imbalance, stories play out cultural, technological, and highly personal excitements and anxieties about the place and importance of brain knowledge today. They invite new literacies of readers, by demanding one learns from the vocabulary of scanning machines and the latest anatomies, as well as encouraging one to think through and with accounts of everyday life that centralize the significance of brain activity.

Five objects, which index five brains with character, help me encounter the concept of neuronarrative and productively destabilize it beyond the frame of genre.

Chapter One reads a character in Richard Powers’s novel *The Echo Maker* to problematize the concepts and practices of reading and writing engendered by a ‘typical’ neuronarrative. As noted above, *The Echo Maker* features on many critics’ lists of neuronovels. Yet, by looking closer at one character, a neurologist, who, over the course of the story, rewrites himself by confronting a neurological disease, I find a productive way to encounter both the literary conceit of inscription and the neuroscientific—and philosophical—theory of material plasticity. My encounter with the novel questions the basis of cultural and scientific literacy in a pursuit to understand—through the interface of fictional characters and moldable selves—how neurologic narratives engage storytelling today.

Chapter Two analyzes a character who undergoes a change in character as a result of a surgically removed brain tumor. It engages the concept of metastasis as a productive way of revisiting the trope of metamorphosis in literature. The nun protagonist Sister John of the

Cross in Mark Salzman's novel *Lying Awake* discovers that her deeply spiritual connection with God is a result of an epilepsy-inducing meningioma. After surgical removal of the tumor, she loses this connection with God. While the narrative accords with the emergence and imbrication of neurobiology in modern narrative fiction, the novel engages the changes needed to depict character transformations when writing with and through contemporary neurobiology and psychology. Reading the concept of metastasis in dialogue with the text challenges what *Lying Awake* does to and for a tradition of writing about metamorphosed characters in literature. Rather than classifying it as an illustration of neuronarrative-as-genre or as an example of neural plasticity, this chapter's approach questions the contemporary stakes of literary metamorphosis and inspires questions about the novel's affiliations and deteriorations with politics, religion, psychology, and history as well as challenging the new forms of literacy neuroscience demands of narrative today.

Chapter Three looks to a character known as Patient S.M. in current scientific literature. Formerly pathologized as a woman who could feel no fear, the chapter closely reads a neuroscientific report from the University of Iowa that destabilizes that previously stable neurological understanding of fear. This chapter takes up the concept and presence of fear as a productive problem for both neuroscience and affect studies in the humanities. The concept and mechanics of fear proves a productive point of departure to think about affect and the careers that affect studies enjoys in contemporary scholarship. Interior to the report, from 2013, are moments of neuroscientific storytelling that expose the affective and literary conventions enfolded by scientific texts. Noting the rich disciplinary cross-literacies, the chapter questions how particular narrative patterns shape scientific research agendas about fear, as well as the methods by which neuroscience propagates and solidifies inquiries of affect in critical analyses by way of narrative conventions. What the chapter discovers is how the habits of scientific case studies themselves, alongside popular scientific and philosophical appropriations of scientific material, can be determined by affective responses formed in relation to narrative.

Chapter Four looks to a particular character introduced through the widespread appeal of popular science advocacy, and tracks its materialization from metaphor to corporeality. It analyzes how popular psychologist and corporate spokesperson Michael Gurian's creation of

the persona “bridge brain”—to describe, diagnose, and nurse parental anxieties about gender conformity—functions as pedagogical tool and neurological foil to so-called “male” and “female brains.” Gurian’s use of therapeutic anecdotes vivifies the “bridge brain” character, which exposes that ways neuroscience then writes that brain into its own archive of literature. His metaphoric ontology of “bridge brain” focuses the analysis as a way to understand the science/culture divide as well as a tool to speak back to character conventions that make use of neuronarrative.

