Rhetorics of pain: agency and regulation in the medical-industrial complex

Samuel Scott Graham

Iowa State University

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Rhetorics of pain: agency and regulation in the medical-industrial complex

by

S. Scott Graham

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Rhetoric and Professional Communication

Program of Study Committee:
Carl G. Herndl, Major Professor
  Carla Fehr
  Lee Honeycutt
  Leland Poague
  Diane Price Herndl
  Greg Wilson

Iowa State University

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For Roxi, with love.
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Mark Collen, *Hey Doc, Have You Figured It Out Yet?* “This piece represents the frustration both on the part of the physician and patient in diagnosing and treating chronic pain. It is not unusual for doctors to order the same test over and over again in hopes of understanding the cause of chronic pain. It also exemplifies how the patient often puts the onus on the physician to find the problem and cure it. In reality, it should be a team effort and in many cases there is no cure.” —“Artist Statement.”
At 10 feet high and four feet square, “Hey Doc, Have You Figured It Out Yet?” [previous page] suggests a nearly insolvable puzzle. Beyond its impressive size, the work includes a dizzying array of complex medical images including x-rays, sonograms, and CT scans. These images are repeated (sometimes with variation) around the circumference of five different, yet connected cylinders which offer the promise, but not the realization, of alignment. Read against the above epigraph (the artist’s statement), the “frustration” is palpable, the repetition monotonous. Constructed in a style reminiscent of a “cryptex,” this sculpture represents the extreme difficulty confronted both by clinicians who study pain and patients who seek relief. The very idea of a cryptex was invented by Dan Brown in his internationally best selling *The Da Vinci Code*. An amalgam of cryptology—the study and practice of hiding information—and codex—a bound collection of scrolls (information), a cryptex is a secret store of information that can only be accessed through careful and diligent code-breaking. In Brown’s narrative, Robert Langdon (professor of symbology and *Da Vinci Code* protagonist) must use all his intellectual acumen to break the cryptex’s code and retrieve the hidden information—all while avoiding (and sometimes confronting) a complex array of agendas stemming from secret organizations and powerful institutions.

With this in mind, the cryptex is a remarkably *apropos* metaphor for the plight of the pain clinician. Pain is a greatly vexing collection of phenomena for modern medicine. The causes are illusive. The cures are unknown. The education and training of physicians tells them that the secrets they seek lie in the code of the human body. In medical school, residency, and continued training they have learned that science will prevail. It will break any code only if through continued scrutiny and the agency of more sophisticated technology. Yet at the same time, the question of pain persists. Recognizing this dilemma, clinicians have published numerous works on pain with suggestive titles like *The Mystery of Pain* (Hilton and Nichols, 1886), *The Puzzle of Pain* (Melzack, 1975), *The Challenge of Pain* (Melzack and Wall, 1982), and “The Complexity of Pain” (Stevens, 1999). These titles are but a few of the thousands of theoretical treatises, research studies, and clinical trials that have addressed the mysteries of pain. And, certainly, researchers and clinicians studying pain have made great strides throughout medical history. Nevertheless, the cryptex that contains the secrets of pain remains largely unsolved. Clinicians who treat pain routinely grapple with challenging epistemological issues that go to the core of Western science while working in a highly regulated environment. Pain is a phenomenon that defies modernist categorization. It exists in both physical and psychological forms. It is considered real—and therefore objective, but it is only accessible through the subjective report of the sufferer.
Furthermore, pain medicine—as a practice—exists at a nexus of multidisciplinarity with treatment options from at least twenty different medical specialties ranging from neurology and rheumatology to psychology and physical therapy. And of course, each of the disciplinary approaches is subject to regulatory oversight not only from professional organizations like the American Academy of Pain Management and the American College of Rheumatology, but also from governmental agencies like the Food and Drug Administration (FDA) and the Drug Enforcement Agency (DEA). And if this discursive environment does not seem complicated enough, one should not forget the influence of the insurance and pharmaceuticals industries. While this complex array of agendas does not necessarily (or at least, does not always) involve the same conspiratorial overtones that fuel Brown’s narrative, pain science and practice is beset by a densely articulated imbroglio of cross-proposes, complicated agendas, and powerful organizations.

In sum, three fundamental problems continue to challenge future research into pain: 1) Pain defies the mind/body dichotomy on which modern medical science is based. 2) The increasing proliferation of subspecialties reifies this dichotomy and continues to propagate reductivist approaches to medicine and health. And 3) powerful structural and regulatory mechanisms are in place that both inhibit innovation and support continued medical diversification. Despite all this, however, there are groups of clinicians working at local, national, and international levels who are dedicated to solving the pain cryptex. Would-be agentive organizations of pain management clinicians are striving to change the way practitioners in the medical-industrial complex (MIC) think about and treat pain. This coalition of groups is attempting to foster what Latour (1991) called a “nonmodern science”—i.e. one that rejects mind/body duality. In establishing this new and nonreductive approach, these practitioners hope to usher in a new era of interdisciplinarity that would result in more effective and holistic treatment for those in pain. While this coalition has made some significant headway in the past 30 years, it is, nevertheless, continuously thwarted by the various regulatory forces of the MIC.

This dissertation chronicles my exploration of three such activist interdisciplinary groups—the Midwest Pain Group (MPG), the American Academy of Pain Management (AAPM), and the International Association for the Study of Pain (IASP). The efforts of these organizations are nothing if not ambitious. In fact, many organization members hope that their efforts will help pave the way for a new approach to medicine in general. Indeed as one interview subject from the MPG argued, “My honest opinion is that we are not going to solve the problem [of pain] or many of the problems in health care, until we get a new model of the mind-body connection…. I think somebody's going to put it together. They could be the Freud of the new, of the current, age” (Landau Interview). Finding
the Freud of the new era and fostering a change of this magnitude will not be easy. As noted above, this process is vexed by challenges that 1) lie at the very core of scientific legitimacy, 2) threaten the reimbursement mechanisms of the subspecialties, and 3) may destabilize the power structures of the MIC. In establishing a new approach to pain, clinicians must address these difficulties. They must first overcome strong interdisciplinary incommensurability. Secondly, they must also foster a noncumulative developmental episode in pain theory—for lack of a better term, a “revolution.” And finally, the MPG, the AAPM, and the IASP must refashion the economic and regulatory structures of the MIC so as to support the new model. Obviously overcoming incommensurability and fostering revolutionary change are not easy tasks. Neither is establishing socio-economic and/or regulatory change. Nevertheless, these are the tasks the subjects of this research have embraced, and these are the processes this dissertation explores.

More specifically, as a rhetorical project, this dissertation seeks to gain insight into the discursive aspects of incommensurability, regulation, and agency. My investigation of pain management will explore questions related to the interactions among the symbolic and material mechanisms involved in the medical-industrial complex. Specifically, this dissertation will address the following questions: 1) How do material and discursive hindrances coordinate in the perpetuation of incommensurability in pain management? 2) What rhetorical resources are deployed by the MPG, the AAPM and the IASP in order to overcome those hindrances? 3) What material-semiotic resources are used to maintain the power structures of the medical-industrial complex? And, finally, 4) what discursive strategies have been used to foster counter-hegemonic change within pain management?

In order to frame my exploration, this introduction must outline my theoretical and methodological approach to the study of pain discourse. However, my approach—which I locate within the emerging field of technoscience studies and call the rhetoric of technoscience and medicine—is not a well-established area of inquiry. Therefore, this dissertation is as much an exploration of how to conduct such a study as it is a study of pain discourse. Accordingly, the bulk of this introduction will be devoted to outlining exactly what I mean by “rhetoric of technoscience and medicine.” Subsequently, the following sections will outline this area of inquiry in terms of its 1) theoretical foundations and objects of inquiry, 2) methodological resources, and 3) ethical and theoretical commitments. Following this exegesis, I will provide a brief outline of chapters and proceed directly to Chapter 1 and my exploration of pain discourse.
Rhetoric of Technoscience and Medicine

Fundamentally this dissertation is an exploration of discourse. Interrogating the MIC involves an investigation of overlapping discursive systems, and, for this dissertation, inquiry into the rhetorical strategies of the MPG, AAPM, and IASP. However, the investigation of discourse in health and medicine is not exactly a unified area of inquiry. Studies devoted primarily to such discourse fall alternately under a variety of rubrics, including rhetoric of medicine, health communications, and rhetoric of science. Furthermore interdisciplinary fields such as medical humanities and science and technology studies (STS) often investigate discursive issues in medical contexts as well. Of these approaches, rhetoric of medicine is perhaps the least established area of inquiry. Health communication, medical humanities, and STS all have their own academic journals and scholarly conferences. Albeit on a smaller scale, rhetoric of science also has its own professional organization and academic (pre-)conferences. And, of course, rhetoric of science has a rich tradition of journal and monograph inquiry dating back to at least the early 1980s. Rhetoric of medicine, on the other hand, has no journal, no conference, and no professional organization. This, however, does not make it illegitimate or nonexistent. Indeed books and articles identifying as rhetoric of medicine are being published with increasing frequency. (See, for example, Preda, 2004; Segal, 2005; Keränen, 2005; Koerber, 2006; Derkatch, 2008; Graham, 2009.)

The relative youth and lack of codification for rhetoric of medicine should be viewed as an opportunity and not a detriment. Specifically, the flexibility afforded by a lack of codification can help rhetoric of medicine participate in what STS scholar Andrew Pickering (1995) has identified as the “new antidisciplinary synthesis.” In the Mangle of Practice, he argued that inquiry into science and technology would be best served by a coordination of efforts that transcend disciplinarity—i.e. rather than interdisciplinarity, antidiscipline. Building on the sometimes coordinated foundation in what Pickering refers to as “traditional” STS fields (history, philosophy, sociology), he argued for the synthetic inclusion of new approaches including cultural studies, anthropology, and literature (pp. 214-217). While Pickering’s argument references neither rhetoric nor medicine explicitly, it will still constitute the foundation for my approach to the rhetoric of medicine.

Pickering is certainly not the only scholar calling for coordination among various science studies fields. In “Why Hermagoras Still Matters,” Gross (2004) argued for the establishment of an interdisciplinary space that combines the resources of philosophy, history, rhetoric, and psychology in the investigation of interdisciplinarity and incommensurability. Similarly, Ceccarelli (2005) argued that this interdisciplinary collaboration should extend beyond mutual citation to engaged dialogue with the members of other fields (p. 263). Scott (2003) also argued for cross-disciplinary
collaboration in the rhetoric of science. Specifically he suggested that “rhetorical studies of science can be enriched by a methodological intermingling with cultural studies” (p. 365). This argument is particularly relevant here given that Scott explicitly includes well-known STS scholars like Bruno Latour and Donna Haraway under his definition of cultural studies.

Even members of the broader interdisciplinary STS community have called for the participation of rhetoricians in the broader projects of STS, although not always explicitly. Philosopher Steve Fuller has been interfacing with rhetorical studies since at least 1999. In one of his latest works, The Philosophy of Science and Technology Studies (2006), Fuller explicitly calls for interdisciplinary engagements with

the debating teams affiliated with the Departments of Speech, Rhetoric, and Communications Studies across college campuses in the United States. Their grassroots initiatives were consolidated as the science policy forum convened by the American Association for the Rhetoric of Science and Technology, or AARST... (p. 174)

And while Fuller would box rhetoric’s participation into the narrower subdomain of rhetorical activism, thus rendering us not so much the handmaiden of science, but perhaps the handmaiden of STS, this sort of explicit olive branch provides an excellent entrée for beginning to participate more regularly in the interdisciplinary discourses of STS. Finally, the famous historian Peter Galison, in his recent Isis (2008) essay entitled “Ten Problems in History and Philosophy of Science,” identified two primary weaknesses in the history and philosophy of science, as 1) an incomplete understanding of the context of arguments, and 2) an incomplete understanding of the technologies of argumentation. Though Galison did not explicitly invite the participation of rhetoricians into the history and philosophy of science, these self-identified theoretical weaknesses provide an excellent opportunity for rhetoricians to bring some of their most stable and well-articulated theoretical positions to STS more broadly.

Following these calls for cross/multi/antidisciplinarity, inquiry into rhetorics of health and medicine will necessarily involve the coordination of resources from disciplines and subdisciplines such as health communication, rhetoric of science and technology, and STS. Though naming this new amalgamation probably runs contrary to the goals of anitidiscipline, I am going to do so anyway for the sake of convenience. Therefore, I suggest that inquiry into the discourses of health and medicine can be effectively conducted under the rubric of the rhetoric of technoscience and medicine. Rhetoric of technoscience and medicine as project of inquiry seeks to follow the suggestions of Pickering (and others) that inquiry into the discourse and culture of science, technology, and/or medicine requires coordination from many different scholarly approaches. In this sense it is antidisciplinary. However,
at the same time as rhetoric of technoscience and medicine seeks to incorporate the methods and theories of various scholarly fields, it also rests on theoretical and methodological foundations that conflict with the basic premises of those fields from which it draws resources. As a result of this, it behooves me, here, to outline some of the most prominent resonances and conflicts among more well established approaches (health communication, rhetoric of science and technology) and rhetoric of technoscience and medicine.

Health communication, as an area of inquiry, might seem like the obvious place to start with a study of pain medicine. However, despite the excellent work being done in this field, it has little bearing on my study. Health communication has a tendency to treat the discourses of health and medicine as special cases of business or technical communication. As such there is an emphasis on analyzing the emergence and regulation of established health genres—the clinician/patient relationship (Menz and Al-Roubaie, 2008; Jucks and Bromme, 2007), the case-report (Schryer, Lingard, Spafford, and Garwood, 2003), medical records (Schryer, 1993), etc. Catherine Schryer and Ellen Barton are, perhaps, two of the best exemplars of this tradition. Each has produced a wealth of articles and book chapters exploring the discursive strategies and generic constraints of common health communication situations including case-presentations, medical interviews, informed consent, referrals, and diagnostic pronouncements. While the tools of genre analysis are important resources for any inquiry into the strategies and mechanisms of discourse, the sometimes myopic focus on specific genres does not effectively serve inquiry into the broader MIC. Genre studies seldom interrogate issues like agency and power that are critical to the type of inquiry in this dissertation. As Scott (2003) argued, one primary task of “rhetorical-cultural study,” and I would argue of rhetoric of technoscience and medicine,

is to map the connections and power relations among science's heterogeneous actors. Cultural critic Vincent Leitch refers to this mapping of interrelationships as the "protocol of entanglement," a "methodological strategy that construes objects and phenomena always in relation to complex temporal and spatial contiguities and proximities" (74). Although Leitch's protocol invokes rhetorical notions of context and intertext, it also departs from the traditional subordination of these notions to the individual text. Rather than accounting for cultural entanglements as a way to situate and elucidate texts, a rhetorical-cultural mapping discusses specific texts as a way to elucidate cultural entanglements. In such an approach, the shifting intertext itself becomes the primary object of study. (p. 355)

In short, genre studies tend to ask different questions about different artifacts than rhetoric of technoscience and medicine. Though the inquiry of health communication genres is informative of rhetoric of technoscience and medicine, it is generally pursued with an altogether different purpose. As such, both the scholarly space of rhetoric of technoscience and medicine I am outlining and the
work of this dissertation will rely much more heavily on rhetoric of science and technology and STS than health communication.

Subsequently, the development of rhetoric of technoscience and medicine requires a careful negotiation between the theories and methods of both rhetoric of science and technology and STS. However, this does present rhetoric of technoscience and medicine with something of a problem. There is a strong affinity between rhetoric of science and technology, as traditionally conceived, and “traditional” approaches to the sociology, philosophy, and history of science. The challenges lie in the fact that STS arose as a critical response to those approaches. So the question that remains is, how can rhetoric of technoscience and medicine recuperate the valuable resources of rhetoric of science and technology without assimilating the more challenging issues associated with it? Answering this question requires an exploration of the conflicts between rhetoric of science and technology and STS.

**Theoretical Foundations and Objects of Inquiry**

Certainly, STS did not arise in response to rhetoric of science and technology, *per se*—most obviously because STS developed primarily in the disciplines of history, philosophy, and sociology. Nevertheless, STS arose out of some of the same concerns that I identify in ‘traditional’ rhetoric of science and technology. Perhaps the most poignant of these concerns is the question of the object of inquiry for STS. As Fuller (2006) explained in reflecting on the difference between traditional approaches to philosophy and sociology of science and STS,

[T]he legitimate bone of contention can be summed up in the following proposition: practicing scientists are only a fraction of those who contribute to what science is. The other contributors are not just those people who use science more—or less as scientists intend, such as technologists, physicians, and policymakers. STS also takes seriously the rest of the population who consume science by reading *The Tao of Physics*, watching “Tomorrow’s World,” and eating fat-free muffins. (p. 3)

In contrast, traditional rhetoricians of science (e.g. Alan Gross, early Randy Allen Harris, Jeanne Fahnestock, and Craig Waddell) focus primarily on the professional discourse of scientists. In an early exemplar of this tradition—a text that devotes nearly 336 pages to the study of a single article—Jack Selzer (1993) identified the goal of *Understanding Scientific Prose*: “to ‘open up’ another kind of literature, scientific discourse” (p. 3). In “opening up” scientific discourse, much of the work in the traditional rhetoric of science interrogates the discursive strategies of scientific heroes. Much of this work is based on the questionable methodological assumption that because a particular scientific theory is/was well accepted, its author(s) must have been skilled in persuasion. For example, Harris (1997) described how the first set of essays in *Landmark Essays on the Rhetoric of Science* exemplify this trend,
Together these three papers...represent one of the major themes in rhetoric of science, the investigation of the suasive greatness of scientific giants, individuals whose accomplishments have stamped their respective sciences in epoch-defining ways. (p. xxvii)

This reference to “suasive greatness” illustrates a tendency towards the valorization of science, not uncommon in traditional rhetoric of science. Harris (1997) even described the rhetorical prowess of scientists as qualitatively better than other disciplines, “the overall level of agreement they achieve is amazing when compared to politics or religion or literary criticism” (p. xi). Indeed, it is this scientific greatness to which Gross’s (1996) Rhetoric of Science is partially dedicated,

But to say that scientific knowledge represents a consensus... is not to denigrate science; it is rather to pay tribute to the supreme human achievement that consensus on complex issues represents. (p. 203)

As previously mentioned, STS scholars, and I would argue rhetoric of technoscience and medicine scholars see the suasive endeavors of professional scientists as merely one aspect of their object of inquiry. STS scholars tend to view technoscience as a complicated and heterogeneous cultural enterprise made up of almost innumerable constituents. As such, technoscience, as an entity (or collection of entities), is defined in varying ways. Major STS promulgator Haraway (1997) identifies technoscience both as a “a mutation in historical narrative” (pp. 3-4) and as “more, less, and other than what Althusser meant by ideology; technoscience is a form of life, a practice, a culture, a generative matrix” (p. 50). Technoscience is a generative matrix, but, it is also a construct borne of a specific historico-material mutation. In one sense technoscience involves modernist epistemology run amuck, yet in another sense it also involves material-semiotic configurations that transcend modernist dichotomies such as the “distinction[s] between science and technology,...nature and society, subjects and objects, and the natural and the artificial...” (Haraway p. 3).

In Foucaultian terms, technoscience can be understood as an extension and mutation of the will-to-knowledge. The will-to-knowledge, predicated on the will-to-truth, constitutes the primary volitional move of enlightenment epistemology. As Foucault recounts in his Discourse on language (1972),

A will to knowledge emerged which...sketched out a schema of possible, observable, measurable and classifiable objects... which imposed upon the knowing subject—in some ways taking precedent over all experience—a certain position, a certain viewpoint, and a certain function (look rather than read, verify rather than comment)... which prescribed the technological level at which knowledge could be employed in order to be verifiable and useful... (p. 218)

Though Descartes’ defense of the Cogito (“Meditations”), and the subsequent positioning of man “the observer” (“Discourse” p. 24) often receives full blame for this epistemological shift, Foucault
identifies unnamed English thinkers (p. 25). Likely he refers to the work of Boyle, Bacon, and Locke, among others. Certainly, Boyle’s contribution is well documented by Shapin and Schaffer (1985) in their widely cited *Leviathan and the Air-Pump*. Additionally, both Bacon’s *Novum Organon* and Locke’s *Essay Concerning Human Understanding* promulgate the logic of the will-to-truth. For example, Locke clearly separates mind from body and elucidates the proper detached method of empirical observation, “the understanding, like the eye, whilst it makes us see and perceive all other things, takes no notice of itself” (p.172).

Furthermore, inquiry into technoscience is about far more than the recognition that practicing scientists are not the only participants in scientific discourse. It is also about developing a project of inquiry that embraces the idea that scientific culture is about more than scientific discourse. STS and rhetoric of technoscience and medicine are built on an intellectual foundation that requires simultaneous inquiry into both the material and the semiotic as coconstitutive and coequal. To be sure, the recognition of material-semiotic unity is an equally foreign concept for both modernist scientists and postmodernist rhetoricians. The very idea violates the fundamental tenets of at least 500 (if not 2500) years of epistemology and ontology. Recognizing the difficulty of this, STS scholars have invoked a cornucopia of engaging metaphors to help explain this idea of the material-semiotic. Addressing this question, Latour has offered theories of “hybrids” (1991), “collectives,” “assemblages”, “factishes” (1999), and “actor-networks” (2005). Pickering has explored “mangles” and “dances of agency.” And Haraway—queen of the metaphorical—has introduced STS scholars to “chimeras,” “cyborgs” (1991), “networks,” “cat’s cradles” (1997), and “companion species” (2003)—just to name a few.

Despite this potentially excessive proliferation of metaphors, each of these theorists is working on just a few key concepts related to material-semiotic interactions. Hybrids, factishes, cyborgs, and companion species constitute various approaches to coming to grips with those entities of contemporary technoscience that obviously challenge modernist dichotomies (mind/body, nature/culture, science/technology). Haraway’s notion of mutation recognizes that despite the fact that the will-to-knowledge is still the governing ideology of technoscientific practices, the material-semiotic instantiations of those practices have created a “proliferation of hybrids” (Latour, 1993)—i.e. dichotomy-crossing entities such as biotechnology, industrial-scale physics, and Oncomouse. Haraway’s cyborg is perhaps the most well known and oft-used of the material-semiotic subject/object metaphors. In fact, Haraway identified these boundary-crossing entities as one fundamental feature of our era,
By the late twentieth century, our time, a mythic time, we are all chimeras, theorized and fabricated hybrids of machine and organism; in short, we are cyborgs. The cyborg is our ontology; it gives us our politics. The cyborg is a condensed image of both imagination and material reality, the two joined centers structure any possibility of historical transformation. (p. 150)

Similarly, Latour offered STS scholars the notion of the factish—the hybridization of material reality and institutional discourse that, as a result of its internal material-semiotic interaction and institutional legitimization, assumes the power of material fact in the still dominant modernist regime. This construct, he argued, allows STS researchers to avoid not only the perils of positivism, but also the problems of ludic postmodernism:

The solution of the factish is not to ignore the choice [between the material and the semiotic], as many postmoderns do, by saying, “Yes, of course, construction and reality are the same thing; everything is just so much illusion, storytelling, and make believe. Who would be so naïve, nowadays as to dispute such trivia?” The factish suggests an entirely different move: it is because it is constructed that it is so very real, so autonomous, so independent of our own hands. (p. 275)

Pickering’s treatment of these material-semiotic interactions focused more on the processes by which they come into being, rather than the entity produced. In his work, he invoked the metaphor of the mangle to help describe the way the material and the semiotic are smashed together in an unpredictable and inseparable concatenation. As he argued,

I find “mangle” a convenient and suggestive shorthand for the dialectic [between the semiotic and the material] because, for me, it conjures up the image of the unpredictable transformations worked upon whatever gets fed into the old-fashioned device of the same name used to squeeze water out of the washing. It draws attention to the emergently intertwined delineation and reconfiguration of machine captures and human intentions, practices and so on. (p. 21-23)

Local material-semiotic conglomerations such as hybrids, cyborgs, are factishes are only part of STS inquiry into material-semiotic interactions. These investigations also extend into theorizations about such interactions in much more global contexts—hence the metaphors of assemblages, networks, etc. As Latour has argued, “To conceive of humanity and technology as polar opposites is, in effect, to wish away humanity: we are sociotechnical animals, and each human interaction is sociotechnical” (p. 214). In sum this suggests that inquiry into the cultures of technoscience must treat the entirety of technoscience as a material-semiotic interface. As Haraway put it, “Discourses are not just “words”; they are material-semiotic practices through which objects of attention and knowing subjects are both constituted” (p. 218). This broader understanding of the material-semiotic interfaces
of technoscience is responsible for spawning the various network and assemblage metaphors in use. Latour has suggested that,

The name of the game is not to extend subjectivity to things, to treat humans like objects, to take machines for social actors, but to avoid using the subject-object distinction at all in order to talk about the folding of humans and nonhumans. What the new picture seeks to capture are the moves by which any given collective extends its social fabric to other entities. This is what I have meant, until now, by the provisional expression “Science and technology are what socialize nonhumans to bear upon human relations.” (p. 194)

These metaphors are precisely the intellectual resources that provide us entrée into these new conceptions of our ontology. In relying on them, STS and rhetoric of technoscience and medicine can help to contribute to one of the most challenging intellectual quandaries of our time—namely the nature of material-semiotic interactions.

Furthermore, exploring the ways rhetoric circulates within the material-semiotic networks of contemporary science allows for important contributions to rhetorical theories of agency. The idea that contemporary science tends to occur in densely articulated networks is not lost on all rhetoricians. Kinsella (2005) has argued that we exist in a world of “big science.” Specifically, he argued that,

Consistent with Galison and Hevly, here I view big science as a mode of activity that combines well-established, modernist goals of knowledge production with more recent forms of organization. The organizational forms of big science involve complex, long-term, costly projects conducted by large communities of researchers, support staff, and administrators, rather than by individual actors or small groups. Not all contemporary science fits this description, but this modality increasingly represents what science means to scientists, sponsors of science, the public, and those who study science from academic or policy perspectives. (p. 304)

Furthermore, I must agree with Kinsella when he argues that this state of affairs makes the question of rhetorical agency both all the more pressing and all the more difficult. “[T]he problem for rhetoric of science and technology [and I would argue rhetoric of technoscience and medicine] is not whether individual agency and intentionality can be invoked but, rather, whether they can be reconceptualized productively in the contemporary institutional and theoretical context” (p. 306).

Finally, grounding rhetoric of technoscience and medicine in this framework constitutes an excellent foundation for my inquiry into pain medicine. As noted above, the science of pain and the practices of pain management occur in a densely regulated environment that involves far more than the discourse of scientists. Regulatory agencies, professional societies, patient advocacy groups, pharmaceuticals corporations, and insurance companies all play key roles in medical discourse. Nevertheless, the science of pain management is dominated by modernist linguistic resources that
focus on objective evidence, ocular centrism, and epistemological certainty. Or as Fuller describes the current state of affairs in science writ-large, “even though scientists are now doing radically different things in radically different contexts from three centuries ago, they nevertheless draw on largely the same linguistic resources to justify their knowledge claims (p. 25). The discourses of pain medicine are a natural place to explore the disjunct between scientific practices and linguistic resources precisely because pain resists objectification. Furthermore, regulatory structures like the FDA, despite being “government” rather than “scientific,” embrace the discursive resources of modernist inquiry in order to make assurances about the safety and efficacy of drugs. An exploration of the genres and strategies of pain scientists participating in scientific communities would certainly shed considerable light on these issues. However, a more complete exploration requires inquiry beyond those tightly defined limits. In much the same way that rhetoric of technoscience and medicine’s theoretical foundation seeks to combine the insights of rhetoric of science and technology and STS, a project of this scope requires a similar methodological fusion. The traditional methods of rhetoric of science and technology as designed for the study of single texts are only so helpful in the exploration of such a broad set of artifacts. Similarly, the resources of STS have not typically been designed to ask the kinds of questions that might interest rhetoricians.

**Methodological Resources**

Understanding technoscience as a culture of new activities/objects justified by antiquated linguistic resources provides the perfect entrée for rhetoricians who have the methodological tools to identify and deconstruct the use of these linguistic resources as they perpetuate technoscientific hegemony. However, the understanding of technoscience as an integrated network of cultural forces requires a shift in the methods of inquiry. Traditional rhetoric of science employs primarily neoclassical rhetorical methods and/or genre-studies approaches in the study of scientific documents. Concomitant with the focus on rhetorical heroes is a use of rhetorical methodologies, such as generic analysis, tropic analysis, and figurative analysis. As Harris (1997) explained, “Rhetoric of science is simply, then, the study of how scientists persuade and dissuade each other and the rest of us about nature—the study of how scientists argue in the making of knowledge” (Harris p. xii), In a more detailed discussion Fahnestock (1997) suggested, An analysis of texts from a rhetorical perspective asks what tactics and topics of argumentation are used, and how the arguments are arranged sequentially as series of effects, and how they are actually expressed, their precise wording, their qualifications (or lack thereof), their indirection, their use of figures (tropes and schemes). The rhetorician is primarily interested in explaining textual features as an arguer’s creative response to the constraints of a particular situation. (p. 53)
In keeping with this focus on textual strategies, some traditional scholars, deviating from the exploration of heroes, study science’s “rhetorical failures.” For example, incommensurability scholars often interrogate and diagnose the rhetorical problems of interdisciplinary communication (see Prelli, 1997; 2005; and Fahnestock, 1997; 2005). Additionally, rhetoricians of science do, from time to time, investigate objects other than mainstream scientific discourse. Waddell’s (1996) exploration of science in policy relied on discourse interviews in addition to science-driven political debate (p. 129). However, the interviews are based on the primary textual artifacts of Waddell’s analysis.

Perhaps the most widely recognized advocate of an alternate STS methodology is Bruno Latour. His works (alone and with Steve Woolgar) are considered founding documents of one of the most dominant methodological approaches to STS, actor-network theory. The basic rationale behind this approach tends to go as follows: if the object of study is technoscience—a densely articulated cultural matrix—then the proper method of exploration seeks to describe the actants and articulations that constitute the network. In the primary work of actor-network theory Latour (1993) describes the proper orientation of the STS scholar (nonmodern in Latour’s vernacular) to his/her object, “a nonmodern is anyone who takes simultaneously into account the moderns’ Constitution and the populations of hybrids that that Constitution rejects and allows to proliferate” (p. 47). In exploring this Constitution and hybrid proliferation, actor-network theorists rely primarily on methodological tools derived from ethnomethodology. Specifically, Latour and Woolgar (1986) argue that field observations are a critical component of STS,

It is therefore necessary to retrieve some of the craft character of scientific activity through in situ observations of scientific practice….It is necessary to show through empirical investigation how such craft practices are organised into a systematic and tidied research report. (p. 29)

Rhetoric of technoscience and medicine-like rhetoricians have embraced this call for ethnomethodology. In exploring the nature of technoscientific practice and the rhetorical resources employed, scholars have fashioned various hybrid methodological approaches that capitalize both on field observations and traditional rhetorical analysis. For example, Wilson and Herndl’s (2007) ethnographic exploration of missile engineers employs a combination of field observations and rhetorical artifact analysis and Amy Koeber’s (2007) exploration of various technoscientific and counter-cultural rhetorics of breast-feeding includes systematic interviews of non-scientist participants. It is precisely this kind of integrated methodology that Bazerman (1999) employs in The Language of Edison’s Light,
The approach presented here moves us closer to the kind of micro-empirical study that is associated with ethnomethodology, conversational analysis, and sociolinguistics, allowing us to locate and examine the exact sites of social production and reproduction in particular discursive movements…. This approach also redirects discourse studies of technology out of the realm of disembodied persuasion and into the realm of socio-material practice. (pp. 343-344)

Recently this type of research has spawned a proliferation of case-studies wherein rhetoric of science and technology, rhetoric of technoscience and medicine, and STS scholars provide engaging and nuanced accounts of individual episodes of scientific discourse. However, this too has been a cause for concern. Collier (2005) has argued that rhetoric of science and technology needs to engage in serious philosophical and metacognitive work in order to synthesize the results of all of these case-studies into codified theories describing how rhetoric operates in science—generally. Similarly, Fuller (2006) also argued, and I think rightly so, that the *modus operandi* of STS fieldworkers can be described as follows, “having completed the study of one research site, not to test … findings for their generalizability to other research sites but to use the findings as a template to explore new sites, deviation from which then provide the base for generating still more findings” (p. 51). And while I do not know if I will be “testing” my findings in the way Fuller would want, I will be using an approach in my dissertation that attempts to wed localized fieldwork to generalized understanding. In essence, this work will be an ethnography of the MIC. But that, of course, raises the obvious question: if the MIC is a vast technoscientific network comprised of manifold articulations, how can I possibly ethongraphize it?

In answering this question, I turn to territory more familiar to rhetoricians, though, I get there through, perhaps, a circuitous route. In *ModestWitness* Haraway echoed the general argument of STS theorists for ethnographic-style research into technoscience and medicine. Specifically, she argued,

“To study technoscience requires an immersion in worldly material-semiotic practices, where the analyst, as well as the humans and nonhumans studied, are all at risk—morally, politically, technically, and epistemologically. Science studies that do not take on that kind of situated knowledge practice stand a good chance of floating off screen into an empyrean and academic never-never land. (p. 190)

Of course this type of *in situ* observational research was never Haraway’s *modus operandi*. Rather she relied on extensive artifact collection and textual analysis. More to the point, she warranted her research practice by arguing that,

Textual analysis must be articulated with many kinds of sustained scholarly interaction among living people in living situations, historical and contemporary, documentary and *in vivo*. These different studies need each other, and they are all theory-building projects. (p. 191)
Haraway’s suggestion was that these types of research can and often do remain separate. That is, there are ethnographers, and there are textual analysts. And both can meet and interact in scholarly journals and the pages of edited volumes. While it is certainly not my intent to suggest that everyone doing ethnography should engage in close textual analysis and that everyone doing textual analysis must also conduct observational research, this dissertation explicitly crosses those boundaries. I hope to foster the same sort of dialectic that Haraway envisions among multiple researchers within the pages of this work. So in one sense, this work is two studies in one: 1) it traces the results of two years of ethnographic study with the MPG, and 2) it explores the MIC through textually analyzing a broad array of discursive artifacts.

More specifically, data collection began in June 2006 with the administration of an on-line pre-intervention survey. This survey was designed to collect demographic data about organization members, including professional data such as field/ sub-specialty, additional certifications, type of practice, primary patient population, and years of practice. The survey also included open-ended questions designed to get some initial information on why individual members participate in MPG. Finally, the survey also solicited information on individual member’s definition of pain and their approach to pain management. I subsequently observed, audio-recorded, and transcribed approximately 25 journal club meetings between June 2006 and November 2008. The field observations and interviews in this project are best described as critical action research (Blythe, Grabill, & Reily, 2008). Textual artifacts distributed at these meetings (PowerPoint presentations, pharmaceuticals advertisements, and research articles) were also collected. Additionally, fifteen 40-90 minute participant interviews have been conducted and transcribed. In these interviews, subjects were asked to reflect on their understandings of pain, pain management, the problems/advantages of interdisciplinarity and the discussions that occur at MPG meetings. (A representative list of questions is available in Appendix A). I also attended, took observational notes, secured audio recordings, and collected documents at the annual meeting of the American Academy of Pain Management.

Ethical and Theoretical Issues

However, also following Haraway and other STS ethnographers, my inquiry into the rhetorics of pain is not simply a documentary project. My work, and rhetoric of technoscience and medicine—at large—embraces postmodern ethical and theoretical commitments that distinguish them from traditional approaches to rhetoric of science and technology, STS, and modernist ethnography. I have already discussed the tendency towards valorization in traditional rhetoric of science and technology. And the rejection of this by STS scholars is readily apparent from their identification of technoscience with forms of cultural hegemony such as Althusser’s notion of ideological interpellation. There are at
least two other concerning trends at the heart of the differences between rhetoric of science and the STS approach. First, the traditional rhetoric of science and technology approach manifests a tendency towards ontological realism avidly denied by STS (and rhetoric of technoscience and medicine) scholars; and secondly, much of traditional rhetoric of science and technology scholarship rests on a notion of the epistemic priority of scientific knowledge.

Even in the midst of postmodern critiques of enlightenment epistemology, traditional rhetoricians have made somewhat regular reference to the ‘indisputable’ reality of scientific knowledge. For example, see the opening lines of Harris’ (1997) Landmark Essays, “the ultimate matter of [scientists’] arguments is so concrete that we can stub our toes on it, or burn our fingers on it, or have our cars chased by it” (p. xi) Or as Gross (1997) argues, “the natural sciences differ from the humanities in a fundamental way. As Habermas says: ‘they do not have first to gain access to their object domain through hermeneutic means’” (p. 21). Even though both Harris and Gross offer concerns about realism, the returning references to it belie a certain sympathy with the doctrine. So even though in one work Gross (1996) warns that “rhetoricians are realists only at their peril” (p. 207), in another he suggests a realist epistemology for STS,

Just as scientific concepts have to be realized and extended by means of an extended dialogue with nature, so Kuhn’s concept of incommensurability must be realized and extended by means of an extended dialogue between it and the history of science,…a strict dialogue with historical reality, reconstructed independently of any philosophical thesis. (2005 p. 192)

The social-constructivist tradition of STS scholarship is diametrically opposed to this tradition of realism. Indeed, many STS scholars self-identify as anti-realists. Though there are many threads of anti-realism, the most prominent comes from the strong programme of Barnes and Bloor. The first tenet of the strong programme is the symmetry postulate, which according, to historian Jan Golinski (2005), requires that “the researcher should maintain a neutral stance toward all the contending [knowledge] claims” (p. 7). Of course this comes along with the second requirement of reflexivity, which requires that “the kind of explanation given by the sociology of knowledge should also apply to itself” (p. 22).

My second concern—the assumption of epistemic priority in the traditional approach—both arises from the first concern and harkens back to the age-old rhetorical/philosophical debates between Platonists and Sophists. As is well known to rhetoricians, Plato viewed the proper role of rhetoric as a posteriori to dialectic. As described in the Phaedrus, only after “one employs the dialectic method and plants and sows in fitting sound intelligent words” (p. 166) can one use the art of rhetoric to
“arrange and adorn his discourse accordingly, offering to the complex soul elaborate and harmonious
discourses, and simple talks to the simple soul” (p. 167).

Though the current configuration of this logic has shifted the priority from dialectically-
inspired noésis to empirically-derived epistêmê, the assumption of temporal priority remains. Take,
for example, the following justification for the rhetoric of science by Campbell (1997),

Aristarchus was not believed when he argued that the earth moved around the sun, and
although Mendel discovered the laws of inheritance, he failed to convince his scientific peers.
To claim that Darwin was a rhetorician, therefore, is not to dismiss his science, but to draw
attention to his accommodation of his message to the professional and lay audiences whose
support was necessary for its acceptance. (p. 3)

Here Campbell presents a state of affairs wherein the knowledge of geocentrism, inheritance, and
evolution is a priori to the rhetorical discourse that promulgates their study.

STS scholars, of course, object to this assumption of temporality on two accounts. Fist it
violates the aforementioned symmetry postulate, in that it grants epistemic priority to scientific
knowledge. Secondly, it fails to account for the integrated nature of technoscience. In presuming that
science, in isolation, comes first and then is instantiated into other cultural practices, it underestimates
the reciprocal effects of various cultural entities within technoscience. Most notably, STS/rhetoric of
 technoscience and medicine scholars object to the idea that scientific inquiry can occur in isolation,
and suggest that it is an inextricably socio-cultural process.

rhetoric of technoscience and medicine’s commitment to interdisciplinarity allows it to
capitalize on the strengths of traditional rhetorical inquiry and the insights from STS. The extension
of the objects of inquiry to include a wider array of cultural artifacts allows rhetoric of technoscience
to explore the relationship between discourse and context in a more nuanced fashion. But in so doing,
it can transcend the traditional approach and avoid the theoretical/ideological problems such as
valorization of science, realism, and assumptions of epistemic a priority. Finally, in both critical and
practical ways, rhetoric of technoscience and medicine and critical ethnography have the opportunity
to contribute to what Haraway identifies as the “high-stakes game” of “shaping technoscience” (p.
50). Rhetoric of technoscience and medicine can use its critical resources to expose the discursive
mechanisms of technoscientific hegemony. Additionally, rhetoric of technoscience and medicine can
help scientific practitioners see the problems that arise from the continued use of enlightenment
linguistic resources. In so doing, rhetoricians may be able to help eliminate dangerous and
unproductive assumptions about the nature of scientific knowledge and its relationship to technology,
policy, and the public.
Put yet another way, rhetoric of technoscience and medicine allows rhetoricians to participate in what STS scholars Collins and Evans (2002) have identified as the “Third Wave of Science Studies.” Collins and Evans outline three waves of science studies. In short, wave one was characterized by a general climate of reinforcement. Namely, first wave scholars sought to document the successes of science as the supreme exemplar of human inquiry and achievement it was presumed to be. In contrast the second wave was characterized by the embrace of postmodernism and the attendant deconstruction of epistemology. The second wave was primarily known under the rubric of the Sociology of Scientific Knowledge (SSK). SSK was the primary opponent to scientists in the “science wars” and tended to focus on “extra-scientific” factors like the impact of funding, peer-review, and the tenure process. The third wave, which Collins and Evans helped to inaugurate, seeks to build on the insights of wave one in order to tackle the problem of expertise. In so doing, however, wave three scholars do not merely study technoscience, they intervene. In short, they seek to help see that interfaces among science, politics, and the public function more ethically and democratically.

**Outline of Chapters**

Ultimately, this dissertation is to be an example of one way scholars might implement rhetoric of technoscience and medicine. As such, my exploration of pain management and agency seeks to document a broad array of socio-historico-cultural forces and issues. Obviously, this covers a great deal of territory, but that territory is an investigational space held together by the focus on pain and an ethical obligation. The modes of regulation that circulate in the MIC are nothing if not complex, but they are articulated. Continuing efforts to understand the landscape of the MIC and to contribute productively to improved healthcare and more humane practices will require a detailed conception of this complex network of articulation. Whether future agentive efforts in health and medicine involve new conceptual models, increasing interdisciplinarity, new technological innovations, as in the case with the MPG and AAPM, or something else entirely, navigating the path to change will be either haphazard or the result of detailed study of complex regulatory waters. As such, this dissertation will provide a foundation for future efforts that aim to establish both more effective and more ethical healthcare. That said, the exploration of the above cases works towards somewhat more modest goals. Nevertheless, I hope to contribute productively to the three primary goals outlined in the beginning of this dissertation: 1) to explore the mechanisms of regulation and spaces for agency in the MIC, 2) to contribute to developing theories of incommensurability and agency in technoscience, and 3) to provide a model for continuing efforts in the rhetoric of technoscience.
To these ends, I have divided this work into two parts and five chapters. The first part (chapters 1-3) explores the historical contexts and contemporary activity of the MPG, AAPM, and IASP. More specifically it seeks to document the means by which these organizations attempt to cope with and change contemporary approaches to pain science and medicine. The second part (chapters 4-5) offers two case-studies which further explore the issues from Part I. These case-studies focus on attempts to (de-)legitimize two pain disorders and document in the first case agentive failure and in the second case agentive success.

**Chapter 1: A Phylogeny of Pain:** I begin my inquiry into pain medicine with a historical overview of pain science and management from antiquity to the present. Like many histories of technoscience, this chapter traces the emergence of new theoretical paradigms—or configurations as I call them. I use the term ‘configuration’ rather than paradigm, episteme, *habitus*, frame, or scheme to avoid the biases that come from each of the later. Conceptions of paradigm, episteme, frame, and scheme typically include assumptions of top-down structuration—i.e. the idea that a theoretical commitment will determine (or at least influence) practice. Similarly, conceptions like *habitus* assume the opposite—viz., that practices determine theories. In adopting the term ‘configuration,’ I reject any such assumptions and suggest that depending on each individual configuration theory may structure practice, practice may structure theory, or more likely, they will be codeterminant.

Furthermore my history of pain differs from many other accounts of technoscientific transformations in that it is not strictly a tale of theory succession. Over the history of pain medicine new configurations have not supplanted their predecessors. Rather, as each new configuration has emerged it has developed its own discursive instantiation that exists alongside the previously accepted configurations. As medicine and health continues to fracture into a cornucopia of different subspecialties and distinct disciplines, different intellectual or healthcare programs have attached themselves to alternate pain configurations as suits their underlying purposes. This historical narrative provides a critically important contextual backdrop for understanding the complex manifold discursive environment that confronts contemporary researchers and clinicians in pain science and medicine.

**Chapter 2: Overcoming Incommensurability and the Path to Nonmodern Pain.** Pain medicine is plagued by a highly contentious and fractured discursive environment. Practitioners—through the agency of their education—are indoctrinated into one of four pain configurations and any number of disciplinary approaches. Furthermore pain medicine is currently exploring a barely nascent fifth configuration. All five of these configurations have their own theoretical histories and pragmatic exigencies which shape the discourse of pain healthcare. With five different approaches to pick from
pain management clinicians are forced to practice in an environment of ontological uncertainty. Their object of study is subject to conflicting definitions and each definition proscribes conflicting treatment options. Furthermore, pain is an object of study vexed by epistemological angst. There is no easy way to measure pain; most studies of pain rely exclusively on subjective patient report—not a comfortable state-of-affairs for scientific inquiry.

Nevertheless, multidisciplinary organizations like the Midwest Pain Group (MPG) are working diligently to overcome these issues and to establish a discursive terra firma for pain science. Chapter 2 explores the results of two years of ethnographic observation with the MPG. I trace their efforts to resolve the philosophical difficulties that hinder pain management and to establish a new model. As would be expected, the establishment of this new approach is not an easy process. The MPG includes members from over 20 different disciplines and subspecialties, and as such, they must overcome significant incommensurability. At the same time, they seek to develop a shared cross-disciplinary pain language on which to ground their new configuration.

Chapter 3: Stases and Transformation: The Midwest Pain Group’s Fight for the Fifth Configuration: Building on the previous chapter, Chapter 3 explores the coalitional work of the MPG as it attempts to change the science and practice of pain medicine. The results of this chapter suggest that the establishment and legitimization of the fifth configuration would constitute a Foucauldian transformation—a noncumulative developmental episode. Furthermore, the MPG’s attempts to realize this transformation inadvertently replicate the logic of stasis theory—rendering definitional and jurisdictional issues as points of contention whose resolution will establish the new topoi of the fifth configuration. Beyond documenting this case in pain medicine, this chapter contributes to efforts to link the work of Foucault with classical rhetorical theory.

The second half of this chapter explores the structural and regulatory institutions that seek to hinder the establishment of the fifth configuration. Specifically, through interrogating the discourse of the FDA, DEA, and insurance companies, I explore how the jurisdictional stasis becomes a point of contention often resolved through the power-structures of the MIC. In sum, the structural entities typically carry the day.

Chapter 4: Ontological Rarefaction and the Sinus Headache: In his “Discourse on Language” Foucault (1972) outlined what he dubbed the “principles of rarefaction.” These are the socio-cultural/institutional mechanisms that regulate discourse. One of the most interrogated principles of rarefaction presented in the “Discourse” is the authority function. This material-discursive mechanism authorizes certain classes of individuals to contribute to a discourse while at the same time it prevents others. The authority function is very active in scientific communities.
Without expert credentials, academic or government appointment, access to funding, and the sanction of peer reviewers, it is nearly impossible to participate in technoscientific discourse. In addition to the authority function, Foucault acknowledges that each individual discipline has its own principles of rarefaction which regulate the type of statements that can be made—i.e. statements of an institutionally legitimate form can circulate freely in discourse whereas unsanctioned/unauthorized statements cannot. These illegitimate statements are branded as error, heresy, or insanity.

