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Brains with character: Reading and writing neuronarrative

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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.