

**COMPLEX FEEDBACK LOOPS OF
TECHNOSCIENCE, LITERATURE, AND CULTURE:
DYNAMICS OF THE COMPLEXITY PARADIGM IN SCIENTIFIC FICTION**

A Dissertation

by

HO RIM SONG

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2010

Major Subject: English

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Dynamics of the Complexity Paradigm in Scientific Fiction
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Approved by:

Chair of Committee,	Sally Robinson
Committee Members,	M. Jimmie Killingsworth
	Mary Ann O'Farrell
	Michael Hand
Head of Department,	M. Jimmie Killingsworth

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ABSTRACT

Complex Feedback Loops of
Technoscience, Literature, and Culture:
Dynamics of the Complexity Paradigm in Scientific Fiction. (August 2010)

Ho Rim Song, B.A., Pukyong National University;

M.A., Pusan National University;

M.A., Kansas State University

Chair of Advisory Committee: Dr. Sally Robinson

This dissertation explores the emergence of the complexity paradigm in our technoscience culture and proposes “scientific fiction” as a genre of cultural studies based on that paradigm. Throughout this dissertation, I use the terms and concepts of complexity theory developed by new science, which revises the reductionism and linearity of classic science. The complexity paradigm signifies a system of all knowledge that conceives the productivity and creativity of the complexity created by interconnective and interactive dynamics among and within systems. As a literary response to the complexity paradigm, scientific fiction emphasizes the productivity and creativity of the complexity, offering the possibility of the human’s co-evolution with technoscience. These characteristics of scientific fiction help articulate new ontological, ethical, and aesthetic visions for the posthuman. This dissertation ultimately highlights

the strong feedback loops of technoscience, literature, and culture, which promote the complexity paradigm.

By comparing Pat Cadigan's *Synners* as a scientific fiction novel and William Gibson's *Neuromancer* as a representative postmodern science fiction novel, Chapter II presents the defining characteristics of scientific fiction, reconfiguring humanity in relation to the technoscience environment. Furthermore, analyzing Greg Bear's *Blood Music*, the chapter claims that the human subject is an adaptive, self-organizing, interconnective system. Grounded in such understandings of humanity and subjectivity, the next chapter examines Marge Piercy's *He, She and It* to offer a new ethical perspective, or the complexity ethics, which establishes the interconnective and interactive relationship between the human and the technological as an evolutionary partner. The complexity ethics describes human behaviors and thoughts in our technoscience culture rather than prescribing a moral guideline. Next, in investigating Shelley Jackson's *Patchwork Girl*, a hypertext novel that rewrites Mary Shelley's *Frankenstein*, Chapter IV explores a new aesthetics appreciating the creativity of the complexity produced by interconnective and interactive dynamics. Finally, through the analyses of the scientific fiction novels, this dissertation suggests that scientific fiction is a transdisciplinary field that can offer new cultural visions.

DEDICATION

To my father and my mother

ACKNOWLEDGEMENTS

I would like to express the deepest thanks and appreciation to my advisor Dr. Sally Robinson, whose persistent encouragement and support helped me finish this dissertation. The dissertation might not have been possible without her thought-provoking questions and insightful comments. Through her advice, I also learned how to question my own thoughts and better express my own ideas, tools that have enriched my scholarship. I have been absolutely fortunate to have her as my advisor.

I also thank my committee members: Dr. Jimmie Killingsworth, Dr. Mary Ann O'Farrell, and Dr. Michael Hand. I am very grateful to Dr. Killingsworth for his interests in my dissertation and his cheerful encouragement. His knowledge of and insight into "complexity" helped me have confidence in my ideas. I also would like to express thanks to Dr. O'Farrell, who recommended and lent books that I needed to sharpen my ideas about body. I also appreciated her insightful comments about gender and technoscience. I thank Dr. Michael Hand, who introduced a variety of interesting science fiction novels and texts of science studies to me. His encyclopedic knowledge helped me expand my academic interests.

I must also acknowledge my colleagues and friends with whom I share memories and experiences here at Texas A&M as well as old friends in my home country, whose unchanging love for me kept me grounded. Without their friendship and support, I could not have survived. Although I cannot name all of them here, I hope they know how much I love and thank them.

I would like to give special thanks to the Waddells: Carol, Lynn, and Shen. They are not only my friends but family. Through their unconditional kindness and genuine interest in me, they proved that cultural differences are not a barrier to understanding and loving people. Their constant support and hospitality kept me strong.

Finally and most importantly, my greatest thanks must go to my family. My parents, sisters, and brother are part of my soul. Their endless love for me and belief in my work make me go forward. I am deeply grateful especially to my late father, who passed away while I was writing this dissertation. I was his always-loving daughter, and I am sure he would have been happy with my achievement because in life he let me know that this dream of mine was his dream for me, too.

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CHAPTER I
**INTRODUCTION: THE EMERGING COMPLEXITY PARADIGM,
COMPLEXITY THEORY, AND SCIENTIFIC FICTION**

1. The Emerging Network Culture and the Complexity Paradigm

The transformation of social structure from industrial society to post-industrial society and the epistemological transition from modernity to post-modernity during the twentieth century cause the human to go through a time of confusion and uncertainty both in the physical and metaphysical sense. Daniel Bell maintains that this confusion and uncertainty are associated with increasing complexity by the altered physical and metaphorical environments and that social and cultural problems occur in handling this complexity: “The major intellectual and sociological problems of the postindustrial society are those of ‘organized complexity’—the management of large-scale systems, with large numbers of interacting variables, which have to be coordinated to achieve specific goals” (29). Bell asserts that what matters for a society is how to organize complexity. In order to understand our society and its culture, which is considered post-industrial and post-modern, therefore, we have to first understand complexity. Naming the post-industrial society as the “information society,” Bell claims that the

This dissertation follows the style of MLA.

understanding of the creation and exchange of information makes our post-industrial age distinctive and that information science and technology, such as information theory, cybernetics, and game theory, emerge to solve social and cultural problems caused by social complexity (29-30). This view contributes to solidifying the assumption that “[t]he growing outer social complexity is matched by a corresponding inner technological complexity” (Qvortrup 118). Indeed, information science and technology, which can model the “organized complexity” as shown in the creation of the computer, allow us to understand social and cultural complexity by exploring how large numbers of interacting variables work to produce complex systems.

Science and technology in our age, however, not only reflect the complexity of our age but also they actively participate in increasing complexity. Science and technology cannot be innocent of cultural values and aspirations in that they are rooted in human labor and social relations; science and technology come to be deeply involved in metaphorical areas as well as physical areas. Furthering this idea, Michael Reed and David L. Harvey contend that a “new worldview is emerging in sciences” and technologies (353). In the same vein, Donna Haraway suggests the term “technoscience” as an epistemic word for the late twentieth and twenty-first centuries. For her, “technoscience” is not just a combined word of technology and science. Rather, Haraway defines the term as the “hyperspace” that exceeds the distinction between science and technology: it is “a specific, finite, material-semiotic universe” (*Modest* 3). Through the term, she re-confirms the fact that science and technology become cultural conditions of our age. Technoscience, indeed, is “culture,” performing “the task of

reflecting a world back to us and of articulating its own . . . version of reality” (Graham 30). The culture that technoscience reflects and articulates is the network culture that works as a complex system, which is ever-changing, nonlinear, and interconnective. Reconfiguring the world as a complex system that is dynamically networked, technoscience “treats nature and society as if they were ontologically open and historically constituted; . . . non-reductive and indeterminate, yet amenable to rational explanation; capable of seeing nature as a ‘self-organizing’ enterprise without succumbing to anthropomorphism or mystifying animism” (Reed and Harvey 359). In this way, rejecting traditions of binary thoughts produced by the ideas of discontinuity and disconnectivity and instead foregrounding the complexity that emerges from crisscrossing connectivity among them, the network culture of technoscience attempts to reconfigure such binary relationships as nature and culture, self/subject and other/object, and science/technology and humanities/art. In the process of such reconfiguration, the network culture of technoscience evokes feedback loops among culture, theory, and science/technology. The understanding of the feedback loops, which assumes interconnective and interactive dynamics between systems, renders the emergence of the complexity paradigm.

The complexity paradigm is an epistemological framework channeling the cultural dynamics of the network culture. “Paradigm” in this dissertation means a system of intuitive knowledge that defines the condition for the construction of all

knowledge at a particular time.¹ The complexity paradigm signifies a system of all knowledge that conceives complexity, or the dynamics of interconnectivities and interactivities among and within systems. The dissertation deems that the emergence of the complexity paradigm becomes noticeable with the development of information theories and technologies, and the constitution of its epistemology is spurred with the disciplinary convergence of hard science and the humanities. Complexity theory is formed by the new epistemological move.² Complexity theory views the world as a large system composed of (sub)systems, in which components of systems and systems themselves are interconnected and also adaptively self-organized into more complex systems. This distinctive worldview of complexity theory can grasp and articulate the interconnective and interactive dynamics of the network culture. The dissertation is indebted to this viewpoint and the lexicon of complexity theory in arguing the emergence of the network culture and its complexity paradigm. Locating science, technology, and literature within the complex network of culture viewed by complexity

¹ In *The Structure of Scientific Revolution*, Thomas Kuhn defines paradigm as an agreed-upon achievement model in scientific practices. Foucault develops the concept of “episteme” based on Kuhn’s paradigm; “An episteme is the ‘underground’ grid of network which allows thought to organize itself” (Horrocks and Jevtic 65). The “paradigm” in this dissertation is a negotiated concept of Kuhn’s paradigm and Foucault’s episteme in that it is a worldview based on scientific ideas.

² Although the discussion of complexity is not new, complexity theory is still new to social sciences and humanities. Complexity theory was substantiated when Santa Fe Institute was founded in 1984 to research complex adaptive systems, which is essential to understand contemporary social and cultural environment. Santa Fe Institute is constituted of groups of scholars from a variety of fields, such as biology, computer science, economics, politics, etc. The institute itself is a complexity group of contemporary knowledge. In *Complexity: The Emerging Science at the Edge of Order and Chaos* (1992), M. Mitchell Waldrop introduces the process of the foundation of Santa Fe Institute and the science of complexity in the hope that the science of complexity would be able to give insight into today’s complex social, cultural, and economic environments. After the book was published, the term “complexity theory” began to become famous. Along with Waldrop’s book, Roger Lewin’s *Complexity: Life at the Edge of Chaos* and Mark. C. Taylor’s *The Moment of Complexity: Emerging Network Culture* are known as the primary texts of complexity theory.

theory, the dissertation examines how scientific fiction illuminates and reproduces a variety of interactivity both within and among systems.

In understanding contemporary cultural trends, complexity theory basically agrees with some principles of postmodernism, such as the emphasis of difference and the rejection of totality. Yet complexity theory foregrounds more creative and positivistic possibilities of the network culture through the amalgam of scientific thoughts and philosophical insights. Viewing the world as a large complex system composed of “complex, self-organizing adaptive systems,” complexity theory explains that complex systems “possess a kind of dynamism that makes them qualitatively different from static objects, such as computer chips or snowflakes, which are merely complicated” (Waldrop 11-12). The dynamism of a complex system gains “the ability to bring order and chaos into a special kind of balance” and “[t]he balance point—often called *the edge of chaos*—is where the components of a system never quite lock in place, and yet never quite dissolve into turbulence, either” (Waldrop 12, italics in original). The dynamism that complexity theory conceptualizes is what the dissertation tries to point out in analyzing scientific fiction novels so as to claim that the viewpoint of complexity theory is more positive than any other recent cultural and social view. Considering the dynamism of complexity theory, the dissertation attempts to answer the following questions: how can we define human beings in the complex system of our culture?; how can the relationship between the self and the other be conceptualized within the frame of complexity theory?; based on the answers to the previous two questions, how are we expected to behave and what would be the ethical criteria in the moment of decision

making ?; in the new concepts of ourselves and the world, then, how do we sense and create aesthetics? Through answering those questions, the dissertation will show how differently the concept of complexity theory can suggest human subjectivity and the cognition of reality. Nonetheless, it is not the construction of a new world, but a new understanding of the world. Fundamentally, through the dissertation, I propose that we are not in “schizophrenic structures”³ but are “connected” to “complex, self-organizing, adaptive systems,” and that the reality that we perceive in this ontological condition is not disappearing into simulacra⁴ any more but reappearing as the inseparably interactive compound of the actual and the virtual.