Chapter Five locates a distributed brain with character from Jennifer Egan’s tweeted short story “Black Box,” which appeared serially on the *New Yorker’s* Twitter feed in 2012. “We could think of genres as clusters of metadata—information about how to use information—that help define the possible uses of textual materials,” writes John Frow, and in this chapter I approach the metadata that a particular brain with character produces (“Reproducibles” 1631). Twitter is a noisy and fractured forum for narrative, but it nonetheless engages many readers’ screens and thoughts with immediacy. Egan takes advantage of this aspect to deliver her story as if each tweet is the recorded mental thoughts of her protagonist. Archived outside of the text of the object—the cascade of tweeted neural bursts describing the experiences of the focalized character—are users’ own re-tweets, hashtags, and networked conversations. Thus, the narrative afterlives of Egan’s story and their method of distribution through popular social media complicate direct readings of brains with character and interrogate contemporary communication of neural-based information. Revisiting the concept of neuronarrative in a final way helps analyze the cooperative reading required to make meaning from the brain that ‘writes’ this particular story.

Samenvatting

“Breinen met Karakter: Het Lezen en Schrijven van Neuronarratief” traceert het concept van ‘neuronarratief’ door het analyseren van de wederzijds productieve relaties tussen neurowetenschappen en literaire uittingen. Cruciaal voor het begrijpen van de hedendaagse toepassingen in deze twee discursieve praktijken is hoe deze de culturele technieken lezen en schrijven impliceren. Dit proefschrift onderzoekt deze implicaties door karakters te analyseren die de neurowetenschappen in culturele uittingen heeft voortgebracht. Tegelijkertijd onderzoekt ‘Breinen met Karakter’ karakterbeschrijvingen die wetenschappelijke ideeën over de hersenen vormgeven. Van de non die met een hersentumor worstelt, tot de schurk wiens handelingen, zo komen we te weten, veroorzaakt worden door een neurochemische onbalans, brengen deze verhalen culturele, technologische, en zeer persoonlijke opwindingen en angsten tot stand over de plaats en het belang van de hersenkennis van vandaag. Ze nodigen uit tot een nieuwe manier van lezen. Niet alleen door de introductie van het jargon van scanmachines en de nieuwste anatomie, maar ze stimuleren om na te denken over de manier waarop wetenschappelijke, literaire en alledaagse verhalen elkaar vormen en veranderen.

Vijf objecten, die vijf hersenen met karakter aanduiden, maken het mij mogelijk het concept van neuronarratief te verkennen. Ook maken zij het mij mogelijk vastgeroeste genrekaders te destabiliseren.

Hoofdstuk één problematiseert de concepten van lezen en schrijven aan de hand van een personage uit de roman *The Echo Maker* van Richard Powers, een boek dat door vele critici wordt gezien als ‘typische neuronarratief.’ Door in te zoomen op een personage - een neuroloog die in de loop van het verhaal zichzelf ontdekt door de confrontatie met een neurologische ziekte - vind ik een productieve manier om de literaire erruditie van opschriften en de neurowetenschappelijke / filosofische theorie van hersenplasticiteit te duiden. In mijn ontmoeting met de roman onderzoek ik de basis van culturele en wetenschappelijke geletterdheid in een poging te begrijpen hoe—via de interface van fictieve personages en het kneedbare ‘zelf’—neurologische verhalen opgaan in de hedendaagse vertelkunst.

Hoofdstuk twee analyseert een personage die als gevolg van een chirurgisch verwijderde hersentumor een karakterverandering ondergaat. Het gaat in op het concept van metastase als een productieve manier om de stijlfiguur van de metamorfose in de literatuur te herzien. In de roman *Lying Awake* van Mark Salzman, ontdekt de hoofdpersonage, non en voorvechtster Sister John of the Cross, dat haar diep spirituele verbinding met God een gevolg is van een hersentumor die epilepsie veroorzaakt. Na het chirurgisch verwijderen van de tumor verliest ze deze verbinding met God. Hoewel het verhaal in overeenstemming is met de opkomst en de overlapping van de neurobiologie in de moderne verhalende fictie, verbindt de roman de veranderingen die nodig zijn om het karaktertransformaties te verbeelden met hedendaagse neurobiologie en psychologie. Het lezen van het concept van de metastase in dialoog met de tekst, daagt uit wat *Lying Awake* doet voor de schrijftraditie in de literatuur over personages die van gedaante zijn veranderd. Mijn analyse weerstaat de verleiding om *Lying Awake* eenvoudigweg te zien als een illustratie van neuronarratief als genre of als een voorbeeld van neurale kneedbaarheid. In plaats daarvan, onderzoekt dit hoofdstuk het hedendaagse gebruik van literaire metamorfose en inspireert het tot vragen over politiek, religie, psychologie en geschiedenis. De neurowetenschappen vragen om nieuwe vormen van geletterdheid. Dit hoofdstuk laat zien hoe *Lying Awake* deze vraag op een uitdagende manier beantwoordt.

