You're here because you know something. What you know you can't explain. But you feel it. You've felt it your entire life. That there's something wrong with the world. You don't know what it is but it's there, like a splinter in your mind driving you mad.

Morpheus, *The Matrix*

University of Alberta

Splintering the Mind's 'I': Cognitive Science and Subjectivity

by

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A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the

requirements for the degree of Master of Arts

in

English and Film Studies

Humanities Computing

Edmonton, Alberta

Spring 2006

Your file Votre référence
ISBN: 0-494-13740-1
Our file Notre référence
ISBN: 0-494-13740-1

Abstract

This thesis unites cognitive science and subjectivity, seeking to assess the impact of different models of cognition on individuals' self-conception. Looking at the computational model of minds in sources like Descartes and Turing from philosophy, and the Matrix trilogy from popular culture, reveals that this construction is linked to the liberal humanist subject, supporting traits such as autonomy, agency, and free-will. A survey of new models of minds portrays cognition as distributed, embodied, and cultural that, offering different possibilities for subjectivity. These reconfigurations reduce the emphasis placed on centralized cognitive processing, displacing the conscious 'I' as the focal point for subjectivity. Using the films of Charlie Kaufman, *Being John Malkovich* and *Adaptation*, I conclude by showing how subjects may react to this remodelling of cognition and speculate on why the conscious 'I' remains so important for subjectivity when cognitive science has already declared it obsolete.

Acknowledgments

My first thanks go to the stimulating reading group I participated in with Natasha Nunn and Erika Smith that really got things started. The guidance and perception of Harvey Quamen overseeing this group and supervising the thesis were instrumental in bringing it to completion. Many thanks also to the other committee members David Miall and Sean Gouglas whose thoughtful reading helped clarify many issues. The strong editorial work of Alethea Adair was also greatly appreciated and smoothed the process considerably. Finally I have to thank Katie Murray whose constant support and encouragement were just what I needed when I was not motivated. I could not have concluded this project without her.

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Introduction

> Every human mind you've ever looked at—including most especially your own, which you look at from the inside—is the product not just of natural selection but of cultural redesign of enormous proportion.
>
> Daniel Dennett *Kinds of Minds*, 153

> What we take to be the self is really a network of knowledge, probably the richest there is, that is saturated in language and organized in such a way as to be useful rather than true. Whereas the world is known by mental structures, the self *is* a system of structures. It is not a thing to be known, but a process of knowing, which is why it escapes description, and baffles scrutiny.
>
> Jeremy Campbell *The Improbable Machine*, 258

This thesis studies how cognitive science influences people's self-conception, focusing on how descriptions of the mind impact on subjectivity. The two passages quoted above point the direction for the study. They articulate a common cultural frame for both minds and selves, while at the same time suggesting the dynamic, elusive nature of both entities.

The mind is often overlooked amidst the myriad complex factors that contribute to subjectivity. Our cognitive repertoire is indispensable to the construction of identity and any experience of subjective reality. Critical focus is commonly devoted to other sociocultural factors, notably those subsumed under the broad rubric of Identity

Politics; among others gender, sexual orientation, race, nationality, and economic status play a large role in the formation of subjects. These factors have been productive sites for many theorists to challenge the hegemony of the Western phallocentric, patriarchal tradition and to empower identities outside the mainstream. While postmodern criticism can be lauded for no longer positing a singular privileged subject position in the face of this clamour of new voices and identities, it can be critiqued for ignoring the shared features that contribute to all human subjectivity. The mind is one such feature.

Unfortunately it is a tricky task to pin down the role of the mind in the formation of subjects. The problem occurs simultaneously at multiple levels. Initially we are faced with the question of how the mind functions, how it creates and maintains an individual's identity. It is through the mind that we know and recall the formative incidents of youth, conceive of our place in the social order, and make the decisions of behaviour that ultimately make us who we are. The mind shapes our interactions with the world, producing internal representations of our surroundings that we use to navigate, plan, and ponder. Yet with all the advances of modern medicine, philosophy, and science, many of the basic puzzles of human cognition remain unsolved. We simply cannot say for certain how the mind accomplishes the self-representation that is integral to subjectivity and to the creation of the 'I'. Many different theories seek to explain these processes and recent experimental work is making impressive strides but at present our understanding of the mind from a functional perspective is far from complete.

Stepping past this (not inconsequential) difficulty, we arrive at a second dimension of the problem: minds are also discursive entities. A long tradition of

introspection and observation has sought to classify the mind, to explain our subjective mental experiences. Philosophers, poets, psychologists, and more recently, cognitive scientists have produced reams of work detailing the mind's properties and operations. This work, although often contradictory and incomplete, has coalesced into a constellation of minds that plays a critical role in subjectivity. Our cultural discourse reveals this constellation in a multitude of products—a mass-mediated description of the mind. Every subject is included in the class of things called minds, and while the category is as fluid as the mind itself, its universal features shape individual's self-conception. Our shared beliefs about minds are involved in answering the question "Who am I?" at the most basic level. For example, when Descartes proclaimed "I am a thing that thinks," he not only enshrined the mind's central role in subjectivity, he advocated mathematical reason and the rational scientific method as governing principles of thought. These traits, and the others that shape the discursive constellation of minds, form some of the basic boundaries that subjects encounter.

While I will be focusing on the discursive construction of cognition rather than probing the intricacies of cognitive function, these two aspects of the mind's role in subjectivity are clearly related. Successive philosophical and scientific efforts to explain mental function trickle into the collective conception of minds, subtly altering the formation of subjects. However, it takes a certain critical mass for novel theories to permeate popular consciousness and become part of the cultural conception of minds. It takes even longer to dislodge extant and possibly outdated notions as these become deeply embedded in the fabric of people's lives. The view of minds that is currently the most pervasive is the computational theory of mind. Arising under the classical

cognitivist paradigm of the mid-twentieth century, this construction has some older origins. I will trace a line of influence directly from the dawn of the Age of Reason in the seventeenth century to the seminal work on cognition and computation by Turing, Von Neumann, and Simon and Newell. These pioneers built upon the Cartesian model of mathematical cognition, abstracting thought further into the operations of symbolic logic. Capturing these operations in electrical transistors, the researchers assured their fame by duplicating the processes of thought in metal wires and vacuum tubes.

This groundbreaking work not only formulated a novel (at the time) manner of viewing minds, it sparked the computing industry, ushering in the Information Age. The current omnipresence of computers only helps the common conception that minds and computers are interchangeable. Computers are utilized in every sphere of society, for too vast a range of applications to enumerate. Some of their tasks involve storage of information into memory, retrieval of data for calculations and output, and the execution of programmed operations. The parallels between the operations of computers and human mental function are clear. Philosopher Daniel Dennett sees an even stronger relation between the two, characterizing computing as cognitive off-loading. He describes that process as

> extruding our minds (that is our mental projects and activities) into the surrounding world, where a host of peripheral devices we construct can store, process, and re-represent our meanings, streamlining, enhancing, and protecting the processes of transformation that *are* our thinking. (134–135 original emphasis)

I will examine Dennett's viewpoint in detail in Chapter Four; at present, it simply points towards the intimate relationship between minds and computers. In popular conceptions it is only a matter of time before full-fledged consciousnesses are extruded into the silicon circuitry of computers.

There is ample evidence of this conviction in the countless pop culture venues that depict sentient machines or futuristic struggles between computers and humans. Although this theme is no doubt tied into a growing technological anxiety, it is predicated on the underlying transposition of mental processes and computational processes. Nowhere is this more evident than in the many Hollywood movies that portray robots with human personae, confirming for subjects that our minds can be replicated out of metal and plastic. I use the Matrix* trilogy as an example to sketch the key traits of the computational conception of minds, and to assess how these impact on the formation of subjects. My cinematic survey of minds adopts a methodology that is is heavily influenced by N. Katherine Hayles. In *How We Became Posthuman*, the subjective constellation we have 'become' is the product not only of the evolving theories Hayles traces through cybernetics, information theory, and artificial intelligence, but of the reflection and revision of these in the science fiction novels of Bernard Wolfe, Philip K Dick, William S. Burroughs, and others. The analysis gains much of its power via its split topography: the twinned narratives of science and literature that are the fertile grounds for Hayles' reading. Bridging these two often polarized domains reveals what investigations confined to one or the other may

* To eliminate confusion from the outset, there are three distinct ways I will be referring to the films: "the Matrix" or "the Matrix trilogy" refers to the work as a whole, "*The Matrix*" (italicized) refers specifically to the first film of the trilogy, and "the matrix" refers to the neural interactive simulation that gives the films their name.

overlook. Moreover, the interrelations between science and culture help "resist the idea that influence flows from science into literature"; as Hayles notes, the "cross-currents are considerably more complex than a one-way model of influence would allow" (21). This strategy embodies cybernetics by analogy, splicing pop culture and cognitive science into a single system operating via feedback looping. In addition to outlining the impact of cognitive science on subjectivity, this style of analysis reveals how cultural conceptions of minds can point to new directions of investigation for scientists and philosophers.

A close reading of the films that serve as cultural test cases does more than reveal their conception of the mind. In addition, the unstated assumptions inherent in this particular construction of cognition become apparent—the unconscious features of the computational mind so to speak. This does not point towards a Freudian unconscious; instead I refer to Michel Foucault's notion of the tacit and unseen lines of power that flow through discourse and exert control over subjects. Through investigation of several social institutions and their practice, Foucault's work reveals discursive constellations that are deeply implicated in shaping subjects: "through these different practices—psychological, medical, penitential, educational—a certain idea or model of humanity was developed, and now this idea of man has become normative, self-evident, and is supposed to be universal" (Foucault "Technologies" 15). Although he never directly focused on the discourse of cognitive science, it is clear that our common conception of minds can be a useful direction "to study the constitution of the subject as an object for himself: the formation of the procedures by which the subject is led to observe himself, analyze himself, interpret himself, recognize himself as a

domain of possible knowledge." (Foucault *Aesthetics* 461). The discursive constellation of minds is shaped via techniques and along trajectories that are governed by power relations often overlooked when answering "What is a mind?" Consequently a subject who states "I am a mind", not only incorporates the common properties of minds, but the political, economic, and other institutional forces that have shaped the constellation. Taking the association of the mind and computation to an unprecedented extreme, the Matrix films are an ideal venue to delve into some of these tacit forces brought to bear on subjects by this construction of minds.

However, the conception of minds that is revealed in the Wachowski Brothers' trilogy is not some monolithic structure that holds all the answers about the workings of cognition. It forms part of an ongoing narrative seeking to explain the puzzles of consciousness and the human mind. Drawing from theoretical debate, scientific experimentation, and philosophical enquiry, the common current perception is that computers can and will have minds, that the two are functionally isomorphic. This theory has not always held such cultural currency, gaining preeminence only in the latter half of the twentieth century. Tracing the history of the computational view of minds will pinpoint specific nodes in its development that affect subjectivity in different ways. Hayles' *How We Became Posthuman* is an instructive road map through this terrain as it focuses on several of these formative steps in the creation of the computational view of mind. Some critical problems are the relationship between mind and body, the abstraction of thought, and consciousness. From the very outset locating her text as a response to the nightmare-ish notion of downloadable consciousness, Hayles also demonstrates the anxiety that often accompanies this cognitive model. Thus

at the same time that it clarifies many of the underlying assumptions in the development of the computational view of mind, *HWBP* is itself a cultural product that exposes the subjective implications of the theory.

These conspicuous nodes in the discourse of cognition are also sites where alternative theories spring up in opposition to the cognitivist paradigm. There is no longer uniform acceptance of the computational theory within cognitive science as many researchers have lost confidence in the predictive power of computation. Andy Clark sums up this dissatisfaction stating, "cognitive science's aspirations to illuminate real biological cognition may no longer be commensurate with a continuing abstraction away from the real-world anchors of perception and reaction" (1997 59). In the last few decades of the twentieth century, many researchers frustrated with the unfulfilled predictions of the artificial intelligence community set out in new directions. A survey of some of these different formulations will articulate the new flavour of cognitive science and its novel descriptions of cognition—autopoietic, enacted, distributed, embodied, embedded, and cultural to name a few. These new paradigms question the supreme role of the Cartesian 'I' and its conceptualization as an information processing entity. Instead cognition is re-imagined as a distributed process, shared among various intentional agents dispersed throughout the mind, the body, and the world. These changed properties offer a very different set of scriptures for subjectivity. In fact, many of these views of cognition undermine the entire notion of subjectivity, conceiving of the subjective 'I' as a narrative fiction that the mind maintains only for show. The final chapter explores this stark new reality for subjects.

Popular culture will again be used to display constructions of minds that problematize a unified view of thought as computation. The bulk of Hollywood's explorations of cognition reflect the dominant cultural view of minds but a small number offer a different model for subjectivity. I will use the unique work of Charlie Kaufman to explore a variety of different conceptions of minds. Although his two collaborations with director Spike Jonze were critical darlings, they never gained a wide following. The pictures depict scenarios that are so bizarre and that impose such strange conditions on subjectivity that many viewers find them off-putting. His break-out film, *Being John Malkovich*, posits portable consciousness in the form of a dark rushing tunnel that deposits people inside the head of John Malkovich for fifteen minutes. *Adaptation* is a self-reflexive adventure chronicling Kaufman's own desperate attempts to adapt a novel for the screen. These works depict minds in uncommon ways, and so doing suggest a number of interesting possibilities for subjectivity.

As I mentioned previously, existing discursive constructions do not shift easily out of popular consciousness. The conceptions of the mind that underpin identity are tacitly broadcast in all our cultural productions and constantly reinforced. The hypermediation of our current cultural moment heightens this trend, re-broadcasting and re-working these notions for all the different vectors of the Madison Avenue machinery. The result is that there are discrepancies between our mass-mediated representations of minds and the most recent work in cognitive science. This liminal zone between the discursive constellation of minds in pop culture and the discursive constellation of minds envisioned by cognitive science is another productive area to examine the relationship between cognition and subjectivity. Probing the gap between

our cultural view of minds and that of recent theoretical and experimental work reveals many of the unseen forces that hold a conception in the public consciousness. Moreover, such a comparison points to blind spots in the discursive construction of both minds and subjectivity. Michel Foucault employed a similar strategy in *Madness and Civilization*, identifying the shifting role and place which madmen came to occupy at the end of the Middle Ages. Foucault writes, "meaning is no longer read in an immediate perception, the [madman] no longer speaks for itself; between the knowledge which animates it and the form into which it is transposed, a gap widens. It is free for the dream." (*Madness* 19) Evoking the threat of chaos in the very heart of reason-based cognition, the sentient machine-minds of popular culture presented as terrifying figures bent on the extermination of humanity are one such dream. I conclude with a reading of the vacant space between the manifest qualities of the common discursive constellation of minds and those offered by the developments in cognitive science.