Introducing terms and concepts used in this dissertation and mapping theoretical territory to which the dissertation belongs, this chapter investigates how “complexity” is brought to the attention of scientists and cultural theorists and thus how their concerns towards complexity produce complexity theory. Then by surveying the understandings of the relationship between science/technology and humanities, particularly literature, this chapter examines how science/technology studies and literary studies interface, forming the feedback loops among technoscience, literature, and culture. All these investigations are designed to suggest scientific fiction as a genre, which can make visible the feedback loops among technoscience, literature, and culture. In fact, the feedback loops among technoscience, literature, and culture, this dissertation argues, are

³ The discussions of “schizophrenic structure” are often found in postmodern theories. See Fredric Jameson’s *Postmodernism, or the Cultural Logic of Late Capitalism* and Gilles Deleuze and Felix Guattari’s *Anti-Oedipus: Capitalism and Schizophrenia*.

⁴ To see further discussion of reality and simulacra, refer to Jean Baudrillard’s *Simulacra and Simulation*.

a manifestation of the emergence of the complexity paradigm in our technoscience culture.

2. Complexity Theory: A Complex Marriage of Science and Cultural Studies

Classic science pursues universal laws of nature through the reductive process of simplification, and complexity presents a constant stumbling block to this process. But with the emergence of the new science where priority is given to the creativity of disorder or chaos, complexity becomes a major subject of science. Indeed, the scientific paradigm shifts from simplification to complexity, forming the science of chaos and the science of complexity.⁵ For the new science, “chaos does not refer to inherently random or wholly disorderly phenomena that lie beyond our rational grasp” (Reed and Harvey 359). Instead, chaos is an incredibly complex and unpredictable system, which can produce multiple variables through nonlinear, self-organizing dynamics among components of a system. Therefore, chaos is not the opposite of order but the prior phase to order. In this sense, chaos, which has infinite potential, can be understood as a type of complexity. Based on this understanding of chaos and complexity, the new

⁵ Both the science of chaos and the science of complexity are the products of the new science that modifies the reductionism and linearity of classic science. Chaos theory, which claims that there is order in disorder, has brought about a new breadth to scientific, social, and cultural knowledge and perception. Following chaos theory, complexity theory emerged, emphasizing the complexity of the chaotic world. Complexity theory is both related to and different from chaos theory. Although they share similar concerns about chaotic systems, their way to access chaos is a little different: while chaos theory is concerned with the order hidden in the chaotic system, complexity theory is concerned with the order that arises out of chaotic system. In other words, complexity theory focuses on interconnectivity and interactivity between systems in order to see how to organize systems rather than what constitutes systems. As Stuart Sim claims, “complexity takes chaos further, to argue that systems further a high degree of self-organization” (90). Chaos theory and postmodernism cooperate with each other based on their common worldview in seeing reality as disorderly order. However, complexity theory tends to extend its reach outside science without cooperating with other cultural theories.

science becomes concerned with the immediate experience of a chaotic-looking world and of the complex structures that constitute it. As Ilya Prigogine and Isabelle Stengers claim, the scientific worldview also helps us “find ourselves in a world in which reversibility and determinism apply only to limiting, simple cases, while irreversibility and randomness are the rules” (8). Such a sociological view presented by scientists affirms the emergence of the interface between hard science and social science, which is a characteristic of cultural studies for the technoscience culture.

The science of chaos and complexity is based on the assumption that collective behavior and complex phenomena have patterns of activity, which form “a common theoretical framework for complexity that would illuminate nature and humankind alike” (Waldrop 12). Chaos theory and complexity theory study the patterns in chaotic/complex systems. Particularly, paying attention to interconnective and interactive dynamics between subsystems, complexity theory holds that complex systems created and sustained by the dynamics are spontaneous, nonlinear, self-organizing, and adaptive. Complexity theory sees the world as a large complex system, believing that this worldview allows us to “understand the spontaneous, self-organizing dynamics of the world in a way that no one ever has before” (Waldrop 13). In an attempt to establish complexity theory as a fitting theoretical framework for cultural studies, Mark C. Taylor recounts the characteristics of complex systems as the following:

1. Complex systems are comprised of many different parts, which are connected in multiple ways.

2. Diverse components can interact both serially and in parallel to generate sequential as well as simultaneous effects and events.
3. Complex systems display spontaneous self-organization, which complicates interiority and exteriority in such a way that the line that is supposed to separate them becomes undecidable.
4. The structures resulting from spontaneous self-organization emerge from but are not necessarily reducible to the interactivity of the components or elements in the system.
5. Though generated by local interaction, emergent properties tend to be global.
6. Inasmuch as self-organizing structures emerge spontaneously, complex systems are neither fixed nor static but develop or evolve. Such evolution presupposes that complex systems are both open and adaptive.
7. Emergence occurs in a narrow possibility space lying between conditions that are too ordered and too disordered. This boundary or margin is “the edge of chaos,” which is always far from equilibrium.
(Moment 142-43)

Taylor here integrates terms and concepts of complexity scattered among science studies and social sciences. In fact, because it first emerged in science studies, complexity theory is still new for cultural studies. But through his work of integrating the terms and concepts of complexity, Taylor assures critics, writers, and artists that complexity theory

is an adequate theory to model our technoscience culture. Critics, writers, and artists are those who represent the complexity of our time and even participate in increasing the complexity through their works: in other words, they work under the complexity paradigm. To the extent that the world is conceived of as a complex system, every discursive and creative moment is the moment of complexity, which is the very moment that this dissertation pursues to engage in, too. The moment is neither a completely abstract, immaterial, and nonhuman moment, nor completely a substantial, material, and human one; rather, it is a material-nonmaterial, human-nonhuman, physical-metaphysical moment. The dissertation attempts to establish complexity theory as an adequate framework to view the interfacial cultural context of our age and to configure the cultural epistemology of the complexity paradigm.

The science of chaos and complexity are often called “postmodern science” in that they deny reductionism of classic science and value difference and multiplicity in systems: postmodernism rejects reductionism, which has formed hierarchical relationships among components of a system and also made metanarratives possible. However, complexity theorists, including Bob Price and Taylor, claim that to call the science of chaos and complexity “postmodern science” is a mistake (Price 3). In “The Myth of Postmodern Science,” Price argues that while postmodernists reject the entire concept of science as flawed and incorrigible, scientists and theorists of chaos and complexity see that “‘science’ is not the problem, but [the] classical science is” (7); they want to “reconstruct” science while postmodernists want to “deconstruct” it (14). In sum, scientists and theorists of chaos and complexity reject reductionism employed by

classic science, but they do not deny rationalism and positivism of science. For them, the situation of post-industrial or technoscience society is “not hopeless” since “science is not incorrigible” (Price 8). In this sense, they cannot agree with the postmodern relativistic position that “reality per se is subjective and contingent” (Price 9). Despite such efforts of science theorists to differentiate the science of chaos and complexity from postmodern science studies, however, cultural articulations emerging from the postmodern context still tend to subjugate complexity theory to the theoretical framework of postmodernism in order to account for the complexity of technoscience milieu.

Emphasizing affinities between the new science of chaos and complexity and articulations pertinent to the postmodern context, N. Katherine Hayles characterizes the postmodern context as “an emergent awareness of the constructive roles that disorder, nonlinearity, and noise play in complex system” (Hayles, “Complex Dynamics” 5). She maintains that this awareness is accompanied with the realization of coercive structures of order and stability, which have established hierarchical social and cultural systems. In this way, she appropriates the new science to “denature” our cultural context, promoting the realization that “what has always been thought of as the essential, unvarying components of human experience are not natural facts of life but social construction”: Hayles calls the realization “cultural postmodernism” (*Chaos* 265). Grounded in the concept of chaos and complexity provided by the new science, she claims that cultural postmodernism re-visions the world as dynamic, nonlinear, and thus unpredictable: in that world, parts come together and mutually reinforce each other, producing

complexity. This claim is what complexity theory offers as the nature of the world or of the technoscience culture. However, Hayles's accounts of cultural postmodernism do not fully explore why the worldview of complexity theory must be located within the theoretical framework of postmodernism.⁶

In order to account for the complexity of the postmodern context, Paul Cilliers tries to rearticulate postmodern issues in terms of complexity theory. Cilliers argues that a multiplicity of postmodern discourses reflect “an acknowledgement of complexity” (116). There is, however, a major difference between postmodernism and complexity theory—that is, their understandings of the whole. Both postmodernism and complexity theory reject totality. Yet, regarding this anti-totality, whereas postmodernism denies the concept of the whole, complexity theory champions the idea of a complex system working as a whole: complexity theory offers the possibility of non-totalizing whole, which postmodernism does not. Yet Cilliers tries to blur this difference between the two theories by offering Jean-Francois Lyotard's notion of “paralogy” as evidence to show how postmodern discourses produce networks with other discourses. Lyotard proposes

⁶ Relatively early, Hayles became concerned with the science of chaos and complexity and attempted to apply it to literary and cultural studies in terms of postmodernism, as shown in her works published in the early 1990s: *Chaos Bound* (1990) and “Complex dynamics in Literature and Science” in her edited book, *Chaos and Order* (1991). In *Chaos Bound*, she asserts that “poststructuralists appropriated [chaos] to subvert order” whereas “scientists see chaos as the source of order” and attempts to open an intellectual path that crisscrosses the two ways of appreciating chaos—and complexity—through her accounts of “cultural postmodernism” in order to articulate the complexity of our technoscience culture (176). However, she does not concretely suggest the intellectual path until she begins to distinguish her understanding of complexity from postmodernism in the late 1990s. In offering a new understanding of the “posthuman” in *How We Became Posthuman* (1999), she criticizes a postmodern tendency to downplay materiality and claims the interconnective relationship between the discursive and the material. Through the new understanding of the posthuman, she seems to recognize the need for a new way to articulate our technoscience culture—rather than the expansion of postmodernism. Considering Hayles's recent works, such as “Commentary: The Search for the Human” (2005) and *Electronic Literature* (2008), which use the terms and concepts of complexity theory, her idea of the intellectual path to crisscross science and humanities meets complexity theory. My critique of Hayles's cultural postmodernism here is based on her early works that directly deal with the concept of complexity.

“paralogy,” the search for imaginative new insights into existing theories by noting anomalies and paradoxes, as an essential element of the postmodern condition, arguing “incredulity toward metanarratives” (xxiv). Cilliers contends that this function of paralogy has similarity with that of “self-organized criticality,” “the mechanism by which networks diversify their internal structure maximally,” in a complex system (117). However, although both the paralogy of postmodernism and the self-organization of complexity theory are dynamics which bring about multiplicity and decentralization of systems, this paralleling seems overdone in a fundamental sense. While self-organization in complexity theory is a means to sustain a whole, Cilliers’s postmodern understanding of self-organization, as paralogy, functions to collapse the concept of the whole, or metanarrative. Considering this difference in the position of complexity theory, Taylor asserts “the well-known postmodern critique of meta-narrative is wrong” (Rickert and Blakesley 816). Moreover, as David Byrne points out in the review of Cilliers’s book *Complexity and Postmodernism*, Cilliers’s postmodern comprehension of complexity has an ultimate difference from complexity theory in the understanding of science. Lyotard’s paralogy is based on the postmodernist programme as a general deconstruction of science and knowledge. Likewise, Cilliers also perceives science in the sense of “constructed general theory,” unlike complexity theory emerging from real science (par. 5). Cilliers’s insight into the complexity of our cultural context is compelling, but his attempt to use the postmodern theoretical framework in articulating the complexity seems far-reaching.