Hoofdstuk drie kijkt naar een karakter, dat in de wetenschappelijke literatuur bekend staat als Patiënt S.M. en vroeger gepathologiseerd als een vrouw die geen angst kon voelen. Dit hoofdstuk behandelt het concept en de aanwezigheid van angst als een productief probleem voor zowel de neurowetenschappen als de geesteswetenschappen. Het doet dit aan de hand van een neurowetenschappelijk rapport van de University of Iowa, dat het standaard neurologische begrip van angst ondermijnt. Het concept en de mechanieken van angst bewijzen een productief uitgangspunt te zijn om na te denken over macht en andere onzuivere motieven die studies in de hedendaagse wetenschap beïnvloeden. Het rapport uit 2013 bevat momenten van neurowetenschappelijke verhalen die de invloedrijke en literaire conventies door wetenschappelijke teksten laten zien. Wijzend op de rijke kruisverbanden in deze discipline, onderzoekt dit hoofdstuk hoe narratieve patronen wetenschappelijk onderzoeksagenda's over angst vormgeven. Ook onderzoekt het de methoden waarmee de neurowetenschappen vragen in kritische analyses propageert en consolideert door middel van

narratieve conventies. Wat het hoofdstuk ontdekt is hoe de praktijk van wetenschappelijk onderzoek zelf—samen met populair-wetenschappelijke en filosofische toeëigening van empirisch materiaal—bepaald kunnen worden door de emotionele reacties op case-studies.

Hoofdstuk vier kijkt naar het karakter “bridge brain” en traceert diens transformatie van metafoor naar lichamelijkheid. De bekende psycholoog en bedrijfspersoonlijkheid Michael Gurian introduceert de “bridge brain” om ouderlijke bezorgheid over ‘gender confirmity’ te beschrijven, te diagnosticeren. Het analyseert hoe de creatie van het karakter “bridge brain” functioneert als pedagogisch instrument en neurologische tegenhanger, of verhelderend contrast, voor de zogenaamde “mannelijke” en “vrouwelijke hersenen.” Gurians gebruik van therapeutische anecdotes brengt het “bridge brain” karakter tot leven en creëert op deze manier voor dit brein een eigen literair archief. Zijn metaforische ontologie van “bridge brain” gebruikt de analyse als een strategie om de kloof tussen wetenschap en cultuur te verkleinen, en als middel om stereotypische karakters uit neuronarratieven van replek te voorzien.

Hoofdstuk vijf zet een verstrooid brein aan de hand van een karakter van Jennifer Egan’s getweete korte verhaal “Black Box”, die in 2012 als serie op de *New Yorker’s* Twitter-feed verscheen. “We konden genres bedenken als clusters van metadata—informatie over hoe je informatie moet gebruiken—die mogelijke toepassingen van tekstuele materiaal helpen bepalen,” schrijft John Frow, en in dit hoofdstuk benader ik de metadata die een bepaald brein produceert (“Reproducibles” 1631). Twitter is een luidruchtig en versplinterd forum voor verhalen, maar desalniettemin—of juist daarom—vult het de schermen en gedachten van veel lezers voortdurend. Egan gebruikt dit aspect in haar voordeel voor haar verhaal, waarin elke tweet een snapshot van de mentale toestand van haar hoofdpersoon is. Gearchiveerd buiten de brontekst—in dit geval een waterval van getweete neurale uitbarstingen die de ervaringen van dit gefocaliseerde karakter beschrijven—zijn re-tweets, hashtags en correspondenties onder de volgers. De narratieve onderwereld van Egan’s verhaal en zijn wijze van distributie via de populaire sociale media, compliceren het direct ‘lezen’ van breinen met een karakter en ondervragen ze de hedendaagse communicatie van ‘neural-based’ informatie. Het herzien van het concept van neuronarratief helpt uiteindelijk het gezamenlijke lezen te analyseren dat nodig is om een brein te begrijpen dat zijn eigen verhaal schrijft.