Chapter One: Creating Computational Cognition

To begin to assess the influence of cognition on subjectivity, this opening chapter traces the development of the computational model of minds. This model takes shape from the fields of cognitive science and the philosophy of mind, disciplines that grapple with human thought and link the incredible complexity of the brain to the subjective experience of consciousness. But my goal is not the explication of thought, nor a fuller understanding of the mind; instead I aim to uncover the discursive construction of minds. The distinction is expressed by Foucault in his analysis of "Aspects of Madness" in *Madness and Civilization* when he writes,

> If mania, if melancholia henceforth assumed the aspects of our science knows them by, it is not because in the course of centuries we have learned to "open our eyes" to real symptoms; it is not because we have purified our perception to the point of transparency; it is because in the experience of madness, these concepts were organized around certain qualitative themes that lent them their unity, gave them their significant coherence, made them finally perceptible. (130)

The science of cognition similarly organizes the experience of minds around a specific set of concepts. Certain theoretical moments construct the now commonly accepted view that minds and computers are analogous. Three of these themes—the separation of mind from body, the mathematical abstraction of thought, and the re-construction of the human as an intelligent machine—are of particular interest for subjectivity.

To get beyond teleological categorization, theoretical conceptions of minds are examined not with an eye towards their place in the narrative of rational scientific progress, but towards how these notions are perceived by and impact on individuals. Looking at the numerous mass-mediated products focused on the mind permits a fuller appreciation of how theories of cognition capture the imagination of subjects and society. Many of these theories become intimately tied to individuals' self-conception and become entrenched in the language, mannerisms, and routine of everyday life. Even theories that are outdated experimentally and/or philosophically persist in informing the manner in which people conceive and conduct themselves. While this discrepancy adds to the challenge of tracing the effects of new developments in cognitive science on subjectivity, it also raises an important series of questions. What features of mind are the most important for individuals? What do the persistent cognitive features offer for self-construction that the novel ones do not? In tracing the roots of the computational view of mind, I will begin to address these questions.

The Cartesian Legacy

The quintessential example of a tenacious theory of mind is the seventeenth century work of philosopher Rene Descartes, known both for his postulates and his methods. Through an introspective process of interrogating which facts could be known and believed, Descartes formulated a dualist world view comprising two categories of matter: physical, *res extensa* and mental, *res cogitans*. He arrived at this conclusion by systematically subjecting his own mind to a program of doubt so stringent that only one certainty remained: "thought exists; it alone cannot be separated from me. I am; I exist

— ... For as long as I am thinking" (65). From this beginning, he went on to adduce that since he cannot know his body in this same way, his mind exists as a distinct class of matter, entirely separate from the physical body and surrounding world. This indubitable thinking 'I', linked to the body through intimate union at the pineal gland, controlled the body as would a pilot captaining a ship. Since Descartes' era, numerous advances in neurological science have clarified the brain's role in mental experience. For example, it is now known that the pineal gland is responsible for the production of melatonin and involved in maintaining circadian rhythms. While the notion of intimate union has lost its cachet, Cartesian dualism lingers. People routinely refer to their bodies as separate entities from their minds and to physical activities as separate from mental as demonstrated by a pair of examples cited by Daniel Dennett: "these athletes are prepared both mentally and physically," and "there's nothing wrong with your body —it's all in your mind" (77). The tenacity with which dualism has held its place is undoubtedly due to the manifest details of consciousness. Nothing is more familiar to each human than the nearly constant inner monologue narrating our lives; we certainly don't know our legs, or lips, or teeth with the same conversational intimacy we know our minds. The private thoughts we experience—doubts, fears, fantasies—are a powerful argument for the privileged status of minds and for the view that they are separate from bodies. Unfortunately no justification for this view will square it with the fact of the mind's materialization in the human brain.

The lasting influence of Rene Descartes is not only due to the popular appeal of dualist conceptions of mind; the method he used to produce his findings has also been hugely important in the cultural and intellectual development of Western society. For

Descartes, the method was as much a concern as the results, a fact emphasized by the title of his seventeenth century publication, *Discourse on the Method for Conducting One's Reason Well and for Seeking Truth in the Sciences.* He constructed his method using rules culled from his studies in logic, geometrical analysis, and algebra, "embracing the advantages of these three yet free from their defects" (10). His systematic process of investigation strove to emulate the clear proofs of mathematical reasoning and sought mechanical explanations for phenomena. This research paradigm, along with those of contemporary scientists such as Galileo Galilei, Francis Bacon, John Locke, and Isaac Newton, redefined the practice of science, fundamentally altering its place in and importance for society. The widespread social changes of the eighteenth and nineteenth centuries owe a large debt to processes, products, and ideas fostered by these new modes of inquiry—many of which became foundational structures for subjectivity, implicit in the construction of selfhood.

The novel methods Descartes and his contemporaries developed were critical to the inception of the humanist ethos through the early Modern period. The incorporation of agency, autonomy, and rationality into the process of self-construction is a watershed moment for subjectivity. Tony Davies describes this new condition: "cast adrift upon an indifferent nature by an oppressive society and an absentee Creator, enlightened Man, the only subject in a universe of objects, contemplates himself in the majestic solitude of his sovereign rationality" (124). But Davies goes to great lengths throughout his instructive critical summary, *Humanism,* to emphasize the contingency and historicity of the concept. Locating appeals to humanism in all manner of different movements and ideologies, he points out that "different and clearly incompatible

versions of the 'human' are circulating here, within the orbit of a single concept" (19). All of these various humanisms work to illuminate the essential properties of "Universal man," when in fact "humanity is neither an essence or an end, but a continuous and precarious process of becoming human" (132). For these reasons, my use of humanism will be limited to the specific set of concepts that are introduced to the discourse of subjectivity in the seventeenth century: "a coherent, rational self, the right of that self to autonomy and freedom, and a sense of agency linked with a belief in enlightened self-interest" (Hayles *HWBP* 85). The myth that these are universal human characteristics is only exacerbated by the manner in which they become tied into the discourses of cognition.

While avoiding the simplification of multi-faceted social changes into convenient historical packages, a movement such as humanism is still useful as a caricature of the novel ways people conceived themselves. When Descartes set out "to search for no knowledge other than what could be found within himself, or else in the great book of the world" (5), he took responsibility for his self-creation out of the hands of the monolithic cultural institutions that had dominated subjects until that time. His resolution, "to spend all the powers of my mind in choosing the paths I should follow" (6), helped develop a lasting concept of agency as a process of artifice under individual control. Donald E. Hall summarizes this legacy in *Subjectivity*:

> an important aspect of Descartes' notion of agency—namely, *if one thinks and works hard enough, one can make oneself into a better person*—still underlies much of our thinking today about identity and about our own responsibility for our selves. (21, original emphasis)

The artful construction of identity implies both ownership of the self—a more dubious proposition in the seventeenth century than today—and a definitive understanding of what constituted a "better person." For Descartes this meant being governed by rational logic and the voice of reason, qualities that persist in the computational mind and the subjectivity it constructs.

However, the difficulty in describing purportedly universal subject positions is that individual self-construction is neither a transparent nor consistent process. Subjects find varying degrees of comfort with the culturally transmitted notions of what the self should be. As an example, many feminist theorists have criticized the liberal humanist subject and blamed Descartes for the "masculinization" of thought. In introducing her collection of essays, *Feminist Interpretations of René Descartes*, Susan Bordo summarizes this as his "neglect of those aspects of experience culturally associated with the maternal and the feminine" and "strongly biased in favour of qualities identified with or associated with *ideas* about men" (Bordo 8–9). Properties of the Cartesian mind such as reason, logic, and mathematical order are woven into the humanist subject just as properties such as emotion, chance, and intuition are excluded. Bordo makes the subtle but important distinction that this notion does not make any "claim about 'how men think' by virtue of being men", nor "suggest that women think differently by virtue of being women," (9); rather, that the cultural construction of thought has become entangled with gender in ways the Descartes did not foresee nor necessarily endorse. The scholarship in this collection is very cognizant of the difference between Descartes' work and the ideas for which he is popularly remembered (and blamed). Indeed many of these essays paint Descartes in a forgiving

light: Karl Stern points to the anti-rationalist undertones raised by a reading of the conflicts of his life; Luce Irigiray reconsiders the place of wonder in Descartes' philosophy; Ruth Perry describes the new possibilities the Method opened for women. These readings are valuable reminders of the haphazard creation of cultural constructions. The liberal humanist subject did not spring fully formed from the head of René Descartes; it was fashioned through the constant self-creation of individual subjects and groups of subjects linked by various commonalities. Thus the relationship between theories of minds and subjectivity is always contingent on the ebb and flow of culture and the impact of these theories on individuals.

The Rise of Computing

While it is a challenge to trace the effects of cognitive models on subjects, it is by comparison relatively easy to see the influence of ancestral cognitive models on subsequent theoretical positions. The Cartesian legacy has provided much of the foundation for more recent cognitive work, especially the work precipitating and stemming from the rise of computer electronics in the twentieth century. Taking Descartes' tenets of mathematical logic and mechanization as founding principles, many thinkers contributed to the development of the computer.

> Eventually the ideas of Boole and Leibniz and other great innovators, such as English mathematician Charles Babbage, gave birth to the idea of the general-purpose programmable digital computer. The idea became a reality in the theoretical discoveries of Turing and Church, and in the technological advances of the post-war years. But ... the ideas behind the

> computer, however vague, were often tied up with the general project of understanding human thought by systematizing or codifying it. (Crane 114)

Though their goals may have been in line with the explication of human thought, the early electronic pioneers built machines well-suited for number crunching, becoming vital to the war effort in applications such as code breaking and calculating missile ballistics. In the post-war years, computers began migrating from the public sphere to the private sector where they quickly became indispensable tools for business, and eventually reached the home in the PC revolution of the 1970s. Today computers play a prominent role in our social infrastructure, serving as control system for areas like manufacturing, traffic control, and energy regulation. Computer chips are embedded everywhere from phones to coffee-makers to sunglasses and it is only a matter of time before they become widely used inside our bodies as well. The digital medium has opened new pathways for communication and new possibilities for artistic expression. As so often happens, the cultural manifestation of a specific technology arrives in a somewhat different form than its inventors anticipated—instead of explaining thought and helping us understand our minds, computers have altered the modes of thought and the landscape that minds inhabit.

The initial successes of digital electronics led to widespread enthusiasm about the computer as a powerful new model of the human mind. This association is not that surprising, given that the name 'computer' is taken from people whose job it was to calculate numbers. As Alan Turing stated "The idea behind digital computers may be explained by saying that these machines are intended to carry out any operations which

could be done by a human computer" (436). Turing's seminal 1936 paper "On Computable Numbers, with an Application to the Entscheidungsproblem" described just what a human mind was doing when it performs arithmetic calculations. He conceived that these operations consisted of the step-wise manipulation of symbols according to a finite set of rules and envisioned an abstract machine capable of carrying out them out just as a human could. The machine consisted (in theory) of a paper tape filled with a long row of squares and an apparatus that could read the symbols of a square, write new symbols, and move the paper backward and forward.* This simple machine that Turing called a Logical Calculating Machine (but which are commonly known as Turing machines) could solve any problem for which there exists an algorithm specifying the finite steps towards a solution. It is not hard to see traces of the Cartesian lineage in this formulation—the theory took mathematical thought, broke it into a sequence of logical steps, and detailed a mechanical construction of the entire process.

The revolutionary power of Turing's machines lay not in their physical realization as calculators of specific functions, but rather in their generalized ability to calculate *any* computable function. The circuitry of digital electronics, combined with the simple, powerful application of binary notation, allowed one machine to mimic any other by storing the algorithms to perform any possible calculation. This computational architecture made possible the creation of machines that could do more than arithmetic calculation. In *The Improbable Machine*, Jeremy Campbell surveys these new creations. He draws attention to the work of Alan Newell and Herbert Simon who

* Such machines have since been constructed and Java versions can be accessed over the World Wide Web.

encoded boolean logic into General Problem Solver, a 'thinking machine' that played chess and solved puzzles. While these new programs "were deliberate attempts to discover and describe universal laws of thought" (Campbell 26) that underlie human cognition—not replace or surpass them—from this point onwards artificial intelligence became an area of widespread and optimistic scientific interest. The notion of functional isomorphism between the mind and the computer was cemented into scientific consciousness. Campbell affirms this:

> It does not matter from this point of view, that the basic design of a computer is utterly different from the basic design of a brain. They both manipulate symbols, so that the machine can be programmed to be a general intelligence, like our own. Many researchers saw no limits to this generality. If they were dealing with universal principles like heuristic search and serial symbol systems, then there was no reason, so they supposed, why systems that could solve theorems in mathematical logic and play board games should not go on to match and even surpass the human mind in generality, as well as in powers of intuition, imagination, and insight. (28)

This same supposition—that computers will one day think as humans do—is demonstrated in popular consciousness and the many cultural productions that feature sentient machines. How is it that in a little over a half a century we have fashioned, at least in our cultural imagination, an autonomous subjectivity made from metal and plastic? A simple reason might be our penchant for anthropomorphizing everything in our environments, attributing rich inner lives like those we experience to other minds

and artifacts. But the conceptual transposition between computer and mind can also be linked to specific trends in cognitive discourse, notably the beginnings of cybernetics that we look at next.

Uniting Mind and Computer

Taking an interdisciplinary approach, N. Katherine Hayles' book *How We Became Posthuman (HWBP)* investigates how the association of mind and computer has infiltrated culture and popular consciousness. She reads scientific theories alongside speculative fiction to challenge the established model of human subjectivity. However, at first glance, her posthuman does not seem to be very different from its root. The Cartesian logic that helped shape the liberal humanist subject and engineer the computer revolution is also apparent in Hayles' constellation. Both the 'thinking I' and the posthuman privilege informational pattern over material instantiation, placing "an emphasis on cognition rather than embodiment" (Hayles *HWBP* 4). Furthermore, the posthuman emphasizes the view that the mind is an intelligent machine, construing this point as a critical distancing step from the humanist constellation. To my mind however, this trait is more the product of the existing construction of minds, equally true for the liberal humanist subject. Hayles does point to some novel cognitive theories that separate the posthuman from its predecessor and we will survey these in Chapter Three. At present, it will be instructive to examine how she relates the narrative convergence of human and computer in the origins of cybernetics theory following World War Two. Hayles retools these theoretical developments into threads of the ongoing narrative to define human subjectivity. She makes such a convincing case for

the posthuman that it will be beneficial to take a closer look at some of the nodes in her narrative to see clearly how minds have been re-constructed as intelligent machines.