As shown in the cases of Hayles and Cilliers, however, postmodern science studies and complexity theory are both related to and different from each other. This dissertation deems that complexity theory is not anti-postmodernism, but rather it is post-postmodernism, a modification of previous science and cultural theories, including chaos theory and postmodernism. In *Complexity and the Social Sciences*, David Byrne formulates the position of complexity theory in the map of cultural studies: “the linear and reductionist as a thesis, postmodernism as an antithesis and complexity as a synthesis” (45). This dialectical formulation is not a historical account of the development of scientific knowledge and of the knowledge of social actions, but rather it is an outline to show the formation process of complexity theory. Complexity theory, in fact, is in interconnective relations to previous paradigmatic theories. Accordingly, it is probably not proper to emphasize the difference of complexity theory as a cultural theory from others, but, at the same time, it is necessary to do so in order to appraise its value as a theoretical framework to envision a new paradigm emerging in the technoscience culture—the complexity paradigm. The dissertation suggests that the human is facing the new paradigm and we need new terms and concepts to articulate it, arguing that postmodern science studies cannot adequately cope with the dynamics and complexity of the new paradigm.

In order to claim a paradigm shift in our technoscience culture and further explore the emerging complexity paradigm in terms of complexity theory, this dissertation purposely limits the theoretical reach of postmodernism although Hayles and Cilliers try to offer the possibilities—which feel contrived— that postmodern science

studies may be extensively used to articulate the complexity of the current cultural context by borrowing terms and concepts from complexity theory. This dissertation sees that postmodern epistemology, rejecting the integration and totality of modernism, is pertinent to such concepts as fragmentation, rupture, and discontinuity, and that complexity theory is a new insight into the dynamism of interconnection and interaction, reflecting and observing the epistemological framework of the complexity paradigm. Postmodern science studies contend that meaning is created by dismantling the existing orders/hierarchical systems and emphasizing the differences of the deconstructed components of the systems, but complexity theory sees that meaning is created by interconnections and interactions between subsystems and between subsystems and the whole. By calling into question science's reductionism and linearity—rationalism per se—, postmodern science studies challenge the traditional concept of knowledge and claim the social construction of science/scientific knowledge. For this postmodern position, all knowledge is necessarily ideological and reality per se is subjective. Such characteristics of postmodern science studies reinforce relativistic—as a result, nihilistic—views in cultural understandings. However, complexity theory, modifying the belief of classic science in reductionism and linearity, claims that “there is reality ‘out there’ although it recognizes that complex interactions can obscure that reality” (Price 8). For that stance of complexity theory, the rationalism of science is a necessary method to discern a reality and to infuse empirical and (thus) positive views into cultural understandings, in which a metaphysical nihilism is pervaded. The dissertation focuses the empirical and optimistic view found in scientific fiction, critiquing the relativistic

and nihilistic view of postmodernism. The next section explores how technoscience studies and literary studies have tried to make or perceive feedback loops, on which scientific fiction is founded.

3. Feedback Loops between Science/Technology, Literature, and Culture

Around fifty years ago, C. P. Snow deplored, as a major hindrance to solving the world's problems, the breakdown of communication and thus "a gulf of mutual incomprehension" between science and the humanities—in particular, literature—expressing their relation in terms of a dichotomy: "Literary intellectuals at one pole—at the other pole scientists, and as the most representative, the physical scientists" (4). As Snow noted, there was still a traditional master-slave relationship between science and literature in that dichotomy: that is based on the Western intellectual tradition of privileging reason over imagination and the assumption that literature is a cultural consumption of truth revealed by science. But the terms of the dichotomy have evolved in the years since to build a bridge between science and literature and, as a result, science and literature are now viewed —especially by the postmoderns— as similarly constituted practices embedded in culturally and historically contingent formations. Since the dissertation ultimately maintains that the way to understand the relationship between science/technology and literature is related to the epistemological framework of contemporary culture, I will here outline recent studies that influence the reconfiguration of the relationship between science, literature/humanities, and, further, culture, to grasp

how the epistemological framework of the complexity paradigm has evolved around that relationship.

The emergence of the sociology of scientific knowledge in the 1970s brought about a big change in science studies. While traditional sociology of knowledge focuses on how, and to what extent, science influenced society and history, the sociology of scientific knowledge claims science's social, historical contingency. The sociology of scientific knowledge contends that the focus of the philosophy of science shifts from knowledge to practice, denying science as "a single unitary entity" and claiming "the multiplicity, patchiness, and heterogeneity of the space in which scientists work" (Pickering 8). For the sociology of scientific knowledge, therefore, scientific knowledge is the product of a particular culture, and scientists inescapably bring the assumptions of the paradigm constructed by their scientific and cultural community to bear on the questions they ask and the phenomena they perceive. Based on this perception about the sociality of scientific knowledge, feminism criticizes normativities supported or constructed by gendered scientific knowledge, and reads "science as a text in order to reveal the social meaning—the hidden symbolic and structural agendas—of purportedly value-neutral claims and practice" (Harding 18). The sociology of scientific knowledge and feminism's culturalizing of scientific knowledge make science close to literature by revealing that scientific texts are as amenable to critical analysis as any work of imaginative literature.

Donna Haraway furthers this feminist view about science by dismantling the traditional distinction between fact and fiction. In *Primate Visions*, Haraway claims that

“the history of science appears as a narrative about the history of technical and social means to produce the facts. The facts themselves are types of stories” (4). In this way, Haraway connects science as narrative to science fiction, emphasizing that both of them are in “a territory of contested cultural reproduction” (5). However, Haraway remains wary of claims of nature being reducible to narrative, or science to signs; it is important to Haraway not to operate such a reduction, but to hybridize different categories.

Haraway suggests the image of a cyborg as a hybrid of heterogeneous categories, such as science and narrative, or the material and the semantic: for her, a cyborg is a material-semantic being that illustrates the connection between scientific, literal, and cultural issues without annexing reality to discourse. The concept of the hybrid is acclaimed as an inclusive approach to the networks of current technoscientific culture. But some critics emphasize interactivities between science and narrative/literature rather than their hybridization, expressing an apprehension that valuing hybridization can give rise to “unpleasantly self-conscious form of scientific art or artistic science” (Wilson 211).

In *Consilience: The Unity of Knowledge*, Edward O. Wilson points to complexity as the common characteristic of science and literature, stating “[t]he love of complexity without reductionism makes art; the love of complexity with reductionism makes science” (54). He suggests that there is a complementary relationship between science and art/literature, which allows them to keep their separate strength, rather than hybridizing them: “Science needs the intuition and metaphorical power of the arts, and the arts need the fresh blood of science” (211). Wilson proposes interpretation as “the logical channel of consilient explanation between science and the arts,” which have

different goals and methods, in that interpretation expresses both “the factual expertise of the critic” and “his character and aesthetic judgment” (211). Likewise, J.L. Howarth regards science and literature as different forms of interpreting “reality”: science interprets “reality” by thinking about and narrating “a model of the part of the universe of experience with which we are dealing,” and literature does so by narrating images of the universe of our experience (181). In this way, Howarth, like Wilson, outlines the disciplinary differences. For Wilson and Howarth, the differences serve to produce mutual enrichment, but neither critic expands the discussion of consilience between science and literature into the scope of cultural discourses.

Current postmodern literary criticism tends to use science to restore the place of literature, denying the literature of exhaustion.⁷ William R. Paulson tries to reestablish the place of literature in culture by connecting information theory and cognitive processing to the criticism of literature. He claims literature is “the noise of culture” in that it functions as “a perturbation or source of variety in the circulation and production of discourses and ideas” (*Noise* ix). By so doing, he shifts the role of literature from “the leading edge of the trash phenomenon” to “communication crafted to maximize the positive role of noise” (Hayles, “Complex” 20).⁸ Paulson expects that the new role of literature supported by science can give rise to “new forms of explanation, new articulations between levels of phenomena in a world of emergent complexity” (“Literature” 49). However, the expectation is achieved by placing literature as the noise

⁷ 1960s’ postmodern critics and writers, such as John Barth and Philip Roth, retreated literature into “narrower and more sterile byways of linguistic, stylistic, and formalistic experimentation,” which Barth called “literature of exhaustion” (Porush, “Fictions” 77).

⁸ The passage, “the leading edge of the trash phenomenon,” is from Donald Barthelme’s *Snow White* (103). It is often used to indicate the understanding of postmodern literature in the 1960s.

of culture in “the margin” (Paulson, *Noise* 180). In other words, the “hierarchical gap” between science and literature still remains in Paulson’s vision (Paulson, “Literature” 50).

David Porush refuses the idea that literature is marginal. Rather, Porush contends that literary works come to “be understood as a superior form of describing what we know” thanks to the science of complexity—particularly, its concept of dissipative structure: he claims that literature, like the dissipative system, “acts as a self-organizing system, growing willy nilly through bifurcation points towards higher orders of systematic organization” (“Fictions” 76-77). In his view, literature is no longer in competition with science in describing reality, but rather it has a complementary relationship with science. Further, this view shows that the concept of complexity helps challenge the usual idea of the flow of influence from science to literature, and that the connection between science and literature is no longer metaphoric to the extent that the boundaries between them get blurred in their complementary relationship.

Hayles holds that the complementarity of science and literature is essential in the technoscience age: “[t]he literary texts often reveal, as scientific works cannot, the complex cultural, social, and representational issues tied up with conceptual shifts and technological innovations” while “[t]he scientific texts often reveal, as literature cannot, the foundational assumptions that gave theoretical scope and artifactual efficacy to a particular approach” (*Posthuman* 24). Therefore, the study of literature and science together should be taken as “an area of specialization” rather than “a subset of cultural studies or a minor activity” to understand ourselves who are “embodied creatures living

within and through embodied worlds and embodied words” (*Posthuman* 24). The dissertation offers scientific fiction as the “area of specialization” of cultural studies. Scientific fiction straightforwardly shows the complementary relationship of literature and science and the complexity paradigm based on the comprehensive understanding of that relationship.

4. Scientific Fiction: Novel Perspectives of the New Paradigm

I suggest scientific fiction neither as a subgenre of science fiction nor as a way to re-read science fiction or literary works dealing with science and technology. Rather, I categorize as “scientific fiction” literary works that understand the interconnective and interactive dynamics of the technoscience culture and value the complexity produced by the dynamics: they function as as observers and participants of the complexity paradigm. Based on this definition of scientific fiction, various science fictions and works from other genres are within the scope of scientific fiction: from Mary Shelley’s *Frankenstein* to recent cyberfictions and cognitive fictions and to hypertexts. Scientific fiction as a transdisciplinary practice creatively uses the interconnective dynamics of the complexity paradigm and it creates the context that energizes the dynamics.