While the MIC has many different varieties of rarefactive principles, those regulating statements about disease are among the most rigorous. With the establishment of pathology as a primary medical discipline and the subsequent adoption of the doctrine of specific etiologies as the foundational logic of medicine, health science has shifted away from the human body as object of inquiry and towards the pathogen instead. Concomitant with this discursive reorientation was the establishment of specific and rigorous principles of rarefaction that regulate claims about the existence and nature of disease. Under the hegemony of pathology, it is very difficult to make ontological pronouncements concerning a given disease unless that disease can be explained within a certain discursive regime. Through investigating recent (failing) attempts to establish the existence and nature of the sinus headache, chapter four will expose these principles of rarefaction and explore how they operate within the MIC.

Chapter 5: Technological Agency and the Ontology of Fibromyalgia: Despite the hegemony of pathology and the corresponding principles of rarefaction, new diseases are established and legitimized with some regularity. While most of these “new” disorders probably conform easily to the pathological model, occasionally agentive programs of action within the MIC manage to authorize an aberrant discourse. The case of fibromyalgia syndrome (FMS) constitutes just such a case. Despite decades of doubt and ridicule, FMS has finally started to attain some real legitimacy—something that was marked very recently (and very publically) by the FDA approval of the first FMS drug.

Following a fusion of agency theories derived from the work of Herndl and Licona, Koerber, and Latour, I work to interrogate this case of theory succession as an explicitly diachronic phenomenon. In fact, the legitimization of FMS is predicated on three separate agentive series of events: the invention and promulgation of nuclear imaging (brain scans), the use of nuclear imaging to study FMS, and the FDA’s indication of a drug specifically for FMS. The results of investigating these cases suggest that agentive programs of action are seldom (if ever) the result of lone charismatic rhetors. Rather, agency involves complex coordination among various human, material, and institutional actors.
While the bulk of this research is focused on the MPG, the study necessarily strays into the territories of the AAPM and the IASP as highly influential organizations regarding MPG discourse. From 2006-2008, I worked as a participant-observer with the MPG. Subsequently, the research into the MPG is first-hand, subject to human-subjects research oversight, and has been, therefore, pseudonymized. Both the organizational name of the MPG and the names of individual members are inventions. Since my exploration of the AAPM and the IASP has been based entirely on public discourse (with few exceptions that will be identified and pseudonymized), these organizational and individual names are accurate.

However, in this work, Gross makes the shockingly peculiar claim that such an interdisciplinary space does not exist. As evidence of this claim, he points to citation practices in rhetoric, philosophy, history, and psychology. And while Gross may be correct when it comes to the narrowly and precisely defined interdisciplinary space he envisions—one that explicitly includes rhetoric, philosophy, history, and psychology and intentionally investigates interdisciplinarity and incommensurability—he seems blissfully unaware of the tradition of interdisciplinary scholarship in STS, much of which explicitly addresses interdisciplinarity and incommensurability. Indeed, if one removes the requirement that these explorations of science must address incommensurability, *Rhetorical Hermeneutics*, a project in which Gross is listed as first editor, seems to be the very example of the interdisciplinary space Gross argues for some seven years later. Not only does the introduction explicitly invite the readership of “literary critics, historians, sociologists, anthropologists, and philosophers as well as rhetorical theorists and critics (p. 1), it also, by Gross's own standards of reference practices, is inarguably interdisciplinary. *Rhetorical hermeneutics* explicitly references the work of historians of science, philosophers of science, and sociologists of science, as well as others. In the bibliographic pages of this work, famous interdisciplinary STS scholars such as Steve Fuller, Thomas Kuhn, Bruno Latour, Steve Woolgar, Michael Polanyi, and Shapin and Schaffer are all cited. The book even includes an essay from a philosopher of science, Steve Fuller.

Once again, of course, this opportunity for interdisciplinary participation comes with the potential for a slippery slope. I, in no way, recommend that rhetoricians should allow themselves to be pigeonholed into this narrowly defined expertise, i.e. contextual and argumentative theory.


Notably, these are precisely the types of resources that Galison would bring to bear in historical studies of science, medicine, and technology.

Critical action research is like participatory action research in that it is an extension of post-modern ethnography. However, it is a less participatory variant. The participation in the field site is more reminiscent of consulting work than true co-equal participation.

Significant portions of Chapters 2 and 3 are derived from as of yet unpublished work co-authored with Carl G. Herndl. As such, I owe him considerable thanks for any insights they have to offer.

Chapter 5 has been derived from an article I published in *Technical Communication Quarterly* in 2009 entitled, “Agency and the Rhetoric of Medicine: Biomedical Brainscans and the Ontology of Fibromyalgia.”
Chapter 1: A Phylogeny of Pain

Albrecht Dürer, *Spleen*. “[Dürer] sent his physician a note with this sketch in colors, the location of the spleen in yellow. The note reads, ‘Do der gelb fleck ist und mit dem Finger drawff do ist mir we.” (Where the yellow spot is and when you press with the finger on it, there it hurts.” –Ralph Major, *A History of Medicine*

Dürer’s self-diagnosis aptly represents the longest standing and most dominant approach to pain—viz., the idea that it is a sign that represents an underlying illness. His pointing finger literally evokes the notion of pain as indexical sign. *Spleen* desperately seeks to help an attendant physician diagnosis and cure the underlying ailment of which the pain is indicative, of which the pain is merely an epiphenomenon.
"O Death the Healer, scorn thou not, I pray, To come to me: of cureless ills thou art The one physician. Pain lays not its touch Upon a corpse."

—Aeschylus

“I would say that pain is part of the glory, or the tremendous mystery of life. And that if anything, it's a kind of privilege to stand so close to such an incredible miracle.”

—Simone in Klasson 2001, contributor to online childbirth forum

Whether it is Aeschylus’ horrible pain that can only be taken in death, Simone’s glorious pain of childbirth, or a garden-variety headache, pain is a nearly ubiquitous phenomenon of the human condition. Nevertheless, I imagine most people would be hard pressed to come up with a succinct definition of “pain.” Pain is, in many ways, a phenomenon that defies categorization. Indeed, pain is seldom a singular or discrete entity. There are myriad physical, emotional, social, and cultural causes of pain and an equally myriad number of physical and emotional symptoms and manifestations. Pain management, if attempted, is often only a temporary process of symptom suppression—something done to help one cope as the underlying mechanism of illness/injury is addressed. Of course this is not always the case. Seldom does one think of “curing” a headache. You take your preferred painkiller and wait for it to pass, all headaches forgotten until the next one. However, an understanding of pain management may be different still in the case of pain as part of chronic depression. In this case there is a cause—the depression. But is there a cause of the cause? Is the depression the result of a traumatic experience, a neurotransmitter imbalance, or both, or neither? Will the pain even subside with the treatment of the depression? Pain as a concept and pain management as a concept/practice are truly problematic. Conceptually, their understandings are inextricably tied with one another and with the illness at hand—if there is one.

Of course, it’s not only sore-jointed or headache-stricken rhetoricians or scholars of technoscience who have trouble formulating or articulating a succinct understanding of pain. The nature of pain and the appropriate procedures for pain management are topics of vigorous debate in and among various healthcare disciplines. Pain management is an area of study and/or a certifiable subspecialty in many health practices—including but not limited to anesthetic medicine, neurology, psychology, pharmacy, physical therapy, and nursing. However, no two of these disciplines conceive of pain or pain management in quite the same way.
Certainly, I am not the first person to notice this difficulty concerning different conceptions of pain. Cultural theorist David B. Morris (1991), sociologists Gillian Bendelow and Simon Williams (1991), and historian Roselyn Rey (1993) have all identified a strong tension among conceptions of pain. Specifically, they have noted how latent Cartesian dualism undergirding disciplinary paradigms has resulted in individual disciplines and practitioners having either a physiological or psychological understanding of pain. As would be expected, practitioners from body-oriented disciplines such as neurology and physical therapy tend to have very biomechanical definitions of pain, while mind-oriented disciplines like psychology and psychiatry tend to have more psychological definitions. Of course, this problem of Cartesian dualism is not lost on even the healthcare practitioners themselves. As psychological researchers John C. Liebeskind and Linda A. Paul (1977) noted in *Annual Review of Psychology*:

> While it is often useful to distinguish between various aspects of pain experience [e.g. “sensory-discriminative” versus “motivational-affective” components], other dichotomous terms used in an attempt to specify the origin of pain (“physiological” verses “psychological,” “organic” versus “functional”) connote a Cartesian dualism and should have been discarded long ago. The use of such terms promotes an unfortunate division of pain patients into those seen to have “real” versus those seen to have “imagined” pain and may lead to inappropriate or insufficient treatment offered to the latter. (p. 42)

Similarly, this problem is recognized by interdisciplinary coalitional groups such as the International Association for the Study of Pain (IASP). The IASP developed the first internationally recognized definition of pain at the 4th World Congress on Pain in 1984, and it has continued to be revised by the IASP Taskforce on Taxonomy. This official IASP explicitly attempts to “represent agreement between diverse specialties including anesthesiology, dentistry, neurology, neurosurgery, neurophysiology, psychiatry, and psychology.”

Despite the laudable nature of scientific and humanist work aimed at overcoming the false binaries of pain definitions, the problem of the Cartesian split only represents a small portion of the conflicting issues present in pain management literature. In fact, it appears that contemporary pain scientists and clinicians must deal with no fewer than six different configurations of pain. These configurations fall on either side (and sometimes across) the Cartesian divide and are represented across various pain disciplines. Indeed, most disciplines exhibit more than one configuration. In this chapter, I will explore the historical context that allowed for the emergence and propagation of each pain configuration. This contextualization will provide the backdrop for my discussion of the way these configurations circulate in contemporary discourse (chapter 2), of the structural forces that seek
to maintain these configurations (chapter 3), and of the efforts of some to supplant the dominant configurations with new models (chapters 4-5).

Fundamentally this chapter is a rhetorical history, and as such it is a history of discourse. However, it is not simply a history of the discursive. Rather this history expressly embraces Haraway’s conception of discourse as inextricably material-semiotic. As such it is an exploration of the circulation of cyborgs within networks of articulation (although I will not often use that terminology). This is because, as Haraway has also argued, “The cyborg is a condensed image of both imagination and material reality, the two joined centers structure any possibility of historical transformation” (p. 150). Following Haraway’s suggestion, this chapter takes as its starting point the idea that the material is intimately involved in the history of discourse. The establishment, legitimization, dissolution, and/or destruction of material and economic institutions have profound impacts on the development of discourse—impacts that cannot be ignored. Furthermore, as this history documents the contexts for subsequent chapters, it accepts that the history of institutions is often directly responsible for the power of institutions. The material history of discursive formations can instill in them a powerful recalcitrance that resists the challenges of agentive programs of action. Since this dissertation is ultimately an investigation into attempted agency, the exploration of the powerful institutions which seek to inhibit change is critical to the task at hand.

A note on Historiography

Since the advent of postmodernity, it almost goes without saying that the development and exposition of a historical narrative is necessarily a project of epistemic violence. Indeed, any historical narrative is generally a product of hegemonic conventions, authorial intentions, research foci, and regular sacrifice on the altar of editorial necessity. The following narrative will be no different. Of course, recognition of all this need not amount to a refusal to narrate, but rather a considered approach to the ethics of postmodern historiography. Ethics has been a central concern of historiography since before postmodernity attained prominence. Indeed, Butterfield’s (1936) *The Whig Interpretation of History* is still a canonical text required of many new history graduate students. While Butterfield’s ethical mandates are products of his modernist context—that is, they are borne of ethical mandates for rationality and objectivity—they nevertheless argue for a sense of contextualism in historiographic representations. Specifically, Butterfield argued that, whenever historians “organize our general history by reference to the present we are producing what is really a gigantic optical illusion” (p. 29). As his title suggests, Butterfield likened historiography that
culminates in a normative present to works written by Whig party advocates (circa 1720-1820) that recasted British history as a teleological narrative ending in Whig ascendance.

Of course, this objection to teleological narrative is but one part of the postmodern critique of historiography. Iggers’ (1997) Historiography in the Twentieth Century traced the transformation of historical methods from would-be modernist science to social science to postmodern representationalist praxis. As he noted, the epistemological and methodological shifts brought about by postmodern historiography deconstructed several key features of history’s prior modernist project:

One was the notion that there was one history, die Geschichte, that permitted a continuous narrative of historical development…. Another idea was that there existed certain key institutions, primarily the state, that occupied the central role in the narrative…. Finally, as already noted, there was the firm belief expressed by Hegel, Ranke, Comte, Marx, and many others that there was only one truly historical culture and society, that of the Occident. (Iggers 1997 p.143)

In transitioning away from these ethically problematic facets of modernist history, postmodern historiographers sought a new and more ethical epistemological foundation that did not attempt to replicate the logics of the natural sciences. Of the many new approaches offered, White’s (1978) Tropics of Discourse held broad (though certainly not universal) appeal. In this work, White rejects modernist historiography and attempts to ground his new approach in the practices and methods of literary and discursive analysis. In response to his modernist detractors he noted,

I have never denied that knowledge of history, culture, and society was possible; I have only denied that a scientific knowledge, of the sort actually attained in the study of physical nature, was possible…. [E]ven if we cannot achieve a properly scientific knowledge of human nature, we can achieve another kind of knowledge about it, the kind of knowledge which literature and art in general give us in easily recognizable examples. (White p. 23)

Rejecting teleology and the doctrine of die Geschichte (and its attendant foci on the state and the occident) are not the only new ethical imperatives of postmodern inquiry. Though these two mandates often rise to the forefront in historiography, other intellectual traditions have responded to postmodernism in parallel, albeit different, fashion. As one who employs ethnographic methods, I cannot ignore the ethical mandates that come from that tradition as well. While ethnographers cast their ethical imperatives in varying ways, two issues rise to the forefront: 1) a commitment to positionality and 2) the engagement of polyphony. These two ethical imperatives were built on well-known tenets of postmodernism: the deconstruction of positivity and the assumption of interpretive multiplicity. With the deconstruction of the positivity in knowledge, it was argued that one’s position must be made manifest so readers can understand and evaluate representational claims. Similarly,
since relativistic knowledge means multiple interpretations of a given data-set could be considered “valid” by a given community, it is beneficial to provide multiple interpretations in the same text.

Indeed, positionality has become a cornerstone of postmodern scholarly practice. As ethnographer Chirseri-Strater (1996), for example, noted,

For ethnographers, writing about how we are positioned is part of the data. We are trained to keep field notes on how we negotiated entrance into a community, how we present ourselves to our informants, and how we think our informants perceive us. (p. 116)

Likewise Alsup (2004) extolled the virtues of “self-reflexivity,” a practice part and parcel to positionality, “Self-reflexivity adds to the trustworthiness of qualitative research by making known the research’s social and cultural position in relationship to participants and contexts under study (p. 222). Both Chirseri-Stater and Alsup’s arguments for positionality point towards their commitment to a relativistic epistemology of contextualization and connection; however, neither makes that epistemology explicit. Similarly, Sullivan (1996) explicitly casted her epistemological work as ethical imperative and suggests that ethnographers have an ethical obligation to “disrupt” traditional positivist conceptions of knowledge. Sullivan argues that one primary mode of disruption is the practice of self-reflexivity,

Self-reflexivity—the explicit rendering of one’s own theoretical and political assumptions and beliefs as well as one’s experiences and emotions in the process of fieldwork—is one such disruptive strategy, for in postmodern terms, the self-conscious, critically reflexive “I” that renders the experiences of others is a self-in-relation. (p. 106)

The ethical requirement for positionality is often linked directly to the polyphony imperative. For example McCarthy and Fishman (1996) argued that naturalistic study requires researchers to both “represent diverse voices” and “reveal the researcher’s influence…including a representation of the investigator’s own biases and tacit knowledge” (p. 155). Both projects (positionality and polyphony) are used to make manifest the relativity of knowledge. The oft-cited Rosaldo (1989) described ethical ethnographic practice as a “‘double-vision’ that oscillates between the viewpoint of the social analyst and that of his or her subjects of study” (pp. 127-128). In some cases the polyphony imperative is taken to a further level. Williams (1996) argued that member-checking and other triangulation procedures are insufficient to the ethical and epistemological goals of polyphony. She argued, much as did Sullivan (1996), that postmodern ethnographers have an ethical obligation to combat hegemonic knowledge constructions. Specifically, Williams suggested that when researchers:

co-author the research questions, co-collect, co-analyze, and co-interpret the data, and they co-construct the final product [then they] develop an interactive, dialogic, reciprocal relationship that mitigates the strictures of traditional, imperialist hegemony. (1996 p. 51)
This new epistemological regime and its attendant ethical mandates are embraced not only by ethnographers. These new methods have also been picked up enthusiastically by historians of science, technology, and medicine. In rejecting the tropes of continuous narrative, Kuhn was able to offer a compelling perspective on science that supplanted the development-by-accumulation model and replaced it with his (in)famous succession of paradigms. Setting the problems of the paradigm model aside, it is still worth recognizing the value of his injunction that historians of science should, “ask new sorts of questions and […] trace different, and often less than cumulative, developmental lines for the sciences (p. 3).

Following Kuhn, historians of science have offered alternative models of historiography that challenged the three modernist presuppositions identified by Iggers. Shapin and Schaffer’s (1985) *Leviathan and the Air-pump* famously presented a history not of the state nor even the scientific discipline, but rather of the experiment. Additionally, Starr’s (1982) *Social Transformation of American Medicine* challenged bounded conceptions of disciplinary histories by interrogating a broad array of socio-political forces that influenced the development of American medicine. Finally, Kuhn’s most well-known student famously rejected the idea that scientific disciplines could be treated as unified and coherent and offered a model of intercalated periodization that “separates the subcultures of physics into (at least) three quasi-independent groups of theory, experiment, and instrument making” (Galison, 1997 p.799). Under Galison’s rubric, these three groups pass through their own separate historical periods, but by virtue of their intercalation, those periods influence one another across disciplinary boundaries. Each of these histories challenges modernist epistemology while embracing postmodern ethics in different ways. In rejecting the development-by-accumulation model of scientific progress, Kuhn challenged science’s cultural hegemony. Galison’s recourse to intercalated periodization provided a historiographic structure that highlighted dissonance, thereby embracing the polyphony mandate. Shappin and Schaffer’s focus on a practice rather than a person or institution in and of itself provided a dissonant perspective. Finally, Starr’s emphasis on the socio-political and material influences in the construction of healthcare directly challenged the “sovereignty” of Western biomedicine.

Additionally, those residing within the disciplinary boundaries of history are not the only scholars who have taken up the practices of postmodern history of science, technology, and medicine. Rhetoricians—no doubt due to their long-standing focus on discursivity—have embraced new historiographical methods. Bazerman’s (1999) *Languages of Edison’s Light* offers a detailed historico-rhetorical study of Thomas Edison. However, in keeping the focus rhetorical, Bazerman seeks to avoid the ethical pitfalls of modernist historiography. As he put it,
By focusing attention on situated, symbolic, discursive practices, the approach presented here moves us closer to the kind of micro-empirical study that is associated with ethnomethodology, conversational analysis, and sociolinguistics…. It allows us to see in specific communicative moments the contextually constraining, scene-setting regularities of practice and expectations that produce and maintain social structure, as we perceive it from moment to moment. (Bazerman 1999 p. 344)

Similarly, Segal (2005) in her *Rhetoric of Health and Medicine* develops a specific historico-rhetorical methodology that she dubs *kairology*. Segal grounds her method in the ancient Greek understanding of *kairos* as an occasion or opportune moment for discourse and argument. For her, a rhetorical history is one that focuses on the succession of opportune moments. As she described it,

> What captures the rhetorically minded historian’s attention is not only a *chronology* of events but also a *kairology* of them; a study of historical moments as rhetorical opportunities. A kairotic account of medical history is more Hacking-esque than Foucauldian. Foucault’s account of things answers to a kind of teleology: It is an account of a world moving in a certain direction, away from some things and toward others, as from a more human medicine to a more mechanistic one. Hacking’s account, on the other hand, features vectors. Hacking writes about mental illnesses as thriving in “ecological niches” identified by four vectors. An illness is an illness by fitting into a taxonomy of illness (the medical vector), by being situated in a certain way between cultural elements (the cultural polarity vector), by being visible as a disorder (the observability vector)…. (Segal 2005 p.23)

While, I’m not quite sure that I accept Segal’s characterization of Foucault’s account of things, her description of *kairology* serves as an excellent place to start in defining the historiographical approach I will take in this chapter. In keeping with her approach I propose to offer a history (perhaps a *kairology*) of the opportune moments that helped establish the various configurations of pain. However, my approach will differ from the one offered by Segal in at least one important way. Segal’s *kairology* of biomedicine treats Western biomedicine as a singular monolithic entity. (And, indeed when exploring the cultural hegemony of biomedicines this is not an inappropriate approach.) However, given that the histories of this chapter need to focus on the emergence of multiple pain configurations, I must adopt different methodological tools in order to account for asynchronous divergence. Or, in the language of Galison, I cannot view the different configurations within the broader study of pain through the lens of coperiodization. Rather, I must develop an account more akin to his intercalated approach—viz., an approach that does not treat the discourses of pain as a unified, univocal discipline, but rather as quasi-autonomous yet co-influential. In so doing, my narrative specifically embraces an antiteleological stance and a polyphonic structure.

In an effort to meet not only this goal but also the ethical mandates of postmodern historiography, I turn to what will, no doubt, at first seem an odd source: contemporary evolutionary theory. Despite popular misconceptions of evolutionary theory that are inextricably salvationist and
teleological, contemporary evolutionary theory is remarkably postmodern in its approach to history and temporality. One of the core sub-disciplines of evolutionary theory is phylogeny—the classification of species based on evolutionary ancestry. Phylogenetic narratives typically begin with an origin-point—some common ancestry—and then trace along multiple polylinear pathways successive speciations—points at which new species come into being. Though phylogenetic narratives typically begin with a singular origin, ateleology is a fundamental principle of evolution writ large. Evolutionary theory recognizes a disciplinary presupposition that any and all currently extant species are by definition in the processes of either evolution or extinction—that there is no end. Furthermore, though phylogenetic narratives must select a provisional end-point, they are almost exclusively multi-linear—that is, any given phylogeny is composed of multiple provisional endpoints. Only an extinction is treated as a permanent telos.

The primary representational mode of phylogeny is the cladogram—a branching (tree) diagram wherein each fork represents an evolutionary relationship. These diagrams demonstrate speciation and extinction. Figure 1 (below) details several lines of species that developed from the diapsids—a species of 250 million year old lizards. The diagram details a series of forks some of which ended in extinction, others of which survive today.

![Figure 1: Diapsid Cladogram. This figure traces the evolutionary development of various dinosaurs between the Triassic and Jurassic periods. Additionally, it specifically identifies the temporal location of the “Triassic mass extinction” (approximately 200 million years ago).](image-url)
Similarly, the western discourses of pain medicine\textsuperscript{7} can be traced to a single point of origin which broke off into a variety of branches. Much like how climate change or asteroid impact affected the viability of various dinosaur lines, the broader discursive context of science and medicine affected the viability of various pain discourses. The development of modernist epistemology, the rise of the clinical gaze, the legitimization of statistics, the establishment of the FDA—these events (and others) have all been profoundly transformative for the history of pain, and each have had an impact on the discourse of pain along the same order as an asteroid or catastrophic episode of climate change. The purpose of this chapter is to provide a backdrop for the contemporary discourses of pain medicine.\textsuperscript{8} In order to do justice to that task, I must trace the evolutionary history (so to speak) of pain. Additionally, this will necessarily involve tracing major upheavals in the broader medico-scientific climate and the impact of those changes on the discourses of pain medicine. In an effort to explore a phylogeny of pain, I will provide and elucidate a pain discourse cladogram. After presenting this cladogram, I will trace the major discursive shifts (speciations or extinctions) and the broader contexts that contributed to those shifts.

A Phylogeny of Pain

In my study of the history of pain in healthcare and medicine, I have identified six pain configurations that circulate in contemporary discourse. Some of these trace back to antiquity, and others have emerged very recently (e.g. within the past 40 years). The following cladogram (Fig. 2) describes the emergence of these configurations: 1) pain as indexical sign, 2) pain as nociception, 3) pain as statistical construct, 4) psychological pain, 5) pain as hybrid, and 6) phenomenology of suffering. Figure 2 also identifies key figures and moments in medical history that have contributed to the development of various pain configurations. In the sections that follow, I will describe the historical contexts surrounding the emergence of the first four configurations. The remainder of the dissertation deals with the hybrid and phenomenological configurations. As the hybrid and phenomenological configurations have emerged out of a combination of appropriation and rejection with regards to the other configurations, this historical background for the first four provides a necessary foundation for understanding the contemporary discourse.
Figure 2: Pain Cladogram. The above cladogram replicates the logic of evolutionary phylogeny for the discourses of pain. It includes key intellectual figures and important socio-material events which were tremendously transformative much like the climactic or geological events that impacted the evolution of dinosaurs.

Pain as Indexical Sign

Antiquity: Generally recognized as the father of clinical medicine, Hippocrates (of the famed Hippocratic Oath) provides scholars of medicine (generally) and scholars of pain medicine (specifically) with a convenient starting point. Born around 460 BCE, Hippocrates has been attributed authorship for the nearly seventy works of medical theory that constitute the Hippocratic Corpus. As is often the case with the prolific authors of ancient Greece, there is a great deal of controversy surrounding which (if any) of the works were actually written by Hippocrates. Indeed some scholars suggest that the Corpus was written by up to nineteen different people. Despite this, it is widely accepted that the works of the Hippocratic Corpus were all produced by Hippocrates and/or his followers over a relatively short period in Ionian Greece.

It is within the Hippocratic Corpus that one can find the first discursive formation concerning pain within western medicine. Among his many theoretical and practical inventions, Hippocrates is responsible for the first formal discourses of medicine. Though the Hippocratic Corpus includes little concerning diagnostics (Jones II.ix)—the discipline concerning the study of signs and symptoms—his
discourse on prognosis establishes the first pain configuration. In the absence of readily available laboratory testing and medical imaging, determining how well a patient might fare constituted quite the challenge for the practicing physician. As Hippocrates noted, “He who would make accurate forecasts as to those who will recover, and those who will die, and whether the disease will last a greater or less number of days, must understand all the symptoms thoroughly and be able to appreciate them” (II.xxv). It is under this medical regime that pain finds its first instantiation as indexical sign. Pain—in a particular place, of a particular type, of a particular intensity—helps the physician determine prognoses. As Rey described Hippocrates’ work, “Pain signifies, [sēmainei], which is certainly not to be taken as an isolated symptom but rather as a part of an overall picture of how the patient looks, what his behavior is like compared to how he generally behaves, his stools, urine, seat, etc” (p. 20).

In keeping with this approach to pain, Hippocrates’ Prognostics generally only describes pain as present or absent and by location. For example, in the representative excerpt that follows, the location of pain (in the ear) when combined with the other symptoms indicates a less than favorable prognosis, “Acute pain of the ear with continuous high fever is dangerous, for the patient is likely to become delirious and die” (II.xxii). This focus on pain as indexical sign was pervasive in ancient medicine. Perhaps the best evidence of this can be found in the work of Roman encyclopedist Aulus Cornelius Celsus (BCE 25—50 CE). Celsus’s encyclopedia included works on a broad range of topics from agriculture and oratory to jurisprudence and philosophy. However, only his treatise on medicine (De Medicina) survives. Concerning pain, Rey notes

In Celsus’ approach to medicine, and in the general medical attitude prevalent during Antiquity as a whole, pain had no significance other than its value in announcing specific individual disorders and in providing prognoses; its meaning went no further than such indications, and in consequence, required nothing other than taking the appropriate measures to alleviate it. (Rey p. 26)

The Hippocratic approach to medicine was dominant in Antiquity until extended by the work of the Roman Galen of Pergamon (née CE 129). Building on the foundations of Hippocratic medicine Galen inaugurated an approach to medicine that remained dominant until early modernity, finally being supplanted by Andreas Vesalius and William Harvey in 1548 and 1623 respectively. Galen was, inarguably, the most prolific author of antiquity with over 600 works in his corpus—though only 1/3 of them survive to the present.

Unlike Hippocrates, Galen embraced the need for a through approach to diagnostic medicine. Indeed his book-length essay, On the Affected Parts (De Locis Affectis) is entirely devoted to the theories and practices of diagnoses. This is all the more relevant to the case of pain as Galen’s second
major section in this work—the section on symptomology—places special emphasis on pain. In the following excerpt, which opens the discussion of signs and symptoms, it can be seen how Galenic medicine reproduces the logic of pain as indexical sign nearly as it had been since Hippocrates:

In regards to the symptoms: Pain is symptomatic of a certain condition or location, cough of others, and in this vomiting, bleeding, loose stools, cramps chills, shivering and delirium. If we distinguish each of these symptoms from the others, then it should be easy to detect what has been defined as good or bad. Examination of every detail will clearly demonstrate that these things truly occur in this manner. (p. 43).

The differences in Galen’s approach to pain come not from its basic operating logic but from the focus on diagnosis over prognosis. Furthermore Galen’s work is noteworthy for acknowledging and exploring one of the primary challenges of pain medicine which remains extant today—the problem of properly interpreting patient report:

However, this is difficult to evaluate, since we have to rely on many other persons: either on those who suffer but do not well understand their experiences because their minds are weak, or on those who understand but are unfit to communicate, being totally unable to formulate their suffering in words, since it requires a considerable effort or cannot even be communicated verbally. Consequently, a person who wants to describe each type of pain should have experienced it personally, should also be a physician and able to express it to others, and should observe it with understanding while suffering, and with his mental powers intact. (p. 51)

Here one can see the early stages of a problem that will long plague pain medicine in a variety of configurations. Physicians can only access pain through patient report, and patient report is by definition subjective and variant. This is an issue of continued frustration for physicians who see pain as semiotic and therefore already one step removed from the reality of the mechanisms of injury.

**The Rise of Modernity:** Though the effects are delayed, the rise of empirical method in early modernity constitutes the locus of the first bifurcation in my pain discourse cladogram. The new discursive regime inaugurated by modernity will be interrogated in the sections that follow. However, unlike the accounts of (Kuhnian) scientific revolution, this change in the discourse of pain did not supplant the previous regime. Indeed, an incarnation of the configuration I have labeled “pain as indexical sign” remains extant even today. So while I will save for later my discussion of the new discourse that arose out of modernity, this section will explore the effects of modernity on the discourse of pain as indexical sign.

As Foucault (1970/1966) describes it in *The Order of Things*—his archeology of the transformation from the classical to the modern episteme—one of the fundamental features of the shift into modernity was a change in status for language. As he notes,
language began to fold in upon itself, to acquire its own particular density, to deploy a history, an objectivity, and laws of its own. It became one object of knowledge among others, on the same level as living beings, wealth and value, and history of events and men. (p. 296).

This objectification of language spawned new disciplines of linguistic inquiry—specifically philology and a new semiology. This semiology provided the backdrop for a more nuanced approach to pain as indexical sign. This semiology challenged the direct indexicality of the previous age and began a project of taxonomy that identified and classified various forms of pain and subsequently determined their referents. During this era, “the essential question for the physician was to know whether a particular type of pain could allow one to determine that a given part of the body was affected and/or that a particular illness had befallen the patient” (Rey p. 97).

This developing pain taxonomy was coupled with a semiotic approach to other signs and symptoms and catalogued in diagnostic manuals. Pain as indexical sign was now understood as in coordination with the other common signs such as “pulse, urine, respiration, tongue, face, etc” (Rey p. 94). This approach to pain further relegated pain to an issue of secondary concern for the practicing physician. For example, in the first entry in the Encyclopedic Index of Medicine and Surgery (1884), “ABDOMEN, Contusions and Wounds of,” pain is the sixth symptom listed for an ailment with a list of causes including, “blows, falls, the passage of wheels, pressure between opposing forces, wounds with knives, razors, daggers, sabres, bayonets, horns of animals, gun and pistol shot wounds, etc.” (p. 5). Specifically, the text states that in cases of abdominal contusions or wounds,

there is pain, sudden in character, and probably attended by swelling, the result of effused blood, and probably indicated by a dent in, or by a marked separation of the torn ends of the muscle. The pain is increased on motion to such an extent that the movements of the body may be almost impossible for a time. Contusion with rupture of viscera is characterized by sudden, sometimes excessive, pain, great depression, intense anxiety, rapid pulse, vomiting, great thirst…” (p. 5).

In order to help the practicing clinician make use of these semiotic taxonomies, diagnostic textbooks from the nineteenth century include primers on inductive logic. Nineteenth century clinicians were taught to consider all the signs and their categories and in so doing perform a series of inferences that would lead to diagnoses. Barclay’s (1862) Manual of Medical Diagnosis includes an excellent example of this type of discourse:

All true diagnosis is ultimately based upon inductions separately framed out of clinical and pathological investigations and experiments. By careful and repeated observation, we have succeeded, with every appearance of truth, in associating certain phenomena observed during life with particular lesions found after death; and these form the first step in our progress…. In so far as we are able to correctly interpret symptoms, and to trace out in connection with
them a real change of structure or of function which affords an adequate explanation of their presence, in so far are we prepared to form a correct diagnosis. (p. 29)

From the nineteenth century to the present, incorporation into the current logical schema is the only real change for the pain as indexical sign frame. The taxonomies are refined and complexified; the logics shift. Contemporary diagnostic manuals treat pain in much the same fashion as those of the nineteenth century. Pain is considered as one sign among many in the fashioning of diagnostic pronouncement. For comparison, see the current approach to abdominal pain in *French’s Differential Diagnosis* (2005):

> A common and extremely important clinical problem is the patient who presents with acute abdominal pain. This may be referred all over the abdominal wall, but here we shall consider those patients who present pain localized to a particular part of the cavity. The causes are legion, and it is a useful exercise to summarize the organs that may be implicated together with the pathological processes pertaining to them so that the clinician can consider the possibilities in a logical manner…. (p. 1)

As can be seen, this passage follows the organization of the previously cited 1862 manual almost exactly. Though pain is listed as the first symptom, the text proceeds from symptom to a list of underlying causes. Though the contemporary list offers a greater variety of “pathological processes” than the mostly brute injuries of the 1862 text, overall it is highly similar. What has changed is the logic for unifying the various signs of diagnoses. No longer are medical students given lessons on inductive logic. The primacy of logic in diagnostic assessment has been supplanted by a focus on evidence-based medicine (EBM), and the primary logic of EBM is statistics. Diagnostics is now a process of comparing the observed (or experimentally-derived) signs and symptoms with statistical tables that help the clinician determine the additive probability of each new symptom. Contemporary diagnostics manuals are filled with formulae and probabilistic discussions like the following from McGee’s (2007) *Evidence-Based Physical Diagnosis*:

> Pretest probability is the probability of disease (i.e. prevalence) before application of the results of a physical finding. Pretest probability is the starting point for all clinical decisions. For example, the clinician may know that a certain physical finding shifts the probability of a disease upward 40%, but this information alone is unhelpful unless the clinician also knows the starting point: If the pretest probability for a particular diagnosis was 50%, the finding is diagnostic (i.e., post-test probability 50% + 40%=90%); if the pretest probability was only 10%, the finding is less helpful, because the probability of disease is still the flip of a coin (i.e. post-test probability 10%+40%=50%). (p. 4)

Though it has been co-opted by the statistical regime of EBM, pain as indexical sign is an extant configuration and there is no indication of impending extinction. In fact, pain’s status as indexical sign was further enfranchised in the early 2000s when it was dubbed the “fifth vital sign” by
professional organizations, hospital administrative bodies, and in some cases, legal mandate. Now joined to pulse, respiration, temperature, and blood pressure, pain is widely considered an essential part of determining the basic health of a patient. What has happened is that as the practices of medicine have been sub-divided into a complex and bewildering concatenation of sub-disciplines, each with internal logics of their own, the pain as indexical sign frame has been relegated to diagnostics. Pain’s other configurations can be found almost exclusively within other medical sub-specialties.

Two Centuries of Upheaval

In order to explore how pain has been realized within these emergent sub-specialties, this history of pain must return to the advent of the modern era—the epoch responsible for the scientification of medicine and its subsequent differentiation into sub-disciplines. The rise of modernity, its new scientific model, and the concomitant epistemological transformation that occurred in western thought was, as is well known, broadly influential on all areas of intellectual life. The new methodological tools offered by empiricism created a substantially new approach to knowledge that has been well-documented by history, philosophy, sociology, and rhetoric of science. The epistemological transformation that inaugurated the modern era began in the early 1600s and had nearly immediate impacts on medical science. It’s widely argued in historical studies of science and philosophy that the new episteme was initialized by either Francis Bacon’s 1620 publication of the *Novum Organon* or Renee Descartes’ *Discourse on Method* in 1637. Likewise William Harvey is considered the first scholar of modern medical science. As Rey describes it,

In the 17th century, mankind’s knowledge [sic] took a great leap forward thanks to Harvey’s discovery of the circulation of the blood, which he described in his *Exercitatio anatomica de motu cordis et sanguinis in anima*, published in 1628. Indeed, this work was a turning point in the history of medicine, because it would allow physiologists and doctors alike to gradually break free from the legacy of Galen. They would become free to develop new methods of investigation and to dare uphold that their observations and deductions could be more accurate than those handed down from Antiquity. However, it should be added that this analytical attitude, which had begun to take form in the previous century, also benefitted from the success of the revolution in physics and astronomy which came about as a result of new explanations of the universe formulated in terms of mathematical principles. (Rey p. 71)

While the rise of modernity has been discussed by innumerable texts and authors, I have found the discussions offered by Foucault and Latour to be most informative when it comes to understanding this epoch’s epistemological transformation. While Latour, following the lead of many others, focuses on Descartes and the *Cogito*, Foucault’s *Order of Things* and *Archeology of*
**Knowledge** interrogate the establishment of the modern episteme as part of a two part transformation wherein modernity was brought forth through an intervening “classical” episteme.

As Foucault notes, the classical episteme (approximately 1600-1700) broke from the prior scholastic tradition by shifting away from the traditional focus on language (dialectic) as path to knowledge and the adoption of a new regime dominated by the logics of the will to truth and the will to knowledge. As he described this two-fold epistemic transformation,

A will to knowledge emerged which, anticipating its present content, sketched out a schema of possible, observable, measurable and classifiable objects; and a will to knowledge which imposed upon the knowing subject—in some ways taking precedence over all experience—a certain position, a certain viewpoint, and a certain function (look rather than read, verify rather than comment)…. (Foucault, 1971 p. 218)

While Foucault ultimately situates Descartes as a transitional figure located between the classical (will to truth) and modern (will to knowledge) epistemes, he recognizes Descartes’ work as pivotal in the series of transformations that eventually culminates in the modernity (1970/1966 p. 52). Indeed, Descartes work in the *Discourse of Method* is (in)famous for the establishment of the *Cogito*, the subsequent separation of mind and body, and the use of both of these moves as a foundation for the new epistemology. As Latour noted in *Pandora’s Hope* (1999), Descartes’ separation of mind and body resulted in the establishment of a “brain (or mind)-in-a-vat”—Latour’s metaphor for a disconnected mind seeking absolute certainty (p. 4). As is well-known, Descartes used this separation between mind and body as a foundation for the separation between the mind and the world outside and in so doing established an epistemology predicated on, “the notion of a world ‘out there’ to which a mind-in-a-vat tries to get access by establishing some safe correspondence between words and states of affairs…” (Latour, 1999, p. 113).

With this new epistemological foundation, Descartes set out at his task of developing a new metaphysics and new methodologies for interrogating this new “world out there.” And, of course, this resulted in one of the most mechanistic approaches to natural philosophy ever devised. This history is relevant for two very important reasons: first, it was this mechanism that provided the beginning for the new scientifically-grounded approach to medicine such as the one used by Harvey. As Rey described it,

In this context where Mechanism was triumphing in the natural sciences, medicine tried to envisage the human body as a complex machine which could be compared to an ensemble of ropes, levers, and pulleys. It tied reason to “geometric fashion” i.e. by rigorously stringing together all its propositions and accepting only those that which could be proven. (pp. 71-71)
Secondly, this rather abstract discussion concerning epistemological transformation is critical to understanding the development of pain frameworks. The first firmly established departure from the pain as indexical sign configuration was not only predicated on Cartesian epistemology and metaphysics, it was literally authored by Renée Descartes himself.

**Pain Objectified**

In the wake of the modern epistemological shift, for the first time since antiquity a new pain discourse emerged. This new discourse is highly distinct from the pain as indexical sign frame in that it relocated pain within the metaphysical-epistemological order. No longer was pain a solely semiotic event, pain itself now became an object of study. As Rey notes,

> [Pain's] specificity as an object of scientific interest went unrecognized for a long time and for a variety of frequently contradictory reasons: deemed the inevitable accompaniment of illness, pain was usually acknowledged and then relegated to a place of secondary importance, rather than studied for its own intrinsic qualities. (p. 6)

Given this new order of pain objectification, it seems only fitting that one of the first and most persuasive treatments of pain as object was offered by Descartes. One of the many philosophico-scientific endeavors attempted by Descartes after the publication of the *Discourse of Method* was a new science of anatomy and physiology—and more specifically the physiology of pain and sensation. Not only did Descartes’ development of pain theory follow his establishment of the *Cogito*, it was likely based on it. He was the first thinker to propose the theory of pain transmission—i.e. a theory which describes how pain impulses or signals are propagated from the skin to the mind. This is only fitting, however, since such a theory would’ve been impossible before the mind was separated from the body. Descartes’ described his model with a paired diagram and textual explanation that thoroughly demonstrate Descartes’ commitment to a mechanistic understanding of the world and the human body. Indeed, the following passage reads more like a contemporary instruction manual than a anatomy/physiology text.
Thus, if fire $A$ is near foot $B$, the particles of this fire (which move very quickly, as you know) have force enough to displace the area of skin that they touch; and thus pulling the little thread $cc$, which you see to be attached there, they simultaneously open the entrance to the pore $de$ where this thread terminates [in the brain]: just as, pulling on one end of a cord, one simultaneously rings a bell which hangs at the opposite end. (Descartes, 1972/1633 p. 34)

This model of pain was one among several prominent competing theories in the classical and early modern eras. While its immediate impact on medical science of Descrates’ era is unclear it was highly influential in Descartes’ developing thought and the theories of his followers. Most importantly perhaps, it was Descartes’ work on pain and sensation that led him to develop his theory of the pineal gland—the neurological structure which links soul and body (Rey pp. 74-75). However, I draw the reader’s attention to Descartes theory of pain not so much for its influence among his contemporaries but rather for its influence in twentieth century pain science and medicine. As Morris noted,

Descartes’s rope-pull model of pain is a direct predecessor of the organic model developed in the mid-nineteenth century. Doctors and researchers adhering to the organic model now talk about nociceptive impulses and endorphins rather than about filaments and animal spirits, but the basic idea is the same. They view pain as the result of a universal, internal mechanism that sends a signal from the injury to the brain.” (Morris, 1991 p. 271)
The continued importance and influence of this model to contemporary approaches to pain can be seen from the fact that it is widely cited in contemporary texts designed for medical practitioners and lay-readers. (See descriptions in Melzak (1973 p. 126), Melzak and Wall (1996 p. 149-150) and Fishman (2000 p. 9) for a few prominent examples.) Indeed Fishman even credits Descartes for essentially getting it right, “Considering that Descartes’ methods of exploration were limited to crude microscopes and dissected cadavers, his concept of the sensory nervous system was wonderfully advanced. Pain does travel along pathways of nerves, although not along a single primary interstate, so to speak, but via two main routes….” (p. 9, emphasis original). However, it should be noted that pain clinicians and researchers who trace their work back to Descartes typically neglect the passage immediately following the preceding description of pain transmission. Indeed they seem little interested in Descartes’ description of the human response to painful stimuli:

Now the entrance of the pore or small conduit de, being thus opened, the animal spirits from cavity $F$ enter and are carried through it—part into the muscles that serve to withdraw this foot from the fire, part into those that serve to turn the eyes and head to look at it, and part into those that serve to advance the hands and bend the whole body to protect it. (p. 35)

**Pain as Nociception:** Despite Descartes’ early foray into pain science, there wouldn’t be another widely influential model of pain until the end of the nineteenth century. While the mechanics of this new model differ significantly from those described by Descartes, it should not go without noting that the pain as nociception configuration is but an extension of the transmission/communication model of pain. Indeed, Rey’s chapter heading for the nociceptive model of pain is “Communication Strategies: The Approach to Pain During the First Half of the 20th Century.” As she further explained, a primary preoccupation [of this era in pain science] concerned the pathway connecting one point to another, the time it took to travel along it, and the various states and transmission relays along the way. Research on pain was dominated by problems of communication, speed, and efficiency. (Rey p. 263)

While communication models of pain had (as evidenced by Descartes) been discussed at a much earlier date, the intervening establishment of the neuron doctrine solidified transmission as the mechanism of pain physiology. While Descartes may have pioneered the modern approach to bodies passing impulses onto the brain, medical science at large was dubious until they came to an agreement on the underlying mechanism of information transmission. First proposed by Santiago Ramón y Cajal and finalized by Heinrich Wilhelm Gottfried von Waldeyer-Hartz, the neuron doctrine established that nervous impulses are transmitted via electrochemical propagation along a network of closely aligned task-specific cells dubbed “neurons.” Waldeyer-Hartz published his seminal work on
the subject, “Ueber einige neuere Forschungen im Gebiete der Anatomie des Centralnervensystems” in the journal *Deutsche medicinische Wochenschrift*, in 1891.

This work provided a foundation for contemporary neurophysiology and exposed medical scientists to some of the first images of microscopic neuroanatomy. These images came in the form of sketches drawn from Waldeyer-Hartz’s microscopic observations and displayed how neurological impulses could originate in a single neuron or cluster of neurons and be transmitted along the peripheral nervous system (PNS) to the central nervous system (CNS). This work helped to codify the distinction between PNS (body) and CNS (brain) that began as early as Descartes (albeit under different nomenclature) and continues strongly into the present.

Building on the foundations provided by the neuron doctrine, physiological researchers built new theories of pain much more rapidly than before. As Rey noted in the introduction to her *History of Pain*, pain research has often found itself at an odd interdisciplinary nexus, “Historically speaking, knowledge about pain has usually been gathered within the framework of the strained—frequently broken, and then reestablished—relationship between experimental physiology and clinical medicine” (p. 7). With the establishment of the neuron doctrine, at the end of the nineteenth and the beginning of the twentieth century, the study of pain was codified into a thoroughly modernist science. As such it became capable of wielding considerable power over both experimental physiology and clinical medicine. Ultimately the neuron doctrine is responsible for the development of contemporary theories of pain physiology and the subsequent reliance on opioid pharmacology that dominates contemporary clinical medicine. However, before any of this could happen, pain researchers needed to take neuron theory and apply its tenets to the study of pain. Historical treatments of medicine (whether by historians or physicians) broadly credit C.S. Sherrington, a neurophysiologist from Cambridge, with the identification of the neuromechanical means of pain transmission. Rey went so far as to suggest that even though the bulk of Sherrington’s research on pain mechanisms was published before 1910, he “really belongs to contemporary science due to the nature of his theories” (p. 279). Rhetorically speaking, this is probably an accurate assessment as Sherrington’s description of pain neurophysiology hardly differs at all from those of contemporary authorship. Indeed Sherrington’s research not only founded what I have identified as the pain as nociception configuration, but it also earned him both an English Knighthood in 1922 and the Nobel Prize for Physiology or Medicine in 1932.