The Macy Conferences on Cybernetics are the prime venue that Hayles reads to flesh out the story of the posthuman. Spanning a little under a decade, the series of meetings gathered an all-star lineup that gave shape to the emerging cybernetic paradigm. The participants at these round table discussions—"among the several dozen visionaries invited over the nine years of the conference were Gregory Bateson, Norbert Wiener, Margaret Mead, Lawrence Frank, John von Neumann, Warren McCulloch, and Arturo Rosenblueth" (Kelly)—were clearly concerned with shaping both an experimental research paradigm and in redefining cognitive epistemology. As Hayles acknowledges, these were not the only locus of early cybernetics work, but via their diverse attendees and open-floor discussion format, "were particularly important because they acted as a crossroads for the traffic in cybernetic models and artifacts" (*HWBP*, 50). In *Out of Control: The New Biology of Machines, Social Systems and the Economic World*, Kevin Kelly summarizes the conference's results:

> their chief achievement was to articulate a language of control and design that worked for biology, social sciences, and computers. Much of the brilliance of these conferences came by the then unconventional approach of rigorously considering living things as machines and machines as living things.

At the first few conferences, the productive intersection of information theory, neural functioning, and homeostatic robots were critical in articulating the cybernetic paradigm and producing a vision of humans as information processing entities,

interchangeable with intelligent machines. Hayles focuses on these three points that permit the transposition of mind and computer.

Information Theory

Claude Shannon, one of the original Macy conference participants, was the first to consider the flow of information—in other words, communication—as an explicitly mathematical entity. Shannon single-handedly gave rise to a new discipline through his formulation of information as an abstract concept, explicitly divorced from semantic content. The field of information theory is concerned with a series of calculations—the probabilistic choice of a specific message, the amount of information that can flow through a particular system, the rate at which a message can be communicated, and the most efficient means of transmitting that message through a channel. For Hayles this abstraction of mental products is the first necessary step in re-imagining the human as an intelligent machine. She points out that "a simplification necessitated by engineering considerations becomes an ideology in which a reified concept of information is treated as if it were fully commensurate with the complexities of thought" (54). Another instance where mental processes are converted to mathematical ones, this simplification of communication to information was a critical step in a research paradigm that displayed the mind as an intelligent machine for a broad audience.

Neurology

The mechanisms of thought become translated into information flows via the model of neural function conceptualized by Warren McCulloch. He deduced that neurons fire according to whether the sum total of excitatory and inhibitory inputs received by the

neuron reaches a certain threshold level. Neurons get connected into nets that organize different input and output sets, as well as a set of internal states that are configured based on the flow of excitation and inhibition into the net. Using McCulloch's tenet that these neural nets could represent logical propositions, his colleague Walter Pitts "worked out the mathematics proving several important theorems about neural nets", in particular showing "that a neural net can calculate any number (that is any proposition) that can be calculated by a Turing machine" (Hayles 60). Thus McCulloch and Pitt's model has the same fundamental theoretical features as those underlying the development of electronic digital computers, similarly fashioning the mind into a mathematical entity. Hayles confirms this when she identifies the McCulloch-Pitts neuron as "an essential step in seeing human being as an informational pattern" (61) and a necessary precursor that gave context to some of the cybernetic artifacts that followed.

Cybernetic robots

The electromechanical devices that demonstrated cybernetic principles at the Macy forums were important in a number of regards. Though by modern standards they were quite simple constructions, they provided a material instantiation of cyborg function, validating the doctrine, and so doing completed the transposition of human and machine. As Hayles puts it,

> by suggesting certain kinds of experiments, the analogs between intelligent machines and humans *construct the human in terms of the machine*. Even when the experiment fails, the basic terms of the

> comparison operate to constitute the signifying difference. (64, original emphasis)

Two ingenious electronic machines were unveiled at Macy: Claude Shannon's maze-solving machine (dubbed the rat) and W. Ross Ashby's homeostat. The rat consisted of a sensing finger that travelled around a grid in search of a target. It utilized and remembered successful search patterns, searching more effectively over time. The homeostat was constructed of transducers and variable resistors wired to respond to input changes by returning to its original condition. The system searched for how to reconfigure its variables to recreate its conditions before the input. Both devices were touted as small-scale models of human function, presupposing that "humans and cybernetic machines are goal-seeking mechanisms that learn, through corrective feedback, to reach a stable state" (Hayles 65). These inventions were electromechanical embodiments of the cybernetic paradigm and completed the move to view human minds as information processing machines.

Each of these nodes are critical components of the theoretical trajectory uniting human with intelligent machine. In particular, "the construction of information as a theoretical entity", "the construction of (human) neural structures so that they were seen as flows of information", and "the construction of artifacts that translated information flows into observable operations" (50) work in concert to shape Hayles' posthuman. To this point however, this novel subjectivity is not vastly different from the Cartesian humanist subject—both predicating thought as a mathematical, mechanical event. Certainly, the developments in cybernetics augment the computational model for cognition by actually realizing intelligent machines that embody these theories. The

developments also undoubtedly share the responsibility for increasing general awareness of the theory of computational cognition.

We turn now to a different venue for confirmation of this viewpoint: popular culture. In portraying what has become the dominant view of minds in our century, the Matrix trilogy reiterates the association of mind and computer. More importantly, these films take a closer look at the unwritten dynamics that this theory of cognition lends to subjectivity.

Chapter Two. The Cultural (Re)Vision of the Computational Mind

I have no lid upon my head
But if I did
You could look inside and see
What's on my mind. Dave Matthews Band

Where else but in a pop song could we find such a simplistic statement of the problem confronting cognitive scientists? They truly cannot open up the skull to examine the inner workings of thought; nor could they even 'see' the mind in the slurry of grey matter filling the brain pan. This difficulty extends to any determination of the exact role that cognitive models play in individuals' self-construction. Ironically, popular culture also provides the direction of a solution—by inspecting some of the many cultural artifacts about the mind, we can see how cognition is reproduced through the lens of culture. In this chapter, I look at how minds are depicted in films to characterize the dominant view of cognition, namely the view that minds and computers are analogous. These cultural test cases also point to links between this viewpoint and subjectivity.

While Hollywood provides ample possible examples to choose from, the venue best suited for this examination is the Matrix trilogy. Certainly one of the most direct treatments of the computational mind to date, the series focused on the theoretical underpinnings of cognition in a manner unusual for a major motion picture. The epic not only tackled this complicated material, it became a blockbuster in the process, grossing over one and half billion dollars worldwide (Worldwide Box office). Without a doubt, this movie has played a critical role in spreading the common cultural

conception of minds. How did the Wachowsky brothers arrive at this construction of minds? In general, they are simply passing on the received view from culture—they have tapped into popular consciousness like Neo jacking into the matrix. But in particular, specific sources provided inspiration, many that I have already discussed as the theoretical underpinnings of computational cognition discussed in Chapter One. Beyond re-constructing the computational mind, I draw attention to these particular discourses due to their importance for subjectivity.

In addition to the theoretical treatment of cognition, the Matrix trilogy is part futuristic shoot 'em up, part kung fu fight flic, part doomed love story, and part messianic meditation on belief, free-will, and destiny. The films relate a near-future Earth where the bulk of humanity has been enslaved by machines and wired into a communal virtual reality generator that occupies their minds while their bodies are being used as the machines' power supply. The first installment, *The Matrix* (1999), introduces a group of humans who have been freed from the Matrix and hack into it to further their struggle against the machines, and in the sequels, *The Matrix Reloaded* and *The Matrix Revolutions* (both 2003), follow the war to its conclusion. I first sketch the conception of mind portrayed by the Wachowsky brothers, relating how their films reflect specific elements of this view of cognition, before looking at the Matrix and the minds within it as delimiters of subjectivity.

Matrix Minds

The manner in which the Matrix trilogy conceives of minds is a perfect example of the computational theory of cognition. When Morpheus relates that ninety-nine percent of

the human minds left on Earth are hooked in to a "computer generated dreamworld" (*Matrix*) one cannot help but marvel at the science-fictional technology that makes this possible. But equally important as the Matrix's proposed function, and no less fascinating, is the cultural construction of minds that allows this possibility. The Wachowsky brothers depict a view of the human mind as fully interchangeable with the digital electronic computer. For minds to be written into the Matrix mainframe, they must be mathematical entities, generated by complex algorithms and calculations. They must be reducible to (and reproducible from) a specific series of electrical voltage differences that represent the ones and zeros of binary notation. The transposition of mind and computer program occurs throughout the films. For example, when Morpheus is captured and agents are trying to get him to reveal the Zion mainframe access codes the mind and computer are analogous:

> Neo: What are they doing to him?
>
> Tank: Breaking into his mind. Its like hacking into a computer. (*Matrix*)

Similarly, the trilogy poses no essential difference between the conscious programs within the Matrix (e.g. The Oracle, the agents, the Architect) and human minds that are jacked into the Matrix (e.g. Morpheus and his crew). Mind and program are viewed as different realizations of the same phenomenon, each as conscious entities capable of acting, reasoning, emoting, and dying.

A closer examination of Neo and Agent Smith underlines how the computational conception of cognition affects subjectivity. In the film, the mathematical underpinnings so critical for transposing minds and computers infiltrate

subjects in more direct ways. The conflict between the two antagonists is described as the terms of an equation, embodying the mathematical basis of the matrix. The Oracle describes Smith to Neo as "your opposite, your negative, the result of the equation trying to balance itself out" (*Reloaded*). After the climax of the first film, Neo and Smith become linked in a manner once again suggesting consciousness as computer code. Smith states, "some part of you imprinted on to me, something *overwritten or copied*" (*Reloaded*, emphasis added). The pair's concurrent growth in strength accelerates toward the final battle; Smith's conquest of all the programs within the matrix is paralleled by Neo's new sight and power outside of it. In the end, however, it is the stability of a balanced equation converging at unity (the One) that averts the crash of the matrix. The resolution of the films' conflict through the solution of an equation demonstrates the importance of mathematics to the Matrix's conception of minds and how subjects are shaped by this mathematical influence.

Smith and Neo also embody an important link between reason and emotion. As Smith becomes more powerful and omnipresent in the Matrix, his behaviour becomes more and more un-reason-able. He laughs maniacally after he infects the Oracle; he responds viscerally to his incorporation into Bane's body, saying "it is difficult to think, encased in this rotting piece of meat. The stink of it filling every breath, a suffocating cloud you can't escape. Disgusting!" (Revolutions). On the other hand, Neo bases his choices on the irrational landscape of love. Even though he seems more rational when compared to Smith, this favourable evaluation is due to the positive connotations associated with his emotional responses and actions. It is easy to see sanity in the protection and salvation of a loved one and madness in the conquest and eradication of

all of humanity. The moral value of his actions notwithstanding, Neo's choice to attempt to save Trinity is put in context by the Architect:

> Already, I can see the chain reaction—the chemical precursors that signal the onset of an emotion, designed specifically to overwhelm logic and reason—an emotion that is blinding you from the simple and obvious truth. (*Reloaded*)

Both Smith and Neo are the anomalous expression of emotion within the structure and order of the Architect's perfect mathematical solution. Their similarity is noted by the Merovingian who states "it is remarkable how similar the pattern of love is to the pattern of insanity" (*Revolutions*). The peaceful resolution of the conflict within and without of the Matrix not only requires the reconciliation of Neo and Smith, it requires that both reason and emotion be a part of the mathematical code for minds to accept it. This is the assumed result when the Matrix re-awakens: the code of the One has been re-inserted into every sentient program and thus the new dawn for humanity and machine alike.

Agency

In a different regard, the trilogy functions as a meta-narrative describing the importance of agency for subjectivity. Much of the narrative is driven by characters making choices and struggling to understand those choices. Neo chooses the red pill and accepts becoming the One; Morpheus chooses to sacrifice himself so that Neo can escape Cypher's trap; the Oracle chooses to help free Sati even though she knows it will give the Merovingian power over her. More importantly however, the matrix itself would

not be possible without offering the wired-in minds the agency to choose to accept the program. As the Architect explains,

> The first Matrix I designed was quite naturally perfect, it was a work of art—flawless, sublime. A triumph equaled only by its monumental failure. ... [An] intuitive program, initially created to examine aspects of the human psyche ... stumbled upon a solution where 99 percent of all test subjects accepted the program, as long as they were given a choice, even if they were only aware of it at a near-unconscious level. (*Reloaded*)

The subjective agency of each mind in the matrix is written into the code and necessary for the system to function. The problem with incorporating choice is that there is, as the Architect puts it, "an escalating probability of disaster" that those who do not accept the program will threaten the stability of the entire matrix. These minds are those that inhabit the last human city and home of the resistance, Zion. The programmer's solution was to code an avatar of the systemic anomaly (the One) who would restore balance to the system by returning to the source, rebooting the system. Of course this once again hinges on agency, requiring yet another decision to be made. When Neo chooses his love for Trinity over the Architect's reinsertion plan, he forges a new path for the entire matrix and for the citizens of Zion. On a literal level, this choice sets the stage for the final confrontation with Agent Smith, confirming the importance of balancing the mathematical equation governing the matrix. But at a more abstract level, the range of choices offered to Neo emphasizes how intimately agency is tied to subjectivity.

Agency can be explored more fully by examining the notion of the matrix as a system of control. When Morpheus "awakens" Neo, he emphasizes the function of the neural-interactive simulation, stating "What is the matrix? Control. The matrix is a computer generated dreamworld built to keep us under control" (*Matrix*). This is true of the Matrix in a very literal way, but I feel that the critical success of the original film points to its truth in a metaphoric way as well. Little hints suggest that the Matrix represents some of the forms of social control that postmodern theorists have brought to light over the last half century. The most obvious example of this is the references to Jean Baudrillard—Neo keeps his hacker treasures inside a dummy copy of *Simulacra and Simulation.* Although it would be fatuous to assume a vehicle of the Hollywood entertainment machine could capture the nuance of a French postmodern intellectual, the nod towards theory does not need to be very pointed to add depth to the film. Baudrillard holds that our culture has increasingly divorced representation from reality, so much so that we can no longer distinguish the two; increasingly the representation determines the real rather than the other way around. He describes a scenario evocative of the Matrix:

> It is rather a question of substituting signs of the real for the real itself; that is, an operation to deter every real process by its operational double, *a metastable, programmatic, perfect descriptive machine* which provides all the signs of the real and short-circuits all its vicissitudes. (Baudrillard, emphasis added)

When Morpheus introduces Neo to the truth about the fate of humanity and welcomes him to "the desert of the real," (*Matrix*) he quotes from *Simulacra and Simulation.*

Subjects are invited to ponder whether the world they inhabit is like the Matrix—not a computer simulation but nonetheless one where our multitude of cultural representations cease to have meaningful referents and prevent any genuine interaction with reality.

Idealism

Baudrillard's theories form a useful segue to the concept of idealism as suggested by the Matrix films. Many philosophers draw special attention to the fact that human experience of reality occurs only in the mind. This position is succinctly summarized by Hilary Putnam:

> What we can know—and this is the idea that Kant himself regarded as a kind of Copernican Revolution in philosophy—is never the thing in itself, but always the thing as represented. And the representation is never a mere copy; it is always a joint product of our interaction with the external world and the active powers of the mind. (*Realism* 261)

Morpheus echoes this conception of reality while 'freeing' Neo: "What is real? How do you define real? If you're talking about what you can feel, what you can smell, what you can taste and see, then real is simply electrical signals interpreted by the brain" (*Matrix*). Without the intervention of external sources, a mind within the matrix cannot distinguish between the virtual simulation designed to occupy it and the real world within which it exists. Idealist philosophers claim the same is true for every human mind, putting forward numerous suggestions for the external confirmation of the 'real' world. For example, George Berkeley contends that everything we perceive is an idea

in the mind of God. If this were true of the matrix, God would be a computer. Ultimately though, the idealism suggested by the Wachowskys is balanced by a realist sensibility. With Morpheus' assistance, Neo is able to awaken and access "the real world". The implication is that although we can only know reality in our minds, it does exist and that given the right conditions, we can experience it authentically.