The dissertation differentiates scientific fiction from postmodern understandings of science fiction in order to emphasize the critical characteristics of scientific fiction. Postmodern science fiction—particularly, cyberpunk, a subgenre of science fiction appropriating information science and technology— interestingly imagines how far the boundaries of the human subject can be expanded by technologies and questions how the

redefined subject will live in a world where the boundaries between human and nonhuman beings blur. Due to its collaboration with postmodernism, science fiction, or narrowly cyberpunk, is regarded as an agent of postmodernism seeking discontinuity or disconnectivity.⁹ In the same vein, Rosi Braidotti claims that science fiction is “all about displacement, ruptures and discontinuities” (*Metamorphoses* 182). Postmodern science fiction conceives of science and technology as deepening the discontinuity/disconnectivity only to produce “high-tech paranoia” (Jameson 38). Indeed, postmodern writers, such as William Burroughs and Thomas Pynchon, “confront in their fiction the incompleteness and narrowness of science both thematically and in their deployment of literary style”—for instance, discontinuity, ambiguity, and collage (Porush, “Hacking” 109). Such distrust of science and technology is rooted in the anti-rationalism and relativism of the postmoderns. The postmodern relativistic and anti-rational viewpoint results in a schizophrenic understanding of our cultural condition in which the fragmentation of the human subject, rather than the coherence of the subject, is more persuasively discussed and in which universal ethics is no longer valid.¹⁰ Under the influence of the postmodern epistemology, science fiction thematizes and stylizes in its texts the fragmentation of the subject and the absence of ethical codes, reflecting postmodern nihilism.

⁹ In *Constructing Postmodernism*, Brian McHale insists on “[t]he cycling of materials between cyberpunk SF and postmodernist mainstream fiction,” using the phrases, “postmodernism recycled as cyberpunk” and “cyberpunk recycled as postmodernism” (229-36).

¹⁰ See Fredric Jameson’s *Postmodernism, or the Cultural Logic of Late Capitalism* for the fragmentality of the subject and the discussion of the schizophrenic; for postmodern ethics, see Zygmunt Bauman’s *Postmodern Ethics*.

However, despite similarities to postmodern science fiction such as descriptions of the cybernetic technology-sutured life, scientific fictions, including Pat Cadigan's *Synners*, Greg Bear's *Blood Music*, Marge Piercy's *He, She and It*, and Shelley Jackson's *Patchwork Girl* present more optimistic views. Scientific fiction perceives and reinforces the impulse of (inter)connectivity inherent in the network culture of our technoscience age, describing the world as a dynamic system composed of "complex, self-organizing, adaptive systems" rather than the collection of fragmented units (Waldrop 11). In this understanding of the dynamics of the complexity paradigm, science and technology are no longer used as a metaphor for disconnectivity/discontinuity, but rather they are media that connect the subjects to other systems. In this vein, scientific fiction accepts the changed relationship between the human and science/technology from a subject-object to "a subject-subject relationship, in which not only does the human being form the technological agent, but the technological agent also forms the human being" (Qvortrup 90). The favorable stance about science and technology also reflects the importance of science and technology as essential epistemological elements in the complexity paradigm. However, the favorable stance of scientific fiction toward science and technology does not necessarily mean that scientific fiction is technophilic: scientific fiction is neither utopian nor dystopian for the future of the technoscience culture. Its focus is on how the (post)human co-evolves with technoscience rather than how technoscience improves (post)humans and our environments or how we should keep our humanity from technoscience.

Based on such distinctive views of scientific fiction, I examine how scientific fiction novels articulate humanity, human subjectivity, ethics, and aesthetics, and how the articulations can show the emergence of the network culture and the complexity paradigm. Chapter II analyzes *Synners* and *Blood Music* to delineate how science and technology both materially and discursively affect the construction of the subject. In doing so, I redefine the human subject as an informational-material being, and reclaim the possibility of agency in accounting for the dynamics underlying the human subject. Furthering the discussion of the subject by representing the physiologically and psychologically obscure demarcation between human beings and technological monsters (cyborgs), Chapter III traces how Piercy's *He, She and It* explores an ethical dilemma generated by the technoscience culture: how would the subject live as/with a human-machine conscience or a technological monster? Through the analysis of human beings' ethical relationship with technological monsters (cyborgs) in the novel, I attempt to configure a new ethics for technoscience culture. I link this text with Mary Shelley's *Frankenstein: or, the Modern Prometheus* to examine their intertextual complexity made possible by the new ethics. In Chapter IV, to suggest hypertext as a practical reaction of literature toward the new paradigm, I examine Jackson's hypertext *Patchwork Girl*, which rewrites Shelley's *Frankenstein* in the technoscientific narrative environment. By examining the "hypertextuality" that the electronic novel explores and also by focusing on the creative dynamics of the hypertextuality, the chapter discusses new aesthetic ideas provided by the complexity paradigm. The analyzing focus of all chapters is on how each scientific fiction novel perceives and appropriates interconnective and interactive

dynamics between systems—whether between humans, between human and machine/technology, between individuals and social systems, or between different textual elements— and the complexity produced by the dynamics. The dynamics and complexity read in the novels will be appreciated to claim the existence of the strong feedback loops between technoscience, literature, and culture and the emergence of the network culture and the complexity paradigm.

CHAPTER II

THE POSTHUMAN CONDITION AND SELF-ORGANIZING SUBJECTIVITY

IN THE COMPLEXITY PARADIGM

It is an undeniable fact that tools and machines—or, technology—are “part of the process of natural selection, giving humans an advantage in their evolutionary struggle” (Mazlish 216). The familiar theme of “man tool maker,” reflecting human beings’ biological uniqueness and intellectual superiority, has long dominated human understanding of the relationship between humans and the rest of the world as well as technology. Examining epistemological changes of human beings in evolutionary terms, Bruce Mazlish affirms that humans come to realize that we are not in a privileged position, but in intimate connections with machines. He argues that that is the fourth discontinuity that the human race is recently breaking up: the discontinuity between human and machine.¹¹ There have been considerable physical and metaphysical symptoms of the inseparable relationship between humans and machines. Particularly, information theory and technologies, affecting dramatic changes in human life, have brought about a new context for humans, and now humans need to reconfigure themselves in that new context. Mazlish expects that once humans break the discontinuity between ourselves and machines, humans can “move closer to reality and away from disabling fantasy” (4). Then, how will the reality in which the discontinuity

¹¹ Mazlish addresses that there have been breakdowns of discontinuities that have constituted human pride. Citing Sigmund Freud and Jerome Bruner, he states that through “three smashings of the ego, humans are placed on a continuous spectrum in relation to the universe, to the rest of the animal kingdom, and to themselves”: Greek philosophers and Copernicus’s heliocentrism, Darwin’s evolution theory, and Freud’s theory of continuous ego and unconsciousness (4-5). According to him, recently humans have begun breaking a fourth and major discontinuity: human and machine.

between humans and machines vanishes be like, and how can we articulate what it is to be the human and its subjectivity in that reality? This chapter attempts to answer these questions by examining scientific fiction modeling novel conditions of the human in the new context, looking over posthuman discourses to get away from the arrogant fantasy that human beings have about our position in Nature—distinctive and privileged reason.

Martin Heidegger was a leading philosopher who speculated on the relationship between human and technology in terms of human ontology. He denied the instrumental understanding of technology and insisted on technological enframing (*Gestell*) of being in “The Question Concerning Technology,” emphasizing his claim that the essence of technology was not technological. Heidegger argued that technology should be understood as “a way of revealing the totality of beings” (Krell 309). According to him, the human is a being thrown into the world, which comes to be a dwelling in its infinite totality. Modern technology and science become located deeply and fundamentally in what it means to be human and to engage in the world. Therefore, to understand science and technology is a way to reveal the totality of beings. Considering its caution about the possibility that the human can be enframed by technology, it can be said that this view embeds a technophobic stance that resists technology/science’s power to dehumanize and objectify. However, Heidegger’s contribution to science/technology discourses is not his caution against potential dangers of technology, but rather his notice of the innate power of technology as an integral element in constituting the human subject. In addition to such philosophical consideration for technology as constitutive, recent science and technologies make human beings physically and metaphysically

experience transition and metamorphosis. Such discursive and material changes in understanding the relationship between human and science/technology call into question old issues about humanity: what is human nature and how is it scientifically described and symbolically reproduced? These questions, however, imply a similar yet more essential question, “what does it mean to be human?”

Ironically, the question of “what it means to be human” coemerges with discourses of “the end of man.” Human’s epistemological and ontological changes are too radical to keep the old concept of humanity, and thus a new definition of humanity is required. Michel Foucault claims that “Man is an invention of recent date. And one perhaps nearing its end” (*Order* 387). He sees “man” as a product of *épistème*—or, *paradigm* in Thomas Kuhn’s term—of a period, and, in this sense, the end of man implies the change of the paradigm. Foucault means that our contemporary paradigm no longer accommodates the agential subject formed in Western culture since the eighteenth century (the Modern age)—that is, the conscious and coherent self that produces meaning and actions. Foucault’s provocative remark of “the end of man” represents postmodern deconstruction of liberal humanism. Interrogating, or promoting, collapses of metanarratives including liberal humanism, postmodern critics have suggested new insights into the relationship between humans and the rest of the world. They replace the traditional idea of the human subject, the agential self, with such consequential concepts of their deconstructive remapping of cognition as “multiplicity, heterogeneity, difference, and ceaseless becoming” (Schrag 8). In this postmodern understanding of

the human subject, humans cannot claim any more the ontological purity of human beings since human nature itself is “an evolving identity” (Mazlish 7).

The deconstruction of the subject comes to flourish with the advent of technological reconceptioning of humankind. Such neologisms as cyborg, metamen,¹² and homo datum¹³ are attempts at the technological reconception of the human. By modeling the human beyond homo-sapiens, these terms manifest that humans face a new stage of evolution and need new articulation for the new humanity. Ihab Hassan names this emergent view of humanity as “post-human” coming after the end of “the five hundred years of humanism” (843). This word is authorized, as a constellation of discourses of “the end of man,” by self-proclaimed posthumanists, such as N. Katherine Hayles, who notice interactions between postmodernism and science/technology changes: science studies also question the universality of knowledge, and weigh in on knowledge’s locality and situatedness.¹⁴ Such postmodern influences on science studies promoted discourses about posthumanism to be constructed in more scientific and technological concepts and terms. More specifically, the question of “what it means to be (post)human” becomes how to understand humans as a constitutive of the technoscience milieu.

Technology modifies the concept of the human, making ‘natural’ aspects of human beings obsolete: technologies concerning the human body, such as cybernetics,

¹² Gregory Stock uses this neologism, which represents human nature evolving with the milieu, in his book *Metaman*.

¹³ Cadigan’s term to express the human as a being in informational networks.

¹⁴ This scholarly tendency was led by the sociology of science knowledge (SSK). SSK insists on science’s sociological aspects through empirical and naturalistic accounts of hard science. See *Science as Practice and Culture* (Andrew Pickering ed.).

biomedical technologies, and genetic engineering, come to implicate normative and exemplary humanity. For this human condition, posthumanism suggests “a human-technology symbiosis” as a human existential mode of the technoscience age (Haney 2). Donna Haraway’s statement, “The machine is in us, our process, an aspect of our embodiment,” is no longer science-fictional imagination in the technoscience age (*Simians* 180). Biotechnology, the convergence of technology and biology, literally begets the convergence of human and technology. Such convergences make the cyborg real. Haraway defines the cyborg as “a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction” (*Simians* 149). The concept of the cyborg, understanding humans as conglomerations of separate parts, dissolves traditional boundaries by denaturing the human. Indeed, the cyborg becomes the emblematic existential mode of humans in the posthuman age.

Andy Clark claims that “human beings . . . are *natural-born* cyborgs,” deepening the idea of the cyborg in the cognitive level: cyborgs, or “being human-technology symbionts,” are “thinking and reasoning systems whose minds and selves are spread across biological brain and nonbiological circuitry” (3). Genetics promotes the posthuman viewpoint by using such cyborgian metaphor in describing human biological nature. In *The Posthuman Condition: Consciousness beyond the Brain*, Robert Pepperell maintains that “there is no distinction between the mechanical and the organic when it comes to considering DNA” (10). Such blurring of the boundary between the mechanical and the organic is based on an assumption that human identity is essentially an informational pattern. In information theory, what is important is not the content of

information, but its constitution and flow. In this view, the ontological essence of the human as an information pattern, if any, cannot be natural and singular, but contingent and non-essential: the ontological attribute of the posthuman is contingency and fluidity.