As a physiologist of his era, Sherrington used the methodologies available to him—i.e. a combination of microscopy and vivisection. Indeed, his ground-breaking article that established the pain as nociception configuration (1903) used the cold detached language of science to describe a
research methodology that involved intentionally inflicting pain on laboratory dogs that had been subjected to surgical mutilation:

In the "spinal" dog (e.g. after exsection of a short piece, a segment, from the posterior cervical region of the cord) if the skin underneath and between the toe-pads and cushion of the hind-foot be pressed or stretched, a sudden forcible extension of the limb is evoked. This is especially the case if at the time of stimulation the limb be resting flexed at hip and knee. (p. 39)

While, thankfully, the spinal dog as exemplar animal in pain research has been largely abandoned, spinal rats (subjected to similar protocols) are still a staple of neurophysiological research. Even though the ethics of these experiments are broadly questioned, the experiments themselves are largely credited with providing medical science with true knowledge of the neurophysiology of pain. In Sherrington’s case they led to the verification of both transmission theory and specificity theory (the idea that there are specific nervous fibers that transmit specific types of information—e.g. pain or pressure or pleasure. Sherrington’s aforementioned 1903 piece published in the Journal of Physiology provided the first objective evidence of pain-specific transmission fibers:

I have elsewhere put forward a view that there has been evolved in the skin "a special sense of its own injuries." There is considerable evidence that the skin is provided with a set of nerve-endings whose specific office it is to be amenable to stimuli that do the skin injury, stimuli that in continuing to act would injure it still further. These nerve-endings when still connected with the sensorium (using that term simply to mean the neural machinery to which consciousness is adjunct) on excitation evoke skin pain. (p. 40)

Following this paragraph, Sherrington coined the term “nocipient” for pain transmission fibers (p. 41). Though this variant of the term never really caught on, it provided the foundation for the publication of a collection of Sherrington’s lectures in 1906 which firmly established not only the theory, but also the jargon, of pain as nociception. As Sherrington described it, “Reflexes initiated from a species of receptor apparatus that may be termed “noc-ceptive” appear to particularly dominate the majority of the final common paths issuing from the spinal cord (p. 226). Sherrington’s work in Integrative Action of the Nervous System (the aforementioned lecture collection) went on to theorize the mechanisms of nociception and modes of evaluating nociception in terms of intensity of stimulus. In so doing, Sherrington manages to further divorce physical pain from the mind and described how noxious stimuli can produce certain electrochemical responses in nociceptive fibers that, if of sufficient intensity, may be labeled by the conscious mind as “pain.” In his words,

In the simpler sensations we experience from various kinds of stimuli applied to our skin there can be distinguished those of touch, of cold, of warmth, and of pain…. In evidence of this it is urged that mechanical stimuli applied at certain places excite sensations which from
their very threshold upward possess unpleasantness, and as the intensity of the stimulus is increased, culminate in “physical pain.” (Sherrington, 1906 p. 226)

This increased mind/body separation and subsequent focus on intensity was (and is) so universally accepted that it was heralded almost seventy years later a beautiful theory “that is rightfully considered to be a biological principle or law” (Melzack, 1973 p. 133). This accolade is perhaps all the more impressive as Melzack is the architect of one of the hybrid pain configurations which seeks to supplant the rubrics of pain as nociception.

Right or wrong, complete or lacking, the pain as nociception configuration has turned out to be a highly generative intellectual rubric—both in the practical and rhetorical senses. The transmission and specificity doctrines on which nociception is based coordinate seamlessly with the vast material enterprises surrounding opiate pharmacology. Indeed opiates—a technology long considered a mystery—have only recently begun to ‘make sense’ to the medical and pharmacological communities in that they can now be understood as hindrances to nociception. This coordination between nociception and pharmacology is critical from a practical perspective as it has produced a new regime of medicine that, until recently, was almost universally embraced by patient and physician alike. Indeed the impact of morphine on medical practices from the battle field to the hospital has been well-documented by a cornucopia of sources. I also claim that the pain as nociception configuration has been rhetorically generative because it has (again until recently) seemed to live up to Foucault’s (1972) benchmark for disciplinary robustness—i.e. it has/had “the possibility of formulating—and doing so ad infinitum—fresh propositions” (p. 223). The pain as nociception configuration inaugurated a new era of medical and pharmaceutical research aimed at understanding and controlling the transmission of nervous signals.

**Pain as Statistical Construct:** As would be expected, pain’s relocation under the logic of science was part of a broader project of the scientification of medicine. This process was well-documented by Foucault’s *Birth of the Clinic*, which charted the appropriation of nosology (the study of diseases) by the epistemology of the gaze, and Paul Starr’s *Social Transformation of American Medicine*, which explored (among other things) the professionalization and legitimization of American medicine through alliance with science. Medicine’s transformation from clinical art to empirical science was critical in establishing the pain as statistical construct configuration. The development of this configuration is part of a long process in medicine’s evolution that began with the establishment of the logic of the gaze, was aided (in America) by the publication of the Flexner report, and solidified by the advent of evidence-based medicine (EBM). Of course, there are entire books dedicated to each of these ‘events’ of medical history, and there is no way I can offer the reader
an adequate treatment of any one of them within the confines of this chapter. However, a brief 
acknowledgement of the contexts and effects of each of these moments is critical to the task of 
providing an adequate background for the pain as statistical construct configuration.

Foucault’s Birth of the Clinic is (in)famous for its archeology of clinical medicine. This work 
traces the transformation of medicine into medical science as it occurred in eighteenth and nineteenth 
century France.12 Though Foucault traces this transformation back to many sources, the proscription 
to relocate clinical medicine under the empirical practices of observational science was perhaps most 
succinctly and aptly put by Marc Antoine Petit, a physician from Lyons who wrote that, “One must, 
as far as possible, make science ocular” (qtd in Foucault, 1973/1963 p. 108). As Foucault noted, this 
mandate that clinical medicine be subsumed under the logic of the gaze was linked to a great variety 
of medical practices and used as a foundation for clinical authority,

So many powers, from the slow illumination of obscurities, the ever-prudent reading of the 
essential, the calculation of times and risks, to the mastery of the heart and the majestic 
confiscation of paternal authority, are just so many forms in which the sovereignty of the 
gaze gradually establishes itself—the eye that knows and decides, the eye that governs. (p. 108)

This environment where “[f]or the clinic all truth is sensible truth” (Foucault 1973/1963 p. 148) was 
readily embraced by both the French and American medical establishments and inaugurated a great 
shift in medical theory and practice. As Foucault notes, this transformation was expedited in France 
by the establishment of a somewhat unified clinical system. Lacking this socio-political mechanism, it 
would be some time more before the new approach to medicine was broadly accepted in America.

However, in the late nineteenth and early twentieth century, the American Medical 
Association (AMA)—the premier organization for allopathic physicians—launched a new campaign 
of purification designed to limit the field of competition though challenging the validity of alternate 
schools of health and medicine including osteopathic, homeopathic, midwifery, etc. In so doing, the 
AMA enlisted the aid of the ‘independent’ Carnegie Foundation for Advancement in Teaching to 
investigate the state of American medical education. The Carnegie Foundation then, around 1906, 
tapped Abraham Flexner—a young educator with political connections—to conduct a survey of 
American medical education. This study resulted in the famous book-length report Bulletin Number 
Four which was published in 1910. In this treatise, Flexner levels a strong indictment on most 
American medical schools for great failures in both physician-education and protecting the public 
good. More specifically, as Starr noted, “As Flexner saw it, a great discrepancy had opened up 
between medical science and medical education. While science had progressed, education had lagged 
behind” (p. 120).
Essentially this indictment amounted to a condemnation of any school that had not adopted a scientific approach to medicine and in so doing accepted the sovereignty of the gaze. Indeed, in *Bulletin Number Four*, Flexner argues that medicine has entered a new age of scientific accuracy dominated by the primacy of observation and experimentation.

The third era [modern medicine] is dominated by the knowledge that medicine is part and parcel of modern science. The human body belongs to the animal world. It is put together of tissues and organs, in their structure, origin, and development not essentially unlike what the biologist is otherwise familiar with; it grows, reproduces itself, decays, according to general laws. It is liable to attack by hostile physical and biological agencies; now struck with a weapon, again ravaged by parasites. The normal course of bodily activity is a matter of observation and experience; the best methods of combating interference must be learned in much the same way. (p. 53)

Following the clinical logics outlined by Foucault’s archeology, Flexner’s report places tremendous importance on the observational and experimental practices of the empirical sciences. Indeed, in his proscribed approach to medical education, scientific training is to be considered a prerequisite for medical knowledge and practice. Not only do physicians need an understanding of the basic clinical sciences such as “anatomy, physiology, physiological chemistry,” they also need continuing education in more advanced knowledge—i.e., those of “experimental physiology, pathology, and bacteriology” (Flexner p.24). Additionally, this knowledge involve both basic precepts and theoretical insights, and it must also include education in the practices of experiment and observation and the attendant technologies of an increasingly powerful gaze:

Succeed as he might, however, [the physician’s] possibilities in the way of reducing, differentiating, and interpreting phenomena, or significant aspects of phenomena, were abruptly limited by his natural powers. These powers are nowadays easily enough transcended. The self-registering thermometer, the stethoscope, the microscope, the correlation of observed symptoms with the outgivings of chimerical analysis and biological experimentation, enormously extend the physician’s range. He perceives more speedily and more accurately what he is actually dealing with; he knows with far greater assurance the merits or the limitations of the agents which he is in position to invoke. (Flexner p. 20)

This report arrived amidst a perfect storm of economic decline, governmental regulation, and AMA purification and the result was a massive reduction in the number of American medical schools (Starr p. 118). Those that survived this period of purification were those who accepted regulation and accreditation by the AMA and modified their curricula in accordance with medical science and the sovereignty of the gaze. And as Starr has explained, this educational transformation resulted in a similar change within the broader culture of American medicine. Specifically, “As American medical
education became increasingly dominated by scientists and researchers, doctors came to be trained according to the values and standards of academic specialists. (p. 123)

In the very same year (1906) that the AMA commissioned the Carnegie Foundation to start its investigation of American medical schools, President Theodore Roosevelt signed into law the Food and Drug Safety Act that provided for the establishment of what has become one of the US’s most prominent and powerful regulatory agencies—the Food and Drug Administration (FDA). The establishment of the FDA arose out of some of the very same socio-political issues that lead to Flexner’s work. Specifically, the heightened sense of competition in American healthcare following the civil war created an environment wherein various professional organizations lobbied for economically advantageous regulation and legislation. As Cooper (2006) noted in his chapter for the FDA’s (sometimes self-aggrandizing) centennial history:

Before the [civil] war, the professions of medicine and pharmacy had begun to separate, as more highly trained physicians lobbied for state statutes to bar pharmacists from diagnosing. In turn, better educated pharmacists sought to eliminate competition from grocers and other uneducated formulators and dispensers of “patent” medicines…. Physicians’ and pharmacists’ attacks on each other, coupled with newspaper attacks on incompetence and both professions, generated public concern about drugs. Such attacks and concerns have ample basis, for neither medicine nor pharmacy had a firm scientific basis. (p. 30)

Of course, the response to this climate of combined professional organization/consumer outcry was the aforementioned establishment of the FDA. While the FDA of the early twentieth century vigorously pursued many of the shared goals of the current FDA, there is actually little similarity between the organization of the past and the present. Early on the FDA functioned more as a branch of law enforcement and routinely raided pharmaceuticals manufacturing plants and distribution centers seizing improperly labeled or marketed drugs. Though the FDA underwent a number of transformations in its evolution to current form, the most important for the pain as statistical construct configuration was in 1962 when congress added four words (among others) to the Food and Drug Act that would profoundly revolutionize the science and practice of medicine. The new provision of the law required that all pharmaceuticals marketed in the US should demonstrate safety and efficacy through “adequate and well-controlled investigations.” Though this phrase was tailored somewhat haphazardly in an effort to avoid specific definitions concerning evidentiary sufficiency, this phrase has become the cornerstone of EBM (Crout, Vodra, and Werble, 2006 p. 159).

The late sixties and early seventies marked the systemization of the clinical trials approach to medicine. With the public outcry following the thalidomide disaster and similar events, new regulations were enacted world-wide to ensure that human pharmaceuticals would not be distributed
without documented safety and efficacy. In 1975 the World Health Organization (WHO) published an international mandate outlying the proper procedures for pharmaceuticals evaluation and these procedures still comprise the backbone of contemporary pharmacological research. Specifically the WHO outlined a multi-stage progressive process for pharmaceuticals evaluation. Only when basic chemical testing has been completed can investigators move on to research in animal models and finally humans:

When a compound is found to have interesting pharmacological activity, it is investigated in depth. Before starting this work it is essential to characterize the chemical and physical properties of the new compound. The substance is then subjected to a wide range of pharmacological tests on animals to detect any effects that may be of therapeutic use. Many compounds are rejected at this stage, but those that survive are further investigated to determine there are pharmacodynamic and pharmacokinetic properties and to assess their toxicity. When adequate data are available, early studies are initiated in man and, if successful, are followed by controlled therapeutic trials. (WHO p. 10)

For the WHO it’s “controlled therapeutic trials” and for the 1965 FDA revision it was “well-controlled investigations,” and eventually these practices would come to be known under the broad rubric of Randomized Controlled Trials (RCTs). RCTs are the cornerstone of EBM—the contemporary benchmark for scientific medicine. As Dunn and Everett noted in *Clinical Biostatistics* (1995), RCTs are the means by which we cope with the fact that “The distinct feature of modern science is skepticism: we are no longer prepared to take the pronouncements of authority on trust. We ask for evidence and we wish to evaluate the claims of experts (whether they be scientists, clinicians or politicians)” (p. 2). Indeed, RCTs are the strategic realization of the scientific demands placed on the American medical community by the Flexner report. RCTs provide contemporary scientists with a rigorous approach to observation and experiment:

The scientific approach to medicine demands that we question claims about health and illness by recourse to observation and experiment. We check claims against the empirical evidence. In order to do this, we need to be able to understand the nature of evidence (the data) and to the way in which it has been collected and presented. (Dunn and Everett p.2)

To this cursory gloss of the history of the rise of EBM and the hegemony of the RCT, I must add only one additional note. While RCTs and EBM began in the early 1970s they were not fully realized until the late 1980s and early 1990s. At its heart, contemporary EBM is a statistical discipline and its establishment required the promulgation of computer technology adequate to the computational demands. Indeed, it is very telling that Dunn and Everett open their textbook with the following epitaph by Florence Nightingale, “To understand God’s thoughts we must study statistics, for those are the measure of his purpose” (p. 1).
Finally, with this historical background sketched out in all too brief of detail, I can return to the proper subject of this section: the statistical construct configuration of pain. In a medical tradition dominated by RCTs and EBM, pain needed to be disciplined under the rubric of statistics. But, of course, this presents clinicians with an enormous problem. Nociception is not directly measurable in clinical patients—as it usually requires vivisection. But the patient’s report of pain is inherently subjective and therefore untrustworthy. ‘Discipline’—in the Foucauldian sense—really is the operative term when it comes to the statistics of pain. In order to fold pain reports into the logic of statistics, clinicians and researchers needed to develop instruments that would discipline the patient’s report. Subsequently, researchers have come up with a variety of rubrics with which patients are allowed to express their pain and that are amenable to statistical evaluation.

One of the simplest and most readily available is the Numeric Pain Rating Scale (NPRS). When pain is assessed using the NPRS, patients are simply asked to quantify their pain on a scale of 0 to 10. The scale is calibrated for each patient who is told that 0 is equal to no pain and that 10 is equal to passing a kidney stone if male or childbirth if female. Given the subjective nature of this scale clinicians never perform statistical treatments of isolated reports or compare pain numbers across patients. Rather the NPRS is used to measure pain-change. So if a new narcotic is being tested on a patient population, then the clinicians are hoping that a statistically significant portion of the patient population will report a statistically significant reduction in pain. (Of course, a high confidence interval or statistical power would be nice too.)

There are a variety of numerically-based pain scales which are used primarily for quick-assessment or narcotics studies. Another popular inventory is the Visual Analog Scale (VAS) which presents the various levels of pain as a series of increasingly unhappy looking similey faces. This is used primarily with children, the mentally disabled, and when there is a doctor-patient language barrier. Psychologists and psychiatrists have developed a number of more exhaustive pain inventories that quantify the impact on a patient’s quality of life. These tests are designed to measure things like sleep disturbance, changes in diet, sexual activity, or loss of work productivity. While there are a wide variety of these and other pain measures, fundamentally they all are means of quantifying patient report and most were designed specifically for RCTs rather than for clinical care (an issue that will come up again later).

**Psychological Pain:** Pain as nociception and pain as statistical construct are not the only object configurations at work in pain discourse. The contemporary rhetorical landscape makes regular reference to the concept of psychological pain. Indeed, the idea that there exists both physical types and psychological types of pain is a common conception of our cultural landscape. Certainly, we
make somewhat routine reference to the pain of loss, the pain of sadness, and the pain of anger. This is an issue Morris had described as the “myth of two pains,”

Modern culture rests upon an underlying belief so strong that it grips us with the force of a founding myth. Call it the Myth of Two Pains. We live in an era when many people believe—as a basic, unexamined foundation of thought—that pain comes divided into separate types: physical and mental. These two types of pain, so the myth goes, are as different as land and sea. You feel physical pain if your arm breaks, and you feel mental pain if your heart breaks. Between these two different events we seem to imagine a gulf so wide and deep that it might as well be filled by a sea that is impossible to navigate. (Morris p.9)

When it comes to pain in medical discourse, there is, indeed, a myth of two pains, but it is not a myth that says one type of pain is different from another so much as it is a myth which suggests that medical discourse actually discusses two different types of pain. Within the history of medical discourse, discussions of psychological pain are largely absent. I should note now that I do not object to Morris’ suggestion that there are two different conceptions of pain working at cross-purposes in Western culture writ large. Indeed, there are and they are aptly described as physical and mental. However, when analyzed from a rhetorical perspective, the history of psychology and psychiatry are more apt to discuss psychological reactions to physical pain rather than pain of psychological origin.

When Morris and others discuss psychological or mental pain, they often refer to the suffering that follows difficult or painful life events or the suffering attendant to a psychological disorder. In terms of traumatic events, scholars often discuss the types of pain that arise from heartbreak—the loss of a meaningful relationship, the failure to achieve some long-held dream, or the death of a loved one. Additionally, some scholars discuss the pain that follows witnessing or being subject to violent events—such as war or rape. Finally, there is a rich literature on comorbid pain with depression or anxiety disorders. Despite all this, the suffering which results from these various issues does not, for the medical community, result in pain. Indeed, the psychological and psychiatric community has developed its own nomenclature in order to distinguish mental suffering from pain (i.e. the subjective experience of nociception). Psychologists use terms like anxiety, negative affect, loss of motivation, and depressed mood to refer to the discomfort that arises from psychological issues. More to the point, they have held since Freud that any pain felt in such situations is most likely physical pain due to anxiety-induced muscle tension (Melzack and Wall p. 21).

Nevertheless, there is an identifiable sub-discipline known as the ‘psychology of pain.’ Though it did not emerge until around the 1950s. However, this field, by and large, does not have a history of studying mental pain. Rather, pain psychologists tend to study the psychological responses to nociception—i.e. the subjective response to physical pain. As can be seen from the following
discussion of psychological and anthropological approaches to pain, the pain itself is still understood within the nociceptive configuration as a stimulus transmitted from a pain receptor to the brain. It is at this point—the terminus of the transmission—where psychology begins:

Psychological and anthropological studies have shown that pain is not simply a function of the amount of bodily damage alone. Rather the amount and quality of pain we feel are also determined by our previous experiences and how well we remember them, by our ability to understand the cause of the pain and to grasp its consequences…. Stimuli that produce intolerable pain in one person may be tolerated without a whimper by another…. Pain perception, then, cannot be defined simply in terms of particular kinds of stimuli. Rather, it is a highly personal experience, depending on cultural learning, the meaning of the situation, and other factors that are unique to each individual. (Melzack and Wall p. 15)

Decades of study in the psychology of pain has replicated this approach. Pain psychologists have developed robust theories accounting for pain behaviors such as catastrophization—an overwhelmed response to the unfamiliar. Additionally, psychologists have charted the impact of pain on a broad array of quality of life issues like those discussed in the section above on quality of life inventories (productivity, continence, sex-drive, sleep disturbance, etc). And while all of this research has been conducted from a largely psychological perspective, it still rests primarily on a nociceptive configuration.

My readers familiar with the broader psychology of pain will no doubt be raising some important objections: What about imagined pain? What about psychotic pain? What about phantom limb? Broadly speaking these disorders and many similar disorders fall under the rubric of psychogenic (formerly psychosomatic) pain. The current vernacular suggests that psychogenic pain might be akin to the mental and emotional pain discussed in other arenas. There are two reasons why I would object to this suggestion: 1) psychogenic pain is usually understood as a phenomenon wherein psychological conditions mimic physical pain, and 2) psychogenic pain as a concept is broadly decried as a convenient label for pain not (yet) properly understood. As Morris noted, “Traditional medicine, not surprisingly, does not know what to do with psychogenic pain, expect to deny that it exists; the term itself is quite controversial” (p. 157). Furthermore, in addition to flat denial, clinicians even frequently link psychogenic pain with preexisting physiological pain. As Morris elaborated,

Although the concept of psychogenic pain normally implies that there is no identifiable organic cause, two eminent doctors remind their colleagues that psychogenic pain commonly expresses itself as “an elaboration” of pain already arising from tissue damage. Perhaps an injury has healed, but the pain—for reasons unknown—simply refuses to stop, as if the brain had encoded it in a neural circuit that, once started, cannot be shut off. (p. 157)
On the issue of psychogenic pain, I will leave the reader with one final note from Melzack and Wall who specifically identify psychogenic pain as a diagnosis for the otherwise undiagnosable: “It is clear that we must recognize the psychological contribution to pain, but we must maintain a balanced view of it. The term ‘psychogenic’ assumes that medical diagnosis is so perfect that all organic causes of pain can be detected; regrettably, we are far from such infallibility” (p. 34). The inclusion of this caveat in Melzak and Wall is all the more suggestive given that they are primary proponents of a balanced view of pain which is purported to treat physical and psychological pain equally.

As I conclude my argument concerning the lack of a psychological pain configuration, I would like to draw the reader’s attention to the work of Renée Leriche. Leriche was one of, if not the first, pain specialist. He studied pain at the University of Strasbourg in France from around 1910 until the 1940s. His pain masterwork, *The Surgery of Pain* (1939), is a work uniquely out of time. His approach to pain was anomalous in his time and would not become mainstream until the 1970s and 1980s. In any event, *The Surgery of Pain* is an edited collection of lectures designed to be a comprehensive study of pain both from a laboratory and a clinical perspective, and indeed it may well be the first book of its kind. In Leriche’s dedication to detailed investigation, he sought to elucidate and evaluate understandings of pain that come from a variety of different traditions. In so doing, he devotes substantial passages to literary and philosophical conceptions of pain (pp. 24-27), but any mention of psychological pain is distinctly absent. Of course, it may be that the absence of psychological pain in this text was merely an oversight on Leriche’s part, but I doubt it. It seems to me that if there were a psychological discourse on pain, he would have mentioned it somewhere among the laboratory, clinical, literary, and philosophical sections.

Of course, at this point my astute readers will be wondering why I am even bothering to address a configuration labeled “psychological pain” if it does not exist within the confines of medical discourse. The answer to this question is to be found in the contemporary discourse that seeks to unify the physiological configurations with the psychological ones. They constantly allude to a discursive regime primarily concerned with psychological pain. Even though a detailed historical study suggests there never was such a discourse, its supposed existence exerts considerable force in contemporary discussion. This quasi-existence for the psychological pain configuration is why I have chosen to diagram this branch in the cladogram in grayscale rather than black.

**Towards hybrid models of pain**

During the late 1970s there were four extant pain configurations: 1) Pain as indexical sign was alive and well in much the same way as it had been since antiquity. 2) Pain as nociception had
enjoyed over 60 years of clinical and scientific success and was easily the dominant object configuration. 3) Pain as statistical construct was in its infancy, but after nearly a decade of RCTs, it was coming into its own. And, 4) psychological pain was a constant facet of literary and philosophical discourse and widely presumed to be undergoing continuing scrutiny within the arena of pain psychology.

This highly polyphonic pain discourse with its multiple configurations helped to create an ideal environment for a discursive shift that might aptly be considered revolutionary. As I have been alluding all throughout this chapter, the above historical treatment was designed to provide a foundation for understanding a radically new series of pain configurations that have emerged only in the past 40 years and are still working at coming to prominence. These configurations I have dubbed the “hybrid” or “nonmodern” models of pain because they are grounded (sometimes explicitly) in a rejection of the Cartesian mind/body divide. In short, hybrid models of pain argue that pain is a phenomenon or collection of phenomena that defy the mind/body binary. Pain, under these rubrics, is always mental and physical, always subjective and objective, always hybrid. These new approaches to pain medicine are often explicitly interdisciplinary and reject intentionally the historically dominant configurations. For these reasons, hybrid and nonmodern pain configurations represent significant breaks from mainstream medical history. However, due to the profoundly revolutionary nature of these new approaches, the rhetorical battle for acceptance and legitimacy is still ongoing. In the chapters that follow, I will explore the efforts of new coalitions of multidisciplinary medical professions to supplant the traditional four pain configurations with new hybrid and nonmodern models. Additionally, I will interrogate how the material and authoritative resources that support the traditional models resist such attempts at radical change.

Therefore, at this point, I will bring my historical discussion of pain medicine to a close, so that I may begin investigation of the would-be agentive work of nonmodern pain practitioners. If this approach makes it appear to the reader that the historical narratives presented in this chapter were Whiggish or teleological, it should not. The contemporary state of pain science and medicine is by no means static or at an end. In fact what remains to be done with the chapters that follow is a case-study of agency, or in the operational metaphor of this chapter, continued evolution wherein some species of thought persist and others become extinct.
Albrecht Drürer (1471-1528) was a German painter, printmaker and theorist whose interests ranged from theology and linguistics to anatomy and metrology. His engaging, insightful, and sometimes disturbing works provide insight into a variety of issues including the nature of pain, the history of medicine, and modernist epistemology. As a long-time sufferer of chronic illness, his art provides insight into multiple dimensions of illness, pain, and depression. As a theorist and critic, his work explores the problems of modernist representation and epistemology. As such I will be relying on several of his works to serve as the front pieces for the various chapters in this dissertation.

The IASP definition of pain will be discussed in greater detail in Chapter 2.

In using the term configuration, I mean something like those social, linguistic, and philosophical entities alternately referred to as a paradigm, linguistic frame, habitas, or conceptual scheme. I’ve adopted the term configuration in order to distance myself from the theoretical traditions that inform the other terms.

This historically created power could be understood in Latourian terms as “durability” and “enlistment” In various works Latour argued that the more certain material-semiotic resources are employed and invested with power, the more power they will retain. As such, the resource (institution, technology) becomes durable. A durable resource grows further in power through enlistment. The more nodes connected to said resource the more power it acquires. For example, in this chapter, we will see how the first pain configuration has enjoyed around 2500 years of durability and enlistment. This history imbues this configuration with considerable power and legitimacy such that it nearly forecloses the possibility of new configurations.

I agree with Segal that Foucauldian archaeologies typically explore transformations from one point to another—The Order of Things traces the shift from the classical episteme to the modern episteme; The Birth of the Clinic excavates medicine’s reorganization under the logic of the gaze; and The History of Sexuality explores the emergence of biopower. While the modern episteme, medicine’s reorganization, and the establishment of biopower certainly serve as end-points in Foucault’s work, I don’t know that that necessarily makes the histories teleological. Indeed, Foucault’s general critical bent seems to hope for and suggest the possibility of a future that either more clearly understands the relations of power or better yet overcomes some of the inequity.

There are a number of different types of cladograms. Some do not represent temporality or extinction at all, but those are beyond the scope of this discussion.

I am intentionally limiting this phylogeny of pain to the discourses of western pain medicine. Circumscribing my discussion this way unfortunately involves neglecting rich discursive traditions surrounding pain. Indeed, there is an abundance of pain discourse from antiquity to the present in literary, philosophical, and religious texts. Furthermore, the notions of pain explored in Homer, Sophocles, medieval Christian theology, and Romantic literature were arguably more influential in the cultures of their times than the medical discourse. Nevertheless, these discourses have little bearing on contemporary discussions of pain. Additionally, it should not go without saying that eastern discourses—medical, religious, and philosophical—have a great deal to say on the subject of pain. However, that too lies beyond the scope of this work.

In crafting this chapter, I am greatly indebted to the diligent scholarship of Roselyne Rey. Without her History of Pain (1993), so detailed an exploration would not have been possible. That being said, this chapter offers a very different story about the history of pain than the one provided by Rey. While History of Pain is an exemplary example of thorough and detailed historiography, it is quite frankly modernist and boarders on Whiggish. Where Rey seeks to document the development of pain medicine into a more exact science, this chapter’s primary goal is to explore the evolution of a polyphonic discourse and the material events which have shaped that evolution.

For convenience, I will refer to the Hippocratic Corpus as being of Hippocratic authorship.
The rise of statistics constitutes a profoundly powerful moment in the history of science and medicine. As such it will make an appearance in multiple configurations. In fact the rise of statistics is arguably so important as to warrant its own section in this chapter. However, because it appears in multiple configurations a single section on statistics would violate my ethical commitment to the phylogenetic model. This is a history of clades, and as such the clade must be the organizing structure.

By broadly questioned, I refer to discourses outside of pain science proper. Discussions of the ethics of research and animal rights are largely absent from general treatments of pain research, Fishman provided readers with a remarkably even-handed discussion of the issue (pp. 83-84).

Though this chapter is largely a history of American medical discourse, this period of French medicine is highly relevant. Even into the early twentieth century, the American medical community considered French medicine to be of the highest quality. In fact, it was quite the fashion among well-to-do American physicians of the time to spend a year or two studying medicine in France after completing American medical school.

Both the WHO document and the 1965 FDA revision specifically reference thalidomide.

I adopt this terminology following STS scholars such as Donna Haraway and Bruno Latour. In these critiques of both modernism and postmodernism, they establish a robust nomenclature devoted to exploring ontological and metaphysical conceptions based not on binary but on polyphony and unity. The specific manner in which these approaches relate to pain configurations will be discussed in the chapters that follow.

Certainly there are a number of ways to think about what it might mean to be “Whiggish.” Two dominant features of Whiggish historiography are 1) teleology and 2) normativity. While, I am confident that the phylogenetic model of history—with its tacit acceptance that the present is merely a blip through which we are passing—eschews teleology, my historiography does contain a certain element of normativity. To this concern, I have two suggestions. 1) Whiggish historiography casts the present’s dominant theory/institution/conception as normatively correct. As such, I argue my bias for the underdog does not qualify me as Whiggish. 2) Whether you accept that argument or not, the fact remains that this is a work of third wave STS/RTM. The challenge before me however, is that the third wave is quite new, and the ethical mandates of postmodern historiography and ethnography are the results of second wave scholarship. Recognizing this dilemma, Collins and Evans astutely observed that “Doing upstream [third wave] work without abandoning the insights of Wave Two may involve a degree of compartmentalization of activity, but compartmentalization can often be avoided only on pain of paralysis” (p. 241). Subsequently, I have done my best to keep this chapter true to the tenets of the second wave. I have compartmentalized my more interventionist moments to later chapters.
Chapter 2: Overcoming Incommensurability and the Path to Nonmodern Pain

Albrecht Dürer, Head of the Dead Christ (left) and Untitled Drawing (right). “Dürer’s inscription on the drawing, 'Head of the Dead Christ' (Sl, 5218.29) which apparently associates it with this sheet [right] implies that they were executed at the same time when the artist was suffering from an illness…. Writers have frequently commented on the expressive qualities of this drawing: Winkler called it one of the earliest and most grandiose representations of suffering in Dürer’s works, and Panofsky (vol.1, p.90) claimed that this figure with 'his features distorted with pain and his mouth half open in a stifled groan' reflected the atmosphere of an epidemic disease which had probably broken out in parts of Germany by 1503, although it did not reach its height in Nuremberg until the summer of 1505, and from which Dürer himself may also have been suffering.” —“Curator’s Notes” The British Museum

Together these two images help to define the spectrum of pain. They point to the origins of suffering in physical injury, medical illness, and psychological unrest. Furthermore, they hint at the wide range of valences pain can take from the hopeful overtones in Christian theology to the misery of Dürer personal medical reality.
In the summer of 2006, I attended my first meeting of the Midwest Pain Group (MPG). I had never been to the research site before, so I followed the directions provided me by Google Maps until I arrived at a strip mall on the outskirts of a prominent Midwestern city. On the end (next to the quasi-French pizza delivery shop) was a small restaurant that the MPG had rented out for the evening. A handwritten sign on the door informed me that the restaurant had been reserved for a private party, and I recognized a few of the people trickling in as belonging to the MPG, so I followed. The door opened into a bar where an MPG representative had set up a table for new members to pay and for established members to pick up their nametags—of which there were an impressive array. Nearly a hundred of the little laminated cards spread out across the table, each listing a name, highest degree earned, and medical subspecialty. There were nametags for general practitioners, nurses, chiropractors, psychologists, psychiatrists, anesthesiologists, physical therapists, pharmacists, and more. The alphabet soup that followed the names was just as varied, and included BS, BSN, MS, MSN, PhD, MD, DO, PharmD, FACS, JD and more. Since I’d negotiated access by offering my web design skills, I was given membership in the MPG and a nametag which read: Scott Graham, MS / Webmaster. (Of course, I have an MA not an MS, but I decided not to mention it.)

Past the bar and around the corner from the extensive wine rack was the main dining area. Ten long rectangular tables had been set parallel to one another. All were oriented toward a wall with a white screen illuminated by an LCD projector. On the screen was a comic that showed a man in a black suit with devil horns sitting on a throne of skulls overlooking the fires of hell. The caption read simply: HMO Claims Adjustor. (I later learned that the president of the MPG tried to find a new insurance industry cartoon for each monthly meeting.) At this point the room was about half full. Doctors, nurses, chiropractors, psychologists, attorneys, and pharmaceuticals representatives were ordering drinks, finding seats, talking to friends, and comparing case notes. In short, the dining room was filled with the dull hum of polite conversation.

As more members arrived, the hum escalated to a roar until the agreed upon start time when the MPG’s president tapped his microphone to get the crowd’s attention and switched the projector to the first of four PowerPoint presentations for the evening. The president—a doctor of osteopathy who specializes in pain medicine—introduced the first presenter—a pharmaceuticals representative from Endo. A lively and engaging speaker, she addressed the crowd on the benefits and proper usage of the fentanyl patch. Fentanyl is a Schedule II narcotic, which means it’s a prescription opioid, and it is commonly used for chronic pain. The patch, as the name suggests, is a topical delivery system—i.e., it attaches to the patient’s skin (much like a nicotine patch) and delivers a time-released dose of fentanyl directly to the pained area. The drug rep spoke for about ten minutes referring regularly to the PowerPoint slides, which had clearly been designed by a professional graphic artist. The slides juxtaposed anguished faces with relieved faces, bar charts with scatter plots, and clinical data with blatant advertisement. When the presentation was over, the time for questions and answers began.

This is when the real work of the MPG started. FDA regulations and pharmaceuticals business practices require that during a presentation, a pharmaceuticals representative can only talk about the proven and approved uses. In short, they must confine themselves to discussing only those doses, applications, and uses approved and indicated by the FDA. However, if you’re visiting the MPG, when it comes to question and answer time, all bets are off. The MPG members questioned the representative about study limitations, potential uses that lay outside the FDA indication, specific cases they had experienced where the patch did not perform as they’d anticipated, and ways to use the patch in combination with other therapies. But the membership did not only talk with Endo’s representative. The entire conversation sparked lively debate among MPG members, generating discussion across disciplinary boundaries and levels of education.

As debate continued a real point of contention arose. Apparently patients had reported that when they first put on a new patch, they experienced a cool tingling sensation. No one knew why, and
as good scientifically-minded practitioners everyone wanted to. Why would it tingle? Was it the fentanyl? Was it the patch glue? Was it the combination? The Endo representative didn’t know. A physiologist and a pharmacist in the group each speculated contradictory answers. And then, the drug rep remembered that the Endo gift bag everyone had been graciously provided included a placebo patch as a sample. The room paused for a moment, and then en masse the MPG membership dove into their swag bags, used the free Endo scissors to open the free Endo placebo and all began sticking—to themselves—the sample patch. The room was alight with discovery as member after member exclaimed, “It does tingle! It must be the glue!”

Though the discovery of the tingling agent in the fentanyl patch is certainly not the most important discovery ever made at an MPG meeting, this vignette does, indeed, describe my first encounter with the group, and it also serves as an excellent representative of the spirit of engagement that the members exhibit. MPG members reported over and over again in observed settings and in follow-up interviews about their passionate investment in reducing pain and improving health. They also reported that the MPG has been instrumental in their efforts to do just that. But that combination of passion, commitment, and past success does not mean that the efforts of the MPG are easy or even entirely successful. Indeed, there are many challenges that face the MPG as the members attempt to establish and refine a fifth pain configuration. The long-standing hegemony of pain as indexical sign and the more recent prominence of pain as nociception are only two of these challenges. Integrating perspectives from the over twenty different subspecialties that comprise the MPG constitutes a challenging feat of interdisciplinarity. Members from different disciplines not only come to the MPG embracing different pain configurations, they also have fundamentally different views concerning the metaphysics of the human body, the ontology of disease, and the proper epistemology for health and/or medical science. These fundamental differences in defining pain, in interpreting data, and in understanding the body make it difficult for MPG members to embrace research from disciplines whose basic concepts do not match those of their own.

Nevertheless the MPG as an organization and the members as individuals are strongly committed to establishing a new approach both to pain science and medicine. They seek a new configuration that integrates both the insights from prior configurations as well as the myriad number of disciplinary approaches to pain management. They hope to foster a new form of medical practice that utilizes therapies and interventions from a wide variety of practices to pursue new—sometimes grander—goals for healthcare. The MPG actively pursues these goals despite the many challenges from traditional disciplinary medicine, pre-established pain configurations, and the political/economic forces of the medical-industrial complex. In this chapter, I will explore the discursive work of the MPG. More specifically, I will interrogate the mechanisms through which the MPG confronts and seeks to overcome disciplinary incommensurability. However, before I can delve into the details of
the MPG’s work, I must begin with an excavation of the rhetorical and practical exigencies that have helped both to establish and shape the MPG. This opening section will explore the philosophical and practical anxieties that have led to the establishment of common goals among the various disciplinary stakeholders within the MPG. Following this excavation, I will argue that incommensurability theorists have overreached in their attempts to use one thesis to explain both the barriers to interdisciplinarity and the challenges to theory change. In refocusing incommensurability theory more narrowly, I use it as a framework to explain 1) the discursive mechanisms that establish and perpetuate the MPG’s collaborative discourse, and 2) the nature of that discourse. Finally, this chapter will conclude with a discussion of my own interventions in the MPG and my attempts at helping the membership develop even greater interdisciplinary synergy.

**Common angst, shared goals**

In the last chapter, I began to explore the broader exigencies that led to the establishment of the MPG. The four long-standing pain configurations and their particular histories are active participants in the discursive reality that MPG members face. As such, I will begin my exploration of the MPG where I left off in chapter 1, *viz.*, with the origins of the fifth pain configuration in the early 1970s. While the objectification and subsequent medicalization of pain began as early as the advent of modernity, medical science of the 1970s took the discourse of pain to a previously unreached level of complexity. The 1970s marked the rise of the International Association for the Study of Pain (IASP), the first major professional body with pain as its primary object of knowledge. The founding of this *multidisciplinary* body of healthcare providers and researchers ushered in a new era of pain inquiry and pain management healthcare. Capitalizing on the research of previous eras, the IASP and its affiliates pursued a broad research agenda designed to unify the preexisting pain configurations. Indeed, the researchers of this era actively investigated pain as nociception, psychological pain, and pain as statistical construct—each of these research agendas continuing to the present.

These clinicians and scientists invented instruments like the Numeric Pain Rating Scale (NPRS) to help quantify pain and measure the success of pain management. The now widely used McGill Pain Questionnaire defines a list of acceptable adjectives for describing pain, e.g. tugging, burning, splitting, nagging, and dreadful (Melzack 1975). They divided pain into identifiable subtypes: somatic, neuropathic, and psychogenic. They developed statistical methods for quantifying the impact of pain on the patient’s quality of life, psychological well-being, and economic livelihood. Additionally, this flurry of research into the nature and treatments of pain fostered the development of multiple agencies that regulate and certify practitioners’ qualification to practice pain management
(International Association for the Study of Pain, American Pain Foundation, American Board of Pain Medicine, American Pain Society, American Academy for Pain Management). There are fellowships, internships, and student clinical rotations in pain medicine. There are now several disciplinary journals devoted exclusively to the study and treatment of pain: *Pain, Pain Practice, Pain Medicine, Pain Physician, Journal of Pain*. In short, the study of pain has become a science, and the practice of pain management healthcare has become its own amalgam of technoscientific organizations and practices.

Foundational to this new engagement with pain was (and still is) the attempt to establish a hybrid configuration, and a hybrid configuration was only made possible by the establishment of a new hybrid model for health in general. This new model—dubbed the biopsychosocial model—was pioneered by Engel and presented to the broader medical community in a 1977 article in *Science*. In this article he objected to the reductive biomedical model of disease that was then (and to a certain extent still is) ubiquitous across health disciplines. As an alternative, he suggested an approach grounded in systems modeling that treats biological, social, and psychological factors as coequals in an interactional matrix of causality for disease. Deconstructing the mind/body dichotomy, Engel cautioned against treating the physical body separately from the mind and recommended instead that healthcare should recognize “the psychobiological unity of man” (p. 133). Though this new model certainly has not become uniform across the medical disciplines, it is nearly ubiquitous in contemporary psychology and, additionally, it serves as a foundational construct for efforts to establish a new pain configuration.

However, this program of new research, treatment, and administration has presented the pain management community with perhaps more questions than answers. In their efforts to establish an approach to pain which bridges the insights from multiple configurations, pain scientists have run up against several challenges that delve into the core of Western technoscience. These challenges manifest themselves in a variety of forms, but have ultimately contributed to profound metaphysical and epistemological anxieties for pain science. As I have suggested, the process of attempting to forge a hybrid configuration of pain has forced the pain management community to directly confront the problem of the mind/body dichotomy—i.e., they are continually presented with issues that force them to question their preconceived notions concerning the metaphysics of pain, the nature of consciousness, and the fundamentals of the human condition. As if that were not enough, pain science is also challenged by a seemingly insurmountable epistemological problem—namely a lack of data that conforms to the demands of technoscientific objectivity. Fundamentally, nearly all pain data is
subjective, and that is it is acquired through patient report. While that certainly is not a problem for ethnographers such as myself, it is profoundly problematic for medical technoscience.

The broader discourse of pain management that provides the context for the work of the MPG is shot through with these metaphysical and epistemological anxieties. One prominent example of this comes from the IASP’s efforts to develop a hybrid definition of pain—one that combines the insights of both the nociceptive and psychological configurations. The IASP employs a Taskforce on Taxonomy that is charged with creating an interdisciplinary definition of pain and pain related medical language. Underscoring the varied approaches and understandings of pain, the IASP provides definitions of over twenty pain related terms including pain types (e.g. neurogenic pain, allodynia, and peripheral neuropathic pain), pain “syndromes” (e.g. dysesthesia, hyperalgesia, and neuralgia), and pain-related terminology (nociceptor, noxious stimulus, and pain tolerance level). The entry for “pain,” however, is one of the longest definitions available and includes multiple explanatory notes that serve to emphasize the problematic nature of defining and assessing pain. Nevertheless, this definition is one of the first codified attempts to establish a fifth pain configuration—a hybrid configuration that links mind and body:

An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Note: The inability to communicate verbally does not negate the possibility that an individual is experiencing pain and is in need of appropriate pain-relieving treatment. Notes: Pain is always subjective. Each individual learns the application of the word through experiences related to injury in early life. Biologists recognize that those stimuli which cause pain are liable to damage tissue. Accordingly, pain is that experience we associate with actual or potential tissue damage. It is unquestionably a sensation in a part or parts of the body, but it is also always unpleasant and therefore also an emotional experience. Experiences which resemble pain but are not unpleasant, e.g., pricking, should not be called pain. Unpleasant abnormal experiences (dysesthesias) may also be pain but are not necessarily so because, subjectively, they may not have the usual sensory qualities of pain.

Many people report pain in the absence of tissue damage or any likely pathophysiological cause; usually this happens for psychological reasons. There is usually no way to distinguish their experience from that due to tissue damage if we take the subjective report. If they regard their experience as pain and if they report it in the same ways as pain caused by tissue damage, it should be accepted as pain. This definition avoids tying pain to the stimulus. Activity induced in the nociceptor and nociceptive pathways by a noxious stimulus is not pain, which is always a psychological state, even though we may well appreciate that pain most often has a proximate physical cause. (IASP, 1994)

In this effort at a hybrid pain configuration, the IASP succeeds in unifying the physical and the psychology, but that success is fraught with dissonance. The definition is undeniably hybrid, but
certainly not synthetic. Indeed, the second paragraph almost directly contradicts the first. Though pain is defined as subjective and emotional, and the definition takes great care to divorce the medical understanding of pain from a physical mechanism of injury, the link to physical stimulus is ever-present. The definition directly relates the subjective-emotional experience to "actual or potential tissue damage," "description in terms of such damage," and "injury in early life." Pain is explicitly described as physical in the statement, "It is unquestionably a sensation in part or parts of the body." Yet at the same time the definition works against this physically-grounded conception of pain, stating that pain is "emotional," "always subjective," "learned," not identical with "nociception," and "always psychological."

These problems with the definition do not go unrecognised. Dr Michelson, an osteopathic surgeon, bioethicist, and speaker for the American Academy of Pain Management (AAPM) specifically objects to the IASP's approach as "neo-dualist." In a follow-up interview when asked what he thought about the IASP's definition, he replied,

I ignore it as much as I can, because it obscures the difference between perception and experience. There's no way to reconcile these two uses of the word. Unless you acknowledge they are separate and that one is objective and one subjective. You're lost using the same word to describe two entirely different events—neurobiologically and phenomenological.... Here's the paradox of my position. It makes me sound like a dualist—that I'm creating a dual nature of pain, when I think the people that try to integrate them, they are the neo-dualists who think that thinking and feeling are fundamentally separate. (Michelson Interview)

Michelson fundamentally objects to the notion that there can be a "real" event and a subjective experience of it. He sees consciousness as a fundamentally unified entity and that is the reason for his accusation of neo-dualism. In further discussion with Michelson he elaborated on his objection and in so doing rejected any distinction that treats conscious processes differently:

[T]here's been 2500 years of philosophical polemic that there's an ontological difference between epistemology and hermeneutics, but there's not at a neurophysiological level. Internal versus external: that is the subjectivity of consciousness. Consciousness is the awareness of perception. To separate epistemology and hermeneutics is contextual only. At the neurobiological level they are the same. (Michelson Interview)

In objecting to the neo-dualism of the IASP, Michelson offers pain scientists and managers a fundamentally different approach to pain—still hybrid, but in competition with the IASP definition. Michelson's approach to pain is explicitly phenomenological and grounds itself in the practices of narrative medicine. What makes Michelson's approach distinct from other approaches is that his focus is not so much on the nature of pain so much as it is on the "phenomenology of suffering." He defines "pain" as one of many negative stimuli which can cause suffering, and "suffering" as "the loss
or fear of loss of the integrity of personhood, a threat or potential threat to the autobiographical self” (Michaelson, AAPM presentation, November 2008).