Nevertheless, the idealist philosophy demonstrated by the Matrix harbours some deep implications for subjectivity. Putnam describes a common thought experiment eerily similar to the matrix. Even though he is more concerned with the connection between mental concepts and their referents—how a mind's interpretation hooks onto the world—than in raising "the classical problem of skepticism with respect to the external world in a modern way" (Putnum, "Brains"), the experiment informs the Matrix films. Putnum suggests "we could imagine that all human beings (perhaps all sentient beings) are brains in a vat" and that each brain

> has been removed from the body and placed in a vat of nutrients which keeps the brain alive. The nerve endings have been connected to a super-scientific computer which causes the person whose brain it is to have the illusion that everything is perfectly normal. ("Brains")

The prime use of this well-traveled notion from the philosophy of mind has been to unsettle our ontological certitude that the world around us exists just as it appears. It is disconcerting for subjects to grapple with the solipsistic possibility that all reality is only in their mind—more unsettling since these arguments persist tenaciously. In a way, however, such constructions affirm the independence of subjects. If either external reality does not exist or external reality exists but is only known through

representations in the mind, the primacy and privacy of subjective experience is reinforced. An unavoidable consequence of this construction is that subjects perceive their separation from the world and from other minds. Huck Gutman echoes this result when he states "Although the first reward of constituting oneself as a subject is a feeling of centrality and well-being, an inevitable consequence of that constitution, which depends on division, is isolation" (108). Idealism shifts the dividing point between the subject and object toward the former, granting both a sense of self-identity and separation to the individual. In this light, the Matrix's conception of cognition provides a basic affirmation of the autonomy of subjects.

Dualism

A second long-toothed notion of philosophy is promoted by the Matrix's construction of minds. In many ways related to idealism, mind-body dualism has even more profound effects on our subjective experience. The mind's hypothesized separation from the body is the overarching truth of the Matrix—fields of coppertops inhabiting fluid-filled, glass balconies in power-plant high rises while their minds are absorbed in the bustling simulation of a twentieth-century metropolis. This truth is likewise demonstrated by the Nebechudnezzar's crew; while their minds are roaming the matrix practicing ju-jitsu, their bodies remain inert. Arrayed in barber chairs, they are vessels waiting for reanimation with the return of their consciousness down the telephone line. The deaths of Apoc and Switch occur when they are unplugged from the matrix before they can get out, showing that the mind and body are indispensable to one another. However, at the same time, the divided existence of the mind and body shows just as

convincingly that their experience is not necessarily the same. Furthermore, the sentient programs within the mainframe have no materiality whatsoever, positing a situation where corporeality truly does become irrelevant. These examples evoke the computational mind and further the discursive movement that privileges cognition over embodiment.

Dualism also plays a formative role in the subjectivity suggested by the Matrix. The discursive separation of mind and body draws similar lines for self-identity, relinquishing a certain portion of a subject's agency to biology. Agent Smith describes the body as a "rotting piece of meat", echoing Case from Gibson's *Neuromancer* and emphasizing a disturbing implication for subjects: our bodies are never fully under our control. Daniel Dennett provides a useful and familiar example.

> [The body] can "decide" that in spite of *your* well-laid plans, right now would be a good time for sex, and not intellectual discussion, and then take embarrassing steps in preparation for a coup d'état. On another occasion, to your even greater chagrin and frustration, it can turn a deaf ear on your own efforts to enlist it for a sexual campaign, forcing you to raise the volume, twirl the dials, try all manner of preposterous cajolings to *persuade* it. (Dennett 80, original emphasis)

Not only is the flesh weak, it is frail, fallible, and ephemeral. It is also the material reality that every subject experiences, every day of his or her life. The body's vagaries are a constant challenge that subjects overcome, defining themselves by the manner in which they do so. All manner of awkward and grotesque behaviours are blamed on the body, thus somewhat shielding the 'I' from their embarrassing taint. While this

sloughing of responsibility to a separate agent is only a self-protecting fiction, it nevertheless lays some of the basic boundaries for the subject, localizing identity in the mind.

Consciousness as Code

Subjectivity is constrained in a similar manner by the relationship between minds and the underlying codes that shape them: fractal, binary, and chemical. Each film of the trilogy opens with a magnifying descent into the electric green rain on the Nebechudnezzar's monitors, suggesting from the outset that the surface is not as important as the information concealed in the microscopic depths. The cameras float past images of Mandelbrot fractal sets, visual embodiments of chaos theory—the branch of computer assisted mathematics that searches for ordered patterns in complex chaotic systems. Digital encodings are also prominently linked to minds. It is the pattern of binary information encoded into the Nebechudnezzar's pirate signal or onto the Matrix mainframe that determines a mind or program's subjective experiences. Avatars disappear through their exit phone lines via the familiar and haunting song of the FAX machine. Biological code is translated into binary code.

A similar conflation is effected between chemical codes and the binary code of computer programs. The drug that Neo chooses to take to become free of the matrix is a trace program delivered in the chemical structure of the red pill. Similarly, the Merovingian's special dessert reduces the biochemical changes associated with sexual arousal to the lines of code in a program. Even emotions such as love are reduced to code. Love appears as changes in the code visible to those especially tuned to

recognizing its sequence. Persephone comments on it in Neo and Trinity, "You love her. She loves you. It's all over you both" (*Reloaded*). This reduces the agency of Trinity and Neo choosing each other, submersing the macroscopic reality into changes to the lines of code. In this conception of emotion as coding, love is equally possible for computer programs within the Matrix as Neo discovers when he meets Rama-kandra and Kamala.

> Neo: It is just that I have never ... heard a program talk of love before. It's a ... human emotion.
>
> Rama-Kandra: No, it is a word. What matters is the connection the word implies. (*Revolutions*)

In both these cases, the Matrix's conception of mind reduces love to a material object—something that can be seen (Persephone) and a physical linkage between two things (Rama-Kandra). All these examples of codes underscore another of the important traits of the current conception of mind, namely that cognition be ultimately reduced to the concrete: minds to lines of binary code sent down telephone lines, emotions to the complex structures of chemical molecules. Subjects predicated on this construction have to negotiate the paradox between opposing discourses, pulled towards the concrete scientific materiality of atoms and molecules on one hand and towards an abstract world of representations connoting desires, agency, and consciousness on the other.

The view that minds and their products are defined by strings of binary or chemical codes further restricts subjectivity. The depth to which our cultural knowledge is now able to penetrate the universe ensures that many aspects of our survival and

behaviour are beyond subjective control.* Writing thought into the explanatory scriptures of scientific materialism is a double-edged sword. Subjects experience greater understanding of themselves, granting the form of power that comes through knowledge of a thing. Concurrently, materialist explanations of minds shift agency away from the individual to their coded sequences: genetic, chemical, or binary. The subjective "I" can no more control its hard-wired genetic predilections than the Merovingian can control his libido. In his meditation on causality, the Merovingian confirms the supremacy of the coded instructions in his aphrodisiac dessert, stating

> soon it does not matter, soon the why and the reason are gone, and all that matters is the feeling itself. This is the nature of the universe. We struggle against it, we fight to deny it, but it is of course pretense, it is a lie. Beneath our poised appearance, the truth is we are completely out of control. (*Reloaded*)

The manner in which we account for ourselves and explain some of these uncontrollable behaviours to society and to ourselves is a defining aspect of subjectivity. Subjects are faced with the paradox of having a scientific understanding of their underlying codings without the ability to exert any control over them.

Thus to a large degree, the films reconstitute the liberal humanist subject discussed in Chapter One. The implicit features of the film's neural interactive simulation shape a subjectivity that holds consciousness as the seat of identity. It makes no difference whether consciousness is in a flesh-and-bone body or in the bits of a

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* No matter how hard we may try: the current explosion of stem cell research—and the resultant hysteria—are signs of our continued willingness to try and of the deep implications for subjectivity.

digital transmission. The programming of the matrix described by the Architect also draws attention to the foundational role of agency in the subjectivity the films construct. Written into the system as a precondition of its function, subjective choice is indispensable to avatars within the matrix. Similarly, for the liberal humanist subject, free will is valourized as a defining feature of individuality. The programmed nature of the matrix points to the underlying mathematical basis that the computational view of minds imparts to subjectivity—a foundation again similar to the one supplied by Descartes to the liberal humanist. The philosophical notions of dualism and idealism also support this construction of identity. The former reinforces the supremacy of mind over materiality and the latter emphasizes the private nature of thought as a first step toward the ownership of self so critical to the liberal humanist subject.

However, the construction of minds in the Matrix infringes on the humanist subjectivity in a number of ways as well. By focusing on the codings that underwrite consciousness, the films raise the spectre of determinism to haunt subjective agency. The depiction of consciousness hinges on the many microscopic codes—genetic, chemical, binary—that express macroscopic phenomena. But if behaviour is determined by these underlying sequences, then how can subjects exercise free-will? The Matrix acknowledges the problem, but hedges on an answer. When confronted by Neo about whether she is "a part of this system, another kind of control," the Oracle responds,

> It is a pickle, no doubt about it. The bad news is there's no way you can really know if I'm here to help you or not. So it's really up to you. You

> just have to make up your own damn mind to either accept what I'm going to tell you or reject it. (*Reloaded*)

For subjectivity, the "pickle," simply stated, is whether our behavioural choices are in fact freely taken or whether they are determined by our deeper patterns and merely appear to us as choices. The Matrix trilogy answers this dilemma with a gesture towards faith, exalting the role of belief in guiding behaviour. Morpheus, the nominal prophet of Zion, continually justifies his behaviour as a matter of his beliefs. He chooses to awaken Neo because he believes Neo is the One; he refuses Commander Lock's orders to return the Nebuchednezzar to Zion because he believes consulting the Oracle is of greater importance. Morpheus encourages this ethos in his crew, asking "Do you believe it now, Trinity?" after witnessing Neo in action. When Neo chooses to confront the agents, Trinity asks "What is he doing?"; "He is beginning to believe [that he is the One]" responds Morpheus. Even the behaviour of the Oracle, a conscious program within the matrix, follows this trend when bidding Neo farewell: "for what it's worth, you've made a believer out of me. Good luck kiddo" (*Reloaded*). All these examples suggest that in the Wachowskys' view, free will is a critical foundation for subjectivity, but also that faith is the only means of truly confirming that will is free.

Variations on Subjectivity

For some theorists, however, belief is not enough, nor is the liberal humanist subject an adequate model of self-identification. For example, Louis Althusser conceives of subjectivity not in terms of autonomy and agency but as a process of subjecting the individual to the will of the State. While we have seen how the conception of minds

portrayed by the Matrix trilogy informs our discussion of subjectivity, the film can also be read as an allegory of Althusser's theories. His most well-known work, "Ideology and Ideological State Apparatuses (Notes towards an Investigation)," discusses how capitalist states maintain themselves by reproducing the conditions of production. Althusser identifies two vehicles that accomplish this perpetuation of the state: the Repressive State Apparatus (RSA) and the Ideological State Apparatus (ISA). First, the RSA functions by force and violence to secure the social conditions that permit ongoing production. In the Matrix, this notion is represented by the Agents and the other law enforcement agencies that populate the neural interactive simulation. A second role of the RSA is to "secure by repression (from the most brutal physical force, via mere administrative commands and interdictions, to open and tacit censorship) the political conditions for the action of the Ideological State Apparatuses" (Althusser 150). The RSA uses force to maintain conditions that permit the ISA to function. This explains why the various arms of government are so concerned with apprehending Morpheus and his crew, a group who make it their job to awaken individuals to the truth of their living conditions—revealing the matrix's deception, and its true nature as an ISA.

The ISAs, a parallel set of social sites that use ideology instead of force to control subjects, are more important for Althusser. The ISAs operate through the institutions and practices of society to impose a particular conception of subjectivity onto citizens of the state. Althusser stresses that "what is represented in ideology is therefore not the system of the real relations which govern the existence of individuals, but the imaginary relation of those individuals to the real relations in which they live"

(165). This conception of ideology is readily visible in the neural interactive dreamworld central to the Matrix—"the world that has been pulled over your eyes to blind you from the truth" (*The Matrix*). The matrix is in effect a hybrid of both of Althusser's modes of state perpetuation: it is a repressive, physical system of control that functions via the creation of an imaginary (ideological) world to soothe its captive minds.

In my estimation, the matrix may even be a better metaphor than interpellation (hailing) for the manner in which ideology constructs subjectivity for individuals. Althusser's model proposes

> that ideology 'acts' or 'functions' in such a way that it 'recruits' subjects among the individuals (it recruits them all), or 'transforms' the individuals into subjects (it transforms them all) by that precise operation which ... can be imagined along the lines of the most commonplace everyday police (or other) hailing: 'Hey, you there!' (174)

This theoretical operation seems too abrupt to be an effective explanation of the persistent and omnipresent relationship between subjects and ideology. While Althusser is quick to acknowledge the atemporality of ideology – "in reality these things happen without any [temporal] succession" (175)—the matrix would have served him admirably as a theoretical model for how subjects are constructed in, and by, the authorized ideology.

A closer look will accentuate the similarities between the Matrix and an Althusserian Ideological State Apparatus. To begin with, it is undoubtedly significant that the simulation is a late-twentieth-century-capitalist city. Further, the social

institutions of capitalism are specifically emphasized as defining features of Neo's life before being awakened. First by Agent Smith: "...you're Thomas A. Anderson, program writer for a respectable software company, you have a social security number, you pay your taxes, and you help your landlady carry out her garbage" (*The Matrix*) and again by Morpheus: "the Matrix is everywhere. ... You can see it when you look out your window or when you turn on your television. You can feel it when you go to work, when you go to church, when you pay your taxes" (*The Matrix*). With these specific descriptions, the Wachowskys deliberately undermine the credibility and motives of these standard practices of the modern capitalist state. The film closes with a monologue from Neo inviting viewers to "a world without rules or controls, without borders or boundaries" (Matrix) before fading out to the tune of Rage Against the Machine's "Wake Up".

> *Departments of police, the judges, the feds*
>
> *Networks at work, keepin' people calm*
>
> You know they went after King
>
> When he spoke out on Vietnam
>
> He turned the power to the have-nots
>
> And then came the shot. (Rage, emphasis added)

The emphasized lyrics are clear links between the matrix and the two apparatuses that Althusser implicates in the subjection of individuals. Viewers are clearly being invited to consider that our social and cultural institutions are not innocent; to realize the possibility that the subjective reality they experience may be produced rather than perceived; and to recognize the complicity of the state in these disjunctions. Neo's

triumph, not over the agents, but in seeing the power structures for what they are, lends an optimism to the movie that postmodern theorists are often accused of lacking.