Hayles argues that due to this contingency and fluidity, it is difficult to define what it means to be posthuman. Instead, presuming that humans already became posthuman, Hayles presents four points of view about the posthuman:

- 1) the posthuman view privileges informational pattern over material instantiation.
- 2) the posthuman view considers consciousness . . . as an epiphenomenon, as an evolutionary upstart trying to claim that it is the whole show when in actuality it is only a minor sideshow.
- 3) the posthuman view thinks of the body as the original prosthesis we all learn to manipulate.
- 4) the posthuman view configures human being so that it can be seamlessly articulated with intelligent machines. (*Posthuman 2-3*)

As shown in these four points of view of the posthuman, understanding the human as an information pattern increases the human identity's disembodiment, and, consequently, the disembodiment of the subject helps radical posthumanists, such as Hans Moravec, believe that human consciousness can be downloaded into a computer in the near future.

Although this radical anticipation of the posthuman is not yet realized, it reflects how persuasively the concept of posthuman as an information pattern is conceived.

The idea of downloading human consciousness into a computer is prevalent in cyberpunk fiction in which “the ontological hygiene between non-human nature, humans, and machines is tested to its limits” (Graham 127). Cyberpunk writers, such as William Gibson, Pat Cadigan Rudy Rucker, and Lewis Shiner, illustrate in their texts the human as an informational pattern theorized in posthuman discourses. In the world of cyberpunk novels, the human body is seamlessly conflated with machines, human consciousnesses can be easily uploaded into cyberspace, and artificial intelligence can perpetuate human consciousness: there is no distinguishable boundary between human and non-human, organism and machine. Indeed, through representation of such posthuman conditions, cyberpunk novels show that the universal and fixed subject of liberal humanism is unavailable as postmodern discourses of the subject claim: in this sense, cyberpunk is often considered to be the literary form of the postmodern.

Although they provide challenging models against traditional humanism through the denaturing of human ontology and experience, postmodern cyberpunk novels also reiterate features of liberal humanism by foregrounding the tendency to emphasize the consciousness or mind rather than the material body. In this way, postmodern cyberpunk fictions—whether intentionally or not—disclose the paradoxical attitude of the posthuman toward liberal humanism. Considering the fact that the posthuman fundamentally intends to be beyond the traditional humanism, the paradox is not desirable for the posthuman. The posthuman wants to suggest a *post*-humanism, one

that goes “beyond the exclusions of the false universality of the humanist self and beyond the moral vacuity of the excessive individualisms of the liberal self” (Vint 13). To redress the paradox of the posthuman, Hayles tries to redefine posthumanism: she argues that posthumanism is not anti-humanism, but rather a new humanism inheriting some properties from liberal humanism. Nonetheless, not to repeat mistakes of liberal humanism, such as hierarchical binarism between mind and body, she argues for the importance of the material embodiment. The embodied posthumanism emphasizes the materiality of the human subject, addressing that complexity produced by such a material embodiment makes humans different from intelligent machines (Hayles, *Posthuman* 283-84).

Whereas it is a fascinating project for technocrats, disembodiment is a fear for those who imagine a horrible future in which mankind is exterminated or dominated by the non-human through the unethical direction of science/technology development. Embodied posthumanism is in a compromising position between the two stances. As Elaine Graham points out,

The ‘end of the human’ need not necessarily entail a choice between ‘impersonal deterministic technologized posthumanism’ and ‘organic unmediated autonomous “natural” subjectivity,’ but may involve modes of post/humanity in which tools and environments are vehicles of, rather than impediments to, the formation of embodied identity. (199)

Scientific fiction, seeking complexity, embraces such a modified vision of the posthuman—embodied posthumanism. In other words, scientific fiction highlights the

interactive dynamics between “impersonal deterministic technologized posthumanism and organic unmediated autonomous ‘natural’ subjectivity” rather than dramatize conflicts over “a choice” between them. For scientific fiction, new technologies do not just involve “the making and remaking of bodies, but the making and remaking of world” (Featherstone and Burrows 2); human evolution is accompanied by social and cultural changes. Hence, it can be said that humans and the rest of the world are necessarily interconnected and, furthermore, interactive. Such understanding of the relationship between humans and the rest of the world reflects the complexity paradigm, which understands the relationship as complex adaptive systems.

The complexity paradigm is an epistemological tendency to see the world as a large system consisting of sub-systems that constantly interconnect with each other and with the whole. As systems, the human and cultural and social structures change and reorganize their components to adapt themselves to the problems and changes posed by their surroundings. In this understanding, it is possible to conceive beings beyond the discussion of embodiment and disembodiment. Besides advocating embodied posthumanism, scientific fiction makes models of new species of humans by recomposing complex structures of humans and non-humans. Because they sense the dynamics of interconnectivity and interactivity between and among systems, scientific fiction writers do not restrict their imaginative experiments with human evolution within existing ontology. In addition, such experiments of scientific fictions about human ontology can be a good base to support a “becoming subjectivity.” In short, the new

models of human species not only suggest future humanity but also describe a desirable subjectivity more concretely and plausibly than any theoretical accounts can.

In order to examine the dynamics of interconnectivity and interactivity and to figure out the human subject imagined in the complexity paradigm, the first half of this chapter will analyze Cadigan's *Synners* along with William Gibson's *Neuromancer*. But *Neuromancer*, as a representative work of postmodern cyberpunk, will be used to emphasize the difference of paradigm on which *Synners* is based. I do not argue that *Synners* is not a cyberpunk novel. Rather, it is not a *postmodern* cyberpunk novel whose foundational dynamics is disintegration and discontinuity, but a cyberpunk novel of complexity paradigm—a subcategory of scientific fiction. The process of this work will help illustrate epistemology and ontology of the complexity paradigm. *Synners*, as a scientific fiction novel, can function as an advanced theory book of the posthuman, reinventing the human subject through the insight into complexity.

The last part of this chapter will examine Greg Bear's *Blood Music* to further the discussion of the human subject in the complexity paradigm. Portraying a post-human world where human beings are transformed into an intelligent superorganism constructed by interconnectivities and interactivities between human and non-human, *Blood Music* focuses on how the individual subject can be articulated in relationship with social networks. In depicting the posthuman condition, the novel takes advantages of the vision of nanotechnology suggesting the possibility of disassembling and reassembling molecules of things, and thus constructing new entities. For nanotechnology, the human is also an information pattern that can always transit to,

transform, and incorporate into other organic and non-organic systems. Through the instability of the human subject that *Blood Music* depicts in the nanotechnological viewpoint, I will reinterpret the becoming subjectivity for the complexity paradigm. Such a reframing work of the human subject will reinforce the aim of this chapter—that is, to show how the technoscience culture reconfigures humanity and subjectivity in light of the complexity paradigm.

1. The Complexity of the Posthuman Condition in *Synners*: Postmodern Cyberpunk Vs. Complex Scientific Fiction

Cyberpunk novels explore on a full scale how “technology mediates our relationship with our own or other bodies” and how it “shapes our perceptions and cognitive process” (de Lauretis 167). Indeed, cyberpunk is a literary embodiment of the interactions between theory and practice—especially, postmodern theories and cybernetic technologies. Using cybernetic imagination, cyberpunk novels dramatize the human condition in contemporary technoscience culture, where human beings become machines and machines become humanized. In so doing, cyberpunk calls into question the traditional concept of humanity: Bruce Sterling, a well-known spokesman of cyberpunk literature, addresses cyberpunk as “a reaction to ‘standard humanist liberalism’” (qtd. in Hollinger 31). Such a critical aspect of cyberpunk has been supported by postmodern deconstruction of the subject, which challenges the

universality and fixity of the subject/self.¹⁵ Providing critical insights into the posthuman condition over technoscience culture, Cadigan's *Synners* and Gibson's *Neuromancer* have been taken as resources of postmodern discourses about humanity and subjectivity.¹⁶ However, in this chapter, I compare the novels to explore the different epistemological and ontological dynamics underlying the novels and thus to argue the emergence of the complexity paradigm.¹⁷

While many cyberpunk novels, including *Neuromancer*, present a postmodern paradigm based on disconnectivity and fragmentation, *Synners* demonstrates an emerging paradigm, complexity paradigm, which conceives phenomena in terms of the dynamics of interconnectivity and interactivity. Postmodern critics use *Neuromancer* to show how the universality of the subject in the traditional concept of the subject can be deconstructed and then rearticulated in terms of differences. Not furthering how the differences are working together within certain systems, postmodern cyberpunk as well

¹⁵ As in the cyberpunk issue of the *Mississippi Review* (47/48:8, 1988) where cyberpunk was characterized as "The apotheosis of the postmodern," many postmodern critics have seen cyberpunk as a literary embodiment of postmodernism (qtd. in Fitting 295). Brian McHale, Istvan Csicsery-Rona, Jr., Veronica Hollinger, Scott Bukatman, and John Chrisite also read cyberpunk as postmodern in some fashion. Postmodern critics interpret cyberpunk novels to exemplify "how technology and capitalism influence human ontology by generating a world of images that have no original referent" (Fair 92): the denial of the original referent leads to the denial of the universal and concrete self in postmodern discourses of subjectivity.

¹⁶ Their works deploy similar imageries of cybernetic culture, such as a blurring of the boundaries between physical and virtual reality, the human desire to transcend bodily limitation, and technological mediation of the relationship between the human body and consciousness. For these characteristics, critics frequently cite both novelists to conceptualize human conditions in technoscience culture.

¹⁷ *Neuromancer* and *Synners* are often compared by feminist critics to expose gender ideology embedded in contemporary technoscience. Anne Balsamo argues that "contemporary discourses of technology rely on the logic of binary gender identity as an underlying organizational framework to structure the possibilities of technological engagement" ("Forms" 234). Cyberpunk, which is dominated by male writers and male ideology, fully embodies the logic. On the other hand, *Synners*, as a work of the female writer, seems to avoid adapting the traditional gender ideology in describing technology: in this sense, the novel is regarded as a good resource for feminist critics to envision a post-gender world. But in comparing *Neuromancer* and *Synners* in this chapter, I try to articulate the difference between the novels in different terms and perspective from feminist ones in order to highlight the difference of paradigm, beyond gender ideology, on which the novels are founded.

as postmodern criticism tends to depict technoscience milieu nihilistically. In structuring the relationship between human and technology, however, despite similar concerns with postmodern cyberpunk, *Synners* describes the human condition in technoscience culture less nihilistically—if not positively—than other cyberpunk novels. The novel redistributes differences, observing the web of relationships between the differences. As a result, the processes of the redistribution produce complexity within the text and leads to the expansion of systems that the text constitutes thematically and structurally. That aspect categorizes *Synners* as *scientific fiction*, which realizes and reflects the complexity paradigm, distinguishing it from postmodern cyberpunk novels.