Though the IASP definition of pain and the phenomenology of suffering provide two possible approaches for moving forward with a hybrid pain configuration, they do not entirely resolve the metaphysical angst in the pain management community. Indeed, it would be very impressive if the last few decades of theorization were sufficient to overcome the “2500 years of philosophical polemic” that has served to firmly establish the dualisms of modernity. Additionally, this anxiety is exacerbated by the disciplinary specialization in the medical sciences. Various sub-specialties tend to have metaphysical predispositions when it comes to the nature of pain. Physiologically-oriented disciplines such as neurology, anesthesiology or physical therapy tend to focus on the physical dimensions of pain, whereas psychologically-oriented disciplines such as psychology and psychiatry focus on the mental dimensions. This is the case even when they also accept the IASP definition. For example, contemporary research journals devoted to the study of pain begin with the IASP’s description of pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage.” However, after doing their due diligence in referencing the definition provided by the most recognized international pain studies organization, authors tend to default to a more limited disciplinary conception such as, “physiological pain is initiated with the generation of action potentials of specialized sensory nociceptor fibers innervating peripheral tissues. The action potentials transmitting somatic pain are conducted to the CNS by forming a three-neuron chain transferring nociception to the cerebral cortex” (Riedel and Neeck 2001 p. 405) or, alternatively, as simply “[a subjective] conscious experience” (Jackson, Rainville, Decetey 2006 p. 5). As these descriptions suggest, medical science describes pain in multiple, sometimes conflicting, and seemingly incommensurate ways, thereby exacerbating the metaphysical angst. As the specialized object of different disciplinary discourses, pain becomes two, or more, very different phenomena knowable through different conceptual apparatuses, technologies, and vocabularies.

And if an episteme-shattering metaphysical conundrum is not enough for pain scientists and clinicians, the contemporary discourse of pain also faces a profound epistemological challenge. As explored in the previous chapter, the culture of EBM has helped to inaugurate both a broad new approach to medical research and a pain configuration—pain as statistical construct. The demands of modern science generally and EBM specifically require objects of investigation that are scrutable and describable within the privileged authoritarian structures of technoscience. Unfortunately, this requirement creates a great deal of angst in the pain management community. It is a fundamental
The science of pain management and the science of pain is tough. We really don’t have a way of truly measuring pain. Animal studies are not measuring pain, they are measuring pain behavior. We can measure the response of nociceptors, but that’s not pain. People can have chronic pain without chronic nociceptive action. A lot of the inferences are very indirect.… (Boyson interview)

Here Dr. Boyson points to what would be the privileged mechanisms for investigating pain. He laments that there is no direct way of assessing patient pain. He identifies pain science as “tough” because pain can only be investigated through surrogates like behavior or nociception. As previously noted, one of the common ways of addressing this issue is by borrowing from the pain as statistical construct configuration. Researchers and practitioners assess pain by asking patients to quantify it. However, this approach still does not allow pain scientists to escape their epistemological angst. As MPG pharmacist Dr. Benedict explains,

Pain can be pretty subjective and treatments—so much patient variability. What may work for me, may not work for the next person. My level of tolerance is not the same. Physicians and practitioners have to juggle this. If somebody says [the pain is] an 8, they have to change their minds, the scale in their minds. An 8 for that patient may not be an 8 for the next patient. I think the inter-patient variability is probably the biggest challenge in knowing what works and doesn’t work. (Benedict interview)

Here Dr. Benedict explains how pain science is challenged by a patient variability that creates a significant issue for medical practice. The concepts of pain threshold and pain tolerance are still very much a part of contemporary pain discussions. In addition, however, a new challenge has been brought forth by the psychological and hybrid pain configurations. Threshold and tolerance are not stable from culture to culture or person to person. A recent study has even indicated that redheads have lower pain thresholds and tolerance and therefore require more anesthesia than those of other hair colors (Binkley, Beacham, Neace, Gregg, Liem, and Sessler, 2009). With new information of this type being published every year, it is no wonder pain scientists and clinicians are epistemologically vexed.

Dr. Michelson even ties the data-validity question back to the definitional one. He links the problem of the nature of pain directly to the epistemological anxieties that come from measurement:

I think there’s great confusion in medical practice about the definition of pain and suffering. Traditionally, physicians see “suffering” as the affective experience of pain which can’t be true if you understand [that] the subjectivity of something means you can’t measure it, just as you can’t measure pain. The subjectivity makes it immune to validation, and immune to objective measurement. There are people who’ve tried to measure pain and suffering, but one
of the first things those concerned will admit [is] there’s no algometer, no dial on somebody’s
forehead. As long as you can’t read it out you have to rely on the patient’s report. A lot of
physicians don’t trust patients. They think that subjective reports are inherently unreliable,
untrustworthy. In that perception of untrustworthiness they demean the experience of pain
and suffering. (Michelson Interview)

These metaphysical and epistemological anxieties that Dr Michelson has so aptly described provide
the contextual background for the work of the MPG. In the midst of great controversies concerning
the competing pain configurations, the mind/body duality, and a subject of study which is “immune”
to objective investigation, the MPG is attempting (as part of an international conversation) to forge a
new approach to pain—one that resolves these anxieties.

**The twin faces of incommensurability**

Accomplishing this goal, thereby resolving the angst and establishing a viable fifth pain
configuration, will be no easy task. Here incommensurability theorists will recognize that two
different and challenging problems face the IASP and its affiliates. 1) In the case of pain medicine,
the establishment of a hybrid pain configuration predicated on insights from multiple fields of study
presents the challenge of cross-disciplinary incommensurability. And, 2) the ultimate establishment
and legitimization of this new configuration would constitute a non-cumulative developmental
episode—for lack of a better term, a revolution—in pain science. As Kuhn pointed out, such
revolutions are very disruptive and interrupt the procedures and investment of what he called normal
science. While each of these issues—1) cross-disciplinary conflict and 2) “revolutions”—lie at the
heart of incommensurability studies, this co-location constitutes a serious theoretical problem. In
short, I argue that the simultaneous use of the incommensurability thesis in explaining barriers both to
multidisciplinarity (the coordination of MPG disciplines) and theory succession (the establishment of
a hybrid configuration) blunts the explanatory utility of said thesis.

Certainly theory contestation is an important element in theoretical transformations such as
the shift to a hybrid pain configuration, but with increasing frequency interdisciplinary
conflict/collaboration is becoming a progenitor of such change. Indeed, STS literature has provided
numerous examples of this including the work of Fujimara (1992), Galison (1997), and Haraway
(1997). All sorts of new scientific endeavors are rejecting monodisciplinarity and pursuing
collaborative agendas in the search of new approaches, methods, and theories. Galison’s *Image and
logic: The material culture of microphysics* concluded that contemporary physics cannot be
understood as a homogenous or unified discipline. Rather contemporary innovation and change in
microphysics occurs at the intersections among multiple—sometimes contradictory—subdisciplines.
In a section entitled “The Many Cultures of Physics,” Galison explained his approach as an exploration of the “polycultural history of the development of physics” (p. 782). Indeed, his work interrogated how “Different traditions of theorizing, experimenting, instrument making, and engineering meet—even transform one another—but for all that, they do not lose their separate identities and practices” (p. 782). Indeed, it is not only industrial-scale physics that is embracing multidisciplinarity; the biomedical sciences are also moving in this direction.

Fujimara noted in the early 1990s that at least some scientific endeavors have shifted away from a disciplinary-orientation and towards a problem-orientation. For example, he cited cancer research which occurs at the intersections among clinicians and a wide range of medical researchers including those working “in the fields of radiology, epidemiology, oncology, endocrinology, neurology, and pathology” (p. 180). Similarly, Haraway identified two primary exemplars of contemporary science: transuranic elements and transgenic organisms. Each of these relatively new areas of technoscientific inquiry is predicated on broadly multidisciplinary collaboration. As she explained regarding transgenic organisms:

More than 60 percent of all the biological and biomedical research funded federally in the United States by the mid-1990s used the techniques of molecular biology and molecular genetics. Two conclusions from that statistic are obvious: (1) Molecular biology has major importance in practically every area of biology and medicine; and (2) fundable questions in the life sciences have conformed drastically to those compatible with the practice of biology as molecular biotechnics. (Haraway p. 57)

Whether one adopts the term multidisciplinary or polycultural, the conclusion is the same: with increasing frequency scientific projects are occurring in diverse contexts. And if the insights of STS scholars are not enough to prove the point, all one needs to do is spend a few minutes browsing funding opportunities offered by the National Institutes of Health (NIH) or the National Academy of Science (NSF). Many (and probably most) granting mechanisms now include interdisciplinarity as a requirement. Given all this, multidisciplinarity as progenitor of theoretical change is an excellent beginning for my accounts of the discourse of the IASP, AAPM, and the MPG. The mere existence of structural requirements like the NIH or NSF interdisciplinary mandates is not enough to ensure successful collaboration. Indeed, it almost goes without saying that collaborating across disciplinary boundaries is a challenging and sometimes elusive proposition. Nevertheless, there is a growing body of evidence that documents that successful collaboration can and does occur.

Despite all this, explaining both cross-disciplinary conflict and theory succession under the rubric of incommensurability still leaves RTM with a serious theoretical quandary. As Harris (2005)
elaborated in his detailed summary of incommensurability studies in his *Rhetoric and Incommensurability*.

Both Kuhn and Feyerabend were strongly motivated by the synchronic matter of communicative blockage during theory contestation (the same moment when two programs are on the disciplinary table at the same time), a phenomenon routinely called theory succession in the incommensurability literature, emphasizing a concern with dominance and displacement. But they both were also concerned with the diachronic matter of a modern scholar (a philosopher or a historian more than a scientists) confronting a long obsolete program; Kuhn more so than Feyerabend. Incommensurability, the diachronic phenomenon, does not look like the same creature as incommensurability, the synchronic phenomenon. (Harris p. 24)

Though Harris does not expand greatly on this issue, I believe the distinction he made between *theory contestation* and *theory succession* is critical for incommensurability scholarship. As the above excerpt suggested, even the periods of theory contestation that occur during the process of theory succession are synchronic—they involve the “*same moment* when two programs are on the disciplinary table at the *same time*.” Harris correctly noted, following Kuhn, that diachronic incommensurability is truly only a problem for the science studies scholar, and then only so in the strange space of historical scholarship wherein a researcher attempts to imagine two asynchronous world-views at the same time. Despite the fact that Harris consented to explore both the synchronic and diachronic modes of incommensurability, he did so with skepticism and trepidation. Indeed, he specifically acknowledged that the two senses of incommensurability might not belong “in the same basket” but that he would treat them together largely because of their historical affiliation (p. 24).

While this approach works effectively enough for Harris’ theoretical exegesis, I remain unconvinced that treating theory contestation and theory succession equivalently under the rubric of incommensurability will offer an adequate explanation for the work of the MPG. In order to properly explore my objection to this theoretical co-location, I turn first to the roots of incommensurability’s heterochronicity. As is well-known, treating theory contestation and succession under the auspices of incommensurability can be traced back to Kuhn’s (in)famous *Structure of Scientific Revolutions* (1996) originally published in 1962. Since Kuhn’s work there has been an almost incalculable amount of scholarship devoted to exegesis, support, and refutation of the work in *Structure*. Though the *Structure* is the origination point (at least in Anglo-American scholarship) for both incommensurability studies and accounts of “revolutionary” scientific change, the fact that there is a common origin is a quite perplexing turn of events. *Structure*, by its very nature (and title) is a product of its time—a scholarly era dominated by structuralist inquiry. Indeed, though Kuhn did his best to distance himself from the linguistic metaphors that undergird structuralism, the discussion of
paradigmatic science or “normal science” as a process of “puzzle solving” seems to belie those distancing efforts. Certainly, Kuhn argued that scientific paradigms are different from linguistic paradigms like verb conjugation schemata (p. 23). Furthermore his historiographical recommendations included the following injunction,

The determination of shared paradigms is not, however, the determination of shared rules. That demands a second step and one of a somewhat different kind. When undertaking it, the historian must compare the community’s paradigms with each other and with its current research reports. In doing so, his object is to discover what isolable elements, explicit or implicit, the members of that community may have abstracted from their more global paradigms and deployed as rules in their research. (Kuhn p. 43)

Though discerning the preconditions of rules is not the same activity as identifying rules, it is certainly in keeping with the traditions of linguistic structuralism. (For example, Saussure’s focus on semiology is arguably about determining the preconditions for representation.) Concomitant with this structuralist orientation is Kuhn’s thoroughly synchronic conception of a paradigm. No doubt this synchronicity is a direct result of the culture of structuralism in which Kuhn’s scholarship emerged. Nevertheless, it is downright bizarre (from a contemporary perspective) that Kuhn would offer a synchronic account of scientific change. Perhaps this is one of the reasons that Kuhn’s theory of paradigms still holds modest influence in accounting for the conceptual schemata and basic assumptions of scientific communities, but his idea of radical apocalyptic gestalt-shift style change has been largely discarded. In essence, Kuhn has provided a synchronic account of a diachronic process.

No doubt, at least partially, as a result of this paradox, much of contemporary rhetorical inquiry into incommensurability focuses exclusively on theory contestation. For example, even though Harris’ introduction seeks to address both the synchronic and diachronic aspects of incommensurability, most of his case-studies and those of his chapter contributors focus exclusively on synchronicity. Specifically, Harris’ introduction provides a litany of examples including humans conversing with extraterrestrial aliens (p. 28), Hopi to English translation (p. 31), and the Galvai-Volta controversy in physiological electricity (p. 33). Additionally, the contributors to Rhetoric and Incommensurability provided case studies on a range of topics including sociobiology (Ceccarelli), spousal violence research (Prelli), Darwinian evolution (Campbell), and electromagnetic fields (Miller). Even in cases such as Campbell’s exploration of the biological theory succession, the case studies themselves—in so far as they investigate incommensurability—investigate the periods of synchronic theory contestation.
This focus on the synchronic dimension of incommensurability is entirely appropriate. As a synchronic theory, incommensurability has powerful explanatory force in the exploration of case studies concerning multidisciplinary conflict/collaboration and theory contestation. However, it is rather ill-equipped to provide a satisfactory account of theory succession or paradigm revolution. While it might be able to provide a thorough account of the state of affairs in a discipline both prerevolution and postrevolution, the synchronicity does not allow for the interrogation of the mechanisms of change. This does not, however, mean that incommensurability theory should be jettisoned in favor of a diachronic model. As previously mentioned, interdisciplinary conflict/collaboration and periods of theory contestation are sometimes integral parts of technoscientific change. In responding to this problem of the twin faces of incommensurability, I will continue to employ the incommensurability thesis in my exploration of cross-disciplinary collaboration in the MPG. Indeed, this will be the focus for the remainder of this chapter. In the next chapter, I will use, instead, resources from critical/cultural theories of agency and change in order to interrogate the rhetorical mechanisms of theory succession.

**Pragmatic commensurability, establishing a trading zone**

As this section heading suggests, pragmatic commensurability and integrative exigencies (Wilson and Herndl, 2007) are the key avenues to successful multidisciplinary collaboration that I will explore. Before I do that however, I want to take a moment to highlight the fact that the problem of incommensurability is not one that escapes the MPG. Though the MPG members are not, I assume, very familiar with rhetoric, STS, or incommensurability studies, their daily practice in and between seemingly incommensurate communities keeps such issues present to mind. For example, during a presentation on fibromyalgia—a chronic disorder characterized by widespread bodily pain—the speaker—a neurologist who specializes in pain disorders spoke at length on the problems that can arise from disciplinary acculturation:

I want to talk to you briefly about this whole business of defining things. People will say to you, “If it walks like a duck and talks like a duck, it must be a duck.” You’ve heard that expression right? …. But some other people say, “If the duck has a beak and a tail, and the beak is on the tail, someone may be talking out of their arse.” I’m obviously not talking about ducks; I’m talking about fibromyalgia. This is how we come to know things. We’ll recognize it when we see it, because we were always told how to look at it. So perception is preceded by the blending of our acculturation and our experience, so that it is slightly colored. That is a concern that we have to be careful of as we go through this. The culture of medicine can go blindly forward for generations, so I think it’s very legitimate. We all know the stories about the ghoulish surgical aprons that were worn from one surgery to the next infecting every patient as it went. (Heisenberg MPG Presentation February 2008)
Physiologist Dr. Fitzpatrick echoed this same concern in a follow-up interview, “[H]uman beings, by and large, will not let facts stand in the way of behavior. There are lots of preconceived notions that exist that drive behaviors. And even the presence of fact doesn’t seem to make a whole lot of difference” (Fitzpatrick Interview). From these two excerpts, the multifaceted problem facing MPG members begins to become more clear. These excerpts indicate a keen awareness of the notion that disciplinary acculturation can inhibit change, present problems for theoretical definitions, and adversely affect medical practice. The stakes of these difficulties are perhaps even higher in interdisciplinary environments such as the MPG. Multiple conflicting disciplinary perspectives provide multiple challenges to both theory building and medical practice.

Nevertheless, as noted, interdisciplinary collaboration is routine in contemporary technoscience. This recognition of the fundamentally interdisciplinary nature of contemporary technoscientific praxis presents serious questions for the doctrines of impenetrable incommensurability which arose from the work of Kuhn and Feyerabend. Rejecting the notion of “brick-wall incommensurability,” rhetoricians like Lessl (2005) and Harris (2005) have sought to make the understanding of “incommensurability” more practical and applicable, in the former case substituting the more palatable “seemingly incommensurate,” and in the latter case offering rhetorical studies of technoscience a detailed and nuanced “incommensurability suite” with many subtle levels of incommensurability. Harris introduced the concept of “pragmatic” or “value incommensurability,” a term that describes a situation wherein

values can be so entrenched and entangled with terminological meanings, with practices, even with institutions and perceptual possibilities, certainly with premises and argumentative structures, that they can…block solution paths which violate those values, and the acceptance of arguments from others who have rejected or downgraded or never held those values…. (p. 60)

However, just as pragmatic incommensurability can present an insurmountable obstacle to interdisciplinary discourse, its antithesis, “pragmatic commensurability” can foster an environment of sharing and acceptance. As Harris explains, an environment of pragmatic commensurability can “provide rapid passage to solutions and equally rapid acceptance of another’s solution, fostering tight cooperative engagement…” (p. 60).

These situations of pragmatic commensurability can create an exigency for overcoming theoretical, paradigmatic, and/or epistemological incommensurabilities and can foster a value-driven commitment to solving a practical problem with solutions from a variety of perspectives. In *Image and Logic*, Galison argues that technoscience occurs in trading zones between instrument, theory, and experiment (p. 799). He posits that in technoscientific trading zones, there is a constant exchange of
ideas and concepts between the development of scientific instruments, the development of scientific theories, and the conducting of scientific experiments. In Wilson and Herndl’s (2007) exploration of Star and Griesemer’s boundary objects as rhetorical exigence, they describe boundaries as both “lines of demarcation and differentiation [and as] shared social, organizational, and discursive spaces” (132). While boundaries themselves can separate communities and limit exchange, boundary objects like pain capitalize on the shared nature of boundaries to provide the possibility of Galison’s trading zone. As Wilson and Herndl described it, they can foster an “integrative exigency.”

The exigencies MPG members have for seeking interdisciplinarity are varied and complicated. However, some consistent threads have emerged within the data. Obviously, as suggested, there is significant angst over the definition of pain, but this does not represent the full extent of the problems. The recognition (on the part of MPG members) that pain is a concept that transcends dualism comes with a concomitant recognition of the incompleteness of monodisciplinary approaches to the science and medicine of pain. The members of MPG are keenly aware of the effect that their disciplinary inculcation has on their ability to understand and treat pain, and it is this awareness that has led MPG members to seek an organization founded on interdisciplinary equality and multimodal treatment.

The members of the MPG consistently reject the hegemony of any single discipline (including their own) and embrace a multidisciplinary perspective. If this seems like a major perspective shift for individuals who have been through four to eight years of formal healthcare education and up to ten additional years of apprenticeships, residencies, fellowships, and board certifications, it most certainly is. In fact, members of the MPG sometimes refer to these recognitions about the limitedness of their home disciplines and methods and the value of others as a “conversion experience” or an “epiphany”. Gerontologist Dr Olsen described his conversion to a hybrid configuration of pain in precisely such a way:

I suffer from degenerative-disk disease and spinosus. It forced me to exercise a lot and do something that’s beyond pills and surgery. I’ve met a lot of swimmers who are physicians and I ask them what are you doing here. And they say, “I’ve exhausted all the other avenues for pain control, so now I swim, and I go see a chiropractor for my back.” They’ve had a conversion experience based on their own personal health history. And I think that is one way to get into the different integrative areas complementing one another, but working together and seeing patient improvement is another way. There’s a lot of stuff you wonder about the merit of it, but there’s a trend, you see an improvement in the quality of life. (Olsen Interview)
Similarly, physician’s assistant Hamlyn highlighted how potential success with improving patient health contributes to a greater awareness and acceptance of extra-disciplinary treatment options for members of the MPG:

I think that the enthusiasm that the members of the MPG have for the treatment of patients with pain is very inspiring for those of us that do this day to day. Because it is a difficult and challenging role to try to help these patients that have a variety of factors that are contributing to their pain beyond just the physical malady. I think with enough people and diverse fields approach patients with pain, we’re much more apt to be successful. If we look at it in terms of a team approach with the goal of lessening an individual’s pain, and seeing it as a team rather than opposition among the different modalities and disciplines as they treat an individual in pain, it will in the future be more successful overall. (Hamlyn interview)

Though Hamlyn is prognostic whereas Olsen is reflective, they both articulate the goal of improved health with multidisciplinary clinical practice. Indeed, Olsen and Hamlyn were not the only interviewees who, when asked why they joined the MPG, responded with a variant of “because I was interested [in] improving the management of pain” (Boysen Interview). This shared goal—no doubt an extension of the Hippocratic Oath—provides an incredibly powerful integrative exigency for the MPG. A shared commitment to a shared goal is the essence of pragmatic commensurability, and healthcare’s intense cultural investment in patient wellness is a prime exemplar. Indeed, the transformation of this pragmatic commitment into an integrative exigency is even evident in the original version of the Hippocratic Oath, “I will not cut for stone, even for patients in whom the disease is manifest; I will leave this operation to be performed by practitioners, specialists in this art.”

Research into sites of interdisciplinary communication has yielded multiple theories about social and structural exigencies such as boundary objects and trading zones that—for lack of a better term—operationalize interdisciplinary discourse. These socio-structural constructs are, essentially, prerequisites for interdisciplinary communication, and as such they are useful analytic concepts for explaining why/how interdisciplinary communication is possible in certain situations. But these concepts, by themselves, do not explain the rhetorical processes through which this interdisciplinary communication occurs, or how, over time, such collaboration can promote change in a discourse formation such as that of pain science. While I will be saving my discussion of the latter for Chapter 3, the remainder of this chapter will be devoted to exploring how—one the integrative exigencies have helped to foster a trading zone—the discourse of the MPG actually occurs.

**Discursive practices in the MPG’s trading zone**

The MPG became active in 2004 and was, in its infancy, a very informal organization. For years the founder—Dr. Peters, a Doctor of Osteopathy (DO) with five board certifications (two in
pain medicine, one in headaches, one in internal medicine, and one in hospice care), had been working through the difficulties of pain medicine alone in his private practice. Through a combination of his education in pain science/medicine and his experience as a clinician, he began to recognize more and more the need for a multidisciplinary approach to pain (Peters Interview). Following this recognition, Peters invited a few of his close colleges in his referral network—another pain physician, a couple of psychologists, and a pharmacist—to start meeting on a semi-regular basis to talk about the latest innovations in pain medicine. The unnamed pain reading group was formed.

In this early stage of the MPG, Peters and the other members would share recent journal articles on new theories about and/or approaches to pain management. The primary goal was self-education. They would read the articles, meet, and discuss the possible uses and/or limitations of each study. This focus on education and scholarly research (and implicitly EMB), which can be traced back to the founding of the group, continues until today. Indeed, the current incarnation of the MPG mission statement reflects these goals:

The [Midwest Pain Group] is devoted to education and research in pain management. We are a multidisciplinary nonprofit professional organization and feel it is critical to maintain a variety of represented health care professionals within our group. We are not a restricted organization and are open to any health care professional interested in pain and its management.

Primarily the MPG is still a journal club; however, its expanding membership has required changes in venue and format. The setting and format of contemporary MPG meetings are aptly described by the vignette at the beginning of this chapter. Now, it is not atypical for 70-80 practitioners from over 20 different disciplines and subspecialties (including: acupuncture, anesthesiology, alternative medicine, chiropractic medicine, family medicine, gerontology, internal medicine, law, nursing, orthopedics, osteopathy, pain medicine, pharmacology, pharmacy, psychiatry, physical therapy, physiology, psychiatry, psychology, and surgery) to meet at the now regularized meetings which occur the third Wednesday of each month. The opening vignette, while typical of the format and engagement of MPG members, is not however representative of typical content. Though the MPG is often sponsored (at least in part) by pharmaceuticals corporations, those companies seldom provide speakers.

In fact, the vast majority of the presentations are offered by members of the MPG and those presentations are frequently critical of the research supporting the sponsoring pharmaceuticals organization. (Which is one reason why the MPG is always seeking new funding.) Using a combination of money provided through membership dues, educational grants, and pharmaceuticals funding, MPG meetings provide members with meals, drinks, and photocopies of relevant articles and PowerPoint presentations. Typically, drug or medical technology companies will chose to sponsor a
particular MPG meeting. While this sponsorship determines the theme of the evening, it typically does not determine the nature of the discussion—i.e., the majority of MPG meetings are usually balanced in their support and criticism of the sponsoring organization’s product. Meeting themes typically revolve around either an ailment or an intervention. For example, I attended meetings on illnesses such as osteoarthritis of the knee, migraines, fibromyalgia, post-herpetic neuralgia, and failed back surgery syndrome. Additionally, I observed programs devoted to interventions such as acupuncture, spinal cord stimulation, pregabalin therapy, physio-therapy, cognitive-behavioral therapy, and sim-disk injections.

Since the open-ended discussion model which served the group in its infancy would be logistically impossible given the MPG’s current size, the organization has developed its own suite of presentation genres—adapted from common genres and healthcare and education more broadly. These presentations now serve as the foundation of discussion as much as the research on which they are based. I have labeled these dominant presentation genres—which developed organically and informally—article summary, article synthesis, basic science presentation, and practice reflection. In a 12-month sub-set of observed meetings 41 different presentations were delivered at the MPG. Figure 1 below details what percent of the presentations delivered were of each genre.

![Figure 1: Percent by Genre of MPG Presentations During a 12-Month Sample.](image)

As the chart indicates, the majority of presentations during this period were article summaries with the remainder being somewhat equally divided among article synthesis, basic science, and other. Practice reflections were the least represented genre.
Each of these presentation genres comes with its own format and conventions, and each has its own affordances as far as the type, quality, and duration of conversation it evokes. The article summaries—much as the name suggests—are straightforward recapitulations of a selected clinical study. Typically these studies are clinical efficacy trials and come from a wide range of journals including but not limited to *Neuroscience, Journal of Pain Symptom Management, Pain, Archives of Physical Medicine/Rehabilitation, Headache, Cephalgia, The Clinical Journal of Pain, Pain Medicine,* and the *Journal of Opioid Management.* The accompanying presentation and PowerPoint slides are typically arranged identically to the research article with traditional generic slots for introduction, background, subject selection, study methods, results, discussion, limitations, and conclusions. Typically, the presenter will highlight additional study limitations not raised by the author(s). Most MPG meetings begin with a prominent efficacy trial for a pain management drug or procedure promoted by the evening’s sponsor—typically a drug company. This material exigency is no doubt one of the primary reasons for the dominance of this genre.

Article syntheses are much like truncated oral versions of review articles. A member of the MPG will select approximately three to six recent articles on a topic, and, of course, this topic would be selected based on the theme of the meeting. The selected articles would sometimes all be from a single discipline such as orthopedic surgery in the case of one presentation on chronic low back pain, and, in other cases, would be intensely multidisciplinary. One article synthesis on fibromyalgia included articles from pain medicine, physiology, psychology, and physical therapy. As the genre label suggests, these presentations were typically synthetic in nature and would attempt to provide listeners with a brief synopsis of the state of current knowledge regarding the subject at hand.

Basic science presentations are probably the only genre explicitly recognized by members of the MPG. These presentations—typically delivered by a physiologist or a neuroscientist—aim to inform members about nature and cause(s) of a given ailment. These presentations due to their nature are generally very biomechanistic. Adopting the standard nomenclature of Western biomedicine, these presentations typically explain the “etiology” and “pathogenesis” of the chosen disorder. Etiology and pathogenesis are the subfields of medical science devoted to identifying the specific cause(s) and clinical progression of diseases.

Finally, practice reflections articulate recent research with the clinical practice of the presenter. Practice reflections are a variable genre and can take several different forms. The most common and broadly known form of practice reflection is the case-study. These presentations explore the successes and failures involved in treating a particular patient. Case-studies explicitly recognize that the subject selection criteria of clinical trials is designed to eliminate variables and thus elides the
complexity of many patients. Pain patients, in particular, typically have complicated case histories and a variety of comorbid conditions that complicate treatment. Exploring the nuances of one specific patient allows MPG members to reflect on the articulations between the ideals of academic research and the reality of clinical practice. The other common variant of the practice reflection is a hybrid genre which unifies conventions from both the article-based presentations and the case-study. This variant usually follows the format of an article summary or synthesis but pauses frequently along the way for the presenter to reflect on a patient s/he once had that is relevant to the issue at hand.6

Every presentation, regardless of genre, is designed to initiate conversation among the membership. (Of course, success in generating discussion often varies according to presentation content, presenter style, and presentation genre.) The discussions following article summaries and syntheses often revolve around study limitations—both in design and statistical reliability. Questions following basic science presentations are often solely clarifying in nature. However, the discussions following practice reflections are often quite engaged with explanation of the supporting or dissenting case and debate over clinical applicability. The discussions following each genre are the points at which members share information across disciplinary specialties and, thus, at which the group confronts the differences between disciplinary languages and research traditions. In these post-presentation discussions members frequently talk “off-label,” discussing treatments, theories, and practice that violate the tight regulations imposed by disciplines, regulatory agencies and insurance company policies.

Talking “off-label” is the metaphor coined by one of the group members as he deferred certain questions to the “unofficial” discussion that would follow his presentation of data from clinical trials. Talking off-label became a metaphor for the larger efforts of the MPG to overcome the reductive vocabularies and narrow treatments of pain that follow from narrow disciplinarity and regulatory restrictions. The label on a prescription drug, especially the Schedule II opiates that are often prescribed for severe pain, is a highly specific product of scientific trials, legal disclaimers and responsibilities, and regulatory approval processes. The drug label compresses an enormous amount of scientific, legal, and regulatory discourse into a localized and binding statement. The drug label is the epitome of the regulatory rules of discourse in Foucault’s theory. MPG members must talk off-label in a variety of ways to accomplish their goals and to navigate restrictions on the dialogue between research and clinical practice. They must discuss pain as understood outside their discipline. They must discuss treatment interventions not common to their fields. They explore research from different methodological paradigms. And they explore unsanctioned indications of approved treatments. All of this off-label discussion is the space in which MPG members step outside their
disciplinary restrictions and those of the medical-industrial complex and attempt to foster a better understanding of pain science, thereby improving the practices of pain management.

**Rhetorical Intervention**

As a participant-observer for two years, I find it difficult not to both support the goals of the MPG and to be frustrated by the pace of progress. I suppose a traditional ethnographer would accuse me of inappropriately having “gone native.” Of course, I’m a critical action researcher, and as such, I am bound by a different ethics of intervention. In studying a group whose goals I support, I see it as an ethical responsibility to contribute productively to those goals in what ways I can. Obviously, I already contributed to those goals in accepting the position of MPG Webmaster. Though perhaps even the more traditional ethnographer would forgive that since it was the requirement for negotiating access, but, I still felt the need to do more. As a rhetorical theorist with a long-standing interest in the challenges to and the mechanisms for overcoming incommensurability, I felt that I might have a unique and helpful prospective to offer the MPG. I felt that I could contribute to their overall productivity by offering suggestions on how to improve the efficacy of their communications practices. So near the end of my observational period, I made arrangements to present at one of the MPG meetings.

As a scholar of technoscience, I have a reading knowledge of many successes in cross-disciplinary science. I have read the reports of researchers in sociology, history, and rhetoric as they trace the successes and failures of multidisciplinary projects in theoretical physics, missile engineering, toxicology, nanotechnology, evolutionary biology, and much more. While a great number of these studies offered helpful suggestions that might apply to the MPG, three seemed particularly relevant. As I have already discussed above, the concepts of pragmatic commensurability and integrative exigencies were critical in the formation of the MPG. While the MPG members’ shared commitments to patient health and transforming pain medicine provide the motivation for interdisciplinarity, they do not ensure success. Nevertheless, I believe several allied concepts from incommensurability studies can help foster increased success within the MPG.

In his exploration of the methodologists, instrument makers, and theorists of particle physics, Galison adopted the anthropological notion of the trading zone as his explanatory heuristic. His research demonstrated that even when there are profound epistemological differences among competing disciplines, they can, and do, work productively together in sites of local coordination. When collaborating on a shared goal, they develop pidgin languages that help them in their efforts. As Galison explains, “I invoke this anthropological scene for the specific purpose of illustrating how
sharply different global meanings can nonetheless come to (even very complex) coordination in specific contexts” (p. 804). It is the locality and specificity of the contexts that are so instrumental in this case of multidisciplinary success. When the varied disciplines interact on an abstract or theoretical level, their discussion is replete with conflict and controversy, but in the specific contexts of a local task, they collaborate and coordinate.

Similarly, Bazerman and De los Santos have investigated the coordination of disparate methodologies form toxicology and ecotoxicology. This coordination amounts to a specific and local extension of the pragmatic commensurability. As was explained above, the existence of pragmatic commensurabilities form integrative exigencies, and multidisciplinary workgroups can capitalize on those exigencies by working at a local scale. The toxicologists and ecotoxicologists of Bazerman and De los Santos study did not have well-aligned disciplinary goals, but they did have a shared set of specific practical goals that had go to with policy and legislation:

Unlike Kuhn’s vision of science, where practitioners seem free to follow the theoretical and practical commitments of their paradigms, fields like toxicology and ecotoxicology must be responsive to the complexity of applied problems, and changing economic, political and regulatory climates. They do not have the insulation from practical concerns that would allow the luxury of incommensurability with the accompanying methodological intolerance and ontological blindness. The pressures are great to attend to all data and phenomena that might be construed as relevant by the social, economic, and political sponsors…. Here application broadens the vision and mitigates methodological obstinacy of a field to allow a fuller understanding of the issues, acceptance of a greater range of data and phenomena, and tolerance of more methodological tools. (Bazerman and De los Santos p. 459)

Here Bazerman and De los Santos explain the integrative exigencies brought about by their subject’s application of abstract theory to practical goals. The structural and material constraints of specific applications did not allow the subjects to rest on the laurels of their disciplinary preconceptions and forced them not only to appreciate, but also to use the methodological resources of the other discipline.

Finally, I turn once again to Wilson and Herndl’s investigation of missile engineers and LANL. Much like the above two cases, Wilson and Herndl’s multidisciplinary group worked in a specific local environment where the members had a coordinated goal—in this case missile defense. Once again the locality and specificity of the project were key to successful collaboration. However, the collaborative process was further aided by rhetorical intervention. Wilson and the other members of LANL’s Systems Ethnography and Qualitative Modeling group were able to use their expertise as social scientists to map the various knowledges at work in the missile project. As Wilson and Herndl explained,
The knowledge maps we created and shared with project participants encouraged cooperation and mutual understanding rather than the slash-and-burn rhetoric of demarcation events. When technical experts discuss the parts and subfunctions they have made, they get to describe their local practice, explain their knowledge, open up their community-specific lexicon within the ecological relations of the boundary object. As they trace the lines connecting the boxes on the knowledge map, participants articulate communities of practice, each distinct but also connected through the boundary object. (p. 144).

Once again, having a specific, local, and shared object helped to foster integration and collaboration, though not homogenization. In each of these cases, we can see how increasing locality when combined with pragmatic goals and shared (boundary) objects can help produce multidisciplinary exchange and progress. Knowing this tradition of research, I wanted to see how it would apply to the MPG and what suggestions I could offer to help the members improve their collaboration.

My instinct after having investigated the MPG for over two years suggested that they were experiencing only partial success. So, I returned to my field notes and transcripts in an effort to determine which areas of the MPG discourse seemed most successful. I hoped that in identifying these areas, I would be able to capitalize on their strengths and improve upon them using my knowledge of the history of incommensurability studies. One of the first places I looked was to my participant interview transcripts. I saw interview discussion indicated positive valence and feelings of success with regard to certain aspects of the MPG discourse. Members of the MPG reported over and over again how much more productive their work seemed to be when the presentations offered promoted engaged cross-disciplinary debate and conversation—i.e., off-label discourse. For example, Dr. Boysen extolled the virtues of off-label discourse in the wake of presentations over methodologically weak articles:

I think what was useful was not….some of the—I have to put this in quotes—“scientific” papers were less than well done. It was useful to discuss them, but I think some of the discussions about the approach to certain difficult pain problems was useful. There isn’t necessarily a standard way that you can get results. I think getting feedback from a variety of different providers there was quite useful. (Boysen Interview)

Similarly Dr. Bennetti reported that the off-label discussion with its engagement from multiple disciplinary perspectives is one of the most effective means at working towards a nonmodern—or in his jargon “mosaic”—understanding of pain, “When you sit in a group like that and start to put all the pieces of the mosaic together, you start to see the whole picture. The impact on the psychology, the basic science, the attorneys that deal with patients caught in a vortex of [legal and disability issues.]” (Bennetti Interview). This excerpt is, of course, highly suggestive when compared with the results of Bazerman and De los Santos’ study of toxicologists and ecotoxicologists. It hints at
a replication of their results in that medical practitioners must also confront a complicated legal/regulator milieu, and that confrontation may foster integration and collaboration. From these interviews, I will offer one more relevant excerpt from my conversation with pharmacist Dr. Benedict. Thorough the entire interview, he was highly laudatory of the entire MPG process. He reported that the MPG was much more helpful and successful that other organizations of which he was a member. When I asked him why, he immediately indicated the off-label format:

I think the format—the Q &A. The openness lends to that. And it’s practitioners. The diversity of the group we have—of all the healthcare professionals—that lends to the success of it. Example, our last meeting the pragmatic trials vs stage III trials/ phase III trials. Pragmatic ones are really applied to practice settings rather than textbook science settings. We have practitioners in the audience, academicians, nurses, pharmacists, physical therapists, all have questions and everybody gets to ask how it effects or what it means for me and my practice area. Everybody hears that and learns from it. That’s probably the most beneficial or successful. (Benedict Interview)

Here, Dr Benedict links two important issues for cross-disciplinary collaboration: the off-label discussion and a pragmatic orientation. Again the shared commitment to improving patient care made presentations that highlighted pragmatic issues more interesting and engaging, and subsequently in Dr Benedict’s estimation, more successful.

So out of these interview excerpts a hypothesis emerged—viz., that presentations that were more pragmatic would foster more off-label dialogue and would subsequently be more efficacious. When it comes to efficacy, the only real index I have of that is my own sense as a rhetorician and the report of the MPG members, and certainly both of these support the idea that pragmatic discussions are more effective for the MPG. But the question still remained as to whether or not pragmatic discussions helped to encourage more off-label discussions. To help answer this question, I returned to my quantified one-year subset of MPG discussions. In reviewing the transcripts and recordings I used two measures to assess the robustness of the off-label discourse: turn-taking (T-values) and length of discussion. After analyzing the T-values and discussion length for every presentation, I classified the presentations by the above outlined genres (article summary, article synthesis, basic science, and practice reflection). As you can see from the results below the practice reflections were both more effective in higher T-values and longer discussion time:
Figure 2: Mean Utterances by Genre. This figure details the average number of discussion turns by genre. Presentations classified as practice reflection and other generated the most discussion terms on average at 15.5 and 15.8 respectively.

Figure 3: Mean Discussion Time by Genre. This chart compares the average discussion length in minutes and seconds by presentation genre. This data reinforces the t-value figures above in that practice reflections and “other” genres encouraged the lengthiest debate on average. (9:39 and 6:31 respectively.)

These results suggest that the lessons learned from this history of incommensurability studies would apply well to the MPG. More specifically, when the presentations are geared toward practical goals (such as patient care) and when the context is specific and local (particular patients) more off-label dialogue ensues. By each measure of conversational robustness, practically-oriented presentations returned better results than any of the other codified genres. Those presentations in the “other” category are the only ones that generate similarly vigorous discourse. And that too serves to
validate the suggestions made by this history of incommensurability studies. Though the “other” category includes a number of different presentation formats; legal and regulatory issues comprise most of the content of those presentations.

In fall of 2008, I reported these results to the MPG, and recommended that they increase the number of practice-oriented presentations relative to the other genres. Since offering these recommendations the MPG has shifted to a program format that includes a greater emphasis on practice reflection. However, the extent to which my presentation informed that move is debatable. The transformation to a greater emphasis on case-study type presentation also coincided with a change in MPG leadership and the shift in regulations concerning pharmaceuticals funding. Unfortunately, I doubt a simple acceptance of my suggestions and subsequent embrace of practical reflection genres would solve the challenges facing the MPG. Nevertheless, the MPG is still actively working towards the establishment of a nonmodern pain configuration. As that process progresses, off-label discourse is a key aspect. In the next chapter, I will delve more deeply into the transcripts of this off-label dialogue. In so doing, I hope to demonstrate how this discourse is actively contributing to the naissance of the fifth configuration.

1 Taken together this research goes a long way in justifying the inclusion of incommensurability studies in scholarship on scientific change. However, it does not help one escape the problems presented by the use of a synchronic theory to explain a diachronic process. As a response I am suggesting that, rather than being replaced, incommensurability theory needs to be augmented with additional theoretical resources so as to comprise a suite of tools for the STS researcher. Following insights from Foucault (1972), Pickering (1995), Latour (1999), and Koerber (2006), I recommend that scholars scientific change would do well to draw upon the resources provided by poststructuralist approaches to agency. The utility of these approaches for my cases in pain science will be outlined in chapters 3 and 5.

2 In the Structure of Scientific Revolutions, Kuhn went to great lengths to differentiate between paradigms (and by extension incommensurability) as cognitive and as a socio-structural phenomena. It seems that the diachronic sense of incommensurability which plagues STS scholars should be considered an example of cognitive incommensurability. Since my work is primarily concerned with the socio-structural hindrances to interdisciplinary, this sense of the term lies largely beyond its scope.

3 During a member-checking presentation to the MPG, I was explaining how several of the members interviewed used the terminology of “conversion” to explain their motivations for joining the MPG. The audience members objected to the “religious overtones” of “conversion” and suggested that “epiphany” would be a better description.

4 A “board certification” is a recognition of expertise granted to health care providers by various professional organizations such as the American Board of Internal Medicine. Certification requires significant post-graduate education, and in some cases additional examination.
The MPG as described in this chapter was an accurate portrayal during the time of my participant-observations. I have since learned that new regulations for pharmaceuticals funding have resulted in a significant reduction in available funds and a subsequent reduction in attendance. Though, the current funding crisis has forced even MPG members to question the viability of the organization, in keeping with the conventions of this style of study, I will still employ the ethnographic present.

Though this genre could easily be identified as a variant of an article presentation or as an altogether different genre, I include it under the rubric of practice reflection because of the response it generates. The social conventions to responding to each genre of presentation are different in terms of the type of conversation and nature of discussion. Discussion conventions following both types of practice reflections are the same and yet different from the other genres.
Chapter 3: Stases and Transformation: The Midwest Pain Group’s Fight for the Fifth Configuration

Albrecht Dürer, *Rhinoceros*. “I said ‘I think they might also be what are called “hopeful monsters”.’ She said ‘What are hopeful monsters?’ I said “They are born perhaps slightly before their time; when it’s not known if the environment is quite ready for them.’” –Nicholas Mosley, *Hopeful Monsters*.

John Law’s *Sociology of Monsters* uses this image as its cover page, presumably as an avatar of “hopeful monsters.” I use it here because nonmodern pain seems very much to be a hopeful monster—a boundary crossing entity which although long overdue, may also be a bit ahead of its time.
Part of [discipline] modeling is thus what I call bridging or the construction of a bridgehead that tentatively fixes a vector of cultural extension to be explored. Bridging, however, is not sufficient to efface the openness of modeling. It is not enough in itself to define a new conceptual system on the basis of an old one, and instead marks out a space for transcription—the copying of established moves from the old system into the new space fixed by the bridgehead (hence my use of the word "bridgehead"). And, if my example is a reliable guide, even transcription can be insufficient to complete the modeling process. What remains is filling, completing the new system in the absence of any clear guidance for the base models... Bridging and filling are free moves, as I shall say. In contrast transcription is where discipline asserts itself, where the disciplinary agency just discussed carries scientists along, where scientists become passive in the face of their training and established procedures. Transcriptions, in this sense, are disciplined forced moves. (Pickering, 1995, p. 116)

[The MPG] creates a fuller picture of what pain is. You appreciate the complexity of the suffering as it relates to the patient’s whole world. The complex pharmacology, the social interactions ...it’s kind of hard to describe. It’s not an easy thing. Everybody’s got a knowledge-base that they can give you…. It has helped because you interact with other specialists who are interested in pain—physiologists, pharmacologist, basic scientists from the universities, attorneys, psychologists. And what I see is a mosaic of pain. When you sit in a group like that and start to put all the pieces of the mosaic together, you start to see the whole picture. The impact on the psychology, the basic science, the attorneys that deal with patients caught in a vortex of [legal and disability issues.] (Bennetti Interview)

The above epigraphs juxtapose philosopher of science Andrew Pickering’s description of “discipline modeling” with current MPG president Dr. Bennetti’s reflection on its discourse. As Pickering suggested and Dr. Bennetti’s description of the MPG enacts, in cases of multidisciplinary change, members of apparently incommensurate disciplines who come together in a conversation fostered by the kind of trading zone Galison (See Chapter 2) described do not lose their disciplinary identity, nor do they forge new discourses overnight. Rather, the process of transforming a powerful discursive formation and establishing a new trajectory for research and inquiry follows the pattern Pickering described. Certainly in the case of the MPG, members’ commitment to the shared boundary object of pain leads them to establish the interdisciplinary dialogue described in the above epigraphs. As the participants in this conversation establish their off-label dialogue, their discussions become a negotiation between Pickering’s transcription and filling as they struggle to maintain their disciplinary identity while exploring the possibility of a new, transformed discourse on pain science and fifth pain configuration,

As such, the driving question for this chapter has to do with the rhetorical mechanisms whereby the members of the MPG pursue that change and attempt to found a fifth configuration for
pain management. In exploring this question, I will draw on theoretical resources from diverse sources including Foucault and Hemagoras. Essentially, this chapter argues that the MPG’s establishment of a bridgehead constitutes a disciplinary transformation as described by Foucault and that the rhetorical work which grounds that transformation can best be described through the lens of rhetorical stasis theory. However, before I can pursue this line of argument, I must retrace some of recent rhetorical theory as regards Foucault. Following this, I will outline my critical method in more detail and ultimately elucidate the discourse of the MPG using the resources of Foucault’s enunciative analysis and rhetorical stasis theory.