These relationships to theory are what sets *The Matrix* apart from *The Matrix Reloaded* and *The Matrix Revolutions*. The sequels, though popular (grossing over a billion dollars combined), never received the critical acclaim of the original due to their focus on making sense of the matrix for viewers. Whereas their open-ended predecessor focused on Neo actualizing a choice to see the truth of the matrix and hinting that viewers might do the same, the subsequent films, to a great extent ignore the dynamic of social control in favour of narrative closure.† The original became a cult classic because of the fascinating questions it asked; the sequels were something of a letdown because in answering the questions, the metaphoric relationship to postmodern theory is severed.

For purposes of this thesis, however, the theoretical infusion of thinkers like Althusser is critical for further development. Using the Matrix's view of minds, I have pointed to the central role that cognitive models play in shaping subjectivity and to how the cognitive discourses of the films evoke the liberal humanist subject. At the same time, the Matrix's central feature, the neural-interactive simulation, is a suggestive metaphor for Althusser's radical model of subjectivity as ideological subjection. This dimension of the Matrix is a suggestive meta-commentary on the relationship between cognition and subjectivity. By applying Althusser's theory to the overall rhetorical framework of this argument, the common construction of minds emerges as an

† This is unavoidable if a movie is going to ever be produced in present-day Hollywood—a theme maybe ironically echoed by the Oracle's final aphorism "Everything that has a beginning must have an end" (*Revolutions*).

ideological construct functioning to structure subjectivity in a particular way. While it is certain that cognitive scientists do not have sinister motives behind any of their theorizing, subjects are nevertheless heavily influenced by this discourse. It is important to recognize the constructed nature of minds and the similarly constructed form of subjectivity that these models impart. To this end, I turn now to some of the theoretical models that differ from the computational view of mind. Taking up the historic development of cognitive science where we left off at the end of Chapter One, some of the problematic nodes in theoretical discourse will be highlighted as the impetus for different research paradigms. Although not mainstream yet, some novel theories are beginning to gain credibility and I will speculate on how they might offer different predications of subjectivity in Chapter Four.

Chapter Three: Beyond the Computational Mind

This chapter moves from the omnipresent landscape of Hollywood pop culture back to the more rarefied terrain of cognitive science. The Matrix trilogy has provided a useful example of the common cultural conception of minds, suggesting how subjectivity is informed by this view. Some of the new directions in cognitive science bring to light different possibilities for self identification. However, "new directions" implies an origin from which the discussion will depart—a foundation not present in the diverse dialogues of cognitive science and philosophy. The common view of minds displayed in the Matrix is only a snapshot of the field—the most accessible and influential model of the mind which has coalesced into this particular construction in popular consciousness. It is important to keep in mind that divergent theories have existed alongside the computational view through the course of its development. Atemporal, cognitive theories mutate over time—the ongoing products of a constant negotiation between experimental advances, competing theories, and public opinion. It is true that theories that catch the cultural imagination gain a certain discursive solidity and become hard to replace, but it also bears remembering that they are ephemeral artifacts. With this in mind (of course), it will be instructive to examine several zones of discord originating within the established computational construction: reflexivity, intentionality, emergence, and the role of the environment. These themes disrupt the model that a central processor controls cognition through the manipulation of symbols, redistributing thought processes to the body and the environment.

Reflexivity and Self-Making Systems

Returning to the story of computational cognition from the end of Chapter One, N. Katherine Hayles' interrogation of the Macy conferences on cybernetics reveals several concepts that complicate the computational mind. In the early discussions, an enormous tension centered on the question of the observer in the emerging cybernetic discipline. Although never articulated, the underlying concept of reflexivity was involved with this tension and since it informs many of the different constructions of cognition in this survey, the term deserves closer examination. In a general sense, as its root suggests, reflexivity is the redirection of something back towards itself. Hayles' definition, "a movement whereby that which has been used to generate a system is made, through a changed perspective, to become part of the system it generates" (*HWBP* 8), focuses on the material aspect of the term. Citing examples from art, mathematics, critical theory, and literature that juxtapose the act of creation and the product created, she foreshadows the disruptive impact of reflexivity for cognition.

Repositioning the observer undermines the edifice of rationalist discourse championed since Descartes' era by discrediting the objectivity of science. The importance of this epistemological change in stance cannot be overstated: including the context of the observer in scientific work brings a fuller appreciation of the complex interplay between hypothesis, experiment, and deduction. At a more global level, reflexivity also connotes self-reflection, a process of recursive inward contemplation. Using this meaning, the whole of cognitive science can be viewed as reflexive: minds trying to represent, understand, and otherwise define minds. Descartes' thinking 'I,' the

shining proof of the mind's existence and preeminence for subjectivity, is deduced from the act of thinking. Kant responded to this circular argument by theorizing that subjectivity and objectivity are indistinguishable—a proposition embodied by the insertion of observer into subject. Nevertheless, the abstractions of thought necessary for computational cognition do not mesh easily with the reflexive turn.

With specific regard to Macy, the emerging cybernetic paradigm was destabilized through the incorporation of the observer into the cybernetic feedback loop. Hayles pays particular attention to the debate regarding the role of the observer. Reflexivity was a vexing concept—incorporating the receiver in the communication channel undermined the stability of information as a theoretical constant. As shown in the Chapter One, the clean abstraction of communication into information was a critical step in the reconfiguration of the human as an intelligent machine. The reflexive observer, although introducing an additional dimension of information into the communicative exchange, also increased the noise in the channel that interfered with the mathematical precision. Lawrence Kubie, one of the most outspoken supporters of reflexivity, argued that "the multiply encoded nature of language ... operated at once as an instrument that the speaker could use to communicate and as a reflexive mirror that revealed more than the speaker knew" (69). Other researchers saw the importance of incorporating this sense of context to the cybernetic paradigm, but had difficulty reconciling the infinite possibilities of the observer with the predictive power afforded by homeostasis and the construction of mind as intelligent machine. This disparity was not fully resolved until the theory of autopoiesis put forward by Humberto Maturana.

During the subsequent development of cybernetics, researchers struck out in some new directions, giving rise to novel theories of cognition based on biological rather than mechanical or computational premises. Maturana was at the forefront of this innovative departure, integrating the simple cybernetic constructions into experimental loops *in vivo*. The paper that set this new course, "What the Frog's Eye Tells the Frog's Brain," describes the neurological organization and activity of fibers in the optic nerve. Using a clever experimental protocol that measured neuronal output with implanted microelectrodes, the authors recorded the response in the visual cortex to various optic stimuli. While this setup foregrounds the Macy agenda, incorporating "the frog's brain [into] a cybernetic circuit, a bioapparatus reconfigured to produce scientific knowledge" (Hayles 134), the results dealt a telling blow to the objective scientific stance upon which cybernetics was constructed. Several different kinds of fibres were identified based on different types of visual stimuli, with the greatest response produced by small, fast-moving objects and an almost negligible response to larger, slower objects. Maturana and his co-authors conclude that "the eye speaks to the brain in a language already highly organized and interpreted, instead of transmitting some more or less accurate copy of the distribution of light on the receptors" (Lettvin et al. 212). In other words, the visual cortex does not recreate objective reality, but instead produces a representation of reality adapted to the specific behaviour of the organism—in this case the frog's dietary predilection for flies. This work confirmed in the strongest terms possible that reality is constructed by minds, not revealed to them.

In subsequent work, Maturana and Francesco Varela refined their theory, eventually coining the term autopoiesis ("self-making") to describe how each organism

determines the reality of its own existence. The pair held that a living system's organization entails the manufacture and maintenance of certain products whose function in turn creates the organization of the system. The theory describes thought and consciousness in terms of interactions between internal states of a system as if they were independent entities, viewing each "as an emergent phenomenon that arises from autopoietic processes when they recursively interact with themselves" (Hayles 145). In view of this formulation, we can see the importance of reflexivity to Maturana and Varela—not only do autopoietic entities produce their own world, the conscious mind is produced through relations among internal mental constructs. This work begins a movement to shift the control of the mind away from a centralized information processor.

Leaning heavily on reflexivity, this novel conception of an organism lays out a completely new arc in the survey of mental models. The computational paradigm is heavily invested in abstracting cognition away from real world problems of perception and behaviour. The seminal work with the frog's eye reverses this trend, bringing the messy details of the body and world back to the fore. Autopoiesis similarly insists on the preeminent role of an organism's built-in cognitive repertoire in shaping its impressions of the environment. At first glance, this seems a patently obvious reworking of the Kantian / idealist model—the only knowledge we have of the world is of the world represented in our mind. The subtle difference for autopoiesis is that this new internal representation of the world is constructed by the body in an intentional manner so as to maximize benefit to the organism. This construction reveals that awareness of the salient features of the environment inheres in the visual array of the

organism rather than being a matter of conscious discrimination. Through the reflexive turn, external reality is transformed into a contingent event experienced differently by every organism. Control over the selection of beneficial environmental resources shifts from the cogitating 'I' to the visual agent, making a first step towards a model of distributed cognition. This new paradigm has several far reaching implications that are illustrated by some of the ideas of philosopher Daniel Dennett.

Intentional Networks

Providing important contributions to the philosophy of mind, cognitive science, artificial intelligence, and animal studies, Dennett develops distributed cognition (along with a host of other mental models) in *Kinds of Minds: Towards an Understanding of Consciousness*. Although he is known as one of the leading proponents of the computational mind, his view of computation dispenses with the notion of a central processor in favour of a networked model. A key tool Dennett uses in his theorizing is the intentional stance—the method of viewing entities as agents with predictable behaviour based on assigning them beliefs and desires. This theoretical position is differentiated from the physical stance where behaviour is attributed to the laws of physics and from the design stance where behaviour is predicted according to expected function by an understood design. He cautions that "we must walk a tightrope between vacuous metaphor on the one hand and literal falsehood on the other" (27) when using the intentional stance. However, he puts the stance to good use in applying intentionality to the question of cognitive innovations.

Dennett begins to ease the Atlean burden shouldered by the thinking 'I' in noting several instances of adaptively successful, complex mental functions that are performed by minds automatically, without any conscious thought at all. He adopts an evolutionary perspective of cognition that identifies many simpler proto-minds that preceded humans, importantly describing how our minds were built on top of these already well established and highly distributed control systems. The revolutionary result is "the idea that the network *itself*—by virtue of its intricate structure, and hence powers of transformation, and hence capacity for controlling the body—could assume the role of the inner Boss and thus harbor consciousness" (73). This move away from the central processing model has the side-effect of responding to dualism, bringing a reconsideration of the body's importance to cognition. Dennett does not seek to relinquish the mind's necessary role in consciousness, merely to bring the body into an equal partnership, sharing the cognitive load of an organism. He avows this ethos in personal terms, stating

> One cannot tear me apart from my body leaving a nice clean edge, as philosophers have often supposed. My body contains as much of *me*, the values and talents and memories and dispositions that make me who I am, as my nervous system does. (77)

No longer is the body an empty vessel waiting to be animated (or vacated) by consciousness. A startling aspect of this new mode of cognition concerns what becomes of the Cartesian 'I' as its authority over subjectivity is reduced. Being replaced as the star of the (consciousness) show would be a devastating blow for a real person—a

return to the work of Francesco Varela will highlight similarly affective response of the cogitating 'I' when it discovers it doesn't exist.

Varela, along with co-authors Evan Thompson and Eleanor Rosch, attempt to reconcile ordinary subjective experience with the results of cognitive science in *The Embodied Mind.* Integrating themes from the phenomenology of Maurice Merleau-Ponty and the Buddhist tradition of meditation and pragmatic philosophy, the work develops the concept of enaction, overhauling autopoiesis, Varela's previous paradigm. The authors reject objective realist epistemology in a manner similar to autopoiesis, envisioning "organism and environment as bound together in reciprocal specification and selection" (Varela et al. 174). However, enaction diverges from its predecessor in a number of important ways. Hayles describes this discrepancy as the fact that enaction is not quite as static a concept as autopoiesis; she summarizes: "the active engagement of an organism with the environment as the cornerstone of the organism's development" (155). Enaction also differs from autopoeisis in its specific description of several higher order features of minds: perception, cognition, and consciousness. *The Embodied Mind* describes these first two features as self-making processes for organisms linked with their environments, distributed features of closed systems: "perception consists in perceptually guided action; and cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided" (Varela et al. 173). In other words, intentional movement around the environment determines what is perceived, and the persistent interactions with the environment work to shape neural structure and function (cognition). Turning to consciousness, enaction articulates the "self" as a fiction created by the mind, emerging "as an epiphenomenon whose role it is

to tell a coherent story about what is happening, even though this story may have little to do with what is happening processurally" (Hayles 157). This move effectively unseats the 'thinking I' as the central feature of human cognition, calling into doubt what Descartes' held as indubitable. *The Embodied Mind* goes on to suggest that a continual grasping for a coherent self occurs in every individual and is the origin of human suffering in the Buddhist cosmology. Varela and his co-authors construe this grasping for the self in affective terms: "The anxiety is best put as a dilemma: either we have a fixed and stable foundation for knowledge, a point where knowledge starts, is grounded, and rests, or we cannot escape some sort of darkness, chaos, and confusion" (140). While the enacted mind is another intriguing new model of the mind that helps breaks the stranglehold of Cartesian influence over cognition, it clearly points to some strong reasons for the persisting involvement of the thinking 'I' in subjectivity.

The Emergence of Emergence

Maturana, Varela, and Dennett were not the only ones looking at the human mind in new ways. Many researchers were dissatisfied with the Cartesian and computational modes of cognition that dominated the field through the middle of the twentieth century. A growing body of work from diverse schools of philosophy concludes that "if our Cartesian way of thinking about the mind and its self-enclosed content gives rise to skepticism about the outside world, there must be something wrong with this view of the mind having only indirect access to reality" (Dreyfus 53). More importantly, the giddy optimism of the cognitivist and artificial intelligence communities have waned in

the face of a persistent failure to succeed at even the simplest of tasks performed by human minds. Jeremy Campbell explains that,

> By amplifying what seemed to be the quintessence of human intelligence, the ability to manipulate symbols by means of rules, finding a way through the maze of possible pathways toward the answer to a problem, ["thinking" machines] actually showed that there is no such thing as the quintessence of human intelligence, and if it were, logic would not be the leading contender for the title. (26)

It has become clear that while computational processors are very good at mathematical calculation, data storage and retrieval, and sequence matching, emulating human behaviour is not one of their strong suits. By the close of the twentieth century, many researchers, realizing that "cognitive science's aspirations to illuminate real biological cognition may not be commensurate with a continuing abstraction away from the real-world anchors of perception and reaction" (Clark 1997 59), have shifted their focus away from contemplation of mental representations and how they are processed. Maturana and Varela were among the first to begin envisioning the mind in the context of its interactions with the world and to give shape to the model of embodied cognition.