The dynamics underlying *Synners* is interconnectivity and interactivity while disconnectivity and fragmentation underlie *Neuromancer*. In *Neuromancer*, characters and events do not develop into complex relationships although they co-work for a project. Rather, they reconfirm fragmented relationships without any further change. On the other hand, in *Synners*, the human and the artificial cooperate to overcome a cybernetic crisis (an informational virus), and their co-working not only saves the net, a world subsuming cyberspace and the physical world, but also intensifies their relationship, creating a new entity (Markt). In this way, *Synners* perceives technoscience as a system that can interconnect and thus co-evolve with the human, and, further, it offers technoscience, or technology in a narrow sense, as the constitutive element of the human subject. Therefore, to examine a possible model of the posthuman subject that the complexity paradigm envisions, it is necessary to see first how the novel depicts technology as the constitutive element in articulating the (post)human condition.

a. *Technology*

In postmodern literature, technology is often considered an instigator of schizophrenic disjunction. In particular, media technologies, including computer and televisions, are criticized as one that “articulates nothing but rather implodes, carrying its flattened image surface within itself” (Jameson 37); technology furthers depthless fragmentation of the human subject. In this view, the relation between humans and technology is to be set as polar oppositions along a paranoid-schizoid axis, and thus their relationship is understood in terms of control. However, ironically, media technologies, particularly computer technology, are also expected to model complex relationships between humans and technology, furthering the interconnectivity and interactivity between them (Cilliers 24). While postmodern cyberpunk that follows the postmodern impulse of disconnectivity or disjunction tends to take the former position, scientific fiction that reflects the interconnectivity impulse of the complexity paradigm is concerned with the complexity produced by the human-technology combination.

Although in both *Synners* and *Neuromancer* technology is part of human life, the attitude of each novel toward technology is different. Cyberpunk novels, including *Neuromancer*, tend to fear the advancement of technology as David Porush explains: “cyberpunk reveals to what end technology seeks to control us at the same time that it dramatizes the cyberpunk apocalypse: we have met the enemy and he is us: we are the technology” (“Frothing” 257). Porush’s statement implies an anxiety about technology exercising dominion over human beings: the more technology becomes inseparable from

humans, the more it is threatening to humanity. This skeptical opinion is partially relevant to the origin of cybernetic technology developed in the process of developing antiaircraft predictors during World War II.

The technology called “antiaircraft” mechanizes patterns of pilots’ behaviors to predict the movements of enemy aircraft; by converting the human into patterns of information, it shows that humans can be under technological control. Norbert Wiener expanded the war technology into “a new science of control mechanisms in which the exchange of information would play a central role” (Galison 232). Conjoining with mathematics and computer science, the technology was established as cybernetics by Wiener. The essential end of cybernetics is the control and prediction of information. Cybernetic technology, including computer and information technologies, gives rise to both promise and fear for the human future: the promise comes from the expectation that technology could enhance human beings’ physical condition, and the fear from a science-fictional imagination that technology could master humans. *Neuromancer* foregrounds the fear of technology advancement by alluding to the possibility of technology to take control. In the novel, the controller and predictor of information is not humans but an AI (Wintermute), and the human characters hired by the AI are means for it to gain “autonomy.” The main plot of the novel itself is an AI’s quest for independence from human control.

The world of *Neuromancer* is full of the tension between humans and AIs. AIs keep making themselves smarter, and humans struggle to restrain them:

See, those things [AIs], they can work real hard, buy themselves time to write cookbooks or whatever, but the minute, I [Flatline] mean the nanosecond, that one starts figuring out ways to make itself smarter, Turing'll wipe it. Nobody trusts those fuckers, you know that. Every AI ever built has an electromagnetic shotgun wired to its forehead. (159)

Flatline exposes humans' distrust of AIs, which have the potential to reverse the hierarchical relationship between humans and technology. Wintermute and its management of the project to combine with another AI, Neuromancer, represent the threatening power of technology, and the Turing police, which monitors all AIs to keep them within the reins of human control, signifies that there are tensions between humans and technology. In this way, the relationship between the human and technology is defined in terms of control in *Neuromancer*. Flatline's statement ultimately betrays fear of a possible future in which technology dominates and controls humans.¹⁸ This cyberpunk imagination of humans' loss of control over technology assumes a lopsided perspective on technoscience culture: the perspective misses a point that the relationship between human and technology is not necessarily formed in terms of control or domination, and also that the relationship is too complex to explain with those terms.

Paul Cilliers poses two perspectives for modeling the complex structure of technoscience culture: scientific and philosophical perspective. The scientific

¹⁸ The theme of reversing the master-servant relationship of human-technology/science has been a kind of tradition of science fiction since the first science fiction novel, Mary Shelley's *Frankenstein*. In that novel, when the monster asks Dr. Frankenstein for its bride, the horror at the creature is maximized. George Slusser calls the situation the "Frankenstein barrier," which means "[t]he creature of the future is now present as object of horror in the eyes of a humanity that cannot accept its futurity" (48). The human's horror is that the future creature could move beyond human control.

perspective models the structure to predict and control its complexity. However, the whole notion of prediction and control become suspect since they do not fully explain the complexity of technoscience culture. *Neuromancer* adopts the scientific perspective, laying disproportionate emphasis on the control of technology and prediction of a possible future as the result of the control. In order to model the complexity of the technoscience culture, as Cilliers speculates, the approach to the complexity should go through “the shift from control and prediction to understanding” (13). The shift is toward the philosophical perspective from which “we can say that we wish to model complex systems because we want to *understand* them better” rather than to control and predict (13, italics in original). However, the request of the perspective shift does not mean abandoning the scientific perspective. The scientific perspective is needed to provide surface details that the philosophical perspective, emphasizing boundaries of an intellectual continent, tends to miss.¹⁹ In this aspect, Cilliers suggests the co-operation of the two perspectives for a sophisticated modeling. By harmonizing the two perspectives, *Synners* successfully models complexity systems: the novel, disposing scientific details in every nook and corner of the text, focuses on how we can understand complexity of technoscience culture rather than how we should control and predict it.

Synners is a story about music video creators (Visual Mark, Gabe, Gina, the Beater), hackers (Sam, Fez, and Keely), an AI (Art), and their cooperative fight against

¹⁹ Cilliers does not fully develop the two perspectives in his book. To justify his claim of the incorporation of the two perspectives in modeling complex systems, he states, “science without philosophy is blind, and philosophy without science is paralysed” (13). The idea of co-operation between the philosophical and the scientific is relevant to recent efforts of science studies to deconstruct the dichotomy of the rational and the social, or science and sociology. Bruno Latour’s *We Have Never Been Modern* and Helen E. Longino’s *The Fate of Knowledge* examine this scholarly trend.

an informational virus. All these characters and events are engaged with a newly developed socket technology, which is made from living tissue and enables the brain to share information with other socketers and the Net. Music video creators and consumers implant sockets into their brain to enjoy fuller experiences:

When the sockets are engaged, stimuli will induce these things directly, for the duration of the experience. The consumer plugs into the feature presentation—music video, movie release, commercial, standard TV fare—and undergoes a three-dimensional experience. . . . [S]ockets feeding into the temporal lobes will enhance whatever data come in. Interactivity again—the consumer can cooperate in the forming of the images. Useful for the games of any level of sophistication. . . . (66)

People need not wear any devices like hotsuits to enter the virtual reality since the virtual reality is directly enacted within their brain: sockets make it possible to interconnect between organism and machine and the real and the virtual. Besides, the socket technology improves the communication between creators and consumers. The technology does not just help exchange the content without leaking, but can make the original more sophisticated by varying images through the interactivities between creators and consumers—in other words, the technology represents how complexity is produced through interactivities between systems. Moreover, the socket implant can improve socketers' concentration and memory. Along with these benefits, the technology entails dangers. Because the technology directly impacts the neural system

of the human brain, it could cause problems on the human consciousness and the body (132). But problems, the novel recognizes, are not just physical:

I still say you're gonna have to go some fucking distance to turn public opinion on what looks like a faster, easier way of mind control and brainwashing, all that shit. There's still plenty of people around who believe that manic-depressives and the schizos and the migrainers and the epileptics and the narcoleptics and *all* those leptics are morally wrong to have little buttons in their heads to keep them even. Hell, there's still plenty that think test-tube babies are a fucking atrocity. (69)

Through the socket technology, this novel helps us contemplate moral effects as well as physical ones that the interface with technology can bring on. By mentioning test-tube babies, the novel tries to expand the matter into technology in general: interface technology is not just a future reality or fantasy, but it already exists in present technoscience culture as in the technology for producing a test-tube baby, bringing forth both benefits and dangers. *Synners* neither exaggeratedly celebrates the benefits nor dramatically counts the dangers as apocalyptic. The novel does not judge technology, but rather it seems to be interested in how humans should live within a given technological reality with both technological benefits and problems.

Unlike *Neuromancer*, which portrays technology with outlawed images of an underworld and counter culture, *Synners* is situated in a relatively common reality where people are concerned about the morality and legality of technology. The scene wherein the socket technology is examined for legalization is important to show the novel's

attitude toward technoscience. In that scene, possible benefits and dangers, including moral aspects, are discussed. An elder senator insists on the need to control technology:

You've done it, and something like this can't be undone. Like the start of the nuclear age, way back when. You can't stuff it back into the box and tell Pandora you'll get back to her when you're more . . . more *moral*, to use the quaint terminology. So if we can't undo it, we'd better have as much control over it as possible. (136, italics in original)

Stating the need to have “control” over technology, the senator expresses traditional ethics of the relationship between humans and technology. He, however, immediately admits that the old ethics is no longer applicable: “However, it was one of the tenets of the church I grew up in, waiting to use something until you're moral enough” (136). *Synnors* claims that the morality of technology no longer depends on the issue of the control of technology because, as the creator of socket implants Dr. Joslin addresses, “[technology] is out of control” by now (69). Rather the novel questions that if we cannot undo recent technological conditions and also cannot claim humans' total control over technology, how we should prepare for social, moral, and ontological changes by technology.

In answer to this question, *Synnors* asks us to admit the changes at first. Only by doing so, can we reconfigure humanity adapting to the complexity of technoscience. For the new humanity, the traditional viewpoint of morality also confronts its end.

“Knowledge is power. But power corrupts. Which means the Age of Fast Information is an extremely corrupt age in which to live.”

“Aren’t they all?” Sam asked him [Fez]. He smiled his dreamy little smile at her.

“Ah, but I think we’re approaching a kind of corruption unlike anything we’ve ever known before, Sam-I-Am. Sometimes I think we may be on the verge of an original sin.” (53)

Fez hints at the change of paradigm. Human beings are not in a privileged position under the law of God any more. But, rather, we are in the on-going process of “change for the machines,” not of changing the machines: in identifying humanity, the relationship with technology is constitutive.²⁰ In this understanding, the relationship between the human and technology is not necessarily contesting. When Gabe mentions “appropriate technology” as the way that people should live, Gina retorts: “‘All *appropriate technology* hurt somebody. . . . Every technology has its original sin.’ She laughed. ‘Makes us original synners. And we still got to live with what we made’” (435). Gina’s thought represents the attitude of the whole novel toward humanity and technology: humans are not “sinners” of God, but “sinners” of technology. The term “synner” is a coined word to emphasize a (post)human characteristic of synthesizing (with) technology. The Beater from the old generation of the music video industry also manifests the emergence of such a new humanity: “*And now I’m over. This is not my synthesizer anymore. You are. You and Gina and the rest of them, you synthesize the sound and the pictures into what they want to see and hear. You’re real synthesizers. . . . I may be a sinner, but I ain’t no synthesizer. Synner, then. With a y*” (83, italics in

²⁰ The phrase, “change for the machines,” is reiterated throughout the novel.

original). “Synners” indicates, in a narrow sense, people who implant sockets in the brain, but broadly it means all human beings in contemporary technoscience. In this form of the human subject, the polar oppositions set by a paranoid-schizoid axis between humans and technology that postmodern critics assert to exist is no longer valid. But, instead, the subject can be explained as a continuum always added to in relation to new forms of technological mediation.