**Rhetoric and Transformation**

When it comes to exploring the rhetorical work of successful resistant discourses, Foucault is not typically a theorist of first resort. Indeed, Biesecker’s ironic question (below) artfully captured the tension inherent in my recourse to Foucault for use in theorizing agency, resistance and change:

> Given that Foucault's work appears to undermine the liberal view of self-determination as the basis and condition of possibility for freedom and seems to have flagrantly dismissed the deeply entrenched view of our discipline that the existing social order -- it's relations of exploitation, domination, and oppression can be transcended through symbolic intervention and collective recognition and resistance, why have we welcomed him into the house that Aristotle built? (Biesecker p.351)

This is a fine question. Certainly, much of contemporary rhetorical theory devoted to Foucault is devoted to his principles of rarefaction—the mechanisms whereby discourse is inhibited. Indeed, this overarching focus is probably best expressed in the ways Foucault is anthologized for rhetoricians. Both Bizzell and Herzberg’s *Rhetorical Tradition* and Jasinski’s *Sourcebook on Rhetoric* devoted substantial sections to Foucault. However, in each of these works the focus on the regulatory aspects of Foucault’s discourse is quite clear. For example, Bizzell and Herzberg’s editorial preface to Foucault’s excerpt described his theory of discourse exclusively in terms of disciplines, institutions, constraint and power,

> Foucault’s theory of discourse describes the relationship between language and knowledge; the functions of disciplines, institutions, and other discourse communities; the way that particular statements come to have truth value; the constraints on the production of discourse about objects of knowledge; the effects of discursive practices on social action; and the uses of discourse to exercise power. (Bizzell and Herzberg p. 1433)

Similarly, Jasinski’s treatment of Foucault focuses on the mechanisms of power and repressive forces of discourse, “Foucault viewed discourse as a constitutive force […] as a mechanism of power. It
creates knowledge and the institutions and disciplines that protect and perpetuate it. (Jasinski p. 171, emphases original)

Of course, the focus on the restrictive aspects of Foucauldian theory has not gone unnoticed in recent rhetorical appropriations. Bruner (1996, 2006), Biesecker (1992), Blair and Cooper (1987), and Phillips (2002) have each addressed this issue. These scholars all point to a traditional focus on domination (Bruner, 2006, p.188), repression (Biesecker p. 351) and the limits of agency (Blair and Cooper p. 151) as described through Foucault’s model of discourse. And, of course, this is not entirely inaccurate. Foucault’s work almost exclusively focuses on mechanism of domination, repression, rarefaction, and exploitation. Given this, one could hardly help echoing Bieserker’s poignantly phrased question above. In answer to this question Blair and Cooper argued that Foucault can be recuperated for rhetoric as something of a soft humanist. They suggest that while his early work, in particular, does not open up much of a space for resistance and change, that his overall critical project suggests a belief in the possibility of change and transformation. While I am not willing to lump Foucault in with any group of humanists—no matter how soft, I have to agree with Blair and Cooper that Foucault’s work does indeed support possibilities for agency and change. Indeed, Foucault (1970), himself, makes this argument in the preface to the English edition of The Order of Things,

It has been said that this work denies the very possibility of change. And yet my main concern has been with changes. In fact, two things in particular struck me: the suddenness and thoroughness with which certain sciences were sometimes reorganized; and the fact that at the same time the similar changes occurred in apparently very different disciplines…. It seemed to me, therefore, that all these changes should not be treated at the same level, or be made to culminate a single point, as is sometimes done, or be attributed to the genius of an individual, or a new collective spirit, or even the fecundity of a single discovery; that it would be better to respect such differences, and even try to grasp them in their specificity. In this way I tried to describe the combination of corresponding transformations that characterized the appearance of biology, political economy, philology, a number of human sciences, and a new type of philosophy, at the threshold of the 19th century. (p. xii)

While Foucault admitted far more than the mere possibility of change here, he is less direct when it comes to the possibility of agency. Nevertheless, Bruner (1996) echoed Blair and Cooper’s reading when he argued that, “Foucault's bracketing of human agency in his earlier texts does not lead to the inevitable conclusion that Foucault denied human agency” (p. 178). Indeed Bruner, Phillips, Blair and Copper, and I all argue explicitly that Foucault elucidated, however briefly, a doctrine of transformation that makes space for both agency and change.

This recognition of the possibilities for change and agency within Foucauldian theory represents a potential boon for rhetorical studies. Indeed, recently, it has provided a foundation for an
escape from the vexing problem of apparent contradiction between the work of Focuault and the rhetorical cannon—a problem that Beard (2002) aptly described in a recent review of textbooks in *Rhetoric Society Quarterly*. “There is no visible trajectory,” he wrote, “between (a) those who consciously locate their work within the tradition (Aristotle, Campbell, Richards, and even the Aristotelian Burke) and (b) Foucault” (p. 99). Certainly Blair and Cooper’s identification of Foucault as somewhat humanistic constitutes an attempt to repair this breach. However, a more compelling effort can be found in Phillips (2002) recent work published in *Rhetoric and Philosophy*. There he argued that Foucault’s notion of transformation can be operationalized through recourse to rhetorical invention. Specifically, he suggested that resistant acts typically occur at sites of conflict and contradiction within a discourse, and that these resistant acts when properly executed at those sites of opposition can provide the foundation for discursive transformation:

Foucault describes emergent contradictions as spaces of dissension (1972, 152) and the phrase suggests their broader importance. Contradictions are important not only as points of productivity, in terms of the creation of new statements and different discourses, but also as points of possibility. Instability within discourse formations prevents discourse from becoming wholly coherent and, thus, it is oppressive, introducing contingency and uncertainty. While discourse is, inevitably, deployed toward the suppression of such contradictions, their emergence creates the condition for change and transformation. These are spaces of dissension because they are places where the incoherence and contingency of the discourse is experienced directly and, therefore, the production of dissenting discourse becomes possible for those who have momentarily recognized the instability. (pp. 333-334)

Under this rubric, the identification of the spaces of contradiction within a discourse serves as an excellent starting point in my analysis of the agentive work of the MPG. As Phillips suggested and my analysis of the MPG supports, these points of conflict provide a rhetorical space for the establishment of a bridgehead as an integral part of the processes of discursive transformation.

**Enuanciative Analysis and Stasis Theory**

Subsequently, I turn, first, to Foucault’s (1972/1969) concept of enuanciative analysis. Foucault suggested that when we consider discourse we ask the question “How is it that this statement appeared rather than some other?” (p. 27). How do the rules and constitutive regularities of a discursive formation produce one statement about a specific type of object and not some other statement? Enuanciative analysis studies the “distribution of gaps, voids, absences, limits, divisions” that are the dispersion of statements and the specification of objects by discursive formations (p. 119). Such analysis describes what separates what gets said from what cannot be said because it lies outside the regular formation of objects and statements that characterize a discourse. Foucault’s concern was not for the truth or correctness of the statement, but the network of interrelated statements that
constitutes the discursive formation as the conditions of possibility for the statement. Foucault’s analysis suggested that one ought to regard “pain” as a discourse object constituted differently in different professional discourses that correspond to the “home” disciplines of the members of the MPG. I begin by embracing Foucault’s recognition that discursive formations are heterogeneous and shot through with contradictions that are determined neither by individuals nor by trans-historical forms, but are interior to the discursive formation itself. Faced with this discursive conflict, Foucault argued that “the purpose [of analysis] is to map, in a particular discursive practice, the point at which they [contradictions] are constituted, to define the form they assume, the relations they have to each other, and the domain they govern” (pp. 155-56).

For my work with the MPG, mapping the contradictions begins with exploring the profound epistemological gap that underscores the MPG’s attempts at interdisciplinary discourse. This gap lies at the core of MPG’s conversation, as it is most manifest in one of their central concerns—the nature and definition of pain. Their discussions of pain and its definition indicate at least two axes of discursive contradiction—one between alternate theoretical models of pain and a second between any model of pain and the research it makes possible, and the experiences of clinical practice. These two axes of contradiction—body/mind, and theory/practice outline the fundamental difficulties facing the MPG. However, an enunciatve mapping of these contradictions only gets this study of the MPG so far. Foucault’s essentially structuralist analysis fails to explain either how such contradictory formations change or how our participants might forge what Bruno Latour (1993) called a nonmodern science, one that eschews the mind/body dualism that plagues the MPG members. Rather than “change,” Foucault wrote largely about “transformation” which he described as “transformations in practice, perhaps also in neighboring practices, and in their common articulations” (p. 209).

Conceptualizing change was difficult for Foucault because he defined a discourse formation as a network of statements and their interrelations. This is a nascent structure, and structural explanations do not readily admit of the notion of time and change. That said, Foucault’s notion of transformation as opposed to change is, perhaps, useful. How do large institutions or their discourse change? Surely not by radical and revolutionary change, or at least not usually. In locating transformation at the level of transformed relationships between statements within a discursive formation, in the banal ongoing practice of speaking subjects, Foucault seemed to suggest that change is the name we give after the fact to a series of transformations that emerge through the interaction of statements with other statements, through the activity of speakers pushing the limits of the rules of formation.¹ This conception of transformation in practices along with the metaphor of articulation between “neighboring practices” makes change less apocalyptic and more a function of the mundane
action of bridging, transcription and filling that Pickering describes. Where Foucault’s comments are suggestive, however, he does not offer a way to think about how transformations occur. And Pickering’s modeling does not identify the rhetorical processes at work. For this, stasis theory serves as a way to explore the detailed rhetorical activity through which the MPG is trying to transform pain science.

In his discussion of Hermagoras’ stasis theory, Kennedy (1983) introduced stasis as “the basic issue of a dispute and results from the stance taken by the antagonists” (p. 74). And Walker (2000) described the “stasis system as a systematic method for identifying the crucial point of controversy—stasis basically means position, faction, or discord—and thus for discovering the most appropriate and persuasive arguments available in a dispute” (p. 61). Thus the stases named questions designed to bring to the fore the point of disagreement between parties to a dispute, and, once those explicit or implicit conflicts emerge, stases become, in Carter’s (1988) terms, “a means to turn the static situation caused by conflicting forces into action, into rhetoric” (p. 99). As it is typically understood today, the system of stases represents Quintilian’s division of stases into the rational and the legal questions (Walker p. 61). The rational stases in this system are: stochamos or “conjectural” questions dealing with issues of fact or existence; horos or definitional stases that concern the name that should be applied to a fact; Symbebekos or “circumstantial” or “qualitative” stases concerned with contingencies of judgment. To these three stases, McKeon and Gross, following Cicero, add a forth metalepsis or “translative” concerned with the question of jurisdiction and appropriate venue or body of experts making a judgment (McKeon 1966, p. 371; 1989, p. 62; Gross 2004, p. 142; 2006, p. 181). In the case of the MPG the stases of definition and translation or jurisdiction are the powerful moments of conflict that the MPG’s “off-label” discourse identifies. These stases allow the MPG to articulate their disagreement with the pre-existing pain configurations established in the individual disciplines represented by MPG members and serve as strategies for transforming the larger institutional discourse of pain science within which they operate. As Heidlebaugh (2001) argued, such stasis points are the opportunity at which seemingly incommensurate positions can be transformed, where the rhetor can “use what she has before her to suggest the beginnings of new positions (or new systems, new narratives)” (p. 145). As members of the MPG explore the definitional stasis they begin to forge new, shared understandings of pain that exceed or escape the conflicting discourses of their home disciplines. As they explore the jurisdictional stasis, they describe the institutional obstacles to discursive change and the possibilities and limits of agency. This function of stasis doctrine enacts the balance McKeon (1966) ascribes to communication as it “provide[s] both the initial definition of problems and the dynamism of their evolution . . . .” (p. 93).
Discussions of stasis theory in classical rhetoric typically concern stasis in legal disputes, and stasis is typically understood as a process of invention. In recent work, however, stasis theory has been applied to all kinds of discourse (Greek Rhetoric, p. 85) and contemporary uses of stasis theory by McKeon, Gage, Prelli, and Gross make stasis relevant to the invention of rhetoric in any discourse where knowledge claims are in dispute. While Gross has applied stasis theory to the invention of new scientific theory and Koerber (2006) considered the role of stasis in the changing pediatric medicine and its evaluation of the immune function of breast milk, Prelli’s use of stasis in scientific controversy was perhaps the most thorough application of stasis to scientific discourse. Prelli (2005) developed a system of superior and inferior stases and argues that in science, stasis points can provide a foundation for interdisciplinary communication:

*stasis* questions can operate as “reference points” where controversialists can enter each other’s perspective and, thereby, discern their similarities and differences…. *stasis* questions furnish potential sites for transforming controversy into collaboration. They can function as *loci* for negotiating new grounds in common for addressing particular, situated problems of mutual concern. (p. 303)

Thus, stases are the “‘standing point’ or ‘stopping point’ at which argument commences” and, perhaps also, where research often begins.

Stases can be thought of as emerging from the explicit or implicit contradictions within discourse that Foucault’s analysis seeks to map. An established discursive formation for Foucault is a regularized network of statements that determines the objects of discourse, what statements can be made about them, who can say this and within what theoretical framework. These rules of formation laid out in the *Archaeology of Knowledge* can be thought of as stases which over time and through deliberation have been resolved or stabilized and which subsequently legitimize new research and warrant knowledge claims. Once the controversy that constitutes the stasis has been resolved, what had been a stasis point might be thought of as a node in the network of statements that make knowledge possible within the discourse. When the four rational stases have been stabilized in a science, they function as topoi and the science is productive, generating research and new knowledge. As Koerber has recently argued in her analysis of pediatric medical science, settled stases not only produce research, they also restrict new avenues of work, making innovation and change more difficult (p. 156). That is the regulative role of discursive formations in Foucault’s theory, and it explains why these rhetorical achievements are policed so jealously. The benefit of stasis theory in this context is that it describes not only the ongoing process through which Foucault’s theory of discursive regulation is formed, but also a rhetorical mechanism for the transformation of discursive formations which remains abstract and unexplained in Foucault’s theory. Stases make contradictions
in a discursive formation explicit and determinate so that they can become the subject of discussion. And the invention of stases is an important element of rhetorical agency as a group like the MPG attempts to change the conflicting modernist discourses on pain into a nonmodern discourse.

**Definitional stasis at the MPG Journal Club**

In a move that inadvertently (I presume) replicates the logic of stasis theory, the MPG has developed a conversation that allows the members to explore the points of contradiction separating the discourse of the traditional pain configurations from the discourse they would like to create. During their off-label discussions, members of the MPG engage in a self-reflexive conversation about their professional languages and the limitations these languages impose on practice and research. These metadiscursive moments occur following presentations, in the discussion portions of the evening when members engage in a dialogue that explores not only non-traditional treatments, but also their collective frustration with reductive disciplinary configurations of pain and the research it sponsors. This definitional metadiscourse emerges when experts in different disciplines and practices confront the conflict between their terms, concepts and practices and those of their colleagues from other disciplines. As they reflect on the underlying epistemologies that have led to the reductive definitions current in their individual disciplines, members of the MPG develop a new definitional stasis for pain science. In Foucault’s terms, they have recognized a contradiction within the larger discourse on pain and the ways this regulates what statements can be made and what treatments can be authorized. The definitional stasis that emerges from their dialogue places the traditional dualist epistemology of pain against the new hybrid definition for which the MPG is searching. This metadiscursive reflection also provides the MPG opportunities to discuss the difficulty involved in formulating a new definition that coordinates with their practical experiences of pain in clinical settings. The contradictions built into the IASP’s nonmodern definition of pain and the mutually exclusive modernist discourses of pain as biophysical or psychological, as mind or body, that dominate research journals are a major theme in our observations of the MPG. For example, in the following excerpt from a discussion over the nature of “empathetic pain,” Dr. Kaplan attempts to determine whether or not the authors of a particular paper presented by his colleague Dr. Landau, were operating within a dualist metaphysics:

This is very interesting from a... more from a philosophical point of view than a science point of view. I was trying to, as you were presenting this, trying to see if they were dualist or non-dualist from a philosophical point of view. And... was your impression that the authors were more dualist, you know, that there’s two separate things—a mind and a body—or that they weren’t dualist in terms of that? And also, the problem I have with dualism is that there has to be that magical thinking point... there is something happening there that... can’t be
identified, and that you can’t put a finger on. So, you know, I have an inherent problem with a dualist philosophy impinging upon neurophysiology because of that difficulty there, that you always have that step you can never identify. (MPG Journal Club, November 2006)

The magical thinking point Dr. Kapplan identifies as his problem with dualism is an avatar of traditional critiques of empiricism based on mental perceptions of physical stimuli. More to the point, it echoes, unintentionally no doubt, Latour’s metaphor of the “mind in a vat,” his caustic dismissal of modern empiricism and its epistemological dilemmas as a dualism, a mind isolated in a vat, that nevertheless is required to generate certain knowledge of the physical world outside that vat (Latour 1999 p. 4). For both Latour and Dr. Kapplan, this is magical thinking and leaves something, a cognitive or metaphysical something you can’t put your finger on.

The unresolved conflict between these ways of defining pain is a recurrent topic of MPG conversation and becomes a point of stasis for the developing discourse of the MPG as they try to establish a language adequate to their practice of pain management. MPG members often alternate between referring to pain as a “phenomenon” and/or a “problem,” and they modify these terms with adjectives like “complex” and “multidimensional.” Furthermore, MPG members use metaphors like “puzzle” (Fitzpatrick Interview) and “mosaic” (Benetti Interview) to refer to the problems associated with and processes involved in assembling all the various conceptions of pain into a single definition. Perhaps the clearest example of the MPG angst surrounding the problem of pain comes from the follow-up interview with Landau,

My honest opinion is that we are not going to solve the problem [of pain] or many of the problems in health care, until we get a new model of the mind-body connection…. I think somebody's going to put it together they could be the Freud of the new, of the current age…. There is a major cognitive shift going to happen with the mind-body connection and somebody is going to—who's a real good synthesizer is going to put it together in a way that is strongly supported by science and we’re going to be able to make a big jump in pain treatment, because there's no model out there right now. They can put it together and puts it together without all the bias and prejudice that frankly started with Descartes. (Landau Interview)

Dr. Peters, the founder of the MPG, describes the common experience of pain and the troubling difficulty defining it:

There are various definitions of pain: unpleasant sensation that can be an actual or potential damage as the IASP says ‘as described in terms of such damage.’ We all know what pain is. It is like when I think it was Oliver Wendell Holmes who said: ‘I know what pornography is, I just can’t describe it.’ It is like that with pain. You know it when you see it. I think all of us know what pain is. We all can understand what it means when people say they are in horrible pain. We can think back on our lives to a time when we were in pain. But it is a very difficult
thing to define. It’s like other things in our life. Like love. These things are not easy to define although we may know [them]. (Peters Interview)

Here pain is both actual damage to bodily tissue, “as described in terms of such damage,” and an unpleasant sensation. Peters struggles to recognize both the physical element of pain, the damage, and the emotional or subjective experience of it, like pornography or love. And he suggests that our “understanding” of pain is, finally, grounded in personal experience and memory; when we hear someone talk about their pain, our understanding emerges from recollections of our own experience.

As MPG members struggle to rationalize their divergent clinical practices and articulate the different discourses their colleagues bring to the conversation in their local gatherings, they confront the contradictions within the new, interdisciplinary discourse on pain that the IASP is explicitly attempting to facilitate. This self-reflective conversation not only allows members of the MPG to reflect on the philosophical problems that plague contemporary biomedicine and technoscience, it leads them toward definitions of pain that integrate the biophysical and cognitive. Periodically, MPG members attempt boundary-crossing definitions of pain that address the definitional stasis. For example, Dr. Landau, in the discussion on pain empathy from which we have already quoted, said:

The activity in the pain network is sensitive to the top-down perceptual process. The mental representation of nociception in the pain experience results from the interaction between noxious sensory input and cognitive factors. (MPG Journal Club, November 2006)

While Landau’s language is more technical than Peters’, the same difficulty emerges from her analysis. Landau needs to find a way of combining the nociceptive and psychological components of pain. In so doing she articulates their relationship hierarchically (top-down) on the one hand and temporally (“pain experience” that “results”) on the other. Dr. Fitzpatrick’s presentation on Fibromyalgia from February 2008 also uses the temporal link between stimulus and resulting experience to frame the interaction between the sensory and cognitive elements of pain:

Nociceptive information is saying, “Boy that’s a strong stimulus. I’ve localized it to my shoulder.” [It’s] these characteristics. I know it is of such intensity, that it should hurt. But the Cingulate gyrus and these other [brain] areas have to come in and add to it…. to say, “and it hurts!” So when we think about pain we always have to think about these two components: the nociceptive which is simply the physiological processing of a bit of sensory information, and then the context or association we put to it. Does it hurt? I.e., that’s what makes it pain—the two things together. (MPG Journal Club, February 2008)

Here pain is explicitly a hybrid comprised of “a bit of sensory information” and an emotional context, “does it hurt?”
As a final example of how members of the MPG struggle to formulate a new definition of pain, I offer a presentation of the epidemiology and etiology of migraine headaches by pain physician Dr. Heisenberg. In the section of this presentation that explains the basic science of migraines, Heisenberg begins with an argument for the integration of a vast multitude of factors into the understanding of migraines. He begins with a schematic representation of migraines as a theoretical concept. The polar-plot-like diagram he provides depicts migraines as an integrated phenomenon at the intersection of the physical axes of head pain. But his depiction also includes nausea, cold hands, fatigue, despondency, and flatulence among others elements of migraine pain. Heisenberg uses this slide to argue that medical practice needs to use the proper diagnostic inventories to assess not only the migraine, but also the efficacy of treatment. He expresses some serious concern that most of the questionnaires used in the literature (and in clinical practice) fail to address the cognitive-emotional aspects which are integral to migraines:

So one of the things that is also an item of debate is which questionnaire to use. Oh gosh, does this sound familiar to psychologists? Which questionnaire should you use? There’s actually an extraordinarily simple questionnaire called the HIT-6, and we haven’t brought that to the group for a while, but that was promulgated by Glaxo. But, none-the-less, it covers all areas of function. MIDAS actually only covers a few…it doesn’t really cover energy. It doesn’t ask you cognition questions. You, as a clinician, actually have to imply that in your questioning. It’s kind of good to talk to the patient, besides just having them fill out a form. And, emotional distress isn’t covered. The most commonly used study methodology when determining severity of migraine disability is actually this one [MIDAS] in almost all the studies that are published now, even though there are actually better questionnaires in terms of covering everything. So, we need to see some further developments along this line. (MPG Journal Club, February 2007)

Heisenberg objects to the dominant questionnaire, MIDAS, because it does not recognize the emotional and functional aspects of pain. The very next slide in his presentation, however, reduces migraines to a function of the descending nucleus of five—a biomechanical structure. In order to support his argument for the interactional nature of the physiological and psychological aspects of migraine pain, Heisenberg ultimately references physiology. As he outlines it, the brain structures that create the physiological dimension of migraine pain are close enough to those that create the psychological dimension that those “extra” psychological symptoms are present.

If you look at the descending nucleus of five, the nucleus of pain is spread out over a space. It’s not just a small group of cells. And unfortunately it is interweaved with this lower portion of the nucleus which are actually inputs from the back of the head for sensation and pain. Also very close by are nuclei that control [sinus and congestion related] symptoms. So it’s easy to understand why we get so many of these look-alike syndromes in migraines. The point of all this is most of what we call the “extra-features” of migraines are not actually
covered well in these studies. What is covered only is the diagnostic categories. (MPG Journal Club, February 2007)

What operates as a set of contradictions in the seemingly static discourse formation of the IASP appears as a series of stases for the MPG as their ongoing intellectual collaboration identifies points of conflict and disagreement. Dr. Fitzpatrick’s claim that pain is “the two things together” is representative of the MPG’s struggle to collapse the Cartesian dualism. Stasis analysis allows us to see the ongoing rhetorical activity involved in the MPG’s attempts to transform the modernist disciplinary discourse on pain into a nonmodern discourse of hybrid pain science.

Most of the stases that lead the MPG members to explore a nonmodern discourse on pain appear in the informal, “off-label” portion of MPG meetings. Talking “off-label” is the metaphor used by one of the group members as he deferred certain questions to the “unofficial” discussion that would follow his presentation of data from clinical trials. For me, talking off-label became a metaphor for the larger efforts of the MPG to overcome the reductive vocabularies and narrow treatments of pain that follow from narrow disciplinarity and from regulatory restrictions. The label on a prescription drug, especially the schedule three opiates that are often prescribed for severe pain, is a highly specific product of scientific trials, legal disclaimers and responsibilities, and regulatory approval processes. The drug label is the epitome of Foucault’s discursive regulation. MPG members must talk off-label in a variety of ways to accomplish their goals and to navigate restrictions on the dialogue between research and clinical practice. They discuss pain as understood outside their discipline. They discuss treatment interventions not common to their fields. They explore research from different methodological paradigms. And they explore unsanctioned indications of approved treatments. MPG members frequently refer to the off-label discussions as the most helpful or informative parts of journal club meetings. For example during an interview, psychologist Dr. Freedman, when asked which were the most helpful presentations, responded,

We have a variety of different presentation formats which are useful in their own ways. I guess some of the ones I found the most helpful are when somebody presents a basic information, and we use it as a jumping off point. So that's created the most discussion I like that. And from time to time, I think it's also good when you have the presentations that are very didactic…. I think where it gets most fun is when you cut into the talks, whether it's presenting an article or a topic you present something and you really open it up for discussion, and that seems to really get a lot of people going. (Freedman Interview)

All of this off-label discussion is the space in which MPG members step outside their disciplinary restrictions and those of the medical-industrial complex and attempt to foster a better understanding of pain science and improve the practices of pain management. As the MPG president
noted to the membership at one meeting, “None of us individually own pain, and yet we all own pain. We need each other’s insights and perspectives to get a fuller picture of pain and how to treat patients” (MPG Journal Club, February 2008). One of the best examples of when this off-label discussion enlists multidisciplinarity comes from a December 2006 presentation by a pain management physician who researches the importance of restorative sleep. Dr. Steele’s presentation began by specifically acknowledging the strengths of various disciplines and inviting them into dialogue,

I love my surgical friends who can very effectively treat physical pain. You know bad disk, bad nerve, bad blood vessels….whatever the case. Thank you for coming tonight. But…that’s physical pain. It’s not that simple. It’s…I’m gonna use the word emotional pain, psychological pain. Any psychologists here? Good! Anxiety, MRI, a little claustrophobia, What are the chances of getting a good MRI: That would be zero. Because you’re gonna panic and you’re going to leave. What if your wife left you? What if you got beat up by your father? There’s emotional pain that’s real. Physical abuse doesn’t go away with a pill. (MPG Journal Club, December 2006)

These off-label discussions inadvertently replicate the logic of stasis theory. Stasis theory is not only a method for identifying the points of departure grounding particular debates, but also a procedural commitment—a process designed to help foster more effective discourse. As Prelli concludes in his discussion of stasis doctrine, no method will reduce controversy unless disputants “acknowledge the potential value of perspectival diversity” (p. 327). In his discussion of stasis, Cicero argues that sometimes a stasis dispute necessitates the suspension of argument and the engagement of metadiscourse to determine the new stasis from which future argument will derive. Writing on matters of definition, Cicero explains,

The controversy about a definition arises when there is agreement as to the fact and the question is by what word that which has been done is to be described. In this case there must be a dispute about the definition, because there is no agreement about the essential point, not because the fact is not certain, but because the deed appears differently to different people, and for that reason different people describe it in different terms. Therefore in cases of this kind the matter must be defined in words and briefly described. (De Inventione viii 11-12)

During their off-label discussions, members of the MPG work to understand the language and position of other members. At one point Dr. Benetti lamented in reference to a recent presentation with which he had greatly disagreed, “We are all in a silo. One of the best [recent presenters] was talking about spinal cord stimulators, and I love the way he thinks…. He presented his stuff and it was very good. You learn something. It breaks down those barriers” (Journal Club, May 2008). Or as Physician’s Assistant Hamlyn reflected in a follow-up interview, “I think that sometimes there’s a lack of respect among the various disciplines, and some close-mindedness…. I think that may be one
reason why some of the pain specialists in the community—the physicians, MDs—are less in attendance” (Hamlyn Interview).

The stasis points through which MPG members reflect on the underlying epistemologies that have led to the reductive definitions current in their individual disciplines help them invent new understandings of pain as a hybrid appropriate to a nonmodern science of pain. As Dr. Landau suggests, they need a new Freud of pain science. In Foucault’s terms, they have recognized a contradiction within the larger discourse on pain and the ways this regulates what statements can be made and what treatments can be authorized. The definitional stasis that emerges in their dialogue places the traditional dualist definitions of pain against the emerging hybrid definition for which the MPG is searching. Not all MPG members are willing to abandon their traditional modernist definitions of pain in favor of this new nonmodern definition; disciplinary identity and authority are extremely powerful. But the stasis does identify a conflict that prompts professional and disciplinary self-analysis. This off-label discussion provides a rhetorical space in which MPG members struggle to identify, understand and resolve these conflicts that exist both between their individual disciplines and within the IASP definition of pain. Indeed, the entire discourse of the MPG manifests the symptoms of pre-revolution as identified by Kuhn. As he noted, “The proliferation of competing articulations, the willingness to try anything, the expression of explicit discontent, the recourse to philosophy and to debate over fundamentals, all these are symptoms of a transition from normal to extraordinary research” (Kuhn p. 91). Though I am certainly not endorsing the revolutionary model of scientific change, I think acknowledging the manifestation of these symptoms as they occur in the discourse of the MPG further supports their proximity to developing a fifth pain configuration authorized by a biopsychosocial model.

If this account of the MPG’s static metadiscourse leaves the reader without much of a sense of resolution, that aporia is certainly shared by the author and likely also the members of the MPG. The negotiations described in this chapter have yet to reach closure. Neither the MPG nor the international pain management community have yet to successfully establish the new topoi that will ground a nonmodern science of pain. Both the MPG and the international pain management community are continuing to participate in the stasis metadiscourse out of which they hope a new theory (or a new Freud) will emerge.

**Jurisdiction and the MPG**

As my analysis suggests, members of the MPG struggle to find a language to discuss pain that escapes the modern dualism that they resist. They are not always successful, however. Inventing
a new definition adequate to their many disciplines as well as their clinical experience is extremely difficult. Clinical experience tells the members of the MPG that much of their practice works, that they have impacts, but the dualism persists despite their intentions. All this presents a significant problem for many in healthcare, especially with current trends toward scientifically-grounded, evidence-based medicine (EBM) based on randomized clinical trials as the authoritative methodology. The authority of EBM and the ubiquity of randomized clinical trials as the dominant methodology confronts MPG members with a difficult problem: what data and what data gathering methods are appropriate to their new definition of pain? The short answer for the MPG, of course, is theirs—the MPG’s. In fact Dr. Benetti even describes the developing mission of the MPG as an efforts to become “a body of expert knowledge not within each little community but also within the state legislatively” (MPG Journal Club, May 2008). And, indeed, this would be an important concern if Dr. Peters, MPG founder, is correct in his assessment that,

There’s a huge battle on the horizon between the pain physicians—interventionists [who prescribe opiates for pain] versus multimodal multidisciplinary approach [such as that explored by the MPG]. Has to do with payment and salary. (Peters Interview)

Dr. Peters’s concerns about payment and salary highlight the material expression of the translative stasis explored by the members of the MPG. The redefinition of pain as a hybrid phenomenon developed from clinical experience as well as from data from randomized clinical trials opens the jurisdictional stasis typically closed off by the firm disciplinary and legal structures of western biomedicine. Who decides what data are legitimate? Who enforces discursive regulations that shape emerging topoi? This situation reproduces Ruef’s (2007) sociological analysis of the distribution of different forms of rationality and jurisdictional authority in the health care industry. Ruef argued that institutional professionals far removed from actual patient care tend to recognize formal, scientific discourse with a high degree of objectivity. By contrast, practitioners acknowledge discourse that is more concrete, contextual, and prescriptive. More importantly for the issue of the fourth stasis, these different forms of rationality and argument held by regulators and practitioners have direct consequences for the question of jurisdiction. Ruef wrote:

I argue that both issues [distinct forms of rationality and professional jurisdiction] are linked through a hierarchy of abstraction and “objectivity,” whereby the relationship of professionals to the domain of practice regulates the character of their communication and, consequently, the strength of their jurisdictional claims. (p. 94)

MPG members recognize that some knowledge emerges from clinical practice and in qualitative forms that are not typically recognized by the rationality which dominates regulatory
agencies and insurance industry analyses. As the MPG explores the definitional stasis, they confront the fourth stasis as Prelli has recently described it. When it comes to the questions of whose definition of pain is most relevant or whose approach to data is more valid, the particular stasis at issue is the jurisdictional (the translative). As Prelli described it,

“Translative issues locate points for decision in questions about the relative appropriateness of alternative possible criteria, standards or “grounds” for acting upon problems of 1) existence (evidential), 2) meaning (interpretive), 3) significance (evaluative), 4, action (methodological). (pp. 307-308, emphasis original)

In the data presented thus far, we have seen how, when it comes to the definition of pain, these translative questions intersect with the definition—e.g. which discipline’s conception of pain is most valid: those with a nociceptive framework, those with a psychological framework, or those with a nonmodern framework?

Jurisdictional issues surround all four of Prelli’s “superior stases” (evidential, interpretive, evaluative, and methodological) when it comes to questions concerning the proper foundation for the science of pain. As previously noted, research into and treatment of pain requires heavy reliance on subjective patient report. However, this reliance on subjectivity is in direct conflict with the broader project of western science and its foundations in supposed objectivity. Indeed, this is a point of great lament for MPG members. As she struggles with the magical thinking point Dr. Kapplan identifies in duelst definitions of pain, Dr. Landau comments:

You know we have things we know—the things that people do that have an impact. You know there’s lots of studies on belief and how that impacts on a physical illness. And we have no way of measuring that, in my opinion. We can’t measure it. We know it exists. We can’t measure it. (MPG Journal Club, November 2006)

Where Dr. Peters observed that we know what pain is but can’t define it, Dr. Landau rearticulates the point as a problem in disciplinary methodology; there are things we know, but we can’t measure them. Such clinical experience is recognized by MPG members but not by the institutional professionals who administer EBM. EBM regulates what type of data and what methodology are legitimate. And EBM is the mechanism that distributes jurisdiction to non-practitioners in the insurance industry and regulatory agencies.

The problem of empirical measurement in the study of pain was highlighted as a major problem by a variety of presentations and interviews. The definitional metadiscourse of the MPG frequently identifies the lack of empirical techniques as a major barrier to the development of a new definition. In an interview, neurologist/psychiatrist Dr. Boysen lamented that,
I don’t have a way of hooking someone up to a pain-o-meter. We can measure pain-behavior, but pain-behavior is obviously very personalized. I have to listen to what people are telling me. You can define nociception much easier…. [T]he science of pain management and the science of pain is tough. We really don’t have a way of truly measuring pain…. We can measure the response of nociceptors, but that’s not pain. (Boysen Interview)

In response to this problem clinicians and researchers have invested quite a bit of time, money, and research into the development of effective pain measures, but ultimately these are all questionnaires and inventories that must rely almost entirely on patient report. Indeed, the question of pain/quality of life inventories constitutes a jurisdictional discourse of its own with frequent debate over which inventory is most appropriate in which cases. For example, Dr. Boysen also expressed concerns that the design of the patient pain inventories, while often appropriate for research design, are not necessarily appropriate for clinical practice:

I think the chronic pain literature is improving, but much of the older literature uses either the visual-analog scale or the 1-10 scale for pain, and I know why they do it; because you can easily do statistics and get a statistically significant change with an intervention. What is not done very often is a clinically significant change. I think that the chronic pain literature, what I would like to see it go towards is more functional scales or quality of life scales. (Boysen Interview)

In this excerpt, we see a prime example of how translative issues can serve as points of stoppage within pain management discourse. The discourses of medicine as scientific practice and EBM stipulate that only objectively quantifiable sources of data are appropriate to research and practice. However, the MPG as would-be expert body wants recognition for alternative sources of data including subjective report and clinical experience. This creates a host of difficult to resolve jurisdictional issues which can be explored under Prelli’s rubric. Evidentially, it raises the issue of what types of data can be considered—can be treated as existent. Questions concerning pain/quality of life inventories point to a conflict over the appropriate interpretive schemata for this already questioned data. And, of course, “significance” takes on a double meaning within evidence-based medicine and the subsequent hegemony of the randomized clinical trial. Within the collected recordings of MPG Journal Club meetings, I have hours of discussion pertaining to the importance and appropriateness of research findings as measured by statistical significance and power.

This work with the MPG suggests that through the mechanism of EBM, regulatory institutions such as the DEA, the FDA, pharmaceuticals companies, and the medical insurance industry exact as much, if not more, restrictive pressures on the discourse of the MPG than the different disciplines and their reductive definitions of pain and pain management. Data collected from the MPG underscores the fact that clinicians involved are keenly aware of the influences of regulatory
agencies and insurance analysts and how they disrupt practice and research necessary to a new interdisciplinary pain science. MPG Founder John Peters, for example, is famous for his caricatures of HMO actuaries as satanic agents of evil. As has been well documented, the insurance industry has had a broader impact on the practice of medicine than the denial of care in individual cases (Scott et al.).

Under the auspices of EBM, the regulatory professionals at the DEA and in the insurance industry shift the traditional protocols of medical practice. No longer is the clinician seen as the omniscient arbiter of care. Instead, DEA regulations control the use of opioid pharmacology, and treatment decisions are negotiated between the clinician, the insurance adjusters, and the patient. These are regularizing and regulating influences, because while an individual clinician could buck the system—so to speak—and offer less well established care to patients, the material realities of the MIC make this a largely untenable option. Individual clinicians and care-facilities with finite material resources can only offer a limited amount of subsidized care. Consequently, clinicians are largely forced to engage in evidentiary dialogue with insurance adjusters.

While the insurance industry and the DEA wield immense power over the practice of pain medicine, no two entities in the MIC are more influential than the FDA and the pharmaceuticals industry. When it comes to pharmacological practice, the articulated work of these entities has broad and sweeping effects on medical practice from the availability of certain drugs to control over future directions in research. The pharmaceuticals industry is one of the primary funding mechanisms for biomedical research. But individual corporations cannot receive a return on investment without FDA approval. To return to my earlier metaphor, the pharmaceuticals industry writes the label and the FDA approves it, enforcing the discursive regulation the label enacts. The pharmaceuticals industry is a multi-billion dollar a year industry and produces numerous new drugs for which they seek FDA approval. Subsequently, the FDA has to prioritize the order of approval review. However, as would be expected, that prioritization can be a very political process. During a presentation by a pharmaceuticals representative and expert in chronic constipation, Dr Gonsales described some of these problems:

There are going to be some very nice products—theoretically. In that “theoretical” is a wasteland of lots of dead products, of products that never quite make it. Now here’s the problem: this [constipation] is not an area the FDA thinks is important. These patients aren’t going to die. They don’t have AIDS. They don’t have cancer. They don’t have heart disease. So they’ve got to fill every stringent criteria the FDA puts forward with no fluctuation. There’s no fluctuation whatsoever. I need someone on the FDA to be constipated. Then we’ll get a little play. Pain would help us there. (MPG Journal Club, November 2007)
According to Dr. Gonsales, issues like chronic constipation and pain management that do not have a high press profile or mortality rate do not get as much FDA attention. Without these FDA approvals, practitioners cannot offer discovered interventions.

The force of FDA regulations even exerts itself on the informal gatherings of the MPG. As we mentioned earlier, MPG discourse is made possible by subsidies from pharmaceuticals companies. In exchange for an opportunity to present research on the efficacy of their products, pharmaceuticals corporations fund MPG meetings. However, FDA regulations stipulate that pharmaceuticals representatives cannot discuss uses for a given drug that have not been officially approved by the FDA. During one presentation Dr. Gonsales was forced to defer all off-label discussion to the end of the talk, to the informal part:

As you know the government—big brother’s out there listening—this is a pharmaceuticals sponsored discussion. So I can only talk initially about the FDA approved indications for the treatment of chronic constipation. But I can tell you I’ll be happy to talk to you about your questions. (MPG Journal Club, November 2007)

The work of the MPG exists in a professional space dominated by the recent medical trend towards EBM and by the influence of regulatory agencies such as the FDA and the DEA and the regularizing influence of the insurance industry. As members of the MPG explore the forth stasis and the question of who has jurisdiction over the definition of pain, the legitimacy of subjective clinical evidence and the authorization and allocation of practical treatment, they grapple with the institutional obstacles to the transformation of pain medicine that they seek to effect. The jurisdictional stasis brought on by the conflict between clinical practice and the formal requirements of theoretical models imposed by EBM leads the MPG to expose the source, mechanism and nature of the obstacles to discursive transformation, but also, as Dr. Bennetti says, to constitute itself as a legitimate “body of experts” acting in the legislative arena.

**Reflections on Stases and Transformation**

When individual members of the MPG were asked to talk about their experience in the group and how it has affected their understanding of pain, they were uniformly laudatory. They talk of learning to see pain as an assemblage of puzzle pieces or mosaic tiles. And they comment that the ongoing dialogue has made them understand pain as a more complex phenomenon that supercedes any single discipline. The comments of Dr. Bennetti, an anesthesiologist, during an interview are representative of the group’s members.

It creates a fuller picture of what pain is. You appreciate the complexity of the suffering as it relates to the patient’s whole world. The complex pharmacology, the social interactions …it’s
kind of hard to describe. It’s not an easy thing. Everybody’s got a knowledge-base that they can give you. (Bennetti Interview)

Comments like these attest to the power of boundary objects like pain to bring experts together and to inaugurate a trading zone in which ideas, language and treatments are shared. When MPG members present the group with research from disciplinary journals in terms of efficacy trials, statistical reliability and underlying physiology, they speak as members of their discipline. This discourse is authorized by the label and compatible with the jurisdictional authority of regulators and industry. When members talk off-label, however, something different emerges. The meta-discursive space the group carves out is an uncertain space in which a new discourse begins to emerge.

The combination of Foucault’s enunciative analysis with stasis theory allows us to understand the rhetorical processes through which discursive transformation begins and through which the MPG establishes a nascent nonmodern discourse. In this analysis, the off-label discussion of the definitional stasis is the mechanism through which MPG members identify the contradictions in traditional pain discourse and articulate their dissatisfaction with it. In deconstructing the pervasive dualism in pain science, the MPG establishes the stasis that motivates their invention of a new definition of pain. I am not arguing that the MPG has succeeded and that they have articulated a new, non-dualist definition of pain. That is a monumental and ongoing project. But their use of the second stasis has facilitated this process. And stasis theory has made this visible to this analysis. Their continuing dialogue organized by this stasis is the mechanism for what Foucault so hopefully calls discursive transformation. The group’s exploration of the fourth stasis, however, allows them to identify the material obstacles to the discursive transformation for which they struggle. While the MPG has been fairly effective in exploring the definitional stasis, the practical effects of that stasis are greatly limited by the regularizing and regulatory forces of the MIC. The structures of the MIC are designed to protect the institutional authority of its various constituents. And they distribute jurisdictional authority to discourses and institutions that quantify, objectify and reduce phenomena like pain to narrow disciplinary definitions. As such, those structures do not easily allow for the resolution of the jurisdictional stases in ways that legitimize the hybrid rhetoric of interdisciplinary groups such as the MPG.

For rhetorical analysis this chapter suggests that stasis theory makes visible both the means and the obstacles to discursive transformation that Foucault's model omits. Stasis allows one to understand the concrete and messy rhetorical work of invention involved in shifting to a nonmodern science and, the fourth stasis especially, allows us to explore the material and institutional obstacles to transformation in specifically rhetorical terms in ways that other analyses do not. As contemporary
science grapples with more and more hybrid phenomena such as pain, AIDS, Gulf War Syndrome, global warming, and sustainable agriculture, interdisciplinary groups working in these new problem spaces will increasingly struggle to transform scientific discourses. The stasis analysis offered here provides one analytic strategy to understand, and possibly foster, this sort of new technoscientific discourse.

So far this dissertation has focused primarily on the discourses of the MPG—and to a lesser extent the AAPM and the IASP. In so doing, I have explored the material-semiotic history of pain configurations, the metaphysical, epistemological, and structural challenges to the establishment of the fifth configuration, and the role of pragmatic commensurabilities and rhetorical stases in the pursuit of transformation. Viewed optimistically, Chapters 1-3 constitute an exploration of agency in process, agency not yet realized. At the very least, these chapters chronicle an exercise in attempted agency. The establishment and legitmiation of the fifth pain configuration is a monumental task, a task that, if successful, may take another generation to achieve full realization. As such, we do not yet have the historical purchase to interrogate this process so as to draw conclusions regarding agentive success or failure. Subsequently, the remainder of this dissertation will investigate two case studies within pain management. Each of these cases explores attempts at agency that are in the process of achieving closure—resolution. Chapter 4 chronicles a case of agentive failure. It documents the backlash from the medical community as the pharmaceuticals industry attempted to invent a new disease—the sinus headache. In contrast, Chapter 5 explores a case of agentive success—the finally fruitful efforts of the pain management community to legitimize a chronic pain condition known as fibromyalgia.

1 In his analysis of incommensurability and the importance of the fourth stasis—jurisdiction, Alan Gross describes a theory of paradigm change that is similar to our conception of transformation. Citing the work of Paul Thagard and Nancy Neressian, Gross suggests that the abrupt and radical change Kuhn described between paradigms and for which there seemed no arbitrating language, has been recently described as a series of shifts between related, intermediary conceptions, and that the shifts between paradigms “involve continuities as well as discontinuities” (150). Seen in retrospect, this looks like a paradigm shift. Understood as a process that emerges in time as practitioners transform their concepts and their commitments, this looks less daunting. Galison offers a similar model for disciplinary change wherein different, yet allied, sub-disciplinary discourses experience internal transformations. Through the mechanisms of the trading zone, these transformations are distributed to the field at large—sometimes fostering transformations in the allied sub-disciplines. These relatively small sub-disciplinary transformations may appear as massive paradigm shifts when viewed in the aggregate, but the actual mechanisms which instantiate the change are often specific to local practices.
Chapter 4: Ontological Rarefaction in the Medical-Industrial Complex

Albrecht Dürer, Nemesis. ‘Panofsky identified the literary source for Nemesis as “a Latin poem of Politian which synthesizes the classical goddess of retribution with fickle Fortune: clad in a white mantle, she hovers in the void, tearing the air with strident wings, driven hither and thither by the gales, and always wielding the goblet and the bridle - symbols of favor and castigation - with a contemptuous smile.”’ –Artnet

Dürer’s Nemesis as described by Panofsky functions as an excellent metaphor for Foucault’s principles of rarefaction. These principles, like Dürer’s Nemesis, are singular constructs which blandish favor and castigation on those who would participate in a discursive system.
Axiom: that illness isn’t productive. In itself, it generates no commodities and therefore no money. Although it’s an excuse for a lot of activity, all it really does moneywise is cause wealth to flow from the sick to the well. From patients to doctors, from clients to cure-peddlers. Money osmosis, you might call it.—Crake in Atwood’s, *Oryx and Crake*

Dystopic science fiction functions as a reification of technological, scientific and/or economic issues in contemporary culture and often creates a vision of the future wherein the most disturbing and dangerous elements of our cultural landscape come to dominate. Margaret Atwood’s *Oryx and Crake* (excerpted above) is certainly no different. Her compelling yet disturbing novel paints a picture of a not-too-distant-future, a post-apocalyptic dystopia where nearly all humans have been destroyed by a deadly hemorrhagic virus. Atwood’s story is comprised of two parallel narratives, one in the novel’s present, and one in flashback. The flashback narrative tells of the events leading up to the end of humanity. The compelling yet disturbing part of the flashback narrative comes from Atwood’s engaging portrayal of contemporary cultural institutions, reified and extruded into an ultimately pessimistic, but not-inconceivable vision of our near future. The centerpiece of the flashback narrative is the “compound”—the combination corporate campus/gated-community where the intellectual elite have holed up to escape the violence and disease of the rest of society, the “pleeblands.” The compounds are owned and operated by multinational pharmaceutical conglomerates that seem to have taken on a whole host of traditionally governmental responsibilities—including education, law enforcement, and military intelligence. What is perhaps most disturbing about Atwood’s vision of this potential future is not the power that the pharmaceutical corporations exert over the personnel within the compounds, but the power they exert over the pleeblands—for it is these very companies that ultimately pave the way for the impending apocalypse.