Following in their footsteps, Andy Clark fills in many of the details of this new paradigm in *Being There: Putting Brain, Body, and World Together Again.* He sketches the development of cognitive science as a tripartite progression* wherein the classic picture of the mind as a central, logical processor is at first replaced by connectionist or neural net models emphasizing pattern manipulation and decentralized computation.

* Varela, Rosch, and Thompson detail a similar structure in *The Embodied Mind.*

While this replacement provides a more convincing description of the inner cognitive engine, the real revolution comes with the step to the third level. There, two key tenets distinguish embodied cognition from connectionism: "the environment as an active resource whose intrinsic dynamics can play important problem-solving roles" and "the body as part of the computational loop" (Clark 1997 84). The result is that the environment is modeled as one actor of a heterogeneous collective from which solutions emerge depending on the structure of the intimate relationship between mind and world. Most telling are the possibilities for enhanced problem solving via actively structuring the environment, be it by arranging puzzle tiles by colour or by writing a set of instructions. I have reproduced Clark's summary of the embodied cognition from pages 83 and 84 of *Being There* in Table 1.

Table 1: Summary of Embodied Cognition

Classical Cognitivism	Connectionism	Embodied Mind
Memory as retrieval from a stored symbolic database.	Memory as pattern re-creation.	Memory as pattern re-creation.
Problem solving as logical inference.	Problem solving as pattern completion and transformation.	Problem solving as pattern completion and transformation.
Cognition is centralized.	Cognition as increasingly decentralized.	Cognition as increasingly decentralized.
The environment is (just) a problem solving domain.	The environment is (just) a problem solving domain.	The environment as an active resource whose intrinsic dynamics can play important problem solving roles.
The body as input device.	The body as input device.	The body as a part of the computational loop.

For Clark, the implication of all these new ideals is "to invite an *emergentist* perspective on many key phenomena—to see adaptive success as inhering as much in the complex *interactions* among body, world, and brain as in the inner processes bounded by skin and skull" (Clark 1997 84, original emphasis). A clarification of the often utilized but poorly understood notion of emergence is necessary. The term basically describes complex effects in terms of the interactions of simpler causes. Clark assesses the difficulty in defining emergence stating

> we need to find an account of emergence that is neither so liberal as to allow just about everything to count as an instance of emergence (a fate that surely robs the notion of explanatory and descriptive interest), nor so strict as to effectively rule out any phenomenon that can be given a scientific explanation (we do not want to insist that only currently unexplained phenomenon should count as emergent, for that again robs the notion of immediate scientific interest). (2001 113)

Incorporating the themes of collective self-organization and unprogrammed functionality, Clark settles on a working definition that depicts "emergence as the process by which complex, cyclic interactions give rise to stable and salient patterns of systemic behaviour" (2001 114). Problem solutions at the level of the organization arise via the relationship between distributed parts. Clark cites the example of a group of independent computer systems that fill job-orders. As many orders arrive, the systems interact with each other, 'bidding' for each job entering the queue based on available resources, type of job, etc., with the winner completing the job. This model is contrasted with a centralized solution where one agent of system is given data,

monitoring capability, heuristics and then assigns each job to a worker system according to a schedule computed to maximize efficiency (1997 43). In real world applications, the soft-assembled solution (without programmed scheduling) has proven to be more effective at optimizing the work rate of the group. The emergent feature of this example is the schedule—it arises from the interaction between systems, rather than from the calculated output of a single CPU.

A second useful example of this new model for cognition comes from an unlikely source—termite nest building. More biological in character, this emergent process illustrates the manner in which groups of simple agents can collectively create complex outcomes. The nest's arches, one important facet of the overall construction process, are built through the deposition of mud balls. Each deposition leaves a trace amount of chemical that attracts other termites who are predisposed to drop their balls there as well. As more balls are dropped, the increased concentration of the chemical induces ever more termites to deposit their mud balls. Attempting to drop their balls at the region of greatest chemical trace, the termites invariably add on top of the existing ones, building columns. As the columns grow, the chemical from the nearest adjacent pile also attracts the termites so they then drop their balls such that the columns lean toward each other, eventually forming an arch. The beauty of the example is that "no termite acts as construction leader. No termite 'knows' anything beyond how to respond when confronted with a specific patterning of its local environment" (Clark 1997 75). This complex collective behaviour demonstrates all the tenets of embodied cognition. First, there is no central authority, nor is there a blueprint of an arch anywhere. Second the arch structure emerges from the interaction between the mud

balls, the scent markings, and the termites, emphasizing the role of the environment. Lastly, the termites form part of a positive feedback loop as the location to place a mud ball is determined by an ever-increasing concentration of chemical. The environment is altered by the behaviour of the termites, spreading this new model of cognition out into the world.

Thinking in the Environment

I return now to Daniel Dennett's notion of cognitive offloading described in the introduction—the extrusion of mental products into the environment that enable more effective behaviour. To fully appreciate this mental strategy, it must be contextualized as a part of Dennett's "Tower of Generate and Test", a categorization of successive conceptions of minds. He adopts a historical approach to cognition, wondering how our minds came into being:

> We evolved from beings with simpler minds (if minds they were), who evolved from beings with still simpler candidates for minds. And there was a time, four or five billion years ago, when there weren't any minds at all, simple or complex – at least not on this planet. Which innovations occurred in what order and why? (18)

Dennett formulates each new level of the tower as a series of cognitive adaptations that permit organisms to more effectively exploit their environments. Table 2 summarizes the different levels of the Tower and the kinds of organisms found on each.

Table 2:Tower of Generate and Test (adapted from Dennett, 82–100)

Level	***Organism characteristics***
Darwinian creatures	Candidates are blindly generated by mutation and recombination of genes and field tested by natural selection.
Skinnerian creatures	Candidates have plasticity such that their behaviour and survival can be adjusted according to learning in the environment (after behaviourist B. F. Skinner).
Popperian creatures	An inner environment containing information about the world is used to test and preselect behaviours before they are hazarded in real life (after Karl Popper who stated that this "design enhancement 'permits our hypotheses to die in our stead'" (88).
Gregorian creatures	Subset of Popperian creatures who utilize designed elements of the environment to shape behavioural choices (after psychologist Richard Gregory who theorizes the role of technological artifacts in enabling "Smart Moves" (99).

The first point of this summary is to return the importance of external context to cognition—the environment is the sounding board at each level of the tower. The second is that while the creatures at each level are abstractions that do not have clear evolutionary parallels, the successive steps represent important increases in the cognitive ability to *interact* with the environment. With the most versatile cognitive adaptation to date, humans are the shining examples of Gregorian creatures. We actively structure our surroundings with a myriad of mnemonic and perceptual aids for cognition—clocks, sign posts, computers, and arithmetic to name a few. Dennett points

out that we "are the beneficiaries of literally thousands of such useful technologies, invented by others in the dim recesses of history or prehistory but transmitted via cultural highways, not via the genetic pathways of inheritance" (139). The foremost of these technologies is language and the human environment is properly considered a discursive soup that we are all eternally immersed in. Just as fish don't know they're constantly surrounded by water, it is often hard for humans to apprehend our similar cultural emdeddedness and the effects that this has for cognition.

Michael Tomasello offers a different variation on this insight. Drawing on his background in primate cognition, he attempts to bridge evolutionary theory and cognitive psychology in *The Cultural Origins of Human Cognition.* He begins by arguing that explanations that see cognition in evolutionary terms face the problem of time. Evidence from anthropology shows that not enough time has passed since our separation from our closest evolutionary ancestor (the chimpanzee) for the processes of genetic variation and natural selection to have produced our impressive cognitive repertoire. Tomasello then reasons that "only one known biologic mechanism could bring about these kinds of changes in behaviour and cognition in so short a time—social or cultural transmission" (4). He identifies one specific phylogenetic adaptation that allows humans to trump biology via cultural evolution: "the ability of individual organisms to understand conspecifics as beings like themselves who have intentional and mental lives like their own" (5). This hypothesis pins the entire structure of human cognition on this one ability reminiscent of Dennett's intentional stance. If Tomasello is right, we do not choose to adopt this stance, the stance constructs our basic ability *to* choose.

Tomasello's model also neccessitates a small digression. By identifying the evolutionary advantage that humans possess and our nearest relatives do not as the ability to visualize other organisms as intentional entities, he (unwittingly) points to a potential reason for the cultural passion for anthropomorphizing computers. We attribute rich inner lives to computers simply because our ontogenetic development trains us to operate in that manner, requiring the ability to learn from conspecifics from a young age. The mechanism and impetus for this cognitive adaptation is unknown, although it is speculated that conceiving others as intentional agents arose as a consequence of viewing the self in that manner. Interestingly, Nicholas Humphrey argues just the opposite: "that the development of *self*-consciousness was a stratagem for developing and testing hypotheses about what was going through the minds of *others*" (cited in Dennett 120, original emphasis). However, this is a question of the chicken and the egg—the cultural structures that are so critical to cognition depend on both the self and the other, that is, on community processes. This theory emphasizes cultural processes in human thought, critical for both ontogeny, the development of cognitive structures when growing up, and in the Gregorian sense of continually providing adaptive advantage to behaviour. More importantly, the role of our cultural environment becomes a central player in the diverse human forms of thinking, a point echoed by Clark: "the flow of reason and the informational transformations it involves seem to criss-cross brain and world" (1997 69). We may not fully appreciate (or even be able to appreciate) the importance of the intimate union between cognition and culture. As Tomasello states in his conclusion, when "investigating and reflecting on human existence, we cannot take off our cultural glasses to view the world aculturally –

and so compare it to the world as we perceive it culturally." (216). The revolutionary possibility ultimately suggested by *The Cultural Origins of Human Cognition*, is that Gregorian thinking succeeds not only because of the discursive medium of linguistic symbols as Dennett suggests, but also because it is in fact created by and exists only in the medium of culture.

This chapter has discussed a number of different models for cognition that expand on or diverge from the computational paradigm. Such a heterogeneous collection is a useful analogy for the main thrust of the many counter-arguments to cognitivism. From a rather unified picture of cognition as a centralized processor, the critical workings that comprise human thought have been spread out to encompass distributed mental agents, the biological body, the environment, and the matrix of culture. This redistribution obviously has huge implications for subjectivity as the cogitating self is stripped of its preeminence. The final chapter will focus on how subjectivity is affected by these new paradigms of cognition and how the thinking 'I' might respond to these infringements into the domain it formerly mastered.

Chapter Four. New Subjectivities

Having outlined the persuasive new models of minds, I now ask how these reconfigurations impact on subjectivity. This objective must overcome the problem of how novel formulations from cognitive science enter popular awareness. The better part of society is not poring over philosophy papers nor keeping current with the latest cognitive science journals. Instead, ideas about minds diffuse through culture in haphazard ways, moving in fits and starts into the public consciousness. Once again, I look to cinematic pop culture for signs of cognition's influences on subjectivity. However, instead of seeking the accepted view of cognition like that displayed in the Matrix, I focus on uncommon depictions of minds—constructions that challenge the cognitivist model of thought.

While the general Hollywood fare is more prone to offer explosions than epistemological reflection, the odd work gives viewers something more. And odd is definitely the right word to describe the work of Charlie Kaufman. I will focus on two collaborations with director Spike Jonze: *Being John Malkovich* (1999) and *Adaptation* (2002). Original, articulate, and often perplexing, these movies are perfect venues to reassess the cultural ideology of minds. While Kaufman and Jonze's work do not completely abandon the Cartesian or computational visions of minds, their original conceptions of the nature of thought help to both interrogate existing mental models and examine possible alternatives. Furthermore, as much of the focus of both movies is

the struggle for identity resulting from the various novel conceptions of minds, they lend themselves readily to a discussion of subjectivity.

The Minds of John Malkovich

The first film in the Kaufman oeuvre, *Being John Malkovich* (*BJM*), is a darkly comic fantasy that defies convention and summary. The movie reimagines cognition in a way that subverts traditional notions of subjectivity and identity. The central premise, riding as an observer inside someone else's head, foregrounds Cartesian notions of the mind-body split. Participants of 'Malkovich' experience all his bodily sensations but maintain their own subjective consciousness, separate from the thoughts of the actor. In the film, this separation is identified by voice-overs and limited-shot, first-person point of view. Viewed in this manner, minds are constructed as informational patterns, a tenet of classic cognitivism. Consciousness can be ported into the Malkovich vessel without altering the content of the transferred mind, recalling Hans Moravec's dream of one day downloading his consciousness onto a machine (Hayles 1). In this regard *BJM*, echoes the conception of consciousness and subjectivity exhibited in the Matrix and the many other mainstream Hollywood takes on artificial intelligence. Where Jonze and Kaufman set themselves apart is in their willingness to self-consciously explore this bizarre cognitive construct. This questioning agenda is announced when Craig Schwartz discovers the portal: "It raises all sorts of philosophical questions about the nature of the self, about the existence of the soul. Am I me? Is Malkovich Malkovich? Was the Buddha right, is duality an illusion?" (Kaufman 36).* Through the operation of

* For convenient referencing, all quotes from *Being John Malkovich* are from the published script cited in the Bibliography.

the portal and its varied effects on the characters who experience it, *BJM* displays a broad range of epistemic possibilities for minds and the construction of subjectivity.

Several themes of the film specifically express the novel notions of cognition introduced in Chapter Three and have interesting effects for subjects. First and foremost is the importance of the body in the construction of minds. Although the portal is predicated on consciousness as an information pattern, as soon as individuals begin using the Malkovich vessel, a different cognitive perspective emerges. The new bodily sensations people experience as Malkovich, even when he is doing things as mundane as riding in a cab or phone-ordering from a catalogue, are a major part of the addictive appeal of the 'ride'. Notice Lottie's voice over as she has a shower as Malkovich: "Oh wet. Wet. Weird. Ooh that's nice. I feel sexy." (Kaufman 39). More importantly, participants, although purportedly only mental voyeurs in Malkovich, do not escape the characteristics of their own material existence. Take for example the fact that Craig, already a puppeteer, is able to do more than ride along in John Malkovich. His skills at manipulating marionettes predispose him to controlling other bodies and after moving Malkovich's arm (while screwing Maxine in Lottie's place), Craig gloats, "It's just a matter of practice before Malkovich becomes nothing more than another one of my puppets" (Kaufman 68). Although the Malkovich body is simply a role that Craig's mind enacts, the embodied routines of his puppeteering experience affect the construction of his new subject position. Similarly, Lottie's lifelong feelings of unease in a woman's body are an integral counterpoint to the "self-actualization as a man" that she feels through Malkovich. The portal, instead of freeing consciousness from its materiality, points out how critical embodiment is for cognition and subjectivity.