Cadigan stresses the phrase “incurably informed” as a characteristic of synners (33, 388, 397, and 432). Synners basically cannot disconnect from information: “[synners are] not in our natural habitat anymore. [They have] become denizens of the net. Homo datum” (Cadigan 386). In this sense, the term “synners,” exploring the potential impact of the human-machine interface, can be a representative word to signify the posthuman subject, seeing humans as a process of information. To synthesize something else, synners always keep interconnective relationships with other components within the system they belong to or with other systems. Therefore, a synner as “homo datum” can be understood as a network that constantly evolves by interacting with others. In this sense, synners, as Taylor claims for the posthuman, are “*incarnations* of worldwide webs and global network whose complexity is fraught with danger as well as opportunity” (*Moment 17*, italics in original). The concept of “synner” supports an ontological perspective that complexity theory proposes: “*to be is to be connected*” (Rickert and Blakesley, “interview” 818). Thomas Rickert and David Blakesley argue that this recognition makes it possible “to understand the interrelation of the multiple systems and structures constituting life at the beginning of the twenty first

century” (“Interview” 818). In short, the term “synner” comprehensively expresses the human subject which, Cadigan suggests, lives in technoscience culture.

b. *Synner and Complexity*

The synner, as a new existential mode of human being, is a system that is ontologically open and historically constituted. Once such a system meets a threshold that connects with another system, it expands its system. As a result of expanding, three modes of the human emerge under the category of synner: “synthesizing human” (embodied human beings), “synthesized human” (AIs), and “the bastard offspring of both” (the combined entity of a human character (Visual Mark) and an AI (Art) (386). These three species are not competitive enough to dominate the others, but rather they are in interactive and coevolving relations: they recognize that they are interconnective components in a bigger network. Therefore, when the entire network has a problem (the hit of informational virus), they fight together against the problem. At the crisis, a leader of hackers, Fez, confirms the existences of the three human species and their interconnections: “Fez blinked. ‘Make that three species. And like all good life forms, we have a natural enemy that can prey on all of us.’ He sighed. ‘This would have been fascinating if it could have lasted. But we have slightly over an hour now before we all *revert* to homo sapiens. Temporarily but, alas, indefinitely’” (386, my italics). As Fez’s consideration shows, what the three human species fear is neither the possibility of losing biological human identity nor a species’ control over the others, but the *reduction* to the traditional humanity—Homo sapiens. In the complexity paradigm, the reversal to

Homo sapiens does not mean simply the retrogression of human being, but its indefinite fatality. Although, according to complexity theory, evolution toward increased complexity does not necessarily imply “progress,” reduction of dynamic systems to a certain point makes the systems stagnated. Therefore, a “synner,” who regards reduction as an ontological apocalypse and thus constantly attempts to connect to others, can be a proper model of the human subject for the complexity paradigm: synners are a product of complex structures and a producer of complexity.

The human category called synner composes dynamic structures not only within each species but also among species: the incorporation of the synthesizing (biological human beings) and the synthesized human (AIs) gives birth to the third species of human. Before discussing the third species, however, the synthesizing and the synthesized human require scrutiny in order to examine the internal and external dynamics of the two, which finally makes the third species possible. Incorporating AIs into the human category, *Synners* no longer sets human and machine/technology in the relation of self and other as in a traditional view of the relationship between human and technology. Rather, the novel understands that the human identity is a matter of interactive process with others. Haraway claims, “what counts as human and non-human is not given by definition, but only by relation, by engagement in situated worldly encounters, where boundaries take shape and categories sediment” (“Game” 64). Like Haraway’s claim, *Synners* concentrates on interconnective relations between the human body and consciousness, between humans and non-humans, and between

physical reality and virtual reality. By reconfiguring the relations, *Synners* explores complexity in the human subject.

In contrast, in postmodern cyberpunk, humans and AIs (or non-human entities in general) are still in the relation of self and other, or in the categories of sameness and difference, although human's mechanization and artificial entity's humanization by technology blur the boundaries between humans and machines. The concept of the human being, in postmodern cyberpunk, is pondered through definition rather than relations. *Neuromancer* is also preoccupied with the definition of human. For instance, Dixie Flatline, who deserted the human body and became a cybernetic construction, tries to explain his identity and AI's by mentioning how different they are from humans: “Well, it *feels* like I am, kid, but I'm really just a bunch of ROM.’ . . . ‘But I ain't likely to write you no poem, if you follow me. Your AI, it just might. But it ain't no way *human*” (159). Flatline's definition of non-human subjects shows that the human, in this novel, is still centralized in identifying other entities. In this identity formation, the relationship between human and machine/technology is still put in the relation of sameness and difference. In other words, despite surface confluences of the two by technology, the boundary between humans and technology is fundamentally solid. On the one hand, deploying the posthuman subject of human-machine symbiosis and the possible reduction of human consciousness into a cybernetic construction, postmodern cyberpunk novels, including *Neuromancer*, recognize human's affinity with non-human subjects. But, on the other hand, the realization makes the cyberpunk novels “articulate more forcefully the boundary between human and non-human in an attempt to disavow

this affinity” (Vint 190). This inconsistent standpoint on the affinity between human and non-human/technology is related to human’s ambivalent attitude toward technology. In cyberpunk, the ambivalent attitude is depicted through human desire and anxiety about disembodiment: the desire for disembodiment to overcome bodily limitation and the anxiety about the loss of humanity due to far-reaching technology.

Cybernetic technologies, in cyberpunk, allow humans to realize an old dream for transcending physical limitation: human bodies are prosthesised with machine and consciousnesses are digitalized. Humans come to know that we cannot claim the purity of humanity any more because we are already the symbiont of human and machine—posthuman. The assumption that the human is “a set of information processes” supports the idea of human-machine symbiosis by exploring the community of the human and the machine (Hayles 4). In cyberpunk, the human as an informational entity can be freely uploaded and erased; human bodies, as “meat,” are taken as a historical accident that can be transcended. Losing its materiality, the body is considered discursive, universal, and volatile. This cyberpunk imagination of disembodiment marks a postmodern understanding of the subject as a discursive construction, which is contingent and unfixated. However, although they welcome the contingency and unfixity of the postmodern subject, corporeal feminists, including Elizabeth Grosz, Hayles, and Anne Balsamo, contend that the postmodern subject lacks for locality and specificity considering multiple differences, such as race, history, and gender. They point out that the problem of the postmodern subject is caused by the abstraction of the material body, and that the abstracted body is a universal and male body. The universal, male body

tends to easily disappear, and the subject normalized by male ideology is disembodied. In this sense, it can be said that discourses of the postmodern subject are still under the shadow of mind-body binaries. Paralleling the disembodiment of the postmodern subject with the loss of materiality of information in cybernetics, Hayles states that the posthuman that supports disembodiment can reiterate the same problems that the postmodern subject is criticized for. In this way, exploring images of the posthuman, postmodern cyberpunk illustrates possibilities and problems of disembodiment.

For the human subject as “a set of information processes,” the body is degraded as a shell delivering information. The extreme imagination of cyberpunk about the disintegration of mind-body becomes a rich resource of gender discourses in technoscience culture. As Balsamo argues, cyberpunk, whose narrative is predominantly masculine, evidences “the obsessive reinscription of dualistic gender identity” produced by that disintegration (*Technologies* 162). *Neuromancer* portrays problems of the dualistic gender identity: the male protagonist’s (Case’s) consciousness/mind invades and controls the female protagonist’s (Molly’s) body.²¹ This relationship between Case’s mind and Molly’s body reinforces the traditional coupling of mind with maleness and the body with femaleness, implying the knowing male subject and the knowable female subject that feminists problematize (Grosz 4). According to Michelle Kendrick, this iteration of an old gender problem is derived from male critics’ understanding of cyberspace as “an idealized vision of electronically mediated experience,” and disembodied subjectivity is “a characteristic response to the advent of new media, which

²¹ Throughout the novel, Case’s consciousness and Molly’s body are highlighted. As a representative example, Case’s consciousness joins Molly’s body through simstim technology.

we persist in trying to fit into traditional paradigms of knowledge, such as mind-body dualism” (154).²² Reminiscent of “the corporeal body in front of the computer,” Kendrick claims that “[n]otions of subjectivity . . . are always and inescapably embodied” and that only embodied subjectivity can adequately convey the complexity of the relationship between human and machine (152). Similarly, Hayles criticizes the tendency for disembodiment as the trace of liberal humanism: the emphasis on cognition leads only to “fantasies of unlimited power and disembodied immortality,” and entails a loss of social, cultural, and sexual specificity (*Posthuman* 5). *Synners* is aware of the problems of disembodiment, and weighs in on embodied posthumanism to keep the balance between the desire for and the anxiety of disembodiment.

Synners envisages the interaction between material bodies and technological devices more positively than postmodern cyberpunk novels. The novel makes the interaction integral to the embodied subject, unlike *Neuromancer*, in which the interaction contributes to producing exclusionary categories. Hence (post)human characters of the novel are not associated with “body loathing,” which Mark Dery signifies as a characteristic of cyber culture.²³ *Synners* also shares typical themes and tendencies of postmodern cyberpunk, such as themes of mind and body invasion and traditional binary associations of mind-male and body-female: male characters (Visual

²² Kendrick maintains that male critics of cyberspace, such as Michael Heim and Steve Shaviro, depend on Gottfried Leibniz’s monadology in theorizing cyberspace and cybernetic technologies. Monads are an ultimate element of the universe, the only substance which material phenomena eventually reduce to. According to Kendrick, the male critics understand that monads, which are “cohesive but bodiless entities,” represent the experience of cyberspace, which projects expressions of pure desire. Such monadic understanding reduces complexity (151).

²³ In *Escape Velocity: Cyberculture at the End of the Century*, Dery argues that “the body loathing” is derived from “a combination of mistrust and contempt for the cumbersome flesh that acts as a drag coefficient in technological environments” (235).

Mark and Gabe) incline for disembodiment and female characters (Gina and Sam) for embodiment.²⁴ However, the novel does not want to ingrain any binary polarization and association. Instead, emphasizing the interactivity between embodiment and disembodiment—rather than downplaying either of them, *Synners* tries to reshape current discourses of mind-body in cyberculture.

One of the male characters, Gabe, is addicted to a virtual game world (*House of the Headhunters*) that he created, neglecting his life in the real world: he spends more time with his virtual characters than with his family. As a result, his daughter (Sam) has left home for years and his wife asks him for divorce. While he is losing bodily relations, he feels more and more alive in the virtual world. The socket implantation and drug intoxication make virtual experiences more realistic for Gabe. However, he does not seek to reduce to a cyber construction like another male character, Visual Mark, or characters of other cyberpunk novels. Rather, he feels pleased when he comes to regain his sense of realness in the physical world: when Gina hits him with fist, he becomes satisfied with the sense of pain and follows her around to keep the sense. Gina, a music video creator, has sockets in her brain, but she is described as a vindicator of bodily experiences unlike other socket-people. Gina has struggled to hold Visual Mark in the physical world for decades, and help Gabe regain the sense of realness through physical feeling. Gina is a promise for Gabe and Visual Mark to find meaning in living in the material world, and, for the entire novel, she is a marker of embodied posthumanism.

²⁴ Bruce Sterling's "Preface from *Mirrorshades*" in *Storming the Reality Studio* (346). Sterling claims the themes of mind and body invasion as central themes of cyberpunk novels.

Gina understands that since “the body possesses incredible new possibilities for inventive acts,” the body is not what humans can easily give up (Bay 232). As Jennifer L. Bay puts it, “Since the outer is no longer merely an expression of the inner, the body is no longer ‘a sign that can be deciphered by those who know the code’” (232).²⁵

Synners embodies this viewpoint through differences of the characters’ perception of “pain.” While Gabe recognizes pain that Gina gives as the evidence of his realness, Visual Mark regards it as information that the brain conveys:

“Because the brain feels no pain.” . . .