Of the many problems associated with the compounds and the corporations that run them in Atwood’s dystopic critique, this chapter is particularly concerned with the efforts of the contemporary pharmaceutical corporations to generate market niches for their products. In Atwood’s novel, these market niches are created through a combination of “problematics”—a communications field borne of a synthesis of “Applied Logic, Applied Rhetoric, Medical Ethics and Terminology, Applied Semantics, Relativistics and Advanced Mischaracterizations, Comparative Cultural Psychology….” (Atwood p. 188), and intentional infection. As title character Crake describes it:

Now, suppose you’re an outfit called HealthWyzer. Suppose you make your money out of drugs and procedures that cure sick people, or else—better—that make it impossible for them to get sick in the first place…. So, what are you going to need after that? More Cures? After that? After you’ve cured everything going? So, you’d need more sick people. Or else—and it might be the same thing—more diseases. New and different ones. Right? Stands to reason,
but don’t they keep discovering new diseases? Not discovering, they’re creating them. (Atwood pp.210-211)

While I am not suggesting that contemporary pharmaceuticals corporations are actually launching biological weapons, they do seem to be involved in something that may amount to the same thing—infected via resignification. That is, the marketing arm of pharmaceuticals corporations sometimes take typical moments of human discomfort, of dis-ease, and rebrand them as disease. The mechanisms through which dis-ease becomes disease are equally well explored in Atwood’s novel, but through the lens of protagonist/narrator character, Jimmy/Snowman, who becomes one of these marketing gurus:

Cosmetic creams, workout equipment, Joltbars to build your muscle-shape into a breathtaking marvel of sculpted granite. Pills to make you fatter, thinner, hairier, balder, whiter, browner, blacker, yellower, sexier, happier. It was his task to describe and extol, to present the vision of what—oh, so easy!—could come to be. Hope and fear, desire and revulsion, these were his stocks-in-trade, on these he rang his changes. (Atwood p. 248)

The proceeding excerpt is one of the moments in *Oryx and Crake* where, for critical scholars of medicine, the fiction becomes uncannily real. Certainly many have argued that the marketing arm of the pharmaceuticals industry is responsible for the proliferation of certain diseases that capitalize on what, in a prior era, might just have been considered the normal (albeit unpleasant) side of human existence (Gardner, 2003; Aho, 2008; Elliott, 2003). But proliferation is not invention, and this infection via resignification, this rebranding of dis-ease as disease is not some Derridian free-play or Beaudrillardian simulacrum, but rather, it is the incorporation of these resignifications into material-semiotic networks of power and control that give them so much authority. That incorporation, however, may be more difficult than either Atwood or critical scholarship of big pharmaceuticals have suggested.

In this chapter, I examine a counter-case in pain medicine: the sinus headache. In the discourse of the sinus headache, the pharmaceuticals industry has attempted to invent/rebrand a disease, but these efforts have been met by a very vocal backlash from the medical community. In short, this attempt to resignify dis-ease as disease has challenged the traditional authorization and legitimization of diseases in the medical-industrial complex. In exploring this case, I will argue that a disease cannot simply be evoked into being through corporate pronouncement, but rather that diseases must be authorized within the constraints of the MIC’s principles of rarefaction. *The question, for me, is how.* As a rhetorician, I’m trained to see this as a problem of persuasion. How is it that drug-promoters attempt to insert their new (definitions of) diseases into such a highly regulated discourse? What are the persuasive means by which those who object are able to convince the medical
community at large to doubt the validity of a disease? In answering these questions, this chapter explores the discourse of the sinus headache in order to develop a deeper understanding of the regulatory mechanisms of the medical-industrial complex. After a brief exploration of contemporary criticism of big pharmaceuticals, I will investigate how various institutions within the MIC are working to thwart the overtly capitalist interests of multinational pharmaceuticals. Through this exploration, I will expose how various institutions exercise what authority they have in order to limit and control disease discourse. Finally, in so doing, I hope to add more nuance to rhetorical accounts of discursive regulation.

Dis-ease to disease: Criticism of pharmacopsychiatry

For some time now medical humanists and medical ethicists have been exploring the role of the pharmaceuticals industry in the creation/legitimization/propagation of new (definitions of) illness. This exploration has largely focused on the relationship between the pharmaceuticals industry and psychiatry/biopsychiatry. These critical analyses tend to focus on the articulations among diagnostic categories (often represented by the Diagnostic and Statistical Manual of Mental Illness [DSM]), pharmaceuticals advertising, and third-party reimbursement practices (Gardner, 2003; Aho, 2008; Elliott, 2003). Echoing Atwood’s critique, Elliot argues that the pharmaceuticals industry has intentionally engaged in the (re)production of disease. Of course, rather than the actual production of a harmful biological agent, this is disease creation through signification, through “problematics,” through marketing: “At least part of what has happened is the marketing of a disease” (Elliott p. 124). Similarly, in the case of antidepressants, Gardner notes that “antidepressant marketing schemes sell the idea that depression is an illness, antidepressants work, while authorizing the larger depression script” (p.124). Indeed, Elliott’s characterization of pharmaceuticals and Atwood’s description of compound problematics parallel each other almost perfectly:

Within this framework, suffering becomes a problem of brain chemistry. A drug that fixes the chemistry solves the problem of suffering. Death, loss, grief, fear, anxiety, sexual inadequacy become medical problems to be addressed by experts with prescription pads. Thus do the existential interests of a moral being harmonize perfectly, in a way that only Adam Smith could appreciate, with the financial interests of the pharmaceutical industry. (Elliott pp.157-158)

And as Aho notes, the same process is evident in technoscientific publications for contemporary ailments such as the DSM;
With the DSM’s rapidly expanding number of diagnostic categories and new medications being introduced to treat them, everyday emotional suffering and behavior --- such as worrying, anger, frustration, restlessness, even the inability to get an erection -- can now be medicalized as biological diseases that can be treated with a particular drug. (Aho p.244)

In fact (according to the research of Elliott, Aho, Gardner, and others), the integration of pharmaceuticals marketing and practical/scientific literature is so complete that it is often difficult to differentiate one from the other. As Elliott notes, “the genius of much of today's pharmaceutical marketing is that it does not look like marketing at all. Very often, it looks like science” (Elliott pp.124-125). Gardner, in his criticism of antidepressant research and advertising, also highlights the links between science and marketing:

Overzealous drug use and promotion, then, is due not only to pharmaceutical company influence, but to the repetitive biopsychiatric script that floats contradictory research findings, reifies the single cause model, and recognizes antidepressant drugs as the route to a (near) cure. Contradictory claims praising and critiquing antidepressants are largely nonexistent in consumer literature, encouraging public confidence and ongoing research monies. The constrained discourse translates easily into marketing schemes. (Gardner p. 124)

All these (often valid) concerns over the relationships between psychiatry, medicine, and the pharmaceuticals industry have led to sometimes scathing criticism by medical humanists and medical ethicists. These critiques often paint a picture rather like Atwood’s dystopic vision wherein dark cabals of pharmaceuticals executives are mercilessly profiting on the naiveté of the unwitting medical consumer. Indeed, as Lewis (2003) describes it, psychotherapy is built on a foundation of hidden ideological forces that configure practice and treatment,

Psychotherapy, no different from psychopharmacologic technoscience, is also intertwined in political forces that are rarely articulated and critiqued within the psychotherapy discourse community. Perhaps the only thing one could say in favor of psychotherapy is that, compared to biopsychiatry, the earlier era of psychotherapeutic psychiatry was not backed by a major bioscience industry and a new breed of corporate medicine. (p. 57)

This hegemonic approach to pharmacological medicine tightly constrains both consumer choice and the possibility of consumer criticism, or as Gardner describes it, “the good consumer-citizen is expected to passively embrace the link between mental health technologies of surveillance and treatment, accept biotechnologies as the solution to productivity lapses, and to leave the critique to the policy of science experts” (p.126).

While my language clearly indicates I have some concern with this portrayal of pharmacological medical science, I do not wish to assume the mantle of pharmaceuticals apologist. Rather, in this chapter, I hope to explore an area of inquiry opened up by Carl Elliott’s (2003) Being
Well. With the luxury of a book-length text, Elliott is able to temper his criticism not so much of the pharmaceuticals industry but of the healthcare providers and researchers who are constrained nearly as much as the patients. Even though pharmaceuticals marketing has a tendency to sell illness as much as treatment, he acknowledges,

_This does not mean that drug companies are simply making up diseases out of thin air_, or the psychiatrists are being gulled into diagnosing well people as sick. No one doubts that some people generally suffer from, say, depression, or attention-deficit/hyperactivity disorder, or that the right medications make these disorders better. But surrounding the core of many of these disorders is a wide zone of ambiguity that can be chiseled out and expanded. Pharmaceutical companies have powerful financial interest in expanding categories of mental disease, because _it is only when a certain condition is recognized as a disease that it can be treated with the products that the companies produce_. The bigger the diagnostic category, the more patients who will fit within its boundaries, and the more psychoactive drugs they will be prescribed. (p. 124, emphasis added)

In this chapter, I want to echo Elliott’s acknowledgement. It is well established that Western biomedicine is a densely regulated enterprise. Biomedicine is constituent of a vast array of structuring agencies that regulate and configure the science and practice of healthcare. These organizations include:

- professional schools which limit entry into the fields
- certifying organizations that monitor practices
- journal editorial standards that evaluate research results
- institutional review boards which regulate research protocols
- funding mechanisms that drive research agendas
- government agencies that regulate pharmaceuticals design (FDA) and distribution (DEA)
- third-party payers that determine reimbursable interventions

Each of these entities (and likely more) places constraints on the activity of researchers, practitioners, and patients participating in healthcare. Given this intense structuration, it seems unlikely, as Elliott suggests, that any individual pharmaceuticals organization could simply stipulate, as if by fiat, that a new disease exists now simply because they’ve developed a treatment for it. However, it seems undeniable from the volume of humanist and ethical research on the subject that the pharmaceuticals industry, at the very least, exerts a profound influence on the contemporary understanding of illnesses.

**Discursive Rarefaction**

In Chapter 3, I worked very hard to divorce the rhetorical understanding of Foucault from a singular focus on regulation and maintenance of the _status quo_. In so doing, I shifted the focus from
Foucault’s theories of regulation to his theories of transformation. In this chapter, I must return to his discussions of hegemony and inhibition, but I hope to do so in such a way that I do not lose what was gained in developing a more nuanced reading of Foucault. In this chapter I turn once again to the *Discourse on Language*, but in this case to the principles of rarefaction. *Discourse* outlines several mechanisms for the regulation of discourse, mechanisms which Foucault termed “principles of rarefaction.” As Foucault noted, “[T]he production of discourse is at once controlled, selected, organised, and redistributed according to a certain number of procedures, whose role is to avert its powers and its dangers, to cope with change events, to evade its ponderous, awesome materiality” (p. 216). These procedures are the principles of rarefaction, the mechanisms of control, selection, and organization.

While both Foucault’s language and my gloss of it highlight the restrictive action of principles of rarefaction, it is important not to neglect their enabling function as well. Principles of rarefaction are those rules which govern discourse within certain systems. Certainly, they constitute a mechanism of control for aberrant discourse. However, at the same time as they inhibit heresy, they provide a legitimized forum for discourse which follows the rules. Foucault’s explanation of this facet of rarefaction is probably most clear in his discussion of the rarefaction of speaking subjects (pp. 224-225). In this section of the *Discourse*, he explained how within each system of discourse certain parties are recognized—granted permission to speak, while others are not. Foucault described the rarefaction of speaking subjects as a matter of qualification, and as such it could not be more appropriate for studies of medical discourse. The ability to contribute to (or speak in) medical discourse is controlled by a system of degrees, certifications, and fellowships. The quintuple board certified physician is automatically granted the right to pronounce on medical issues whereas marginalized speakers (chiropractors, midwives, spiritual healers) are typically confined to other fora. In this sense, principles of rarefaction function as double-edged swords or flip-sides of the same coin. Whichever your metaphor of choice, they simultaneously control some sources of discourse while enabling others.

The *Discourse* focused primarily on seven principles of rarefaction—three external to discourse and three internal. Under the rubric of external principles Foucault pointed to “prohibited words, the division of madness, and the will to truth…” (p. 219), whereas he identified commentary (pp. 220-221), the author (pp.221-222), disciplines (pp. 222-223), and the rarefaction of speaking subjects (pp. 224-225) as internal principles. These principles explicitly identified by Foucault have received the most attention in rhetorical studies. Certainly, madness, the will to truth, the author, disciplines, and the rarefaction of speaking subjects each have undergone significant scrutiny and
appropriation. However, these are not the principles that concern this chapter. As Foucault continued to explore principles of rarefaction he alluded to unique principles which exist within each individual discursive system. Discussing disciplines, he wrote, “Within its own limits every discipline recognizes true and false propositions... In short, a proposition must fulfill some onerous and complex conditions before it can be admitted within a discipline; before it can be pronounced true or false it must be... “within the true.” (Foucault p. 223-4) Here Foucault provides an astute theoretical argument that effectively buttresses my claim that pharmaceuticals companies cannot simply invent diseases. Since each proposition within a discourse must fulfill certain “onerous and complex conditions,” it is reasonable to assume that statements concerning the reality of diseases must do so as well. Furthermore, Bourdieu (1988) argued in *Homo Academicus* that the more dangerous and powerful an area of inquiry, the more tightly regulated it must be. He noted, that

…the faculty of law and the faculty of medicine, which, being able to provide the government with ‘the strongest and most durable influence on the people’, are the most directly controlled by the government, the least autonomous from it at the same time as the most directly entrusted with creating and controlling customary practice…. (p. 62)

Here Bourdieu argued that medicine as extremely powerful and potentially dangerous is not only regulated by its own disciplinary structures, but also will require powerful regulation at the hands of the government. Certainly this observation is borne out in contemporary America with organizations like the FDA and DEA wielding considerable oversight over medical discourse. Indeed, the FDA as charged with the regulation of pharmaceuticals labeling—the regulation of a discourse—constitutes a prime example of an institution of rarefaction. Furthermore, the federal government through the US Food and Drug Act specifically charges the FDA with rarefactive duties.

My exploration of the sinus headache debates (which follows) seeks to identify the specific “onerous and complex conditions” that disease discourse must fulfill. Through investigating objections to the existence of the sinus headache, I will trace which principles of rarefaction are invoked and how those invocations are deployed in the rarefaction of disease discourse. Before I do so, however, I want to point to one more piece of Foucault’s *Discourse* which is often ignored, but is critical for my analysis of the sinus headache and the MIC. Principles of rarefaction do not spring into being from nowhere. Nor are they exercised randomly, haphazardly, or naturally. Rather, principles of rarefaction are implemented through the auspices of institutions of rarefaction. “Institution of rarefaction” is my term for the organizational or administrative locus of power from which principles of rarefaction derive. As Foucault explained regarding the will to truth, “The will to truth, like the other systems of exclusion, relies on institutional support: it is both reinforced and accompanied by
whole strata of practices such as pedagogy—naturally—the book-system, publishing, libraries, such
as the learned societies in the past, and laboratories today” (p. 219). Similarly, we will find that
institutions of rarefaction such as the FDA, the DEA, journal editors, and professional medical
organizations each deploy their own principles of rarefaction, and through them contribute
substantively to the rarefaction of discourse.

The Sinus Headache

Chances are if you own a television, you’ve seen a commercial for a sinus headache
medicine. Whether the product advertised was manufactured by Sudafed, Benadryl, or Excedrin, you
were likely presented with a juxtaposition of pained people clutching their face or head and fancy
computerized animations showing yellow or red glowing pain areas relieved by flying blue or pink
dots. This is, of course, a very familiar script in pharmaceuticals advertising, especially for over-the-
counter (OTC) analgesics. As a result of these advertisements, the sinus headache is a very familiar
illness in America. Most of us are vaguely aware of its purported cause and progression (a build-up in
sinus congestion causes pressure and pain of the head and face), and thanks to this thorough
advertising regime, we are also highly aware the proper remedies for this pain.

Figure 1. Sinus Headache Advertising. These images come from the ad campaigns for two
prominent over the counter sinus headache medications.

Before I continue any further, however; I have a confession to make. I have been (and
perhaps still may be) a periodic sufferer of the sinus headache. While I know I have spent little time
in this work genuflecting at the confessional of postmodern ethnographic reflexivity, in this case, I am
compelled to make my history known. I do this for two reasons: 1) to highlight my own aportia as
regards the case of the sinus headache, and 2) to help the reader appreciate my state of mind during
the following vignette. As mentioned, I have had sinus headaches. I have taken medication for them.
In some cases when the pain was extreme and I sought medical attention, my physicians confirmed
my self-diagnosis and sent me off in search of proper medication—some prescribed, some over the
counter. So imagine my surprise when I was attending an MPG meeting one month and the speaker—
a quintuple board certified physician with expertise in internal medicine, anesthesiology, pain
medicine, and headaches—declared that the sinus headache was a myth, that it was invented and promulgated by pharmaceuticals advertising (MPG February 2007). As a long-term sinus headache sufferer, my empirically-validated incredulity overcame my ethnographic curiosity and I settled into a posture of disbelief—arms crossed, brow furrowed. This guy just has a beef with Sudafed, I thought. He’s just on his soapbox. But eventually, the passion of his presentation gave way to the data and he presented data from peer-reviewed scholarly article after peer-reviewed scholarly article rejecting the sinus headache and condemning the pharmaceuticals industry.

My own subsequent research has done little but validate this argument. Dr. Dana Winegarner of the MidAmerican Neuroscience Institute refers to sinus headaches as “a popular myth” (MidAmerican Neuroscience Institute). An article in the journal for the American Headache Society refers to the sinus headache as “the most frequent erroneous diagnosis given to patients with migraine” (Eross, Dodick, and Eross p. 214). Multiple sources suggest the expansion in sinus headache medicine advertising has come along with a concomitant increase in sinus headache (self-) diagnoses from patients and clinicians alike. As one article from WebMD puts it, “Sinus headache: we are the only country in the world that sees a significant health problem in this…I think part of this is Madison Avenue convincing us of something that is more accurately part of a migraine” (DeNoon, Web MD). This sentiment was echoed by the February 2007 MPG speaker who presented epidemiological data that showed the highest prevalence of sinus headache in the US, Germany, and Sweden, which are the three countries in which the sinus headache medicine has the largest advertising budget.

In each of these cases, healthcare providers place the blame largely on the marketing and advertising arms of the pharmaceuticals corporations. Given this, my readers may be reconsidering my argument that the pharmaceuticals industry cannot invent a disease. The reason I still make my claim is because of the giant backlash that has come from the medical community concerning “erroneous” sinus headache diagnoses. Furthermore, these arguments against the classification of sinus headache as a disease are especially informative when it comes to the identification of the principles of rarefaction. In suggesting that the sinus headache is not a disease, authors often invoke a principle in their argument. For example the following excerpt highlights two of the major principles in one sentence,

Sinus headache is the most frequent erroneous diagnosis given to patients with migraine. This diagnostic confusion is based in part on the paucity of nosologic research to define the distinguishing clinical features of headache associated with rhino-sinus pathology, and the lack of operational diagnostic criteria. (Eross, Dodick, and Eross p. 214)
This objection to sinus headache focus on 1) the lack of acceptable pathological foundation, and 2) the lack of legitimized diagnostic criteria. Each of these are points of objection that warrant the authors’ claims that the sinus headache is an illegitimately identified disease. Accordingly, pathological foundation and diagnostic criteria function as principles of rarefaction within the medical discourse which can serve to either warrant or delegitimize a disease.

**Mechanisms of Rarefaction**

All told, the collected results from this investigation of the sinus headache reveal at least four principles of rarefaction at work in the medical-industrial complex that pertain specifically to ontological statements concerning diseases. The case suggests that in order to make a positive assertion concerning the ontological status of a disease (i.e. to claim that a disease is) one needs to have some combination of the following established under the scrutiny of the medical-industrial complex:

1. An Accepted Specific Etiology (biomechanistic cause)
2. Codified and Statistically Valid Diagnostic Criteria
3. Objective Visual Evidence
4. An FDA Approved treatment

These results replicate my (and Foucault’s) earlier suggestion (Chapter 2) that a focus on disciplines is inadequate for interrogating discursive formations. These principles of rarefaction suggest that the discursive formation for a given disease—for example, the sinus headache—occurs at the intersection of multiple different disciplines. For example, the establishment of a specific etiology typically occurs within the disciplinary boundaries of pathology, while statistical validation for diagnostics occurs within diagnostics journals. Furthermore, disease rarefaction also occurs within non-disciplinary institutions such as FDA advisory groups. Subsequently, an interrogation of disease discourse requires conceptualizing of that discourse as an intersection or amalgamation of multiple institutions of rarefaction. The long-standing material-semiotic investment in the discipline of pathology provides it (through the agency of its journals and professional boards) the power to regulate discourse. This power is exercised through recourse to principles of rarefaction. For example, a diagnostician can cast doubt on the legitimacy of a disease by warranting his or her claims with the principle of diagnostic validity. In short, if a diagnostic inventory has not been statistically validated, it will be cast out of the discourse. The figure below provides a schematic of the relevant institutions of rarefaction which regulate disease through their own principles of rarefaction.
Ultimately, the discourse of the sinus headache suggests that specific etiology is the primary mechanism of ontological rarefaction of disease. And this, of course, makes sense given that pathology is literally the study of diseases. However, in the absence of authorized pathological data, researchers, clinicians, and/or pharmaceuticals corporations lay claim to principles of rarefaction from diagnostics, radiology, and regulatory agencies in order to warrant their arguments. In the sections that follow, I will outline how each of the identified principles of rarefaction are deployed in the debates concerning the sinus headache. In so doing, I hope to contribute to a broader understanding of regulation and rarefaction in the medical-industrial complex more broadly.

Specific Etiology and Pathogenesis

As noted above, “Disciplines constitute a system of control in the production of discourse, fixing its limits…” (Foucault p. 224). When it comes to the regulation of disease discourse, this is certainly true of pathology. As the discipline primarily charged with the study and classification of disease, pathology—through the agency of its institutions of rarefaction (journal editors, professional organizations) exerts considerable force over the ontology of disease. Embodying Foucault’s dictum that “for a discipline to exist, there must be the possibility of formulating—and doing so ad infinitum—fresh propositions” (p. 223), pathology conceives of itself very broadly. Textbooks of pathology often
define themselves through recourse to etymology. For example, *Pathology for Health Professionals* (2006—a text book designed for non-physician health professionals) begins as follows:

In this book you will read about pathology—the basic medical science concerned with diseases. The term *pathology* is derived from two Greek words: *pathos*, meaning disease, and *logos*, meaning science. Thus, pathology is the science that studies diseases. (Damjanov p. xiii)

However, clinicians are as fickle as rhetoricians when it comes to translating from ancient Greek. In contrast a prominent physician-oriented text defines pathology as follows,

Pathology is literally the study (*logos*) of suffering (*pathos*). More specifically, it is a bridging discipline involving both basic science and clinical practice and is devoted to the study of the structural and functional changes in cells, tissues, and organs that underlie disease. By the use of molecular, microbiologic, immunologic, and morphologic techniques, pathology attempts to explain the whys and wherefores of the signs and symptoms manifested by patients while providing a sound foundation for rational clinical care and therapy. (Kumar, Abbas, Fausto, Robbins, and Cotran, 2005, p.4)

Certainly each of these definitions carves out a large space for pathological discourse. Indeed, Kumar, Abbas, Fausto, Robbins and Cotran’s identification of *pathos* as suffering may even legitimize discourse that transforms dis-ease into disease. However, just because a discipline allows for an infinite number of statements does not mean that those statements can be of infinite kind. As previously acknowledged, institutions of rarefaction employ principles of rarefaction in order to legitimize some discourse and restrict others. Although pathology’s institutions marshal a variety of principles of rarefaction, the doctrines of specific etiology and pathogenesis are primary.

Every textbook on pathology I could find followed the basic definition (study of disease) by articulating these two sub-disciplinary spheres. One representative example reads as follows:

The primary goal of this book is to teach you the basic concepts underlying various pathologic processes. You will study the *pathogenesis* of diseases, learn their mechanisms, and understand how they develop. You will learn the *etiology* of pathologic changes and understand the causes of many diseases. (Damjanov p. xiii)

Pathogenesis and etiology are the cornerstones of so-called modern pathology which owes its origin to late nineteenth century German physician, Rudolf Virchow. Virchow is largely credited with the establishment of contemporary (often called “microscopic”) pathology. His initial work involved the identification of the bacterium (1848). Since modern pathology was inaugurated through the study of an illness that can be isolated to a specific pathogen, the doctrine of specific etiology’s focus on monocausality was all but assured. Furthermore, as a product of its era, modern pathology’s focus on causality and mechanistic explanation is, no doubt, part of the reason that pathology can exert so
much control over disease discourse. The doctrines of specific etiology and pathogenesis coordinate very effectively with the mechanistic epistemologies which ground modernist scientific inquiry.

The doctrine of specific etiology and its focus on monocausality has been broadly criticized by medical humanists and critical scholars of health (Elliott, 2003; Whitbeck, 1981; Engelhardt, 1976). Furthermore, those invested in a holistic approach like the IASP-school or pain phenomenologists discussed in Chapter 2 have argued that disease is invariably multi-causal, and the focus of isolable single causes is inappropriate. Finally, it should not go without noting that even the explicitly mechanistic textbooks acknowledge this concern. The 2005 edition of a prominent medical school pathology textbook notes that,

> The concept, however, of one etiologic agent for one disease—developed from the study of infections or single-gene disorders—is no longer sufficient. Genetic factors are clearly involved in some of the common environmentally induced maladies, such as atherosclerosis and cancer, and the environment may also have profound influences on certain genetic diseases. (Kumar, Abbas, Fausto, Robbins, and Cotran, 2005, p. 4)

Of course this passage is immediately followed with a move to simply ignore this very problem, “Knowledge or discovery of the primary cause remains the backbone on which diagnosis can be made, a disease understood, or a treatment developed” (p. 4). And the remainder of the textbook pretty much focuses on “the etiologic agent” for each disease.

While this criticism is of great concern for pain practitioners and medical ethicists, it should not go without noting that it is this very issue that gives pathology so much legitimizing force. In the discourse of science, mechanistic causality and isolable variables are the norm. Complex systems modeling and multicausality are relatively new phenomena and are only taking hold in those disciplines that require them to produce results (i.e. predictive climate modeling, ecology, agronomy). Medicine has been attributed with tremendous popular success because of the way it isolates disease agents and cures them.

As such, without a clearly identified and disciplinarily legitimized pathogenesis and etiology, it is very difficult to make authoritative claims concerning a disease. As Aho notes in his exploration of contemporary psychiatric diagnostics,

> Bio-psychiatry interprets mental disorders from the same objectifying and mechanistic perspective that modern science inherited from the philosophies of Descartes and his empiricist successors. This perspective already makes pre-judgments about what is valuable. [This perspective] adopts a mechanistic picture of the world as an aggregate of quantifiable material objects in causal interaction. (p. 249).
This mechanistic view into which bio-psychiatry is articulated also exerts its sway over the broader medical-industrial complex. As medicine was subsumed by scientific practices, the mechanistic world-view began to take hold. In this world-view the ultimate mark of understanding is mechanistic description—or in medicine pathogenesis (or pathophysiology) and etiology. The result of all this is that the requirement of an articulable pathogenesis and etiology is a very powerful principle of rarefaction. Being able to demonstrate convincingly the pathogenesis and etiology of a disease firmly places that disease in the realm of truth and allows one to make authoritative ontological claims about the disease. The medical community’s lack of consensus concerning a mechanistic understanding for sinus headache is, perhaps, most responsible for the ensuing debate.

Pathogenetic and etiological concerns are of primary importance in the debates surrounding the sinus headache. This is particularly so given the concern over “confusion” between sinus headache and migraines. Each side of the sinus headache debate warrants their claims with pathophysiological and etiological suggestions. The pharmaceuticals suggested etiology and pathogenesis is probably best represented by their graphical depictions of sinus suffering. These computer-graphics-driven advertisements depict increases in sinus congestion which result in pain and pressure around the eyes and nose. Despite the claim that the sinus headache is a relatively new invention of the pharmaceuticals industry, it turns out the mechanisms behind the sinus headache have been theorized as early as 1891. As a 2005 article in Otolaryngology—Head and Neck Surgery states, “negative pressure created in an occluded sinus cavity as a result of air being absorbed by the tissue was first proposed in 1891 by McBride” (Cady and Schreiber p. 268). And certainly this pathogenesis coordinates well with that suggested by the pharmaceuticals companies.

Those who object to the existence of the sinus headache, or at least suggest that it is vastly over-diagnosed, also frequently argue relying on specific etiology and pathogenesis. In contrast to the pro-sinus headache group, these critics warrant their claims by reference to the pathology of migraines. For example Mehle and Schreiber in an article in Otolaryngology asked,

Why are so many “sinus headache” patients misdiagnosed, either by their physicians or themselves? The answer to this question likely is related to the pathophysiology of migraine, and the nature of nasal pain. (Mehle and Schreiber p. 490)

Neurologists suggest that a brain structure known as the descending nucleus of five is built in such a way that when a patient has a migraine it produces symptoms that resemble a sinus problem. As an MPG speaker explains,

If you look at the descending nucleus of five, the nucleus of pain is spread out over a space. It’s not just a small group of cells. And unfortunately it is interweaved with this lower portion
of the nucleus which are actually inputs from the back of the head for sensation and pain. Also very close by are nuclei that control [sinus and congestion related] symptoms. So it’s easy to understand why we get so many of these look-alike syndromes in migraines. (MPG Feb 2007)

In this passage, Dr Peters explains that the neurological structures which control migraine headache are so intertwined with those that control sinus congestion that the former often causes the latter. In this case sinus headaches are viewed as epiphenomena of migraines. Under the mechanistic rubric of pathology, this argument suggests that migrains cause the symptoms of sinus headaches. In offering an alternate specific etiology and pathogenesis, Dr Peters lays claim to the same principles of rarefaction in order to prosecute the other case.

**Diagnostic Criteria and Predictive Validity**

In the era of modern medicine the disciplines of diagnostics and pathology have nearly collapsed into one. If medical science can locate an empirically isolable component of a specific etiology (e.g. a chemical marker in the blood or a medical image), then the clinician can locate that marker in a patient, and a diagnostic pronouncement can be made. However, in cases when the disease in question has been recently identified or resists the logic of the specific etiology (i.e. is multi-causal), then clinicians are forced to rely on a different set of resources for identifying and classifying illness.

From antiquity to the present, diagnosis has been understood as the process of reading signs and symptoms in order to arrive at a label for a patient’s affliction. (See Chapter 1 for a more complete exploration of pain’s traditional role as indexical sign.) Diagnosis is a turning point in medical practice. It is the resolution of one set of questions (illness) and the beginning of another (proper treatment). While the overall goal of diagnosis has remained consistent since the beginnings of medicine, the last one hundred years have proved “revolutionary” for diagnostic medicine. In fact there have been two profound changes—one logical, the other technological (about which more in the following section).

Physical diagnosis (as opposed to chemical or imaging diagnosis) is one of those spaces in medicine where the challenged relationship between art and science is most present. Diagnostics text books refer to the arts of interviewing, speaking, listening, and probability and speak of diagnostics as the practice of combining those arts with the sciences of pathology and clinical examination. At least one textbook even highlights this relationship in its title: *Sapira’s Art and Science of Bedside Diagnosis* (Orient, 2005). Similarly Swartz’s *Textbook of Physical Diagnosis* opens with sections entitled: “The Art of Interviewing,” and “The Science of the Physical Examination.” As Swartz
describes it, diagnosis is a “relatively easy” logical process that follows the more challenging tasks of
data-collection:

Any patient who seeks consultation from a clinician needs to be evaluated in the broadest
sense. The clinician must be keenly aware of all clues, obvious or subtle. Although body
language is important, the spoken word remains the central diagnostic tool in medicine. For
this reason, the art of speaking and listening continues to be the central part of the doctor-
patient interaction. Once all the clues from the history have been gathered, the assimilation of
those clues into an ultimate diagnosis is relatively easy.  (p. 3)

It is this “relatively easy” part that indicates the profound change in contemporary diagnostic
practices. Traditional diagnostic textbooks—those that predate EBM and the challenge from
technological diagnostic procedures—devote extensive sections to the logics of diagnosis. Following
the dictums of early empiricism, early diagnostics textbooks describe the diagnostician’s task as a
problem of logical induction. For example, see the following excerpt from Barclay’s (1872) Manual
of Medical Diagnosis:

All true diagnosis is ultimately based upon inductions separately framed out of clinical and
pathological investigations and experiments. By careful and repeated observation, we have
succeeded, with every appearance of truth, in associating certain phenomena observed during
life with particular lesions found after death; and these form the first step in our progress.
Sound principles have advanced exactly in proportion to the number and accuracy of these
conclusions, because there are so many conditions which we are not yet, and perhaps never
shall be, able to associate with any appreciable change in structure; and to them we must
apply by inference the truths which have been taught in other instances by direct observation.
In so far as we are able to correctly interpret symptoms, and to trace out in connection with
them a real change of structure or of function which affords an adequate explanation of their
presence, in so far are we prepared to form a correct diagnosis. (p. 29)

In contrast to this model of diagnosis as inductive inference, contemporary diagnostic’s logics,
responding to the demands of EBM, ground their practice in probabilistic reasoning. In contemporary
diagnostics the signs and symptoms are elicited in the traditional manner, but the logic of induction
has been replaced by probability tables. These tables assign a probably of coincidence for a particular
symptom and a given disease. Using the identified symptoms and the corresponding probabilities, the
clinician merely adds up the likelihood of a given disease obtaining for a given set of symptoms.
McGee’s (2007) Evidence-Based Physical Diagnosis explains exactly this process:

Pretest probability is the probability of disease (i.e. prevalence) before application of the
results of a physical finding. Pretest probability is the starting point for all clinical decisions.
For example, the clinician may know that a certain physical finding shifts the probability of a
disease upward 40%, but this information alone is unhelpful unless the clinician also knows
the starting point: If the pretest probability for a particular diagnosis was 50%, the finding is
diagnostic (i.e., post-test probability 50% + 40%=90%); if the pretest probability was only
10%, the finding is less helpful, because the probability of disease is still the flip of a coin (i.e. post-test probability 10%+40%=50%). (p. 4)

It is the statistical ground from which these diagnoses are derived that give them so much rarefactive force in ontological statements concerning disease. Relevant and predictive diagnostic signs and symptoms are carefully and painstakingly researched in order to arrive at a robust diagnostic inventory. Indeed evaluating the reliability of diagnostic tests is a lively research agenda, as would be expected given the newfound reliance on probability tables. As Designing Clinical Research (2007) notes,

For a test to be useful it must pass muster on a series of increasingly difficult questions that address its reproducibility, accuracy, feasibility, and effects on clinical decisions and outcomes. Favorable outcomes to each of these questions are necessary but insufficient criteria for a test to be worth doing. For example, if a test does not give consistent results when performed by different people or in different places, it can hardly be useful. If the test seldom supplies new information and hence seldom affects clinical decisions, it may not be worth doing. Even if it affects decisions, if these decisions do not improve the clinical outcome of patients who were tested, the tests still may not be useful (Hulley et al p.183, emphasis original)

The problem of diagnosis is especially pertinent in the case of the sinus headache due to the argument about the confusion with migraines. Furthermore, even physicians who accept the legitimacy of the sinus headache cite the challenge in rendering the diagnosis. For example, an article from Current Pain and Headache Reports identifies the symptoms of sinus headache as “often vague, creating a challenge for the clinician in establishing an accurate diagnosis” (Hauser and Levine p. 45). Diagnosing a sinus headache requires the comparison of patient symptoms with authorized diagnostic criteria, but there are conflicting criteria. The most broadly recognized is probably the criteria provided by the pharmaceuticals industry. However, the most broadly authorized (by medico-scientific discourse) criteria are those provided by the International Headache Society (IHS). As the aforementioned Current Pain and Headache Reports article notes, the “IHS criteria are consensus-driven guidelines that categorize headaches into various subsets based on history and symptoms” (Hauser and Levine p. 45). The IHS provides diagnosticians with five criteria for identifying a sinus headache:

(1) purulent discharge of the nasal passages; (2) pathologic findings on x-ray examination, CT, magnetic resonance imaging (MRI) or transillumination; (3) simultaneous onset of headache and sinusitis; (4) headache location (in relationship to specific sinus structures); and (5) disappearance of headache after treatment of acute sinusitis…. The evidence for the importance of headache location in relationship to sinus disease is now considered doubtful, and the circular reasoning of the fifth criterion has been criticized. (Cady et al p. 909)
The strictness of these criteria are often used as the justification for excluding the majority of patients from the sinus headache diagnosis and offering migraine as an alternative. These criteria position sinus headache as secondary to acute sinusitis, a viral or bacteriological condition. The alternative diagnostic criteria make the sinus headache much easier to diagnosis as it describes it as almost any head or facial pain resulting from sinus pressure. One of the primary advocates of these criteria is the National Headache Foundation, an organization funded by an unrestricted educational grant from Eily Lilly. It should be acknowledged that these criteria, like the commercial advertisements, are geared more towards self-diagnosis than physician-diagnosis, though they are used by quite a number of clinicians:

> Sinuses are filled with air, and their secretions must be able to drain freely into the nose. If your headache is truly caused by a sinus blockage, such as an infection, you will probably have a fever. (National Headache Foundation)

In the wake of diagnostic difficulties, clinicians often turn to diagnostic inventories, and the sinus headache is no exception. Of course each diagnostic approach to these headaches comes with a different specified inventory. If clinicians think of the sinus headache as a legitimate otolaryngologic disorder, then that will lead them to use an inventory such as the sinal-nasal outcomes test (SNOT-20, seriously) (Mehle and Schreiber p. 490). However, if clinicians believe it to be primarily a migraine disorder, then there are appropriate migraine alternatives. This following excerpt from the MPG migraine and sinus headache discussion highlights the difficulty involved in selecting the appropriate diagnostic inventory, even for one illness (in this case migraine):

> So one of the things that is also an item of debate is which questionnaire to use. Oh gosh, does this sound familiar to psychologists? Which questionnaire should you use. There’s actually an extraordinarily simple questionnaire called the HIT-6, and we haven’t brought that to the group for awhile, but that was promulgated by Glaxo. But, none-the-less, it covers all areas of function. MIDAS actually only covers a few…it doesn’t really cover energy. It doesn’t ask you cognition questions. You, as a clinician, actually have to imply that in your questioning. It’s kind of good to talk to the patient, besides just having them fill out a form. And, emotional distress isn’t covered. The most commonly used study methodology when determining severity of migraine disability is actually this one [MIDAS] in almost all the studies that are published now, even though there are actually better questionnaires in terms of covering everything. So, we need to see some further developments along this line. (MPG Feb 2007)

In an era where the reliability and validity of a diagnosis exercises tremendous rarefactive force, the question as to which test to use is essential. Different tests offer clinicians different statistical resources in order to determine a diagnosis. Certain tests are more likely to result in one diagnosis over another, and frequently many tests are required. For example, the SNOT-20 will determine how
likely it is that a given patient has a sinus headache. If the results are not significant, then the clinician may resort to the MIDAS or the HIT-6 in an effort to provide a different diagnosis.

**Objective Visualization**

As previously mentioned, this change in the logics of diagnosis had developed alongside a profound technological change—the shift towards diagnostic imaging technologies. Nowhere, perhaps, is the burgeoning focus on new medical technologies more evident than in the dejected prose of the physical diagnostician. Teaching diagnosticians McGee (2007), Sapira (2005), and Orient (2005) each objected greatly to the apparent destruction of classical medical practice in the wake of these new technologies. McGee referred to a great “tension” between these two schools of thought in his lament on the contemporary state of medical education.

The tension between physical diagnosis and technologic tests has never been greater. Having taught physical diagnosis for 20 years, I frequently observe medical students purchasing textbooks of physical diagnosis during their preclinical years to study and master traditional physical signs, but then neglecting or even discarding this knowledge during their clinical years, after observing that modern diagnosis often takes place at a distance from the bedside. One can hardly fault a student who, caring for a patient with pneumonia, does not talk seriously about crackles and diminished breath sounds when all of his teachers are focused on the subtleties of the patient’s chest radiograph. (McGee p. ix)

And in an even more scathing critique Sapira (qtd in Orient) attacked the new establishment head on:

This book is written with a sense of great sadness about American academic medicine, and from a prerevolutionary point of view (the revolution in academic medicine having occurred about 1968, when the intellectual approach to diagnosis and its attendant techniques of clinical examination fell into disrespect, superseded by an inappropriately exclusive reliance on dogma and modern technologic devices).  --Joseph D. Sapira, M.D. 1989

Though Swartz has a much more measured approach to both schools of thought, I wonder how surprising the rise of imagining diagnostics in particular can be for these writers given constant reference to ocular epistemology. Swartz opens each of the chapters of his text with a quote from a prominent historical physician. Certainly the following two have stood out as precursors to the force of imaging technologies:

What is spoken of as a “clinical picture” is not just a photograph of a man sick in bed; it is an impressionistic painting of the patient surrounded by his home, his work, his relations, his friends, his joys, sorrows, hopes and fears. –Francis Weld Peabody 1881-1927 (Swartz p. 3) [Opening lines of book/section 1]

Don’t touch the patient—state first what you see; cultivate your powers of observation. Sir William Osler 1849-1919 (Swartz p. 129) [Opening lines of section 2]
The role of visualization and visualization technologies in contemporary biomedical practices is so rich and nuanced that it has fostered a rich body of critical literature in fields ranging from science and technology studies to medical anthropology. Of the visualization technologies available one of the most enduring is the x-ray. While the x-ray is no longer the only means of technological visualization, it is one of the most ubiquitous and its authority is routinely invoked in the legitimization of subsequent technologies. Much like contemporary technologies such as positron-emission tomography (PET) or functional magnetic resonance imaging (fMRI), the x-ray filled and continues to fill an important epistemological niche in the ecology of technomedicine. As Herzig (2003) noted,

"The x-ray, on the other hand, enjoyed unquestionable sovereignty as one of medicine's crowning achievements. Particularly in the wake of the damning 1910 Flexner report, American physicians grasped such achievements to shore up their troubled professional authority. For these physicians, the x-ray played a crucial role model not only in medical diagnostics and therapeutics, but also in enhancing the status of the medical profession. (p. 82)"

Though Herzig's investigation of the x-ray primarily focuses on its uses as a depilatory technology, in the above passage, she raised the very important question of the role of x-ray technology in medical authority and legitimization. As she noted, x-rays were instrumental in providing a new scientific credibility for the medical establishment following the Flexner report. The question she did not address is how x-ray technology was able to do this. In this chapter, I argue that the x-ray as visualizing technology is able to extend its authority to the medical profession at large because it reproduces the logic of the medical gaze and is a technological avatar of the ocular centrism that underlies all of Western epistemology. As such the ability to “see” something via medical imaging functions as a principle of rarefaction.

In The Birth of the Clinic, Michel Foucault outlined his theory of the medical gaze. The medical gaze, Foucault argued, is the logic that underscores the new practice of medicine in the wake of contemporary Western epistemologies. The logic of the medical gaze subsumes medical knowledge under the authority of an especially perceptive nearly all-knowing (almost certainly male) physician. The extraordinary perceptive faculties of this physician are located in and legitimized by his status as objective scientific observer. As Foucault noted, the primary linguistic resources of contemporary medicine ground their authority in the ability of the physician to describe health, etiology, and pathogenesis in the language of spatial metaphors and visual perception, “the method of the new anatomy is analysis, just as it is in chemistry, but an analysis detached from its linguistic
support and defining the spatial divisibility of things, rather than the verbal syntax of elements and phenomena” (Foucault p.161).

In short, it is those objects that are observable and codifiable under the medical gaze which are dans le vrai, as opposed to the verbal reconstructions of patient report or physician experience. In his discussion of the history of medicine, Foucault argues that one of the primary stumbling blocks to the rise of gaze-centered medicine was the challenge brought forth by the physio-cultural barrier of the skin. I use the term “physio-cultural” to highlight the twin challenges brought forth by this barrier. The skin is a physical barrier in the very obvious sense that it prevents the physician from seeing effectively into the living patient. It is a cultural barrier as the forces of religious Puritanism in early modern Europe prevented the penetration of the medical gaze into the deceased patient. Indeed, the fight for permission to, as Foucault put it, “open up a few corpses” was a major constituent of early medical public rhetoric:

For 150 years, the same explanation had been repeated: medicine could gain access to that which founded it scientifically only by circumventing, slowly imprudently, one major obstacle, the opposition of religion, morality, and stubborn prejudice to the opening up of corpses. (p. 153)

The physicians had gained relatively routine access to corpses during the early years of x-ray technology; x-ray was perceived as so promising precisely because it allowed the physician to extend his medical gaze into an area previously denied: the interior of the living patient. By the early 20th century, the logic of the medical gaze had so ingrained itself to medical practice that a new technological innovation that allowed an extension of the medical gaze was sure to enjoy rapid legitimization. In essence, I believe it was this ready-made rhetorical niche into which the x-ray could be folded and granted authority.

This niche came, however, not only from the enfranchisement of the medical gaze, but also from the persistent undercurrent of ocular centrism and Western epistemology. As Haraway (1997) explained, visualization technologies are routinely responsible for bringing scientific objects into le vrai:

Both the whole earth and the fetus owe their existence as public objects to visualizing technologies.... The system of ideological oppositions between signifiers of touch and vision remains stubbornly essential to political and scientific debate in modern Western culture. (p. 174)

Employing the speculum as synecdoche, Haraway argues that those visualization technologies that allow for the penetration of scientific vision into previously hidden spaces are those technologies which are responsible for the acceptance of the reality of the described mechanisms and objects that
occur in those hidden spaces. X-ray imaging is a prime exemplar of a high-technology speculum, and Haraway’s virtual speculum synecdoche is so obviously apropos for x-rays that the correspondence between the vehicle and the tenor hardly bears mentioning. It is the strong historical links between visualization technologies, ocular centrism, and the metaphysics of presence that make objective visualization such an important principle of rarefaction.

Similarly, the principle of objective visualization is invoked in the sinus headache literature. Proponents of the sinus headache often point to radiographic findings to indicate the presence of an actual ailment, even in the absence of symptomology commensurate with the IHS criteria. Visualization technologies which subsume diagnostics under the logic of the gaze are common recourse for sinus ailment diagnostics. As the aforementioned Current Pain and Headache article describes,

The nasal cavity is then carefully evaluated, often with an endoscope looking for pathology or anatomic abnormalities that may be the source of the symptomology. A CT scan of the sinuses is often obtained to better evaluate the anatomy and pathology. For patients with new-onset headaches and/or change in headache and/or facial pain character, an MRI of the head and sinuses is also obtained to look for sinister causes of the pain. (Hauser and Levine p. 45)

In keeping with the pharmaceutically-driven definition of the sinus headache (the one that includes many more patients), the National Headache Foundation—the Eli Lilly Front—downplays the IHS criteria (fever-inducing sinusitis) using the word “probably” and highlights the role of x-ray as unquestionable arbiter of diagnosis:

Sinuses are filled with air, and their secretions must be able to drain freely into the nose. If your headache is truly caused by a sinus blockage, such as an infection, you will probably have a fever. An x-ray will confirm a sinus blockage. (National Headache Foundation)

This recourse to visualization technologies is evident in more mainstream medical texts as well. An editorial entitled, “The Demise of the Sinus Headache is Premature,” published in the Archives of Internal Medicine cited “the predictive value of headache for an abnormal CT finding in chronic sinusitis” (Chester p. 954). Similarly a research study from Headache, the journal of the American Headache Society used radiological evidence to question the dichotomy between sinus headache and migraine,

The majority of “sinus headache” patients satisfy the IHS criteria for migraine. Surprisingly, these patients often have radiographic sinus disease. This raises the possibility of selection bias in otolaryngology patients, inaccurate diagnosis, or radiographic sinus disease and migraine as comorbid conditions. (Mehle and Kremer p. 67)
While pathology and diagnostics exert considerable rarefaction control over disease discourse, objective visualization can function as a principle of last resort. While a clinician may not be able to identify the pathophysiology, and may not yet have identified statistically valid diagnostic criteria, if evidence for the disease can be seen, then it is much harder to object to its reality. Visualization’s foundation in ocular centrism certainly helps to provide those who employ it a certain legitimacy that they otherwise might not have. Indeed, in Chapter 5, I explore another case where the recourse to visualization technology eventually caused the legitimization of a previously unrecognized condition. In so doing, I will also explore in greater detail how visualization garners so much authority.