Two other examples show how both cognition and subjectivity are embedded in the sociocultural environment. On many occasions, character's social interactions are taken as the perceptually defining elements of their experience. Consider the hilarious interplay of miscommunication between Floris, Schwartz, and Lester. Floris, who is hard of hearing, believes that everyone around her is either mumbling or making no sense. Her flase beliefs mirror the fabrications made by stroke victims to account for inconsistencies in their thinking. The classic example are patients suffering from unilateral neglect—an inability to perceive the one side (usually the left) of objects and scenes. The patients are shown two pictures of houses, identical except for smoke and flames billowing out of an upstairs window on the left side of one image. All the while claiming the two houses are identical, the stroke victims consistently selected the house without flames as the one they would prefer to inhabit. I want to highlight their justifications: "some of them fabricated the most extraordinary reasons for choosing one house over the other. ... One said it was 'more roomy'; another claimed it was 'more spacious, *especially in the attic*,' and 'had a better layout.'" (Ingram 62). Floris has constructed a similar rationalization to account for her inability to hear people. Lester, due to his adoration of Floris, has taken her fiction and granted it reality in his own perceptions. After watching Schwartz's prodigious filing capabilities for the first time, they share the following repartee:

> Dr. Lester: "Floris! Get Guinness on the phone!"
>
> Floris: "Ah, yes sir, Genghis Khan Capone."
>
> Dr. Lester: "Damn fine woman, Floris. I don't know how she puts up with this speech impediment of mine." (Kaufman 10)

Lester refuses to accept Craig's assertion that he is speaking properly, insisting "I'm afraid we'll have to trust Floris on this one. You see, she has her doctorate in speech impedimentology at Case Western" (Kaufman 11). He has built another narrative fiction on top of Floris' to rationalize his social environment. Instead of "the inner processes bounded by skin and skull", *BJM* advances cultural dialogue and narrative constructions as the delimiters of subjective consciousness.

The film reiterates this theme in its treatment of celebrity. The Malkovich portal demonstrates the Hollywood condition: all surface, no depth. Craig and Maxine exploit the status of Malkovich to advance Craig's puppetry career—giving new meaning to the emptiness of stardom. It truly is a world where image is everything if the complete internal consciousness of a person can be replaced with little change in their outward situation. Even though, in some masterful acting, Malkovich playing Craig-in-Malkovich adopts the puppeteer's mannerisms, speech patterns, and posture, the vessel carries on in the public eye as if nothing were different. Jonze and Kaufman draw our attention to the mechanics of the celebrity machine in action, first in the form of Malkovich's agent. His glib response to Craig's desire to become a puppeteer—"Sure, sure. No problemo. Poof, you're a puppeteer. Heh heh. Just let me make a couple of calls." (Kaufman 91)—emphasizes the repackaging wizardry of Madison avenue. The subsequent Hollywood-reporter style mock-umentary feature on Malkovich and puppetry similarly lampoons the entertainment industry's hypermediated self-promotion. The overall effect of *BJM's* depiction of celebrity is to undercut the importance of inner consciousness to the construction of subjectivity. An individual's social role and the complex machineries that produce and maintain that role are as

important as the traditional hallmarks of the liberal humanist subject: free will, autonomy, and agency.

These properties are also called into question in another regard: the Malkovich vessel is constituted in the film through the language of the marketplace and the courts. Paying $200 a ride produces the experience of being John Malkovich for others, constructing his subjectivity as a consumer product. The long queues waiting for their turn in the vessel are a commentary on the absolute commodification of late capitalism. We live in a culture where buying a "new you" is the authorized mode of self-expression. Consumers race to get the latest fashions; revolutionary new workout systems and fad diets are introduced almost weekly; and cosmetic surgery has become a billion dollar a year industry. Purchasing a different subjectivity fits easily into accepted practice. When Malkovich is adamant about shutting the portal down, Craig argues that, "it's my livelihood, do you understand?" (Kaufman 75). Subjectivity has been converted into a business, and one where the subject, like the capitalist worker, doesn't even see the profits. These depictions evoke Althusser's formulation that subjectivity is the reproduction of capitalist ideology, rather than the expression of autonomous individuals. Malkovich himself reinforces this construction of his own subjectivity, appealing to the judicial system, a repressive state apparatus (RSA) in Althusser's model. Assuring Schwartz "I will see you in court" (Kaufman 76), he points to how the RSA constructs subjects who believe in their self-ownership and autonomy. Social and legal codes define subjects in the social sphere, constructing an ideology that leads individuals to think of themselves as free and self-owning. When

Jonze and Kaufman inscribe Malkovich as a subject produced by capitalism and law, they endorse the cultural construction of cognition, consciousness, and subjectivity.

The final motif that interrogates cognition and its implications for subjectivity is puppetry. The Cartesian cogito has often been metaphorically linked to a puppeteer, controlling the body from some remote, internal command center. Craig Chalquist memorably describes the 'thinking I' as "a sort of misty homunculus behind the eyes pulling lots of invisible puppet-strings" (Chalquist). The metaphor is retooled in Hayles' posthuman theory with the tenet that the body is the original prosthesis that each consciousness must learn to manipulate. This is an important conception in *HWBP* because it allows the cybernetic union of bodies with machines to seem more natural, "so that extending or replacing the body with other prostheses becomes a continuation of a process that began before we were born" (Hayles 3). With the hilarious reinvention of puppetry as a more powerful cultural oeuvre in *BJM*, the metaphor takes on an added significance.

Re-Stringing Reflexivity

The movie features a string (pardon the pun) of similarities between the marionettes and the living characters, the most obvious being their re-creation in Craig's workshop. In many scenes, the puppet's movements are so fluid and detailed that it is very easy to think of them as alive†. There are even scenes where life-sized marionettes perform, furthering the association between puppets and bodies. On the other side of the

† All the puppet scenes except the Derek Mantini biography and the Swan Lake benefit were actually performed with marionettes. The shots are often composites as the puppeteer Phillip Huber had to reset the strings, but all the footage is genuine.

symmetry, the principal characters, Craig and Lottie, seem deliberately non-descript, as if every effort was made to construct a banal existence. The pair seem tied by the strings of social convention to an unhappy marriage. Like puppets on a shoebox-stage, they are trapped and confined by their living space, overpopulated with orphan animals. Craig's new file-clerk employment poses further restrictions for his subject position. The cramped confines of the 7½ floor of the Mertin-Flemmer building can be seen both a literal narrowing of his personal space, and as a negation of his puppeteering dreams which he has to let go for the job. The association between puppets and the characters in the film is another manner of suggesting the constructed nature of subjects. The mutability of subjects is demonstrated every time someone is reconstructed through the portal and is clearly stated when Craig explains his love of puppeteering as "the idea of becoming someone else for a little while. Being inside another skin" (Kaufman 30). While Craig could have commented on the dynamic of control puppetry offers or the mastery of skills to animate the marionettes, it is telling that he focused on the notion of displacement, of experiencing a different bodily reality than his own. In this light, the Malkovich portal, offering this very opportunity, is a dream come true for the artificial subjects of *BJM*.

However, the conflation of the puppets and the subjects in the film poses troubling questions for cognitive subjectivity. Who (or what) is pulling the strings if consciousness resides so explicitly in the (puppet) body? Since the novel models of mind informing *BJM* posit a distributed cognitive framework, the notion of reflexivity becomes pivotal in answering questions about subjective agency. Jonze and Kaufman probe this dilemma through Craig's Dance of Despair and Disillusionment: a scene

repeated using both puppet Craig and puppet body Malkovich. It is the opening scene of the movie, a masterfully wrought free dance on marionette including tumbling, angst, and sweat. During the piece, we see puppet-Craig following the lines of his strings up into to the air and catching sight of the puppeteer hovering above. The dance finishes with a flourish as the despairing puppet catches sight of himself in the mirror and smashes it, realizing he is only a puppet to Craig's consciousness. Later in the film, once Craig is in control of Malkovich, he enacts the same dance in human form, confirming the correlation between puppets and subjects. The scene is a very pointed demonstration of the reflexive relationship between consciousness and subjectivity. The conscious subject is *never* separate from the cognitive array that produces it. Further, the position of the subjective observer *within* the system under observation is critical to permit questions of the system itself. Craig is pulling the strings that permit the puppet's questioning glance to trace the strings back to him. The puppet's disillusionment at discovering it is under the puppeteer's control is equated to Craig's despair that his own identity is shaped by an unhappy marriage, life in a menagerie, and unfulfilled success as a puppeteer. Thus a consequence of emphasizing cognition's role in subjectivity is the increased importance of reflexivity in the process of constructing identities.

A reflexive looping of mind and subject is unavoidable in discursive cognitive models. Subjects construct an understanding of minds; minds structure the formation of subjects. *How We Became Posthuman* provides a focal point to see another way that reflexivity is reproduced in *Being John Malkovich.* While I focused earlier on how various participants at the Macy conferences sought to reposition to scientific observer,

it was not until after Macy was finished that Heinz von Foerster would accentuate this theme. His essay collection, *Observing Systems*, sought to explore the philosophical ramifications of this new positioning of the observer. But here I am less interested in his goals than with his playful title which mirrors Kaufman's—*Being John Malkovich.* Using the doubling of the gerund and the conjugated verb, the titles point both to entities (systems, John Malkovich) whose respective functions are observing and being, but also to entities that the reader and viewer can be a part of (Hayles 74). This similar naming signals the reflexive emphasis of both works, a theme extended by the visual construction of subjective experience in *BJM.* When the characters of the film travel through the portal, the audience sees a restricted, first person view from inside Malkovich, looking out through his eyes. Whichever character has traveled through the portal vanishes except for their voice over, inviting the viewer to step into the gap (Repass 32). This move into the action is a parallel move to that made by the observer of the cybernetic experiments undertaken for the Second Macy Conferences and later work. But more importantly, the viewer is offered the same experience that the characters within the film are. Jonze and Kaufman create a work that brings its central premise of 'being Malkovich' to the viewer as a participatory feature, embodying the movement of consciousness into different subject positions. *BJM* also reproduces this facet of distributed cognition as an expository feature. The end of the film sees Lester and his octogenarian cult filing into the portal for another stab at youth and vigor, assuming the role of an allopoetic‡ army somewhere inside Malkovich's mind. Thus the

‡ Allopoietic entities are defined in opposition to autopoietic ones by Maturana and Varela. The distinction between them is that the goal of allopoietic organisms is not the production of their own organization (Hayles 141). The function of allopoietic entities is subordinated to that of the larger unity.

film fashions a subjectivity that is distributed and rooted in the heterogeneity of the diverse, vicarious participants in Malkovich.

Daniel Dennett also stresses the reflexive relationship between consciousness and subjectivity in his dismissal of the Cartesian theatre—a metaphor for the manner external reality is presented to the "thinking I". Dennett argues that this leads to a misrecognition of consciousness as subjectivity. Matthew Elton summarizes his position

> In speaking of the Cartesian theatre Dennett [notes] ... the 'essential you' is the audience of the drama played out on the inner stage. But this 'essential you' is a strangely passive subject. It cannot be identified with the subject that is responsible for your actions or reports. That subject could only be the 'authorial you'. And in the end, this extra shadow subject looks to be more a product of confused thinking than anything else. (150)

The conundrum is created because we humans both create *and* inhabit our subject position, leading to confusion about the true nature of consciousness and its implications for subjectivity.

The notion of the "authorial you" is a useful segue to the second Jonze and Kaufman collaboration, *Adaptation.* This film also constructs minds and subjects in a manner consistent with the new breed of cognitive science introduced in Chapter Three. The movie is par for the duo's course, engaging the viewer with quirky, humorous dialogue and a mind-bending plot. The action centers on Charlie Kaufman himself and the difficult creative process he faced when adapting the Susan Orlean novel, *The*

Orchid Thief, into a screenplay. Kaufman, behind schedule and without a clue how to bring the novel—a plotless, single-character inquiry into the nature of flowers, personalities, and passions—ends up writing himself into the screenplay. He also writes in a foil for himself, his twin brother Donald, a slick extrovert who wants to become a screenwriter unlike the introverted, neurotic Charlie. Charlie is committed to remaining true to Orlean's story, to not Hollywood-izing it, while Donald busies himself with writing a multiple-personality-disorder serial-killer script that is a cross between *Silence of the Lambs* and *Psycho*. Of course by the end of *Adaptation* all the things Charlie wanted to avoid have manifested themselves in the movie, but he has somehow been true to his vision nonetheless.

I will begin by transposing two images from *Adaptation* and *HWBP* to introduce the recursive layering practiced in reflexive works. The scene from the film takes place in Charlie's kitchen when he is struck with the flash of insight that he should write what he knows (the self-doubt of an overweight author) into his screenplay. The scene shows him leaning on his sink, saying into his tape recorder, "We open with Kaufman: fat, sweating, bald, seated across the table from an attractive studio executive" (*Adaptation*). It is a scene we have already seen: a reflexive doubling of action that occurred near the start of the movie. A moment later, we see Kaufman saying in to his tape recorder, "Kaufman speaks into his tape recorder" (*Adaptation*). The reflexivity is now immediate, depicting Charlie through the recursive re-representation of himself. In this view, subjectivity is a fluid construct, a narrative constellation that is in a perpetual state of revision. The self is once again viewed as a fiction produced by the various

cognitive agents comprising and continually grasping for a cohesive version of the individual.

Hayles also plays a reflexive game in the parallel image from *HWBP*. Dissecting the Macy conference archives, she doubles the image of conference participants Margaret Mead and Gregory Bateson sitting with interviewer Stewart Brand at a kitchen table in 1976 with an image of herself studying the published interview at her own kitchen table. She focuses on a picture of the assembled participants from the Ninth conference in 1952 and realizes that Brand has made an error. He has identified the speaker as Yehoshua Bar-Hillel who spoke at the Tenth conference in 1953, meaning the date is wrong. Hayles, "sitting at [her]kitchen table in March 1996" (80), ponders the error: "I imagine Bateson digging out the photograph and giving it to Brand while he and Mead clue Brand in on who was who as Brand scribbles down the names, probably while they are still sitting at the kitchen table" (80–81). Here identities are reconstructed through their re-representation to autobiographical and thus reflexively wired-in observer. The date is not the only error however. In the picture, the conference transcript editor, Janet Freed, is mistakenly called Janet Freud. In both these misrecognitions, identity is revealed as a contingent quantity, depending on the positional subjectivity of the observer as much as on any essential properties. Foregrounded in the picture and in Hayles argument, the Freud/Freed misrecognition is symptomatic of the way these transcripts and that science in general are constructed and popularly labeled as the product of the big name scientists presiding at Macy (Hayles 81). A similar thing happens to movies as an entire army of staff have their work subsumed by the director and stars, only receiving the

recognition of the credits—a miniaturized typeset, rapidly rolling list, that most viewers don't stay to see. These heterogeneous productions recall the new conception of minds where the various cognitive agents are misrecognized as being the work of a single central processor.