FDA Treatment Approval

Until this point I have been exploring the sinus headache rarefaction through the lens of my earlier model (Figure 2) which locates disease discourse at the center of four identified institutions of rarefaction. While that model was very useful in investigating the rarefactive influences of the medical disciplines—pathology, diagnostics, and radiology—it is inadequate to the task of exploring how that discourse articulates to the FDA. A proper treatment of the relationship between disease discourse and the FDA requires recourse to a more complex schema, one that I derive from the work of Latour (1999). In Pandora’s Hope, Latour develops various models to account for the relationships between the material and the semiotic. One of these models seeks to outline the material-semiotic connection within networks of power. Latour describes these networks of power as “sociotechnical imbroglio[s]”, as “‘seamless web[s]’ of technical and social factors. In describing these networks, Latour invokes Hughes’ (1983) portrayal of the combined social, technical, and material constituents involved in the electrification of America. Indeed, Latour hails Hughes for failing to succumb to dualist models of science and society. Furthermore, Hughes model of electrical networks explicitly includes, “the management of large masses of electrons, clients, power stations, subsidiaries, meters, and dispatching rooms” (Latour, 1999 p.204).

Similarly, the MIC is just such a web, just such an imbroglio. The MIC is a densely articulated network of power—a network wherein the FDA occupies a pivotal node. The FDA exercises tremendous power over the networks of the MIC—a power derived from federal law. Embracing the power granted by this federal legislation, the FDA coordinates material and semiotic activities from a wide array of other powerful institutions including, medical disciplines, the National Institutes of Health, and pharmaceuticals corporations. When the FDA indicates that a drug is safe and effective for treating a given disease, this declaration constitutes one of the greatest levels of legitimacy a disease can achieve. Such an indication follows years (and sometimes decades) of
coordinated work at the intersections among multiple institutions of rarefaction—each with its own principles of rarefaction and mechanisms of oversight. For example, FDA approvals are typically based on the results of RCTs published in scholarly journals, under the oversight of editors and peer-review boards. The publication of an RCT typically requires as part of its methodology section a clearly described and statistically valid means of identifying trial subjects—i.e. valid diagnostic criteria, which as I’ve explained is typically knit with pathological evidence. Subsequently, a typical FDA approval requires that the discourse of the pharmaceuticals label be rarefied and legitimized by the principles of rarefaction deployed by diagnostics, pathology, pharmacy, and the offices of the FDA. As such, I argue that disease discourse is not simply governed by instructions of rarefaction, but rather by a rarefactive network of power—a conglomeration of rarefactive institutions with their own rarefactive principles that coordinate and negotiate over the legitimacy of certain statements within a discursive network.

In order to help clarify how the rarefactive network involved in this case functions, I have provided a map of the various institutions and articulations involved in the establishment of an FDA indication (Figure 2). From this articulation-map and its subsequent discussion, I hope to make clear that any particular drug indications are subject to manifold regulatory/regularizing forces—each employing their own principles of rarefaction similar to those described in the above sections on pathology and diagnostics.
FDA regulation is grounded in the Federal Food, Drug and Cosmetic Act. While this law provides the foundation for oversight and regulation of many products including human food, animal feed, medical instruments, and cosmetics, it is Section 505 that is particularly relevant to the question of new diseases and drugs,

No person shall introduce or deliver for introduction into interstate commerce any new drug, unless an approval of an application filed pursuant to subsection (b) or (j) is effective with respect to such drug.

Subsections (b) and (j) are those that require would-be pharmaceuticals vendors to demonstrate safety and efficacy through legitimized research practices. The primary mechanism of this research oversight is the FDA’s Center for Drug Evaluation and Research (CDER, pronounced cedar). Under the oversight of CDER, the primary mechanism of pre-drug approval testing is the Randomized Clinical Trial (RCT). As CDER notes on its website, RCTs
represent the ultimate premarket testing ground for unapproved drugs. During these trials, an investigation compound is administered to humans and is evaluated for its safety and effectiveness in treating, preventing, or diagnosing a specific disease or condition. The results of this testing will comprise the single most important factor in the approval or disapproval of a new drug.

However, one RCT is never sufficient for drug approval. In fact several tend not to be sufficient. CDER outlines a four phase process for pharmaceuticals research and evaluation, the first three of which are required before any new drug can be marketed or sold. As suggested in the above quote, these phases evaluate the safety and efficacy of new drugs. Each phase of research is regulated by a combination of CDER’s scientific and ethical standards designed both to elicit appropriate safety and efficacy data and to safeguard study participant rights and safety (CDER).

While drug approval studies are designed to meet the standards outlined by CDER, they are also subject to additional regulation/regularization. The research reports following RCTs typically find their way into the peer-reviewed scholarly journals of medicine and pharmacology. And as would be expected, the research protocols are subject to the disciplinary standards of each journal and enforced through the mechanisms of editorial oversight and peer-review. And it is these standards that, perhaps, have the most effect in preventing the invention of disease. In order for an RCT to be considered valid and legitimate it has to pair a diagnosable disease with a controllable intervention (drug). Diagnostics is its own subspecialty with its own disciplinary journals and subsequent regularizing influence. Diagnosis of a disorder now typically relies on what are called “validity studies”—studies which evaluate the statistical soundness of diagnostic criteria (about which more in the diagnostics section).

Additionally, there has been a great deal of concern over inappropriate influence from the pharmaceuticals industry that may come from study-funding. While, there have been few (if any) documented cases of pharmaceuticals-influenced research fraud, even the medical professions have recognized the potential for abuse in this system. As a stop-gap (of arguable efficacy), most research journals and professional meetings require a disclosure of all study funding sources along with the presentation of the data. And physicians and medical humanists alike note with grave concern the lack of negative result (the drug didn’t work) studies funded by the pharmaceuticals industry.

OTC medications like most of those offered for the sinus headache are regulated by the FDA in much the same was as prescription medications. Newly introduced drugs must undergo rigorous safety and efficacy studies. Actually, the safety requirements for OTC medication are even more strict, since they must be deemed safe enough to be administered by lay-people. Most new medications added to the list of FDA approved OTC medications are those that have been reclassified
through the FDA Rx-to-OTC program. Once a drug is classified as OTC, FDA regulatory efforts shift to labeling concerns. That is, the FDA regulates what efficacy claims can be printed on the label as well as dosing information and safety warnings. Given this, patients and physicians are prone to trust the product statements offered by the various OTC medication providers.

In the case of the sinus headache, this rarefactive network is operating to prevent the pharmaceuticals corporations from offering its own understanding of the sinus headache. For some time now, the pharmaceuticals corporations have been relying on the OTC approval status of pseudoephedrine, guaifenesin, and acetaminophen (the active ingredients in sinus headache medicines) to sell drugs designed to treat their version of sinus headache. In response to this medical researchers are using the authority of the disciplines and RCTs to cast doubt on pharmaceuticals claims. Through offering an alternative physiology—that of the migraine—and through casting doubt on the validity of sinus headache diagnostics, these researchers are hoping to influence the FDA Sinus Drug Advisory committee to issues a policy document that revokes the pharmaceuticals industry’s ability to advertise their version of the sinus headache. The legitimacy afforded these RCTs by the professional organizations, CDER, and EBM provide the counter-sinus headache claims with a great deal of authorization. Subsequently, many of the interview subjects in my study fully expect the FDA to rule against the pharmaceuticals companies in the near future.

Reflections on rarefaction in the medical-industrial complex

In one sense, we could consider the rarefactive networks of the MIC as mechanisms for managing jurisdictional disputes. The question of who should have say regarding the existence and nature of a disease is certainly very pressing. The fora of disciplinary journals allow for the adjudication of these disputes between various disciplinary practitioners. The pathologists can argue that specific etiology is the backbone of all disease knowledge. Diagnosticians can argue by reference to the practicality of identifying those who have the disease in a robust (statistically valid) way. And radiologists can continue to enjoy the privilege that comes from being articulated to ocular centrism. However, these are obviously not the only players in the MIC. Regulatory agencies and corporate entities both vie for jurisdictional authority over disease. Ultimately Drug Advisory Committees provide a forum for the adjudication of these disputes. The resignification of sinus headache as disease represents a potential boon to the pharmaceutics industry. The identification of a large percentage of headache sufferers as sinus headache patients ensures continued sales of OTC decongestant/analgesic packages. If the results of the continuing discourse maintains the status quo, the pharmaceuticals companies who sell sinus headache products will continue to benefit as they have.¹¹
The results of this inquiry into sinus headache rarefaction suggest that principles of rarefaction, institutions of rarefaction, and rarefactive networks are useful constructs for interrogating the rhetorical mechanisms of discursive regulation. This exploration has shown how institutions legitimize their discourse and exercise their authority through previously established rarefactive principles. Furthermore, viewing this discourse at the institutional level, helps to further the goals of rhetoric of technoscience in providing a model of discourse than treats the material and semiotic symmetrically. Finally, the pairing of the case of the sinus headache with the case of fibromyalgia (in the next chapter) will help provide rhetorical studies of agency and regulation with a clear comparative set of case-studies. Each of these cases as arguments within pain discourse about the reality of a disease marshal similar material and semiotic resources—one in the exercise of regulation, and one in the pursuit of agency and change. More specifically, Chapter 5 will demonstrate how fibromyalgia advocates were able to rely on the legitimizing force of objective visualization in order to establish a discursive change.

1 In “Structure, Sign, and Play in the Discourses of the Human Sciences,” Derrida (1966) argued that language functions without a central structure and as such is merely the freeplay of signifiers.

2 Beaudrillard’s Simulacra and Simulation (1985/1996) argued that all reality has been replaced by signs and symbols.

3 In answering these questions I differentiate myself from the bulk of the disease resignification literature in focusing on an illness (sinus headache) which is considered entirely of physiological etiology. The underlying principle behind this case-selection is my presupposition of the medical-industrial complex—an integrated entity that includes Western biomedicine writ large, physiological, pharmacological, psychiatric, etc.

4 And this, too, is an area where Foucault’s theory of discourse overlaps with rhetorical stasis theory. The authority to speak and be recognized is a jurisdictional issue in its own right—especially in the densely articulated networks of the MIC. When multiple powerful institutions vie to regulate the same discourse, and authorize or prevent speakers from participating in that discourse, jurisdiction becomes a key point of contention. Though my analysis in this chapter will focus primarily on principles of rarefaction, the discourse of the sinus headache is equally amenable to stasis analysis.

5 In this case “external” does not mean non-discursive. The external principles of rarefaction are essentially the foundations of discourse. They are ontologically a priori. In contrast the “internal” principles arise within specific discourse and are operationalized in different ways depending on their instantiation.

6 I take Foucault’s “within the true” as an effective description of postmodern ontology (hence my chapter title). As the Discourse explained the combined effects of the will to truth and the will to knowledge, “sketched out a schema of possible, observable, measurable and classifiable objects…”—i.e., a collection of objects which can be recognized (through discourse) as being, as existing.

7 See Appendix D for a complete list of collected artifacts and description of analytic procedures.

8 I surveyed approximately a dozen pathology textbooks located at two Iowa medical schools (one osteopathic, one allopathic) and two medical archives. The publication dates on these textbooks ranged from the 1880s to
2008. At each of the medical schools, I located the textbooks currently being used in the basic pathology courses for medical students.

9 Diagnosticians refer to a “revolution” characterized by a new focus on imaging technologies and chemical analysis, as opposed to physical examination and patient interviews.

10 It should not go without noting that the medical testing industry is an economic powerhouse akin to the pharmaceuticals industry. Testing representatives aggressively market and sell their tests to clinicians in much the same way as drug reps. Testing companies have even sponsored meetings of the MPG and provided speakers offering their products.

11 However, it’s not only pharmaceuticals corporations that benefit materially from disease legitimization. Any disease, if recognized and validated by both the medical community and third-party payers, ensures physicians an enormous number of billable hours. And while the legitimization of the disease ensures the billable hours, the mechanism of legitimization determines who gets those hours. Sinus headache, as it currently exists, is treated by otolaryngologists. However, if as many as 90% of sinus headache patients are actually migraineurs, then, by medical standards, they belong to neurologists.
Chapter 5: Technological Agency and the Ontology of Fibromyalgia

Albrecht Dürer, Draftsman Drawing a Nude. Metonymic for the entire array of Renaissance visual techniques, Albrecht Dürer’s Draftsman Drawing a Nude (1538) conventionally dramatizes the story of a revolutionary apparatus for turning disorderly bodies into disciplined art and science. In the drawing, an old man uses a line-of-sight device and a screen-grid to transfer point for point the features of a voluptuous, reclining female nude onto a paper grid marked off into squares. The upright screen-grid separates the prone woman on the table, whose hand is pointed over her genitals, from the erectly seated draughtsman, whose hand guides his stylus on the paper. Dürer’s engraving attests to the power of the technology of perspective to discipline visuals to produce a new kind of knowledge of form. –Donna Haraway, ModestWitness.

Following Haraway, I use Dürer’s Draftsman to highlight the role of visual imaging technology in discourses which purport to describe the body. The neuroimaging discussed in this chapter codifies anatomical structures and physiological mechanisms according to a previously derived set of constraints (algorithms, color schemes, etc). More pointedly, Fibromyalgia is a predominately female disorder which has only recently been legitimized through its subsumption under the (masculine) logics of medical imaging.
The concept of fibromyalgia has fallen into disrepute because it failed to overcome the essentialist fallacy that was the downfall of its predecessors, muscular rheumatism, neurasthenia, and fibrositis. —The Lancet 1999

Pfizer announced today that the Food and Drug Administration approved Lyrica® (pregabalin) capsules for the management of fibromyalgia, one of the most common chronic, widespread pain conditions in the United States. —Drug Week 2007

In late June 2007, something very important happened for millions of chronic pain patients. The U.S. Food and Drug Administration (FDA) approved Lyrica, a prescription pharmaceutical originally developed as an anticonvulsant, for the treatment of fibromyalgia (FM). In the world of contemporary Western biomedicine—an environment saturated by new drugs and regular FDA approvals—this may not seem like news. However, this particular FDA approval was especially interesting given the fact that until recently, much of the medical community did not consider FM real. As such, the Lyrica approval functioned not only as a policy statement but also as an ontological pronouncement—i.e., it enfranchises the reality of FM.

Although some trace the issue back as far as Galen (circa 150 CE), the ontology of fibromyalgia (FM) has been a matter of intense debate for at least the past 20 years. However, when one looks to the recent popular press or professional medical journals, one thing seems clear: Fibromyalgia is enjoying an increasing reality. The online information fact sheet provided by the Mayo Clinic classifies fibromyalgia as “a chronic condition characterized by widespread pain in your muscles, ligaments and tendons, as well as fatigue and multiple tender points—places on your body where slight pressure causes pain.” However, the medical community’s ability to provide such a succinct definition of this disorder is relatively new. A 2000 article from the Philadelphia Inquirer explained the clinical difficulty in obtaining a FM diagnosis: “There are no objective markers of fibromyalgia—nothing that X-rays, blood tests, muscle biopsies or MRIs can find. For many patients fibromyalgia goes together with two other hard-to-diagnose syndromes; chronic fatigue and irritable bowel” (McCullough, p. D01). Indeed, the difficulty in diagnosing FM is something that causes great distress for fibromyalgics and clinicians alike. Additionally, given the sometimes-contested ontology of FM, it can be difficult to get such a diagnosis from FM-skeptical physicians. As fibromyalgic Anne explained in an interview with The Globe and Mail, “It can be tough to diagnose…. It depends on which specialist you see, what your presenting symptoms are” (“Causes of fibromyalgia,” 2002, p. H1). Similarly, nationally renown fibromyalgia specialist Dr. Daniel Clauw reported in an interview
with the *Washington Times*, “There are still a number of people who are skeptical…. It is part of a spectrum of illness that falls into a gray zone, with no evidence on lab tests” (Goff, 2002, p. D1). As the testimonies of Anne and Dr. Clauw suggest, the lack of legitimacy creates a challenging—to say the least—environment for fibromyalgics. Certainly, the angst this state of affairs causes for FM sufferers—a community predominantly of women—is palpable. The president of the American Fibromyalgia Association² (AFA), herself a fibromyalgic, summed it up well during a participant interview when she noted that, “Living with a chronic illness is challenging. Living with a chronic illness that people don’t believe in is overwhelming—at best.” (Martinez Interview). Indeed, Martinez even cited the existence of numerous cases of fibromyalgic-suicide that resulted, at least in part, from the climate of disbelief.

Despite these lingering doubts, the recent Lyrica indication (by the FDA) suggests that the burden of proof has now shifted away from those who believe in FM toward those who do not. This shift seems to stem largely from the application of positron emission tomography (PET) to FM research and diagnosis. Almost immediately after its arrival in medical practice, PET³ and its sibling scanning technologies (CT, MRI, fMRI, SPECT) were heralded as powerful revolutionaries. These accolades have been expressed in a wide range of texts, from the *Atlas of Positron Emission Tomography of the Brain*, which argued that “the diagnosis of neurological diseases has been revolutionized by the introduction of computed axial X-ray tomography” (Heiss et al., 1985, p. 1), to the *Boston Globe*, which suggested that “computerized imaging has revolutionized cancer medicine of the last two decades, [and] the most impressive and life-saving advances may just now be unfolding via the PET scan” (Mishra, 2004, p. C3).

Although the acceptance of the reality of FM is not as widespread as many sources suggest, the recent FDA approval of the first FM drug was a rather inarguable index of change, which brings us to the primary question of this chapter: How does change happen within the often strict and authoritarian structures of Western biomedicine? In addressing this question, I intentionally place the FM case-study in dialogue with the regulatory practices concerning sinus headache. Whereas the previous chapter interrogated the discursive mechanisms of regulation in the MIC, this chapter explores the question of agency. Although the question of agency impacts all aspects of rhetorical theory, it can be particularly problematic within the rhetoric of medicine. The practices of health care professionals replicate both the structuralist accounts of ideological interpellation and the post-structuralist theories of multivocal subjectivity.⁴ For example, activities of practicing physicians are simultaneously regulated by the structures of their education, their disciplinary sub-specialties, governmental regulation, and the administration of their medical facilities. Furthermore, physicians
routinely experience health care through different subjectivities—provider, researcher, administrator, and patient. Neither structuralist ideology theory nor rhetorical humanism is entirely equipped to account for the possibility of agency in this multi-structured, multi-subjective clinician. Fortunately, a recent trend in rhetorical theory has begun to provide an alternative conception of agency that undercuts the stifling subject-structure dichotomy. A growing number of rhetorical scholars have objected to the fact that the battle lines of agency are all too often drawn in terms of resistance versus authority, or individual versus ideological structure (Greene, 2004; Herndl & Licona, 2007; Koerber, 2006; Miller, 2007; Winsor, 2006).

In continuing this recent theoretical tradition, this chapter explores the role of new biomedical imaging technologies in the growing acceptance of the ontology of FM. However, a primary challenge for my analysis arises from the medical community’s broad acceptance of the non-human PET as the primary agent of change. My approach to agency is grounded in two bodies of theoretical work: (1) the recent suggestion that agency arises from the strategic occupation of subject positions within material-semiotic networks (Herndl & Licona, 2007; Koerber, 2006; Latour, 1999) and (2) actor-network theory (Latour, 1987; 1992; 1999). By using this theoretical framework, I will be able to explore the agentive action of this technological artifact. In the sections that follow, I will describe an integrated approach to agency theory that draws from recent work in rhetoric and technical communication and combines it with actor-network theory. Using this model as a foundation, I will employ a broad array of textual artifacts in the reconstruction of an object-centered agency narrative. In so doing, I will show how neuroimaging has directly contributed to the growing acceptance of FM and may have been involved in the FDA decision to approve Lyrica. Finally, I hope to offer some speculative suggestions for future directions at the intersections among agency theory, the rhetoric of medicine, and technical communication.

New Directions in Agency Theory

Rhetorical agency scholarship has presented technical communication scholars with several opportunities for escaping the vicious cycle that Greene (2004) described as the “permanent anxiety over the meaning and potential of rhetorical agency [which] seems destined to be lodged in the critical imagination of rhetorical studies” (p. 188). As Greene suggested, “This permanent anxiety about the character of rhetorical agency is made inevitable, because rhetorical agency as political communication suspends dialectically between structures of power and the possibility of social change” (p. 198). Of course, Greene is not alone in his objection to this dialectical suspension. Miller (2007), Greene (2004), Herndl and Licona (2007), and Winsor (2006) have each provided compelling
discussions from the perspectives of rhetoric and cultural studies, which trace the development of agency theory from unreflective humanism to the crisis that arises when poststructuralism meets interpellation within agency theory. I leave the details of that discussion to those authors. What I am particularly interested in here is how each theorist has responded to this anxiety-inducing problematic.

In short, I argue that these scholars have described and theorized different sections or moments within agentive series of events. So, if agency is understood as the instantiation of change over time, then different scholars have addressed different moments, as follows: the preconditions for agentive action, the initiation of agentive action, the mechanisms of agentive action, and the resolution of agentive action—i.e., the final instantiation of change. An integrated understanding of these theories provides rhetorical scholarship with the following maxims:

1. Agency is the process of instantiating change in the status quo.
2. Change arises from series of rhetorical events over time.
3. While the overall agentive program resists authoritative forces, the constitutive rhetorical events frequently rely on those same authoritative forces.
4. A change becomes the status quo when the (new) authoritative structures operate to maintain the change.

**Agency is the process of instantiating change in the status quo.** Although many theorists discuss agency as the authority to speak and be heard, the capacity for autonomous action, or the occupation of a subject position, much of agency theory is devoted to change. This change can take many forms, ranging from counter-hegemonic action to the authorization of discourse from subaltern classes. Perhaps nowhere is agency as change more prevalent than in rhetorical approaches to agency. Whether this is a result of rhetoric’s history of instrumentalism, the traditional focus on great historical agents, or something else entirely, the focus on change is alive and well in contemporary theorization. For instance, Winsor (2006) referred to agency in terms of “resistance to authority” (p. 441). Similarly, Koerber (2006) discussed agency as “acts of resistance [that] can disrupt the sense established by disciplinary rhetoric” (p. 96). Appropriating cultural studies for rhetoric, Herndl and Licona (2007) explored agency theory as follows:

In cultural studies, the question of agency is an attempt to theorize the possibilities of radical, counterhegemonic action, especially in the face of powerful cultural formations…. In this formulation, agency becomes a question of whether and how the subaltern can make her voice heard and achieve political legitimacy…. In rhetorical theory, we might rephrase this as a question of how rhetors effect social change. (p. 134)
Change arises from series of rhetorical events over time. The legacy of classical humanism often prompts one to think of agency as a property of charismatic individuals. Indeed one might (anachronistically) describe Quintilian’s bonus bene dicendi (good man speaking well) as the ultimate agent. However, the deconstruction of subjectivity and subsequent focus on ideological structure forces rhetoricians to locate agency not within individuals but rather within series of events. For example, Winsor (2006) explored the agentive work of engineers as the “result of a conjunction of opportunities” (p. 427). That is, by taking advantage of a series of events, over time, the engineers were able to effect change. Similarly, Miller (2007) described agency not as a capacity, not as a potential, but rather as rhetorical motion through time. Specifically, Miller invoked a metaphor from physics—the metaphor of kinetic energy:

I suggest, then, that we think of agency as the kinetic energy of rhetorical performance…. In invoking the distinction that physics makes between potential and kinetic energy, I’m comparing agency not to the energy of a stone sitting at the top of a cliff but rather to the energy it has as it falls, the energy of motion…. If agency is a potential energy, it will be thought of as a possession or property of an agent (like a stationary stone), but if agency is a kinetic energy, it must be a property of the rhetorical event or performance itself. (p. 147)

Finally, Koerber’s (2006) exploration of breast-feeding advocates allows us to see the agentive work as “more than the occupation of preexisting subject positions” (p. 88). Instead, we must understand agency as series of “acts of resistance” (p. 88). More specifically, Koerber suggested that these acts of resistance “do not necessarily have to be seen as individual acts with distinct beginnings and end points, but rather, might be understood as, at least, potentially, having implications that extend beyond the individual events or acts they describe” (p. 98).7

Although the overall strategic program resists authoritative forces, the constitutive events frequently rely on those same authoritative forces. Winsor (2006), Koerber (2006), and Herndl and Licona (2007) all have argued recently that agentive events often rely on the very authoritarian structures they seek to depose. That is, individual agency and ideological force are “inextricably linked” (Koerber, p. 88). Within this framework, agentive action can be most effective when it garners authority from preexisting power structures. Rhetors can capitalize on established subject positions in order to deconstruct other elements of the status quo. This is perhaps most clearly articulated in the work of Herndl and Licona, who describe agency as a process that occurs “when [an agent] occupies the agentive intersection of the semiotic and the material through a rhetorical performance” (p. 141). More specifically, Herndl and Licona argue that agency and authority are something like flip sides of the same coin. They must function in concert for the exercise of agency:
Like agency, authority is a social location, (re)produced by a set of relational practices. The authority to speak—a speaker’s authority in discourses and debates—is a social identity that is occupied by a concrete individual but emerges from a set of social practices. In this sense, authority is tied to classical notions of ethos. Authority is (re)produced by the authority function, and it legitimizes a subject to speak out and act for or against change. (p. 142)

Similarly, through invoking Latour, Winsor (2006) explored agency as an articulation of material-semiotic forces: “People achieve status as agents by enlisting other forces into their own program of action. Agency is made stronger by creating longer, stronger networks of people, objects, facts, institutions, and whatever else can be made useful” (p. 419). In essence, “structure was not a bar to agency, but a prerequisite of it” (Winsor, p. 428).

A change becomes the status quo when the (new) authoritative structures operate to maintain the change. Certainly, a full treatment of authority and the history of authority theory is something that must be saved for another work. However, it seems well documented in the history of rhetorical theory and cultural studies that authoritative practices seek to maintain the power of those in charge. As a primary foundation for this assertion, I will rely on Herndl and Licona (2007), who argued, “Because the authority function reflects the cultural and relational practices that constitute value and power, authority tends to stabilize and maintain the structures within which it is constructed” (p. 143).

Herndl and Licona (2007) grounded their treatment of authority and the authority function in the work of Foucault. Given that grounding in Foucault, their work understandably focused on authority as it exists and not as the resolution of change. Nevertheless, it seems a logical conclusion that if change is to “take hold,” there must be forces at work to maintain the new status quo. These forces would undoubtedly be the same forces that are always at work in the maintenance of the status quo—the mechanisms of authority.

I believe these four maxims appropriately represent the major trajectory of agency theory in recent rhetorical and technical communication scholarship, and that furthermore, they should prove highly useful for rhetoric of medicine. However, two issues prevent rhetorical theorists from effectively using this theory to elucidate agency in the case of PET: (1) a lack of “actor-actant symmetry” (Latour, 1999, pp. 176-180), and (2) an inadequate framework to describe the interactions between material and semiotic spheres. Actor-actant symmetry refers to actor-network theory’s (ANT) requirement of treating human and non-human agents equally. This is especially important in the case of FM as PET is routinely described as the agent of change. However, as effective as ANT is in accounting for actor-actant symmetry, I hope to demonstrate that Peirce’s (1978) work provides a
more illustrative framework for explaining the interactions between material and semiotic spheres in material-semiotic networks.

Proponents of ANT have argued against the sole focus on human action in the analysis of technoscientific practices for some time now. For example, Woolgar (1991) argued that agency is a conventional attribution based on linguistic assumptions about which classes of subjects are eligible for which predicates—e.g., the distinction that I am an agent, but my left shoe is not. Woolgar argued that when this set of linguistic conventions is taken up at the level of agency theory, serious problems arise. Upon further investigation, it appears that linguistic conventions for agency attribution are not nearly so clearly defined as they might appear. It is not simply the case that humans have agency and nonhumans do not. One could conceivably develop a broad spectrum of relatively acceptable agency attributions ranging from, on one end, a rock or my left shoe, passing through insects, mice, and horses, and arriving at humans. Of course, not even all humans are attributed the same amount of agency. As Woolgar noted, “We are sometimes less likely to grant this quality [agency] to the very young, the old, or the mentally ill” (p. 62).

Similarly, Latour (1992) objected to human-centered accounts of technoscience as the product of “ontological gerrymandering” (Woolgar’s term). The logic of this critique suggests that reality is experienced as constituent of an interactional matrix (network) of people and things, and the human/object split is a function of the Western episteme. Specifically, Latour argued,

Students of technology are never faced with people on the one hand and things on the other, they are faced with programs of action, sections of which are endowed to parts of humans, while other sections are entrusted to parts of non humans….What appears in the place of the two ghosts—society and technology—is not simply a hybrid object, a little bit of efficiency and a little bit of sociologizing, but a sui generis object: the collective thing. (p. 254)

At its core, ANT is a sociological analytic device used to map network articulations between human and nonhuman actants. Certainly, that function and its underlying actor-actant symmetry coordinate well with the move to understand agency as distributed across material-semiotic networks.

However, the addition of the ANT’s actor-actant symmetry to this integrated agency theory does not, by itself, account for agency in the rhetoric of medicine. If rhetoricians are to explore the role of discourse in material-semiotic networks, they should pay serious attention to theories of semiotics, and in particular, theories of semiotics that account for interactions between material and semiotic realms. Witte (1992) has explored the role of semiotics in a way that both accounts for the interaction between the material and the semiotic and can help explain agency in the rhetoric of medicine. By extending the work of classical American pragmatist and semiotician Peirce, Witte outlined a rhetorical/semiotic theory that conceives of semiotic interactions as a dense network of
material-semiotic articulations. Witte demonstrated how, when building upon Peirce’s basic semiotic construct (see Figure 1)—which theorizes representation as an irreducible relationship between sign, object, and interpretant— one can explore how networks of signs and objects (ontological or hermeneutic) coordinate in and between texts. For the purposes of this chapter, Witte’s primary contribution to Peircian semiotics comes from his exploration of how multiple interpretants can be used within discursive networks to polyphonically mediate between a sign and its object (see Figure 2). The increasing complexity of Witte’s formulation allows rhetorical analysts to explain many of the more complicated material-semiotic interactions. For example, Witte’s analysis theorized how multiple interpretants can relate to each other and build on top of each other in configuring an individual’s interpretation of a particular sign-object relationship.

![Figure 1. Peirce’s Triadic Semiotic](image)

Peirce’s schematic describes the interactions among sign, object, and interpretant that are essential for representation and interpretation. Under this rubric, semiotic representation is a necessarily triadic interaction and cannot be reduced to a series of dyadic interactions between sign and object, sign and interpretant, or interpretant and object. Adapted from Weltanschauungslehre: ein Versuch die Hauptprobleme der allgemeinen theoretischen Philosophie geschichtlich zu entwickeln und sachlich zu bearbeiten (p. 77), by H. Gomperz, 1908, Jena, Germany: E. Diederichs.

![Figure 2. Witte’s Multiple Interpretants](image)


Peirce’s semiotic provides rhetoricians with an infinitely scalable framework. The scalability of this framework allows one to link the microscale of representation with the macroscale of technoscientific networks. Latour’s work moves STS in this direction, but his theory of representation involves a linear material-semiotic chain similar to Saussure’s chain of signifiers (1999, p. 70). In order to move from the material-semiotic articulations in Latour’s model, one must first black-box representation...
then “jump up” a level. Peirce’s model too requires black-boxing when scaling. However, the logic of articulation is the same at all levels, and no level “skipping” is required. The value of this scalability for agency will become more clear as my exploration of the case progresses.

**Positron Emission Tomography, Agent Extraordinaire**

PET was invented and initially promulgated by Ter-Pogossian, Phelps, Hoffman, and Mulaani in 1975 and is used to develop images of the interior spaces of the body. Despite the rhetoric that suggests PET scans “take pictures” of the inside of the body, what they actually do is allow physicians to trace the flow of important bodily chemicals such as blood or oxygen. PET-based neuroimaging operates under the assumption that if more blood or oxygen is going to one part of the brain than another, then that part of the brain is being used more by the patient. This is why this technology is often referred to as “functional imaging”—it images not physical structures (anatomy) but bodily functions (physiology). The development of these images involves a complex, multi-part process—each step replete with a variety of scientific, technological, and rhetorical decisions. PET image generation requires several steps:

1. The injection of the patient with a “marker” chemical. These markers (of which there are many available) have a particular chemical make-up, which allows them to bond with the bodily chemical that the physician wants to trace (e.g., blood or oxygen). The markers emit positron radiation (hence the name PET), which is used to track the flow of the marked chemicals. The released positrons (aka antielectrons) collide with electrons already in the body. This collision produces gamma radiation that can be detected by the PET scanning device.

2. The scanning device uses highly complicated mathematics to trace the trajectory of each gamma ray back to its origin, and after assimilating all of the data from each gamma ray the device creates a mathematical representation of a “slice” of the patient’s brain.

3. The data produced by the scanning device is filtered through a software application designed to produce a graphical representation of the data. The data is represented by one of many available pre-determined color schemes, each designed for different purposes. Through this process, a brain scan—a four-dimensional representation of the function of a cross-section of the brain—is produced.
Despite the complexity of this process, the images produced by PET are often assumed to unproblematically represent the brain. This is an assumption about which medical anthropologist Dumit (2004), in *Picturing personhood: Brain scans and biomedical identity*, has expressed some serious concerns. Dumit unpacked the “black box” of PET and explored the multi-factorial and nuanced assumptions that go into the construction of one PET image. The final PET image elides many methodological assumptions. PET representations are influenced and changed by (a) the choice of radioisotope, (b) the algorithm chosen for processing the gamma ray scatter, and (c) the choice of representing color scheme. Essentially, the same brain, scanned at the same time, could be used to generate thousands of different images, so it takes a highly trained individual to be able to accurately interpret a PET scan.

Nevertheless, as Dumit (2004) explained, despite the complexity of the PET/CT process, “most contemporary understandings of the CT scan assume it to unproblematically represent the structure of the brain” (p.117). The question then arises, if PET scans are this complicated and difficult to produce and read, how is it that they have so much persuasive force? As may be expected, the answer to this question can be found in the discursive modes through which PET is authorized and legitimized. As Latour noted, black boxing only becomes more effective through time. The more people who elide the complexity and authorize the technology, the more authority the technology has garnered. As Latour noted, “The black box moves in space and becomes durable in time only through the actions of many people; if there is no one to take it up, it stops and falls apart however many people may have taken it up however long before” (p. 137). However, as Latour also explained, black boxes can be borrowed. That is, a technology may gain authority and legitimization through analogy to other previously black-boxed technologies. This is precisely the process that Dumit traced in his anthropology of PET. Much like the often-cited cosmology of “turtles all the way down,” it appears the authority of PET is built on a foundation of black boxes all the way down. PET images were and are legitimized through metaphorical references to a nested suite of prior technologies (Dumit, p. 114)—that is, PET is legitimized by reference to CT which is legitimized by reference to X-rays, which are legitimized by reference to photography, which is legitimized by reference to cartography, which is legitimized by references to sight—the ultimate arbiter of reality in the age of modernist epistemology.

The introduction of PET into mainstream medical discourse is a primary example of the third agency maxim. PET’s legitimization relied heavily on the pre-existing authority structures that had legitimized prior scanning/representational technologies. In the terminology of Peircian/Wittean semiotics, this process can be understood through the interaction of multiple interpretants. According
to Peirce’s semiotic model, the relationship between a sign and its object is understood through the lens of the interpretant. When it comes to authorizing a relationship between a new sign (a brain scan) and its object (the underlying brain structure), the technology of apprehension must be black boxed via reference to legitimatized interpretants. In the case of PET data, that legitimization occurs through “sophisticated deferral, [where new technological] imaging is fused to the two most powerful imaging discourses: photography and cartography” (p. 114). See Figure 3 for a schematic representation.

**Figure 3. PET’s Multiple Interpretants.** PET’s rapid legitimization was aided through the coordination of previously legitimized interpretants including those that configure (medical) science’s understanding of X-ray data, CT data, photography, cartography, and the ocular centrism of Western epistemology.

Although Dumit (2004) traced this legitimization-via-metaphor though the discourse of the courts, very similar discursive moves are evident in medical discourse surrounding PET and its legitimization. PET is frequently black boxed and subsequently interpreted via prior technology metaphor—though not always the photographic/cartographic one. For example, there is a significant historical, material, and discursive link between PET and X-ray technology. Practical similarities between the two technologies aside, the location of PET within the disciplinary structures and departmental offices of radiology make the PET-X-ray relationship almost a foregone conclusion. In fact, in the original presentation of PET to the scientific community (in the journal *Radiology*), PET was presented as a more sophisticated extension of previous radiological technologies: “positron-emission transaxial tomographic reconstruction permits the visualization of structures which are not ordinarily perceptible with conventional nuclear medicine imaging devices” (Ter-Pogossian et al., 1975, p. 96).

Medical discourse also sanctions PET by reference to other black-boxed technologies besides the X-ray and the photograph. The cartography metaphor is prevalent in many articles that discuss the use of PET for functional mapping of the brain. In one presentation offered to the MPG on
fibromyalgia, the presenter legitimized the PET scan and other similar scanning technologies through reference to the microscope:

Van Leeuwenhoek really did look down through the microscope and he saw cells. He saw it through reflected light. The point is he saw cells and he reconceived himself in the same moment he saw those cells. And he reconceived everything that we know about biological sciences. He described extending and contracting organisms….What is our modern [equivalent]? I call it our “interior multilinear scope.” Because it’s always something new. It was CT scans, then it was MRIs, then it was PET scans, then it was SPECT scans, and now it’s fMRI…. But the new interior multinlinear scope is fMRI, I think that’s about what we’re up to. (Heisenberg, Journal Club Presentation, Feb 2008)

Indeed, the microscope analogy may well be a common one both for PET and FM. AFA president and AAPM speaker Martinez also invoked the microscopy metaphor during her participant interview with me. And in so doing, she also recognized (and questioned) the dominance of ocular centrism in contemporary science:

We’re working with a whole new paradigm as medicine moves forward, obviously. If you don't have the technological tools to be able to see something, which is what humans tend to want, is to see something and have it proven over and over again, it's very difficult for science, so to speak, to understand or accept something…. My dad was a biologist, and I remember that when I was about six years old he gave me a microscope for Christmas and I took the slide with the pond water on it, and all of a sudden I saw all of these creatures living and moving in this little drop of water which I couldn't have understood or explained or believed in until I had that microscope. [However,] I think it's important that we realize that even though we may not have the tools to understand new things, that human suffering has to come first. If you have something that people are saying over and over again, it makes sense that even though we don't have all the answers or a complete understanding that you can't just say, “Well, we're going to wait for science to prove it or science to catch up with the technology.” (Martinez Interview)

The invention and promulgation of PET (ostensibly by Ter-Pogossian et al., 1975) is an example of the type of agency I am describing in this chapter. When it comes to PET, its invention, subsequent legitimization, and appropriation for medical diagnostics occurs at the confluence of multiple event clusters that only appear to be a linear narrative in hindsight. Western epistemology’s focus on ocular centrism, the invention of microscopy, X-ray technology, X-ray diffraction crystallography, and CT-scans all contributed to the changes that resulted in the invention and legitimization of PET. And, additionally, each of those “events” could be broken down into their own series of event clusters dating back—at least in the case of ocular centrism—to antiquity.
Ontologizing Fibromyalgia

As noted above, black box borrowing as mode of nested interpretation seems to be a fundamental mode of legitimization for PET technology. And it is often this mode of authorization that has made PET and its sibling technologies so persuasive in the discourse concerning the ontology of FM. It is precisely this persuasive force that I propose to explore in the following sections. Having now traced the legitimization and authorization of PET and PET scans, I will explore how that authorization allowed PET data to “speak” so persuasively in the discourse of FM.

However, before I can fully account for the role of PET in ontologizing or making FM “more real,” I must first explore the discursive conditions that led to the incorporation of PET data into the discourse of FM. As previously mentioned, FM has been subject to significant controversy over the years. In addition to the problem of empirical tests cited in the introduction, there has been, historically, a lively debate in the popular press concerning the reality of FM. Although acceptance of FM is much broader in the medical community than ever before, the New York Times published an article this year with the title “Drug Approved. Is Disease Real?” (Berenson, 2008). The scathing article began sarcastically: “Fibromyalgia is a real disease. Or so says Pfizer in a new television advertising campaign for Lyrica, the first medicine approved to treat the pain condition, whose very existence is questioned by some doctors” (p. 1A). In its seventh paragraph, the article finally acknowledged the acceptance of the condition by such entities as the American College of Rheumatology and the FDA. Although the article raised some important concerns about the nature and impact of pharmaceutical funding on the practice of medicine in the U.S., it also incited a vicious backlash from both expert and lay readers. This backlash manifested itself in a long list of concerned letters to the editor including the following:

“Drug Approved. Is Disease real?” (front page, Jan. 14) does a disservice to your readers, including the millions of patients afflicted by fibromyalgia, a debilitating condition. The fact that Western medicine does not yet understand a condition does not make it any less “real.” (Held, 2008, p. 30)

One psychiatrist even offered an etymological critique of the entire process of disease labeling:

As a psychiatrist, I am painfully familiar with the rhetorical wars regarding what does or does not count as “a disease.” Historically, the concept of disease arose in order to explain prolonged suffering and incapacity in the absence of an obvious external cause, such as a knife wound. The word itself originally donated a state of “dis-ease.” (Pies, 2008, p. 30)

The medical literature is much clearer on the subject of FM. Although nearly every research article I found included at least one sentence acknowledging the difficulties in understanding, diagnosing, and/or treating FM, I could find no more than a handful of journal articles that denied the reality of
the disease—and none of those were recent. This lack of anti-FM arguments was confirmed at one of the MPG meetings during a discussion between a physiologist (Dr. Fitzpatrick) and a pain management physician (Dr. Heisenberg) who were both presenting on FM:

Dr. Heisenberg: Are you aware of anyone who doesn’t believe in fibromyalgia anymore?
Dr. Fitzpatrick: Not really. Maybe a few “nut jobs.”
Dr. Heisenberg: At least everyone pretty much agrees the pain is “real” now?
Dr. Fitzpatrick: Oh yeah. Absolutely. (Journal Club Presentation, Feb 2008)

In spite of this agreement, almost every article surveyed included a perfunctory statement acknowledging the lack of understanding concerning FM. The following excerpt from the journal *Arthritis and Rheumatism* is a fairly typical example:

> The etiology and pathogenesis of FMS are not well understood, but they are probably multifactorial. Available evidence points toward dysregulation of neurotransmitter function and central pain sensitization as fundamental mechanisms. (Crofford et al., 2005, pp. 1264-1265)

Many articles also describe the problems associated with treating a disease that is so little understood. There is a great deal of concern about what constitutes “meaningful” treatment, as can be seen from the following excerpt:

> There is a lack of consensus about the definition of clinically meaningful reduction in pain for fibromyalgia clinical trials. In addition, it is unclear whether improvement in pain intensity alone should define response to treatment in fibromyalgia, which is a syndrome characterized by multiple symptoms in addition to pain. (Arnold, 2006, p. 220)

All in all, this debate over the ontology of FM has created an environment of epistemological uncertainty among pain management/FM clinicians. Even those clinicians who are convinced of the existence of FM hedge their statements about FM and point out some of the problems in the data. In my interviews and observations with pain management clinicians, I encountered numerous moments when health care providers would stipulate its existence, while highlighting the lack of evidence. In an FM-specific presentation from February 2008, the debate over the ontology of FM led one clinician to express doubts about the entire epistemology of neuroscience medicine:

> One of the things I want to talk about before [I begin] is the philosophical stance of this whole business of fibromyalgia…. I’m going to just cover a little bit about the whole aspect of looking at the universe of medical ideas, and one of the problems that we have is that we always have this disappearing, reverberating situation with this homunculus. Do you all know what a homunculus is? It’s a sensory system. [It describes, through systems-modeling, neurological functions.] The point is that there is a disappearing or always receding homunculus problem, philosophically. When you’re trying to scoop up something and say
that it’s there, and all that you have is a bit of circular reasoning…. So if we try to describe a state, like chronic pain, we’re going to assume it’s a state of consciousness that must experience the pain. And of course the problem is we don’t even know how to describe consciousness. I’m just mentioning the classic Pascal-Gödel conundrum for math: You can’t describe any system unless you posit at least one thing outside of the system. You cannot complete it. You can’t prove it, without one thing. As my old philosophy professor used to say, “Give me a Coke can; give me a bed post; give me anything. If you absolutely guarantee me you’re going to say that exists, I can prove the rest of the universe.” You gotta start somewhere. So the consciousness epiphenomenon is just a part of this receding homunculus thing. Where you’re always describing something else with another, but more complex thing you can’t actually name or doubt. (Journal Club Presentation, Feb 2008)

In the preceding quotation, Dr Heisenberg expressed his concern that neuroscience modeling is built on an ever-receding set of homunculi. That is, for every description of a neurological system, that description is predicated on another system that has been essentially black boxed for the sake of the current model. Subsequently, when describing complex neurological systems such as pain processing, neuroscientists are faced with an inherent problem of infinitely receding homunculi, or in the more familiar parlance of philosophers, we have once again a situation where it is turtles/homunculi/black boxes all the way down. This is, of course, a very challenging proposition for medical practitioners whose work is often built on a foundation of “pretended omniscience” (Turner, 1990, p. 192).

As one would expect, the epistemological uncertainty generated by the FM debate creates quite a bit of angst amongst health care providers. With this angst comes a corresponding demand for something to alleviate the angst—something to help pave the way back to epistemological certainty. In technoscientific practices, statistically validated evidence typically fills this role, and in the case of FM, it is no different. However, the challenge lies in the fact that traditional experimental protocols have been unable to isolate any verifiable mechanisms for FM. This angst manifests itself in discussions like the one above lamenting the receding homunculi problem but also in expressed desire for mechanistic data. In one of the interviews I conducted, a physiologist elaborated on a discipline-wide desire for mechanistic explanation, and the problem of working on neurological models without one. Although he is discussing the relationship between pain and depression, the concern maps directly onto the same issues driving epistemological uncertainty in FM:

Where does pain end and depression begin? Is the patient depressed because they have this chronic pain condition or is the depression what’s promoting the chronic pain condition? That becomes messier. If you want to deal in that cleaner realm, you want to stay away from that stuff. If you’re dealing with that messier, psychological realm, you’re looking for something mechanistic and concrete, that you can (1) hang your hat on, and (2) offer your patient, and it’s not there. (Fitzpatrick, personal communication [interview], February 18, 2008)
The FM presentation cited earlier replicates this same logic with the discussion of the Pascal-Gödel problem. In invoking his philosophy professor and the vernacular mandate, “you gotta start somewhere,” the speaker expresses his desire for some form of biomechanistic data. The epistemological uncertainty of FM coupled with a belief in the reality of FM creates a rhetorical exigency where any data, no matter how preliminary or problematic, are likely to be greeted with enthusiasm. However, the potentially contrary exigencies of technoscience require that the data are sanctioned or rationalized in such a way as to meet the demands of the broader scientific community.

Although the latest wave of FM acceptance may be attributed to the increasing availability of PET (and other brain scan) data, it appears that the new PET data would not have been as readily accepted if not for a profound redefinition of fibromyalgia in 1990. Responding to the great concern over the nature of FM and its difficulty in diagnosis, the American College of Rheumatologists (ACR) convened meetings in the late 1980s in an effort to establish new accepted and validated diagnostic criteria for FM. The result was the now widely used (though not entirely accepted) tender point criteria:


Definition. Pain is considered widespread when all of the following are present: pain in the left side of the body, pain in the right side of the body, pain above the waist, and pain below the waist. In addition, axial skeletal pain (cervical spine or anterior chest or thoracic spine or low back) must be present. In this definition, shoulder and buttock pain is considered as pain for each involved side. "Low back" pain is considered lower segment pain.

2. Pain in 11 of 18 tender point sites on digital palpation.

Definition. Pain, on digital palpation, must be present in at least 11 of the following 18 sites: [sites listed]. (American Academy of Rheumatology, n.d.)

Pursuant to this redefinition of FM diagnostic criteria, any patient meeting the above criteria (both a history of widespread pain and pain at 11 of 18 pre-identified tender points) can be classified as a fibromyalgic. Since 1990, these criteria “have been widely used, especially in clinical trials and epidemiological studies. These criteria have stimulated research on fibromyalgia worldwide, but are increasingly recognized to lack sensitivity for diagnosis in clinical settings” (Perrot, Dickenson, & Bennett, 2008, p. 2). Whether or not the tender point system remains an acceptable method of research and diagnosis, the practical effect of these new criteria in stimulating more research into FM certainly paved the way for the acceptance of FM, the role of PET data, and the Lyrica indication.

Even with the broad adoption of the 1990 ACR FM criteria, clinicians and researchers still suffered from the epistemological uncertainties that arose out of the dearth of biomechanically
legitimized FM evidence. However, the 1990 ACR criteria did (unintentionally) provide a theoretical framework that legitimized a new place to look for that missing evidence. In the editorial, “Fibromyalgia Is Not a Rheumatologic Disease Anymore,” Griffing (2008) explained how the tender point research that followed the adoption of the ACR criteria proved rather conclusively that “tender points have nothing to do with fibromyalgia” (p. 47). It does not necessarily take a medical expert to see the next logical development in FM research. If FM causes widespread bodily pain and is not caused at the pain locations, then FM is likely a nervous system (spine or brain) problem. In fact, most literature now classifies FM as a Central Nervous System (CNS) disorder, making it perhaps more the providence of neurologists than rheumatologists.

With the reclassification of FM as a CNS disorder, FM researchers began their exploration of the brain in attempt to determine etiology and pathogenesis. And, of course, contemporary biomedical studies of the brain regularly turn to the agent extraordinaire, PET. From the popular Newsweek to the scholarly Rheumatology, PET and its sibling technologies have been hailed for filling the evidentiary gap inhibiting the study of fibromyalgia. The literature is virtually filled with a litany of one-liners exclaiming persuasive impact of PET data. Although the generic conventions of popular press accounts allow for more provocative stylistics—e.g., “Thanks to brain-scan technology, this ‘imaginary’ ailment of 6 million people is proving to be very real” (Underwood, 2003, p. 53), there is also a certain excitement and anticipation in academic accounts:

These recent applications of functional neuroimaging have provided evidence for a centralized pain augmentation in FM and identified brain regions that may be involved in this augmentation. Advances in design and new imaging technologies promise to further increase our understanding of the mechanisms that initiate and maintain this disorder and can lead to improved diagnosis and treatment. (Williams & Gracely, 2006, p. 231)

One can look also to the following excerpts from the same article in Newsweek or the explanation in the trade publication, Chemist and Druggist. Not only is PET noted for providing the first clear-cut biomechanical evidence of FM, but PET also takes center stage in convincing the medical community of the reality of FM:

Until recently, doctors didn’t believe fibromyalgia pain was real. They thought it was “all in the heads” of sufferers, who happened to be mainly women. When Dr. Muhammad Yunus of the University of Illinois began studying it in 1977, colleagues warned him, “You’ll ruin your career. These women are just crazy.” But the fact that doctors couldn’t find a cause or a cure for some 6 million sufferers didn’t mean that the pain wasn’t there. In the past few years scientists have used powerful brain scans to provide proof that it is. Researchers have now pinpointed genetic variations that may play a role, and companies are racing to provide effective drugs. “It’s a new day in fibromyalgia,” says Dr. Andrew Holman, a Seattle
A rheumatologist who's testing promising new pills. “We’re starting to win the battle.” (Underwood, p. 53)

Fibromyalgia is an enigma. No-one disputes that patients experience considerable pain and distress, but the pain is diffuse, there is no obvious pathology in particularly tender areas. Many clinicians traditionally regarded fibromyalgia as predominately psychosomatic, rather than neurological or physiological. However, advances over recent years might be on the verge of resolving these pathophysiological and therapeutic enigmas. For example, imaging studies reveal several differences in the brains of people with fibromyalgia compared to controls. (“Pharmacy update,” 2007, p. 17)

In essence, PET has provided the first “real” object that can function as the Archimedean data point to legitimize the entire discourse of fibromyalgia. This is precisely the role Dr. Heisenberg ascribed to PET in his discussion of FM and the problem of the receding homunculus. PET data allow him to overcome his epistemological uncertainty in that the data provide him an apparently stable ontological point upon which to ground his approach to FM. He presents the “new interior multilienarascope” and likens it to van Leeuwenhoek’s microscope intentionally to fill the evidentiary gap. To date, PET research has provided quite a few insights into FM and subsequently provided a foundation for further ontologizing the disorder. As one article in *Pain Practice* noted in regard to imaging technology, “Advances in technology have led to a better understanding of the pathophysiology of fibromyalgia, including the key role of disordered pain processing in its symptomology” (Perrot, Dickenson, & Bennett, 2008, p. 10). One article from *Arthritis Research and Therapy* offered several paragraphs enumerating the valuable FM insights gained from PET, beginning as follows:

At the present time, functional brain imaging in FM has revealed the following insights. First, FM patients differ from healthy controls in baseline levels of neural activity, specifically in the caudate nucleus. Second, administration of a noxious pressure or heat stimulus results in changes in brain activity consistent with verbal reports of patients’ pain intensity. Third, like healthy controls, FM patients normally detect and experience a full range of perceived pain magnitude; but sensations become unpleasant at stimulus intensity that are significantly lower than those observed in health controls. (Williams & Gracely, 2006, p. 230)

Returning to the language of material-semiotic analysis, the process of ontologizing FM can be described as a cluster of rhetorical events that ultimately became persuasive through the inclusion of a sign-object relationship legitimized by reference to the privileged interpretants of technoscience and biomedicine. The entire discourse of fibromyalgia can be understood as an articulation of statements and texts within a material-semiotic network. However, prior to the advent of PET scans, the discourse of FM was a semiotic network without authorized object. In the beginning, the discourse of FM was little more than a constellation of statements derived from subjective patient
reports and subsequent clinical practice. In the absence of legitimized technoscientific objects such as those provided by lab tests, this discourse was doomed to falter. The 1990 ACR criteria provided clinicians with a constellation of partially authorized statements that they could make about FM, although these statements were still without ontological foundation. PET scans, by virtue of their authorizing chain of interpretants, provided FM researchers and clinicians with access to a legitimized object, and thus the object—by way of the PET representation—legitimized the discourse of FM.

However, a thorough analysis of this legitimization requires a return to the language of Peirce’s semiotics and Latour’s black boxes. This chapter already discussed the semiotics of black box formation through nested interpretants and the subsequent durability and portability of black boxes. However, it has not yet provided a semiotic analysis of what happens when the durable and portable black box insinuates itself into another material-semiotic network. The foundation of this analysis lies in another of the benefits of Witte’s (1992) reformulation of Peircian semiotics—its infinite scalability.

Figure 4. Peirce’s Unlimited Semiosis. Unlimited semiosis is the semiotic representation of textual and intertextual representation and hermeneutics. It describes how multiple signs within and between texts and contexts can articulate with one another to coconfigure meaning. Peirce’s unlimited semiosis can be used to map the articulations among signs, objects, and interpretants within a text or within a discourse. When signs, objects, and interpretants articulate within dense semiotic/hermeneutic networks, individual semiotic elements (e.g., signs or interpretants) can take on alternative functions in becoming sign-interpretants. From “Context, text, intertext: Toward a constructivist semiotic of writing.” by S. P. Witte, 1992, Written Communication, 9, p. 282. Copyright 1992 by Sage Publications. Adapted with permission.
As Figure 4 elucidates, for Peirce and Witte, discourse is understood as a process of unlimited semiosis. As Witte (1992) described it,

Pierce sets out his notion of “unlimited semiosis” in at least two ways. First, he writes that “In the consequence of every sign determining an Interpretant, which is itself a sign, we have a sign overlaying a sign” (2.94). Second, he notes that a sign is “anything which determines something else (its interpretant) [italics added] to refer to an object to which itself refers (its object) in the same way, the interpretant becoming in turn a sign, and so on ad infinitum” [italics added] (2.300). That is to say, once the interpretant is itself recognized as a sign, then that sign becomes part of a new triadic relation such that the original interpretant, now a sign, participates also in a new dynamic relation with an object and another interpretant, which—becoming itself a sign—permits the occurrence of yet another semiotic moment. [italics added] (p. 281)

Semiotic moments are in situ articulations of signs, objects, and interpretants, and as such, I argue they are (if not identical with) constitutive of rhetorical events. So just as a discourse is composed of semiotic moments, so too is agency composed of semiotic moments/rhetorical events. Clusters of semiotic moments/rhetorical events constitute material-semiotic networks and can also change those networks, and this was precisely the case in the discourse of FM. Prior to the inclusion of PET data, the discourse of FM is well explained by Figure 4 if one ignores the ontological foundation—the Os. The subjective data obtained from patient interviews and ACR diagnoses could only serve as signs, interpretants, or sign/interpretants circulating without ontological reference. Of course the problem is that the power and authority of medicine rest on a tacit acceptance of real knowable objects. 

Black-boxed PET enters into the FM discourse with the requisite authority to provide an ontological foundation. In linking the circulating signs and interpretants (discourse) to a real object, PET legitimizes the FM discourse.

**Agency, Rarefaction, and Rhetorical Theory**

Until this point this chapter has been devoted to exploring the case of FM and the mechanisms of agency available in the MIC, and here I will bring that narrowly focused discussion to a close. However, this will not be the concluding section of this chapter. Rather, I will close Chapter 5 by exploring the relationships between the agency of FM and the regulation of the sinus headache. The arguments of this chapter have suggested that the notion of rhetorical event clusters can allow rhetoricians to think about how PET data contributed to the ontologization of FM. One need not identify a particular rhetorical performance and trace its influences in specific discussions but instead can focus on the growing discursive momentum surrounding FM and the contributions made by various sources. One can trace how multiple rhetorical events working in concert form an agentive
chain of events that continues to propagate further discursive and practical effect—in this case, the ontologization of FM.

The Rhetoric of Agency/Rarefaction

This account of the ontologization of FM obviously harkens back to the principles of rarefaction identified in the previous chapter. The traditional rejection of the legitimacy and reality of FM could be understood as resulting from the institutions exercising their principles of rarefaction. Without identifiable markers of FM, neither pathology nor diagnostics could make acceptable claims concerning FM’s reality. With the cause a mystery, specific etiology would not allow for pathological discussion of FM. Similarly, without a statistically valid diagnostic criteria, the disorder could not even be differentiated from rheumatisms or mental illnesses. Of course, as the above narrative suggests the establishment of a statistically valid diagnostic criteria—the 1990 ACR criteria—and the influence of PET data both paved the way for a pathological hypothesis (CNS dysregulation) and ontologization.

The fact that both the regulation of the sinus headache and the agency of FM made use of these same principles of rarefaction speaks as much to the relationship between agency and regulation as it does to the affinity among different disease discourses. Specific etiology, diagnostic validity, and objective visualization are each readily available argumentative resources whether the goal is agency or regulation. Of course, we rhetoricians have a well-established theoretical construct with which to explain such available common places, viz., the special topoi. Indeed, when one thinks back to Foucault’s description of the differences between general principles of rarefaction—authority, disciplines, criticism—and those of the discipline-specific variety, the parallels between the Discourse on Language and Aristotle’s On Rhetoric are striking:

But there are also those special topoi which are based on such propositions as apply only to particular groups or classes of things. Thus there are propositions about natural science on which it is impossible to base any enthymeme or syllogisms about ethics, and other propositions about ethics on which nothing can be based about natural science. The same principle applies throughout. The general topoi have no special subject-matter, and therefore will not increase our understanding of any particular class of things. (Aristotle 1358b)

Here I am suggesting that one can regard principles of rarefaction as a special type of topoi. Authority, disciplines, and criticism can be understood as general topoi which are available for use argumentatively within any discourse. However, special topoi like specific etiology, diagnostic validity, and objective visualization may only be applicable to specific discourses such as those pertaining to disease.
However, merely identifying principles of rarefaction as *topoi* does not provide an exhaustive rhetorical account of the role of such principles in discourse. Principles of rarefaction must be a special type of *topos* in that not all *topoi* are capable of generating such persuasive force. Subsequently, I argue that principles of rarefaction should be understood as warranting *topoi*. Indeed, Toulmin’s description of argumentative warrants is replete with the language of authority,

Supposing we encounter this fresh challenge, we must bring forward not further data….but propositions of a rather different kind: rules, principles, inference-licenses or what you will, instead of additional items of information. Our task is no longer to strengthen the ground on which our argument is constructed, but is rather to show that, taking these data as a starting point, the step to the original claim or conclusion is an appropriate and legitimate one…. Propositions of this kind I shall call *warrants* (W), to distinguish them from both conclusions and data. (These “warrants,” it will be observed correspond to the practical standards or canons of argument….” (Toulmin pp. 1417-1418).

Much like Aristotle’s *topoi*, warrants are available resources that can be deployed in a variety of different argumentative contexts. However, their function as “rules, principles, inference-licenses” imbues them with an authorizing function within a given argument. Furthermore, Toulmin’s metaphor—the warrant—makes the concept all the more applicable to principles of rarefaction. Warrants are documents of authority—authority derived from the judiciary and exercised by law enforcement. Similarly, as I argued in Chapter 4, principles of rarefaction are mechanisms of authority derived from disciplines (institutions of rarefaction) and exercised by peer-reviewers. They are material-semiotic apparatuses which provide arguments (whether regulatory or agentive) with authorizing force.

Finally, there is one additional key parallel among principles of rarefaction, warrants and the deployment of certain special *topoi*—their typical obfuscation. Speaking of the will to truth, Foucault (1972) suggested that focus on true facts engendered by the will to truth cannot help but to “mask” that will (p. 219). Furthermore he argued that “we are unaware of the prodigious machinery of the will to truth” (p. 220). Generally speaking, principles of rarefaction are self-effacing. They are contrast background features exercising considerable control over discourse. Certainly the taboo against naming the will to truth, which Foucault references, is the prime example. As he argued, traditionally an identification of the will to truth would result in an exercise of the will to truth and the identifier would be identified as mad or irrational. (Now, the will to truth is the bedrock principle of modern empirical/scientific and as such the taboo against its identification is perhaps stronger than other principles of rarefaction.) Indeed, as explained in Chapter 4, principles of rarefaction are generally tacit unless they must be used explicitly in order to rarefy—to exorcise the aberrant
discourse. This model of use is perfectly in keeping with Toulmin’s description of warrants. Specifically, his theory uses a jurisprudential analogy to argue the case:

The warrant is, in this sense, incidental and explanatory, its task being simply to register explicitly the legitimacy of the step involved to refer it back to the larger class of steps whose legitimacy is being presupposed. This is one of the reasons for distinguishing between data and warrants: data are appealed to explicitly, warrants implicitly..... This distinction, between data and warrants, is similar to the distinction drawn in law-courts between questions of fact and questions of law.... (Toulmin p. 1418)

This assumed or tacit nature of principles of rarefaction/warrants/special *topoi* are what grants them such persuasive force. As a common point of reference within a discourse they authorize claims—typically without interrogation. In Aristotelian logic, principles of rarefaction are the foundation of enthymeric argument. They are the hidden or implied major premises that certify the link between the minor premise and the conclusion. In Toumin’s schema, they are the (often) uninvoked warrant that legitimizes the use of the data to support the claim.

**FM, the FDA and the Fourth Maxim**

No doubt my readers have noticed that the previous section discussing the role of principles of rarefaction as warranting *topoi* did not address the more regulatory principle identified in Chapter 4—viz., an FDA approval, a label. I have saved this issue for its own section because I think it is more properly understood as an exercise of authority rather than agency. That is, the combined efforts of radiologists, diagnosticians, pathologists, activists, and PET led to the ontologization of FM. Following that ontologization the regulatory mechanism ratified the change, resolving the agency into authority—i.e., the fourth maxim. In clarifying this exercise of authority, I turn once again to my network model of the MIC disease rarefaction as provided in Chapter 4. Figure 5 (below) is a modification of that diagram that highlights the relationships among the agentive discourse of FM and its ultimate authorization—the Lyrica indication.
Figure 5. Agency in the FDA Rarefactive Network. This diagram details the coordination of influences within the MIC which have contributed to the indication of Lyrica for the treatment of FM. The combined efforts of diagnostics, radiology, and pathology have established the legitimacy of FM within RCTs, a legitimacy sanctioned by the peer review process. Furthermore, pharmaceuticals’ desire to expand the Lyrica market contributed to the proliferation of FM-favorable RCTs. The new glut of data when presented to the Arthritis Drug Advisory Committee ultimately resulted in the establishment of a new policy document—the Lyrica indication.

In this rendition of the diagram I have used very bold lines to indicate the discursive actions involved. As I have suggested, the agentive work that capitalized on the warranting topoi occurred within the disciplinary boundaries of pathology, radiology, and diagnostics. As previously noted, the mechanisms of adjudication in this discourse are journals and peer-reviewers. After having met the rarefactive criteria, FM was ontologized within medical science. Subsequently, the coordinated effects of these studies with lobbying from the pharmaceuticals industry ultimately resulted in the sanctioning of FM through the mechanism of the label. While I stand by this assertion, it is an argument that is very difficult to prove conclusively. The resolution of agency relies on the structures of authority. These structures of authority intentionally obfuscate the mechanisms of legitimacy as a means of furthering their authority. Subsequently, the newly ratified propositions concerning FM now
function as warrants in their own right. They are no longer explicitly referenced as data. They are the hidden major premises that allow for the formation of future enthymemes.

For example, I would like to point to the role of PET data in the first major Lyrica clinical trial for FM patients. Although PET did not make an explicit appearance, the brief definition of FM provided in the literature review is built on citation references to PET data: “The etiology and pathogenesis of FMS are not well understood, but they are probably multifactorial (3). Available evidence points toward dysregulation of neurotransmitter function and central pain sensitization as fundamental mechanisms (4)” (Crofford et al., 2005, pp. 1264-1265). The references “(3)” and “(4)” direct readers toward a 2002 *Arthritis and Rheumatism* review article entitled “Fibromyalgia: Where are We a Decade After the American College of Rheumatology Classification Criteria Were Developed?” and “Chronic Widespread Pain and Fibromyalgia: What We Know and What We Need to Know” (2003) from *Best Practices and Research in Clinical Rheumatology*. Each of these articles (by the same authors using much of the exact same language) explicitly referenced neuroimaging studies and their value in providing evidence that is “not dependent on subjective reports by patients” (Crofford & Clauw, 2002, p. 1136; Clauw & Crofford, 2003, p. 691).

On the one hand, the Lyrica article did not directly address the role of PET data. On the other hand, the fact that PET data are now so well accepted that they can be referenced without justification is itself indicative of its authorization and role in ontologizing FM. PET data are now so well enmeshed in the disciplinary discourse of FM that they can be alluded to through footnote and citation. In addition to this link between PET and Lyrica, I was also able to find an additional, more direct example. During a 2003 FDA Arthritis Drugs Advisory Committee meeting, one presentation arguing for FM pharmacotherapy specifically referenced neuroimaging (fMRI) data. In this presentation, Dr. Crofford cited and explained how one then-recent neuroimaging study had found significant differences in the functional neurophysiology of fibromyalgics: “FMs show bilateral activation in middle frontal gyrus while alphabetizing…increased activation in the right superior parietal lobe.” Although neither of these cases definitively proves that neuroimaging data were directly involved in the discourse of the Lyrica indication, I think they are highly suggestive. Neuroimaging data have certainly contributed to an environment of increased acceptance for FM, and that environment has helped produce a pharmacological indication.

**Conclusions**

These cases—the regulation of the sinus headache and the agency of FM—are constitutive of multiple rhetorical events/semiotic moments that involve a coordination of material, semiotic, and
hermeneutic elements. In the case of FM, the authorization of PET data was grounded in a series of nested black boxes leading, ultimately, to ocular centrism. Second, PET data—both as rhetorical construct and indexical representative of ontological fact—profoundly altered the discourse of fibromyalgia, legitimizing the disorder. Finally, the FDA indication of Lyrica—a decision that lies at the intersection of multiple scientific, regulatory, and practical material-semiotic networks—may well simultaneously arise from the inclusion of PET in FM discourse while actively legitimizing that inclusion. Similarly, the case of the sinus headache deployed nearly identical rhetorical resources in order to rarefy the discourse—the demand for specific etiology, diagnostic validity, and objective visualization.

Turning more specifically to agency and regulation theory in the rhetoric of technoscience and medicine, these discourses strongly suggest that both traditional humanistic and post-modern performative accounts of agency are inappropriate to understand processes of change in the legitimization of FM, and perhaps also in Western biomedicine writ large. The alternating processes of agency and authorization are typically understood as the results of individual humans. Rather these cases suggest that agency is an attribution and a recognition of authority. The authority for those individuals to make would-be agentive statements is derived primarily from the legitimizing forces of the discursive network. In sum, the attribution of agency is the creation of a black box around the material-semiotic articulation that provides the warranting force needed to catalyze change. Though this attribution typically targets humans, it can equally target PET or some other such non-human actant. My invocation of agency as material-semiotic network potential, the rhetorical event, and Witte/Peircean semiotics provides a skeleton through which agentive action can be explored. Furthermore my model of principles of rarefaction as warranting topoi is needed to interrogate the authoritative dimensions of such agency. Indeed, I believe future research into agency and regulation will be able to find this constellation of concepts as illustrative as they have been in describing the regulation of the sinus headache and the agency of FM.

1 “Fibromyalgic” is the preferred clinical term for fibromyalgia patients.

2 The American Fibromyalgia Association is a research and advocacy organization dedicated to securing the legitimacy of FM, providing resources for FM research, offering provider education programs, etc. “AFA” and “Martinez” are pseudonyms.

3 Throughout this article I will use PET as a synecdoche for a wide variety of neuroimaging techniques including computerized tomography (CT), magnetic resonance imaging (MRI), functional magnetic resonance imaging (fMRI), and single positron emission computed tomography (SPECT). When rhetorically relevant, I will differentiate between the various technologies. However, the rhetoric surrounding each individual technology (i.e.—the stated goals, rationale, epistemological justifications, and media-driven excitement) is largely the same across the discourse of FM. In the simplest terms, PET is a technological means of generating
representations (images, scans) of the interior spaces of the human body. These images are used in many aspects of medicine, from basic science research, to diagnostics and surgical planning. For the purposes of this article, it is neuroimaging (brain scanning) that is most relevant.

4 The term ideological interpellation comes from the work of structuralist-Marxist Althusser (1971) and has been widely used in critical/cultural studies to refer to the effects of the coordinated efforts of educational and disciplinary programs on individuals and individual subjectivity. In short, interpellation refers to ready-made subject positions provided by society for the individual which circumscribe (nearly) all possibilities for agency. Objecting to the rigid, quasi-determinism of this doctrine, post-structuralist theorists have developed the alternative doctrine of multiple subjectivities (e.g., Smith, 1988; Sullivan & Porter, 1993), which suggests that individuals can occupy any number of subject-positions and willfully switch among them given the demands of the situation. And, each of these theories are posited as alternatives to classical humanism, which identifies willful rhetors as powerful agents of change.

5 Change in technoscientific communities has been variously understood as a function of discourse formation/transformation (Foucault, 1969/1972), paradigm revolution (Kuhn, 1996), fact construction (Latour & Woolgar, 1986), fetishization (Haraway, 1997) and “factish” assemblage (Latour, 1999)—among others. The change I discuss in this article could be understood through any of these theoretical lenses; however, in the interests of greater specificity, I employ the term, ontologization—the process whereby a concept/object comes into being. While there are obviously many different types of change in technoscientific communities, this article addresses one change in particular—FM’s shift from the realm of the imaginary to the realm of the real, FM’s coming into being.

6 The idea that agency is the product of rhetorical events over time obviously takes as its foundation the notion of the “rhetorical event” as a fundamental unit of discourse. As Cooper (1983) has noted this is not a foreign concept for rhetoricians, but it has been realized in a number of different ways. (See Cooper for a survey of the literature.) Following Foucault, Cooper theorizes an approach to rhetorical events that (with some modification) would harmonize effectively with my notion of agentive events. She argued that rhetoric can be understood as being comprised of discursive events which are inextricably material. These “events are the effects of the interactions of bodies that are materially real. There may be material evidence of the event (e.g., a passive body, a wounded body); however, the pure event is incorporeal. It exists above and beyond the colliding, mingling, and separating bodies (Cooper p. 5). Cooper’s focus on rhetorical events as epiphenomena of material events replicates the logic of the material-semantic binary to which this dissertation objects. However, grounding rhetorical events in Foucault’s notion of material-discursive events may actually be closer to the work of this project and the theoretical foundations for RTM.

7 The idea that agency is temporally distributed and the results of many coordinated events overtime is not lost on FM advocates. Reflecting on long years of such advocacy, Martinez reminisced over a small success which took eight years, “It’s taken us almost 8 years to get to a point where we could even get a bill passed in California that recognizes the illness. So the advocacy part of things is very slow going but something that we believe very strongly needs to continue to exist and happen.” (Martinez Interview)

8 An interpretant is the hermeneutic component of representation. It is the lens through which an individual sign user interprets the sign’s object (referent). Interpretants are constellations of acculturation and personal experience. An individual’s historical, cultural, and personal experience with a particular sign-object relationship configures his/her understanding of the sign, the object, and the relationship. (For a more complete accounting, see Witte, 1992 or Peirce, 1978.)

9 The authorization and legitimization of a new technology is generally known, in the language of Latour (1987), as “black boxing”—i.e., the process whereby the complexities of a technology are elided and through which the technology is authorized. Latour (1987) traces the metaphor of the black box to cybernetics (p. 3-4). Cyberneticists routinely deal with highly complex scalable computer systems. Sometimes cybernetics subsystems are so complex that the technical details are not needed in order to solve the current (higher-level)
problem. So cyberneticists draw a black box around the sub-system and merely address it in terms of input and output.

10 An infinite regression of belief. Though the exact origin of this quote is a matter of some debate, it was, perhaps, most promulgated in Stephen Hawking’s (1998) *A Brief History of Time*.

11 Dumit identified metaphor and analogy as the primary discursive means of PET legitimization, and I would argue that they are the tropes through which black boxes can be more rapidly made. Using metaphor and analogy to relate the functionality of PET to X-ray, photography or cartography imbues the tenor with the authority of the vehicle.

12 See Roland (1985) p. 103 for a clear example.

13 The legitimization-via-metaphor of the PET scans *qua* ocular centrism is another example of the profound impact of radiology and objective visualization as discussed in the last chapter. Radiology as an institution of rarefaction and objective visualization as a principle grounded in modernist epistemology exercises considerable authorizing force in the medical-industrial complex. This force is rarefactive in the case of the sinus headache and agentive in the case of FM.

14 For a detailed discussion of this argument see critical epistemologies of science and technology provided by Haraway (1997) or Latour (1999).
Conclusion: Agency, Regulation, and Time

M.C. Escher Relativity. Escher’s "Relativity" illustrates a dissonant yet imaginary world, where the laws of gravity are dissimilar from those of the real world…. The striking thing about this lithograph is that it represents a world having three different sources of gravity. Each of these sources is orthogonal to the other two, just like in a three dimensional structure. Every inhabitant corresponds to a 'gravity well.' …. There are three stairways shown in the picture, with each being used by the inhabitants of varied gravity sources. The inhabitants are also depicted, climbing upside-down on the other stairways, when actually they are walking normally in accordance with their source of gravity. Get actual quote from Lib book

I begin my conclusion to Rhetorics of Pain with Escher’s iconic “Relativity” for two reasons: 1) It marks a definitive break between my earlier chapters (which focus on cases in pain medicine) and my conclusion which will be devoted more to rhetorical theory. And 2) “Relativity” is an apt metaphor for the sibling material-semiotic practices of agency and regulation. The combination of the underlying architecture and the various gravity wells define the structural limits placed on action. Additionally, however, the ability of Escher’s actants to use multiple gravity wells on the same staircase suggests the possibility of agency—an agency defined by the structure of a competing gravity well.
I would like to begin my conclusion by taking a moment to reflect on the scope of material this work has covered. *Rhetorics of Pain* has explored a phylogenetic history of Western pain medicine, the establishment of a trading zone in the MPG, the role of *stasis* in pain medicine’s transformation into the fifth configuration, the mechanisms of sinus disease rarefaction in the MIC, and the role of PET it ontologizing the FM. In reflecting on this territory, one thing becomes immediately clear to me: my dissertation is an exercise in heterochronicity. Following Jack (2006) and Burton (1996) I use the term heterochronic to refer to multiple simultaneous senses of time at work in a given discourse. As Burton put it, following Bakhtin, “The human world exists as an ongoing dialogue in which multiple languages and chronotopes engage and reshape each other perpetually. It is characterized not only by heteroglossia, but equally by multitemporality or heterochrony” (48) (Jack p. 71). More specifically, my use of the term heterochronicity refers to the alternating use of synchronic and diachronic analytic frames in this work.

A quick chapter-by-chapter survey reveals that each part of this dissertation exhibits a prevailing chronicity-bias. Phylogentic historiography, Foucauldian transformation, and rhetorical agency each rely on a heterochronic logic. In contrast, incommensurability, trading zones, and principles of rarefaction are synchronic concepts. Probing somewhat deeper, however, reveals that each chapter employs heterochronicity. For example, my diachronic chapters rely on synchronic resources like configurations, *stasis* theory, and Peirce’s semiotics. Similarly, my synchronic chapters explore the behavior of structural mechanisms through time, for example the establishment of a trading zone and the transition for disciplinary rarefaction to regulatory rarefaction. And perhaps all this should not be surprising given that this dissertation focuses both on agency and regulation—arguably diachronic and synchronic phenomena respectively. However, while, I stand by my use this heterochronic assortment of analytic devices, I must recognize that I have made no accounting of the relationship between synchronicity and diachronicity. It is precisely this oversight I seek to remedy in this conclusion.

In the pages that follow, I will offer a final reflection on agency and regulation. This reflection seeks to find a way to cope with the emergent heterochronicity that arises when rhetorical studies folds agency into authority. As a guide for this reflection I will rely on Latour’s (1999) theories of detours and enlistment. More specifically, I will argue that these theories can help point the way towards an accounting of agency/authority that accounts for the aforementioned emergent heterochronicity. Finally, I will conclude with a moment of reflexivity. In particular, I will interrogate how my reinterpretation of Latour’s detours and enlistment vis-à-vis agency/authority also serves to explicate the disciplinary goals of this dissertation.
Detours and Enlistment

Finding a way to cope with the heterochronicity of agency/authority involves recourse to a theoretical construct that either eschews or embraces dichotomy. As such, it should be unsurprising that I return, once again, to the architect of nonmodernity, Bruno Latour. Though the term nonmodern is primarily found in *We Have Never Been Modern* (1991), it is a concept that undergirds much of Latour’s work. In exploring nonmodernity, Latour focuses primarily on the subject/object distinction. For example, in his earlier work he explores an integrated reality of hybrid quasi-objects/quasi-subjects (1991, p. 51), and his later scholarship focuses on his refined sense of collectives (1999). Though Latour’s interest was largely confined to overcoming the subject/object dichotomy, his underlying nonmodernity makes his work amenable to attending to others, *viz.*, the synchronic/diachronic dichotomy.

In *Pandora’s Hope*, Latour explicates his theory of translation. (See figure 1.) As he described it, “The operation of translation consists of combining two hitherto different interests to form a single composite goal” (p.88). In short, translation involves the coordination of goals among differing agents and/or programs of action. Latour’s most accessible description of this process takes the form of a refutation of the National Rifle Association’s oft quoted mantra, “Guns don’t kill people; people kill people.” Objecting to the underlying philosophy of technological neutrality, Latour argued that the combination of a human agent and a firearm results in a hybrid/composite agent with a composite goal. Specifically, he argued that the recourse to a firearm resulted from an interruption and subsequent detour/enlistment:

If the agent is human, is angry, wants to take revenge, and if the accomplishment of the agent’s goal is interrupted for whatever reason (perhaps the agent is not strong enough), then the agent makes a detour…. Agent 1 falls back on Agent 2, here a gun. Agent 1 enlists the gun or is enlisted by it—it does not matter which—and a third agent emerges from a fusion of the other two. (Latour p.178)

Latour’s narrative argues that the inclusion of a firearm changes the situation in a way that other technologies might now. Agent 1 plus a baseball bat might result in injury whereas Agent 1 plus a gun is more likely to result in homicide. Additionally, Latour’s model assumes that the original goal of Agent 1 was revenge or injury rather than death and with the enlistment of agent two a more permanent composite goal arises, “You only wanted to injure but, with a gun now in your hand, you want to kill” (p. 178-179).
Latour’s model of goal translation provides an excellent starting point for addressing the heterochronicity of agency/authority. Fundamentally, it is based on a series of diachronic moves: detour and enlistment. But it also accounts for the role of structural constraints in the interruption mechanism. In order to clarify this point, I will turn now to a less political and more nuanced example—the case-study from Chapter 5, the agency of FM.

Figure 2 (below) provides a model of the goal translation that occurred during the ontologization of FM. Agent 1 (a generic FM pathologist) sought to determine the etiology of FM. Her progress towards that goal was interrupted by a lack of physical evidence. Therefore, a detour was necessary. By enlisting the authority of the ACR criteria, the pathological program of action was able to infer the brain as the probable location for FM’s specific etiology. Agent 2 (diagnosticians/ACR) were able to proceed on to their goal uninterrupted but Agent 1 + Agent 2 (the pathologists armed with the ACR criteria) was still interrupted by the lack of physical evidence. Subsequently Agent 1 + Agent 2 detoured through radiology, enlisting the PET black box. So finally Agent 1 + Agent 2 +Agent 3 was able to offer a tenable hypothesis regarding specific etiology (CNS dysregulation) and to meet a composite goal (ontologizing FM).
Figure 2: FM Goal Translation. The above schematic details the successive enlistments that allowed for the generation of a FM etiology hypothesis and the subsequent ontologization of FM.

Figure 2 provides a compelling accounting of the agency at work in the case of FM’s ontologization. Detour and enlistment as diachronic processes describe the mechanisms of agency while the interruption helps to account for the role of structural hindrances such as the lack of recognized data. Additionally, Latour’s model offers rhetoricians scalability in accounting for relationships among diachronic and synchronic phenomena. Specifically, this model can help explain the emergence of structural phenomena—in the above case the ontology of FM. Furthermore, Latour’s model of translation also explains the emergence of black boxes such as PET.

Indeed, in Latour’s schema black boxing occurs in the same continuum of phenomena along with goal translation. As he described it,

Any given assembly of artifacts may be moved up or down this succession of steps depending on the crisis they go through. What we may consider, in routine use, as one agent may turn out to be composed of several that may not even be aligned. The history of the earlier translations they had to go through may become visible, until they are freed again from any influences of the others. (p. 184)

This scalability coordinates effectively with the scalability of Perice’s semiotic. However, Latour’s model offers the additional benefit of preserving a sense of time—through detours and enlistments. In Figure 2 PET is black boxed and that black boxing allows PET to retain its authority and participate as an agent in the ontologization of FM. However, as a black box, it is self-effacing. It elides the complexities of its own authority and rise to agency. Fortunately, Latour’s model of translation can also be adequately used to explain the black boxing of PET. See Figure 3 below.
First and foremost, I would like to draw my readers’ attention to Figure 3 as a diachronic explanation of authority. A series of temporally-distributed enlistments resulted in the creation of a structural unit—a black box. In the more familiar parlance of Chapter 5 a series of agentive rhetorical events led to the establishment of a new status quo (agency maxim 4) and the concomitant exercise of authority to maintain that status. My readers will also immediately notice that Figure 3 is strikingly different from Figures 1 and 2 which were more faithful to the Latourian model. While Latour treats enlistment and detours identically, I object to this formulation. The black boxing of PET is a prime example of a situation wherein new technologies faced an interruption borne of novelty and circumnavigated that interruption through enlisting the legitimacy of a prior technology. However, this enlistment and circumnavigation did not exactly create a composite agent or a composite goal as was the case in previous examples. New imaging technologies were able to use the legitimacy of prior technologies to bypass an interruption and proceed on to the original goal without interruption. All this is to say, that I argue that enlistment and detours are distinct (albeit) related moves that help to account for both the diachronic and the synchronic dimensions of agency/regulation.

Ultimately, Latour’s model is suggestive rather than definitive. His notion of detours and my refinement of enlistment provide rhetorical studies with two helpful constructs. These constructs offer
rhetoricians two means accounting for the heterochronicity of agency/authority. Presumably, however, there could be many more constructs that could be employed to this end. It is for this reason that I argue my focus on Latour is suggestive. No doubt, the dedicated attention of rhetoricians could result in the identification of additional, and perhaps more robust, mechanisms of agency/authority which also account for heterochronicity.

Reflexivity: Agency and Rhetorics of Technoscience and Medicine

In this, the final section of my dissertation, I would like to end with a moment of reflexivity. I am so committed to the utility of Latour’s model as an adequate description of the mechanisms of agency/authority that I believe that it aptly reflects the work of this dissertation and rhetorics of technoscience and medicine more broadly. When I set out to complete this work, I wanted to provide a rhetorical/critical account of pain science. However, armed only with the tools of rhetorical criticism, I met an interruption, viz., Gaonkar. Of course, here I refer to Gaonkar’s (1997) infamous critique of rhetoric, agency, and the rhetoric of science, “The Idea of Rhetoric in the Rhetoric of Science” where he argued that, “In its current form, rhetoric as a language of criticism is so thin and abstract that… it commands little sustained attention” (p. 33). In short I was interrupted like in the case of the agent with the gun (lack of strength); my theoretical apparatus was not robust enough to the task at hand.

Subsequently I opted for a detour through critical/cultural studies. Since Gaonkar had suggested that rhetorical studies did not have an adequate account of agency theory, I surmised that critical/cultural studies’ sustained attention to the subject might help me out. In so doing, I became a composite agent—rhetorical/critical/cultural scholar. Whereas my first goal had been to provide a rhetorical account of pain science, my composite goal became threefold: 1) to provide a rhetorical account of pain science, 2) to “thicken” rhetorical theory, and 3) (borrowing from critical/cultural studies) to account for the role of power and institutions in pain science. However the poststructural deconstruction of agency and the author provided yet another interruption to be navigated. The force of postmodernism and poststructuralism would not allow for any detailed accounting of the mechanisms of change. Therefore an additional detour was required.

Obviously that detour took the form an incorporation of STS theories and methods. Marshalling theories from Latour’s actor-network theory helped met to explicate the mechanisms of agency at work in the MIC. All in all this work resulted in the formation of a composite program of action which I have dubbed rhetoric of technoscience and medicine. And, of course, this composite
program of action has its attendant composite goals—each of the aforementioned goals plus a general critique of the hegemony of scientific institutions. Figure 4 elucidates this series of detours.

![Diagram](image)

**Figure 4: Goal Translation for RTM.** This figure details the series of interruptions, detours, and translations that have grounded the core theoretical moves in this dissertation.

Essentially, Figure 4 provides a visual gloss of the argumentative progression in this dissertation. A more robust and compelling analysis would examine each of the individual detours or enlistments. Obviously there is insufficient space left to tend to that task. I do, however, want to take a moment to look at a few of the more notable examples. In particular, I would like to draw my readers’ attention to two particular moments: 1) my exploration of the relationship between Foucauldian transformation and rhetorical stasis theory (Chapter 3) and 2) my comment that black boxing can be understood as a form of metonymy (Chapter 5). In each of these cases, I would argue that something rather different than a traditional detour is going on. In fact, I would like to suggest that these are examples of what I am calling reciprocal enlistment.

Reciprocal enlistment occurs when two agents or programs of action enlist each other in a symbiotic relationship. In contrast to PET’s simple appropriation of legitimacy from X-rays (which do not benefit from the enlistment), cases of reciprocal enlistment afford benefits to both agents/programs of action. For example, Foucault’s explanation of transformation lacks a clear explanation of method, and rhetorical theory as critical apparatus is thin. The reciprocal enlistment of transformation and *stasis* theory provides a much needed explanation of mechanism to transformation and additional theoretical legitimacy (thickness) to rhetorical theory. Similarly, Latour’s discussion of
black boxing lacks precision in describing the rhetoric of black boxing. In adding the fine detail of
tropic analysis to the notion of the black boxing, each theory is augmented. Furthermore these two
examples are not the only such moments in my dissertation. Table 1 (below) provides a chapter-by-
chapter list of similar reciprocal enlistments.

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**Table 1: Reciprocal Enlistments By Chapter.** This table identifies the reciprocal
enlistments explored in each chapter of this dissertation.

All told, my detours through critical/cultural studies and STS combined with the reciprocal
enlistments described above comprise the heart of the theoretical work in this dissertation. While
these models are an apt description of my goals and process, they, of course, says nothing of success.
The establishment of RTM as a viable field of inquiry has become one of the composite goals of this
project. However, time and reception are the measures of success, so that is a question that will
remain unaddressed and unresolved. Nevertheless, I have reason to be hopeful. More and more
scholars in rhetoric of science are starting to deploy similar moves.

For example Winsor’s (2007) reinterpretation of Latour’s doctrine of enrollment as a
mechanism of rhetorical agency, Wilson and Herndl’s (2007) use of Star and Griesemer’s boundary
object as rhetorical exigence, and Stromer’s (2004) recasting of articulation under the canon of
arrangement are all excellent examples of reciprocal enlistment. Indeed, Herndl, Scott, Lynch,
Marack, and Kinsella all borrow theoretical resources from STS theorists such as Latour, Haraway,
Galison, and Fuller. (Whether or not these theorists would accept the mantel of RTM, I believe the
label aptly describes this scholarship.) Indeed, rhetoricians of science should continue precisely this
type of work. They should actively seek out modes of articulation that can link appropriated theory to
the rhetorical cannon. In so doing, rhetoricians can find productive theoretical apparatuses for
exploring the material-semiotic networks that surround scientific discourse. In fact, I argue that these
theoretical developments successfully counter Gaonkar’s charge concerning the thinness of rhetorical
theory. Indeed, this work thickens that theory by linking it to highly productive resources in critical/cultural studies and STS.

1 In *Pandora’s Hope*, Latour explicitly introduces a multifaceted conception of time/history (pp. 170-171). This construct is designed to account for the multilinearity that arises from the differences between time as experienced and time as conceived. As such, it is not particularly relevant to the current discussion.

2 This narrative of my detours through critical/cultural studies and STS has been necessarily reductive. Certainly I recognize that each of these programs of action have far more to them than the narrow goals and interruptions I have ascribed them. My goal here has not really been to provide a thorough accounting of the process. Indeed that would take far more space than is available here. Rather, my purpose merely is to briefly illustrate the applicability of Latour’s model to my own scholarship.
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Appendix A: Representative Interview Questions

1. Describe your educational background and certifications.

2. Describe your current practice and position?

3. What types of pain-patients do you see most frequently?

4. What are the most common types of pain treatments you employ?

5. What pain measurements protocols do you use in assessing patient pain?

6. What types of quality of life measurements do you use in assessing patient pain?

7. Why did you join <relevant organizational entity>?

8. How do you define pain?

9. How does that definition compare to your profession?

10. How has your thinking about pain changed overtime?

11. What types of presentations/ articles/ texts do you find most helpful/ interesting/ persuasive?

12. What types of presentations/ articles/ texts do you find least helpful/ interesting/ persuasive?

13. How has your participation in the interdisciplinary community affected your practice?

14. How has your participation in the interdisciplinary community changed the way you think about pain and/or pain management?

15. What do you think are the primary barriers to research dissemination and implementation?

16. Anything else you’d like to share?
## Appendix B: Research Subjects

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Primary Credential</th>
<th>Secondary Credential(s)</th>
<th>Organizational Affiliation</th>
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<tr>
<td>Benedict</td>
<td>Pharmacist</td>
<td></td>
<td>MPG Board Member</td>
</tr>
<tr>
<td>Bennetti</td>
<td>Doctor of Osteopathy</td>
<td>Pain Medicine</td>
<td>MPG President</td>
</tr>
<tr>
<td>Boysen</td>
<td>Medical Doctor</td>
<td>Pain Medicine</td>
<td>MPG Member</td>
</tr>
<tr>
<td>Fitzpatrick</td>
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<td></td>
<td>MPG Board Member</td>
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<td>Freedman</td>
<td>Psychologist</td>
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<td>MPG Board Member</td>
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<tr>
<td>Gonzales</td>
<td>Medical Doctor</td>
<td>Gastroenterology</td>
<td>MPG Visiting Speaker</td>
</tr>
<tr>
<td>Hamlyn</td>
<td>Physicians' Assistant</td>
<td>Pain Medicine, Reki Healing</td>
<td>MPG Board Member</td>
</tr>
<tr>
<td>Heisenberg</td>
<td>Medical Doctor</td>
<td>Neurology, Pain Medicine</td>
<td>MPG Member</td>
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<tr>
<td>Kapplan</td>
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<td>Vascular Surgery</td>
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<td>Landau</td>
<td>Psychologist</td>
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<tr>
<td>Martinez</td>
<td></td>
<td></td>
<td>AFA President(^1)</td>
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<tr>
<td>Michelson</td>
<td>Medical Doctor</td>
<td>Orthopedic Surgery</td>
<td>AAPM Member</td>
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<td>Olsen</td>
<td>Gerontologist</td>
<td></td>
<td>MPG Board Member</td>
</tr>
<tr>
<td>Peters</td>
<td>Doctor of Osteopathy</td>
<td>Internal Medicine, Pain Medicine, Headache Medicine,</td>
<td>MPG President</td>
</tr>
<tr>
<td>Steele</td>
<td>Medical Doctor</td>
<td>Pain Medicine, Sleep Medicine</td>
<td>MSPO President(^2)</td>
</tr>
</tbody>
</table>

\(^1\)American Fibromyalgia Association (ASA) is a pseudonym for a fibromyalgia research and activist organization. Ms. Martinez, ASA president, was a speaker at the AAPM and participated in an interview for my study.

\(^2\)Middle States Pain Organization (MSPO) is a pseudonym for an MPG clone that was established in another prominent Midwestern city.
Vita

NAME OF AUTHOR: S. Scott Graham

DATE AND PLACE OF BIRTH: November 9, 1980, Durham, NC

DEGREES AWARDED:
    B.A. in Philosophy, Eckerd College, 2003
    M.A. in Rhetoric and Professional Communication, Iowa State University, 2006

PROFESSIONAL PUBLICATIONS:

HONORS AND AWARDS:
    Nell Ann Pickett Award for Best Article in Technical Communication Quarterly 2009
    ISU Graduate Student Senate Peer Research Award, 2008
    Inductee, Phi Kappa Phi Honor Society, 2008
    W. Paul Jones Scholarship for Scholarly Writing, 2008
    Critical Writing Award, 2008
    Freda Hunke Fellowship for Professional Development, 2006-2007
    Aubrey Galyon Award for Academic Excellence, 2006
    Richard R. Wright Award for Expository Writing, 2006