Charlie Kaufman's Alters

Adaptation highlights the special relationship between reflexivity and artistic creation. The act of recording oneself into an artistic production mirrors the self-identification that occurs when consciousness and subjectivity are intertwined. Neither Charlie Kaufman nor Susan Orlean can avoid reflexively instilling a portion of themselves into their work. Recapitulating cognition, the creative process is remodelled as an interaction between the artist and their reflexive embodiment in their artifact. *Adaptation* takes this theme and twists it as only Jonze and Kaufman could. Instead of the unconscious (or at least understated) self-insertion of Susan Orlean into her investigation of orchids, passion, and Laroche, Charlie Kaufman's insertion of himself into his screen adaptation is done to the hilt. He creates not only a character named Charlie Kaufman trying to adapt the novel, but doubles himself by penning a twin brother to complicate the process. In the screenplay, the fictitious Donald Kaufman is actually given credit as co-adaptor. This reflexive creation gained such agency that upon first receipt of the screenplay, the project head was more angry that Charlie had farmed out part of the scripting to someone else than they were at the fact that it was four months late (Keast) and demanded to know who Donald was. As this is a screenplay adaptation of a novel, trust Kaufman to also add the next layer: a recreated

reflexive version of Susan Orlean as she is researching and producing her novel. Charlie, Donald, and Susan can be viewed as three separate artistic subjectivities, authorial agents collaborating in the production of *Adaptation.*

In a different regard, these three characters are useful examples of distributed cognition. Critic David Poland advances the idea that while they serve as authorial agents in the film, their only real existence is within Charlie Kaufman's mind (Act I). Donald and Susan are multiple personalities of Charlie who goes a little crazy trying to adapt the screenplay. In other words, he adapts two new personalities that help him get the script finished. "The Adaptation Column" on Poland's website, The Hot Button, lists a wealth of evidence to support this argument. First is the idea's strong correlation to Donald's script, 'The 3'. As "pitched", there is a serial killer representing Charlie, a victim representing Susan, and a cop, representing Donald. Poland astutely reasons:

> The self-hating screenwriter sees himself as a criminal, perpetrating his ideas on the innocent. He creates a non-existent brother in his mind, who he believes is the only one who can give him the answer of how to "find the girl" as in, doing right by Orlean's book (Act I).

He goes on to lay out several references and plot twists that suggest split or multiple personalities. The clincher is the film's only song, "Happy Together" by the Turtles. Charlie sings its opening line to a dying Donald at the end of the film: "Imagine me and you… I do" (*Adaptation*). Viewers who stayed around to watch the credits roll were rewarded with a quote from Donald's script that expresses the dynamic between Charlie's alters:

> We're all one thing, Lieutenant. That's what I've come to realize. Like cells in a body. 'Cept we can't see the body. The way fish can't see the ocean. And so we envy each other. Hurt each other. Hate each other. How silly is that? A heart cell hating a lung cell - Cassie from THE THREE. (*Adaptation*)

This reading of the film is the penultimate rejection of both the autonomous liberal humanist subject and the central cognitive controller. As a multiple personality, Charlie is a heterogeneous conglomeration of cognitive agents rather than a unified subject.

This reading of the film calls attention to several of the tenets and theories of cognition that were detailed in Chapter Three. To begin with, the conception of Donald and Susan as authorial agents within the film and as subjective agents within Charlie's mind exemplifies Daniel Dennett's intentional stance. For these agents to possess the agency to help Charlie with his difficult adaptation, they must be envisioned as possessing goals and desires. The authorial agents are conceived through their drive to create a cohesive narrative capturing the essence of *The Orchid Thief*. The agents are revealed as the distributed features of Charlie Kaufman's mind through their different roles in the process of adapting the novel. The struggle between Donald and Charlie to write a faithful script and make "a movie simply about flowers" (*Adaptation*) poses cognition as a negotiation between the disparate intentional agents enacted by different subjective interpellations. In this revisionist model of cognition, *Adaptation* subverts the procedures via which consciousness becomes the foundation for subjectivity. No longer is an autonomous agency solely responsible for the act of creative production, nor for the construction of the self.

In its redistribution of subjective agency, Kaufman and Jonze's film also points to the discursive nature of subjects. The mobilization of the three different aspects of Charlie's subjectivity occurs along textual lines. They are given form as narrative constructions to drive the script. This repeats the notion that minds create many fictions to reconcile their distributed elements into a coherent whole, recalling the example of the stroke victims and the burning house. This illusion of inward unity is maintained in *Adaptation* through the omission of explicit identification of Donald and Susan as fictitious components of Charlie's own psyche. Kaufman and Jonze extended this agenda into all the interviews they conducted regarding the movie, refusing to confirm the reality of Charlie's brother. Note the following quote from an online interview:

> Donald's existence or non-existence is something that we don't want to address because the movie is credited to Charlie and Donald. That is an important element in understanding the movie. What happens in the movie is tied to that fact. To say Donald's a creation of mine is something I don't want to do. We're presenting this movie as written by Charlie and Donald. (Murray and Topel)

They placed a definite value on *not* informing the audience of the dynamics of the three alters of Kaufman so that their agency is not diminished in the eyes of viewers. More importantly, this stance promotes the same thing in the eyes of the fictional Charlie Kaufman within the movie. Portraying Donald and Susan as unknowing creations of Charlie's mind, *Adaptation* suggests simultaneously the discursive construction of consciousness and its seamless presentation as subjectivity. Kaufman is like the stroke victim who doesn't know why they are selecting the house without the

flames each time. Donald Hall similarly construes subjectivity as textual, emphasizing its potential for revision when he states "To de-naturalize our *selves* is not to make them easily manipulable but it is to disrupt and disturb the *automatism* of their relationship to the fixed scripts and values of the past" (128, original emphasis). This is precisely what the imaginative works of Charlie Kaufman and Spike Jonze do. The 'selves' of *BJM* and *Adaptation* are reconstructed by the changing models of cognition that these fascinating films put forward. These films suggest similar reimaginations of subjectivity are possible for subjects who begin conceiving their minds in some of the novel ways depicted in this chapter.

Conclusion

The marginal position of these new possibilities for subjectivity is curious. Within cognitive science, there appears to be widespread, if not overwhelming, acceptance of many of these new constructions, raising the question of why they are not reflected in the mirror of pop culture. I close my argument by addressing that question—looking at the gap between the recent developments in cognitive science and the far more prevalent cultural constructions of minds along computational lines. The basic thrust of this interrogation is voiced in *The Embodied Mind*:

> The existential concern that animates our entire discussion in this book results from the tangible demonstration within cognitive science that the self or cognizing subject is fundamentally fragmented, divided, or nonunified. ... Many philosophers, psychiatrists, and social theorists since Nietzsche have challenged our received conception of the self or subject as the epicenter of knowledge, cognition, experience, and action. The emergence of this theme within science, however, marks a quite significant event for science provides the voice of authority in our culture to an extent that is matched by no other human practice and institution. (Varela et al. xvii)

However, for all of Varela's and his co-authors' optimistic claims, the multitude of minds depicted in pop culture remain firmly rooted in the cognitivist school. The cause of this disjunction may be, as I have suggested, a temporal artifact—something that will

change when more people come into contact with these new cognitive paradigms. These theories must become a more common and accepted cultural discourse to become woven into the manner in which people conceive themselves.

However, a different possible explanation is suggested by the manifest properties of the new paradigms of cognitive science. Firstly, construing cognition as a collection of heterogeneous agents does not mesh well with our perception of consciousness as a unified process. I find the cognitive processes assuring me of my autonomy to be more convincing than N. Katherine Hayles' articulation of the posthuman subjective stance. Hayles states, "I now find myself saying things like, 'Well, my sleep agent wants to rest, but my food agent says I should go to the store'" (6). I more often say to myself "I'm tired, I should have a nap; but I'm hungry too, so I'll whip out and grab a snack first." Even if this impression of unity is a misrecognition—merely a fiction adapted from disparate cognitive agents into a narrative of agency—it legislates my every decision. Similarly, the confabulations of neglect patients, although patently false, shape how they explain the world and their interactions with it. The conscious experience of every individual is necessarily instrumental to their subjectivity.

The examples from stroke victims raise a thorny problem—if the conscious subject is indeed a fiction created by our minds, would we be able to know it? Returning for a moment to pop culture, the neural interactive simulation of The Matrix trilogy suggests that this misrecognition is as unavoidable as it is undetectable. Recall that there was no way for a mind within the program to know that what it experienced was not reality. This suggests that all the fictions that the mind constructs for us—the

conscious 'I,' rational thoughts, autonomy agency—are beyond our ability to penetrate. This does not make them any less foundational for subjectivity, only that our knowledge of them will be purely intellectual rather than experiential. Philosophers like Daniel Dennett and cognitive scientists like Andy Clark can then never be figures like Morpheus, arriving one day to awaken us. As Morpheus states: "No one can be told the truth of the Matrix. They must see it with their own eyes to believe it" (*The Matrix*). Since this cannot happen, the fictions that underwrite traditional humanist subject traits will continue to drive self-construction.

How then can the new knowledge gleaned by cognitive science be useful for subjects and their self-conception? The view of consciousness as a construction integrating the heterogeneous collective cognitive agents shows individuals that they need not be locked into any one subject position. Donald Hall sums up the consequence of viewing subjectivity in such fluid terms stating

> We can find it both intellectually and politically empowering to examine critically how, and to what extent, we might avow and disavow our identifications, how we are variously interpellated and enact those interpellations through our mundane activities and continuing frames of reference, and how we do exist and can change in/over time. (128)

Modelling cognition as the dynamic interactions between internal intentional agents (including the body) and an environment brimming with thinking tools facilitates this view of subjectivity.

The novel models of cognition also bring out the best in postmodern theorists such as Michel Foucault whose work has been criticized for the "seemingly meagre

possibilities for agency therein" (Hall 90). Theories that emphasize the role of the cultural environment in cognition are of immediate value to Foucault, corroborating his claims for the supremacy of discourse. For example, work like Tomasello's elaborates Foucaultian notions of the discursive nature of subjectivity, extending the scope of discourse to the construction of cognition itself. Perhaps more importantly, these models of cognition evoke Umberto Eco's assertion that: "the lesson of Foucault [is] that power is not something unitary that exists outside us" (Rosso and Springer 4). The realization that control over subjection is both distributed and reflexive is echoed by the results of many cognitive scientists. Tomasello, Clark, and Dennett all maintain that the discursive configurations of the cultural environment *and* those of individual subject's mental arrays are critical for cognition. In this regard the theories of Foucault improve on Althusser's conception of subjectivity as state and ideologically sanctioned subjection—processes that very much occur from the top down, from the exterior to the interior.

The introduction of a reflexive dynamic to cognition has some interesting consequences for subjectivity that can be brought to light by considering Foucault's essay, "Technologies of the Self." In the author's words, the work is a continuation of his program

> to sketch out a history of the different ways in our culture that humans develop knowledge about themselves: economics, biology, psychiatry, medicine, and penology. The main point is not to accept this knowledge at face value but to analyze these so-called sciences as very specific

> truth games related to specific techniques that human beings use to understand themselves. ("Technologies" 19)

Foucault's "truth games" recapitulate both the "honest lies" told by neglect patients and the fiction of the cohesive self, a move that highlights the technique of narrative construction in cognition. The reflexive role of fabricating or story-telling was central to the revision of subjectivity presented in *Adaptation* and takes on new significance as a truth game.

Foucault distinguishes four different types of techniques that constitute these truth games—the technologies of production, of sign systems, of power, and of the self. While the different modalities operate simultaneously and in concert, he focuses on the final of these modes, defining technologies of the self as the practices that "permit individuals to effect by their own means ... a certain number of operations on their bodies and souls, thoughts, conduct, and way of being, so as to transform themselves" (19) into a particular desired state. In tracing how these techniques are conceived in discourses from late antiquity, through the Stoic tradition, and into Christian asceticism, Foucault articulates (as always) the historicity of any mode of self-construction. I draw particular attention to his focus on the phrase above the entrance to the oracle at Delphi, "Know Thyself". He argues that this is the most well-remembered technology of self from the classical period only through backward projection. In actuality, in the writings of the period, "the injunction of having to know yourself was always associated with the other principle of having to take care of yourself and it was that need to care for oneself that brought the Delphic maxim into operation" (20). The technology of the self most instrumental in antiquity was "Take Care of Oneself",

consisting of a set of practices that individuals followed to become happy and healthy citizens.

Foucault points to two reasons for this curious elision of "Take Care of Oneself" into "Know Thyself". First, he notes that "we inherit a secular tradition which respects external law as the basis for morality," rhetorically wondering "How then can respect for the self be the basis for morality?" (19). Instead, the institutional practices of society that have dominated culture for two millenia are the authorized source of morality. This point can be linked to Althusser's contention that subjectivity is an external ideological construction that hails the individual. Second, Foucault states that "in theoretical philosophy from Descartes to Husserl, knowledge of the self (the thinking subject) takes on an ever-increasing importance as the first step in the theory of knowledge" (19). It should be no surprise that the "thinking I"—so foundational for both cognitivism and the subjectivity it fashions—is implicated in the reconfiguration of "Take Care of Oneself" into "Know Thyself." Foucault's reading reveals the power of the modern notions of ideology and intellection, discursive constellations whose influence repositions the technologies of the self from antiquity. These points once again draw attention to the intimate relationship between discourse and modes of self-conception, revealing the manner in which subjectivity takes its shape from the prevailing cultural discourse, computational cognition in this case. In this light, it is completely appropriate that "Know Thyself" is also written above the Oracle's door in *The Matrix*—a fitting slogan of the brand of subjectivity suggested by cognitivism.

The reflexive forms of cognition examined in Chapter Four suggest the new possibilities endorsed by different discourses. I just noted how the dominant discourse

of computational cognition functioned to reshape classic-age technologies of the self in its own image—relegating "Take Care of Oneself" in favour of "Know Thyself." Recent cognitive models might reverse this trend. The reason for both the confabulations told by neglect patients and the fiction of the unified self is to construct a reasonable explanation for the often bizarre and contradictory experience of consciousness. These concoctions are intended to ease the mind, a goal more in tune with the injunction to "Take Care of Oneself" than with "Know Thyself," especially since true self-knowledge borders on the impossible. The reflexive interrogation of motivations that were formerly credited to a central cognitive authority ("the thinking subject") might also be seen as a technique of care for the self.

My point in these speculations has not been to specify the new form subjectivity will take as cognitive models mutate. Instead, my goal has been to emphasize the contingent manner via which cognition shapes individuals. Specific constructions of minds have specific repercussions for our self-conception. When the cultural perception of cognition changes—as is sure to happen as the Cartesian and cognitivist paradigms gradually lose their influence—so too will a major thread in the discursive construction of subjectivity. This brief investigation of the new cognitive techniques of self that will play a role in how humans understand themselves is only a prelude to a fuller investigation, possible only when these new discourses have matured. The important point to retain is that these new cognitive models promote an understanding of the mind as a technology of the self—a truth game enacted to shape subjectivity—rather than a meat computer locked in the skull.

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