“Pain is curable,” Mark whispered to her. “It’s the most curable thing of all, really, and it’s the thing we all walk around feeling all the time when we don’t have to. There doesn’t have to be pain. Just us. No pain. Just us . . . us . . .”

“ . . . Pain, your pain, my pain, it was all noise, and I’ve cleared it away for us.” (410)

Visual Mark sees human beings as pure information. For him, therefore, pain is just an electronic mark and an unnecessary human condition. But for Gina, pain is more than informational codes. She sees it as a physical experience through which she can feel her realness like Gabe. So she rejects Visual Mark’s suggestion to stay with him at the electronic system where there is no pain. She chooses the embodied life in the physical world.

²⁵ This inner quotation is from Taylor’s *Hiding* (15).

Synners, however, does not reiterate the logic of either/or in handling the theme of mind-body. Characters' choices of the body do not mean disconnection with the disembodied virtual world. Rather, the emphasis on the material body is a significant element to construct the interconnectivity between the real and the virtual. When Gabe and Gina enter the system to cure the virus, Gina hits Gabe again to make him feel "sober" through "pain" (407-08). Gabe's pain is marked as bruises on the skin of his real body: "The marks on his skin were fresh and deep, his swelling cheek looked painful, and the expression on his face said the best dream of his life had just gotten even better" (408). The bruises on his body signify the interactions between interiority and exteriority, mind and body, the virtual and the real. Those different realms are interconnected like the Mobius strip. The Mobius strip shows that "while there are disparate 'things' being related, they have the capacity to twist one into the other" (Grosz 209-10). Grosz explains the relationship between mind and body with this Mobius strip model: through the model, she argues for the embodied subject. According to her, the body also has two aspects (material and discursive) that are always interacting, yet not reducible to the same thing like a Mobius strip. For the embodied posthuman subjects, virtual and real experiences are equally important elements in constructing their subjects because the two systems (the virtual and the real) are so interconnected and interactive that they are not reducible to either of them.

The interconnectivity and interactivity between the virtual and the real are indispensable conditions of the posthuman. *Synners* contends that the symbiosis of human and technology should be understood not just metaphorically but practically in

posthuman culture because it is inevitably true that humans and technology are within communal feedback loops. When the virus hits the net system of the Los Angeles area, socket-people who connect with the system are also directly influenced—they die of the informational stroke: the extraordinary electronic input into the brain by the virus causes the brain's overdrive and shutdown. The novel designates humans' insufficient recognition of their affinity with machines as the cause of this disaster:

Feedback loops—outputs turn around and go back in as inputs. Neurons start firing in patterns over and over, and if they're bad patterns, that's well, too bad. You people got no shields. You put in sockets, but you forgot about the watchdogs and the alarm systems and the antivirals and the vaccines. You people put those on every neural net except your own.
(358)

This comment is made by Art (AI). Art points out humans' underlying recognition of privilege as a maker of machine: although the socket implantation could be achieved due to humans' recognition of the feedback-loop relationship between humans and machine/technology, humans still overlook the fact that we are part of the feedback loops. Art maintains that the privileged viewpoint of humans is rooted in the traditional way of conceiving the self: "I suppose I shouldn't expect you to understand. For you [Sam] the nets are an object. You have self and nonself, and those are both constants. For me [Art] it's something else. The L.A. system wasn't a *where*; it was a configuration of me" (358, italics in original). Remarking on the difference between a human's and a machine's way of thinking, Art implies that the crisis of the net cannot be resolved if it is

conceived in the binary thinking system of self and nonself; to understand the net and to resolve the problem, human beings need to refashion our way of thinking: if human beings are defined as the symbiont of human-technology, we should consider how to incorporate our thinking system and machine's configuration for the new context of the posthuman.

The crisis, affecting both the net and the real world, becomes a good opportunity for all embodied and disembodied characters—the synthesizing and the synthesized—to reconsider their relationships. When every access to the net is shut down due to the virus, Sam's chip-player connected to the former insulin pump was the only workable electronic device. With the help of the remaining part of Art, the device can access the net. Then Gabe, the characters of his virtual game (Caritha and Marly), and Gina enter the net to restore the system. This whole process of the restoration is powered by the material body: the chip-player uses Sam's bio-energy. As such, the efforts to resolve the problem illustrate how systems are interconnected and how their interactivities create complex structures. In this sense, the restoration does not only mean a cleansing of each system, but also recovering all interconnectivities and interactivities between systems—between embodied and disembodied subjects, between the real and the virtual, and between human and non-human.²⁶ *Synners* supposes that the interconnectivities and interactivities make systems coevolve.

²⁶ This assumption is supported by a character's (Adrian) comment: "We'll have clean lines we can't use. That's as bad as being infected" (390). What people ultimately want is not just to recover the net and to restore damages of the real world, but to reconnect with the net.

Neuromancer, in contrast, assumes that systems are fundamentally not interactive: in particular, the real and the virtual are not interactively structured. Even though people jack into cyberspace and AIs can get involved in businesses in the real world, the two systems do not coevolve and the denizens of each system do not develop their relationships into more interactive and organizational ones. Flatline as a cybernetic construction with human consciousness, realizes that he cannot belong to any category of entities: he is no longer a human being, and he is not a free subject in cyberspace as he wished. His transformation reduces his entity into an isolated and closed system. Because Flatline cannot endure his unaffiliated position, he wants to be erased. In terms of complexity, since he is disconnected from other systems, he does not evolve into a more complex being and is entropically degraded. Flatline's existence shows that the real and the virtual in *Neuromancer* are closed systems that are not interactive with other systems, and thus that the closed systems, due to their disconnectivity, may not expect to evolve into more complex systems, or produce any other systems.

The world of *Neuromancer* where humans and non-humans are vividly mixed is a complicated society, but the complication of existential modes does not necessarily yield complexity. In *Neuromancer*, characters of various existential modes are gathered by Wintermute to perform a project. After the project successfully finishes, Wintermute and Neuromancer are fused. However, the relationships among characters are broken up and they go back to their own worlds: Case and Molly leave each other, Armitage is dead, Flatline is going to be erased, and the AIs are dispersed into a matrix. Their gathering just reinforces disconnectivities among characters and systems; the world of

Neuromancer, consisting of disconnective systems, is complicated, yet fragmented. The novel struggles to deconstruct traditionally integral concepts and highlights differences produced by technoscience—different types of existence, space, time, and reality. But the differences in the novel are fragmented without hope of significant change or evolution: neither human being nor non-material forms of will and intelligence, neither the human world nor the virtual world, does change after all. *Neuromancer*, as a complicated system, does not possess dynamics enough to change or expand its structure.

In order to highlight the creativity of complexity, complexity theory makes strenuous efforts to distinguish complicated systems and complex systems. Whereas a *complicated* system is a collection of independent units, a *complex* system is one ““consisting of interconnected or interwoven parts; composite; compound; involved or intricate, as in structure”” (Taylor, *Moment* 138): for instance, static objects, such as computer chips and snowflakes, are complicated, and the human brain and the flocking behavior of a large group of birds are complex. While a complicated system is reducible, linear, and predictable, a complex system is irreducible, nonlinear, adaptive, and self-organizing. Such a dynamics of the complex system makes elements of the system intricate and creates more complexity in the system.

In complex systems, the level of order or behavior is not the sum of the individual elements or actions due to the nonlinear, adaptive, and self-organizing characteristics of complex systems. Whereas complicated systems can be deconstructed into constituent parts and thus allow for explanation and analysis, complex systems

cannot be simplified and thus they are unpredictable; complex systems are unstable and seemingly chaotic. As Fez mentions, however, “chaos is just another kind of order” (Cadigan, *Synners* 175). For complex systems, the order comes from patterns of the dynamics expanding a system—called “deterministic chaos,” not from a simplified core element of the system. Fez explains a pattern that works for the expansion of the net in the concept of deterministic chaos:

The way we all kept adding to the nets did exactly that, passed a threshold. It got to the point where the net should have collapsed in chaos, but it didn't. Or rather, it did, but the collapse was not a collapse in the conventional sense. . . . When it reached the point where it was burdened to the limit, it had two choices—crash, or accommodate. It did both. . . . Going over the brink of catastrophe was the first stage. The second was recovery—since it was programmed to accommodate, it did. But the only way it could accommodate was to exceed the limit. Institute a new limit, and when that was reached, go over the brink of catastrophe again, recover and institute a new limit beyond that. And so forth. (174-75)

Fez's speculation over a pattern of changing the net reflects the dynamics of evolution that complexity theory claims: the word “deterministic chaos” is also from complexity theory's account of evolutionary pattern for complex systems. In fact, Fez's comment re-presents early complex theorists' concept of “dissipative systems,” “the most general

expressions of deterministic chaos found in nature,” including “mechanical and chemical systems” and “biological and social configuration” (Harvey and Reed 377).²⁷

The concept of “dissipative systems” is a fundamental concept to understand complex systems in that it expounds the pattern of evolutionary behaviours of systems. Harvey and Reed schematize the evolutionary behaviours as “oscillation” between a stable state of a dissipative system following “a normal linear trajectory” and a perturbation destabilizing the system (385). According to them, “the oscillation continues until it abandons its original path and takes one or more of the alternative points as its path of development” (385). This dynamics affects both the existence of dissipative systems and their evolutionary capability. Hence, adding complexity to its structure through the dynamics, the dissipative system is far from equilibrium. Such conceptions of dissipative systems are the basic operating logic of complex systems. As Fez points out, by instituting new limits in a crisis of collapse, complex systems expand their structures. In terms of dissipative systems, the virus in *Synners* is a perturbation to the stable state of the entire system, and the perturbation functions not just as a crisis but as an opportunity for expanding the system in that it contributes to increasing complexity.

The oscillating dynamics of dissipative systems between stability and perturbation corresponds to “the edge of order and chaos” at which complexity emerges (Waldrop 12).²⁸ Complex systems have “the ability to bring order and chaos into a

²⁷ The term “dissipative system” is coined by chemist Ilya Prigogine, who won the Nobel Prize.

²⁸ M. Mitchell Waldrop subtitles his book *Complexity* “the edge of order and chaos.” This phrase is also frequently used to account for the emergence of complexity.

special kind of balance,” which is called “the edge of order and chaos.” The edge of order and chaos is “the constantly shifting battle zone between stagnation and anarchy, the one place where a complex system can be spontaneous, adaptive, and alive” (Waldrop 12). In the zone, complex systems, or dissipative systems, can be growing by “[passing] a threshold” (Cadigan, *Synners* 174): the moment of passing a threshold—or that of bifurcation—in complex systems is “when physical processes unpredictably change state or achieve new levels of self-organization” and “when an aggregate of previously disconnected elements suddenly begins to ‘cooperate to form a higher level entity, with new, unpredictable properties’” (Johnston, “Computer” 445). The main plot of *Synners* embodies the moment of bifurcation producing a new human model; indeed, the new model of the human is a product of adaptive, self-organizing dynamics, adding complexity to the entire system. The emerging product of complexity is “Markt,” a type of posthuman constructed by fusing a human (Visual Mark) and an AI (Art). Markt is an entity of higher level complexity than synthesizing humans and synthesized humans. This entity opens up a new context for human beings, and, at the same time, it is the outgrowth of human beings’ recognition of a new context for technoscience culture.

c. Synner, the “Bastard Offspring” of Machinic Phylum

Markt is born at the edge of order and chaos where an interconnective dynamics dominates. In other words, Markt’s ontological basis and behavioral pattern depend on interconnectivities and interactivities with other systems. The existence of Markt in *Synners* reflects how the novel understands the mechanism that operates the

interconnectivity and interactivity between systems—between human and nonhuman, the organic and the inorganic, the real and the virtual: the new entity shows how creatively technoscience can redistribute and reassemble differences in various physical and sociological systems within a larger system, and how the new assemblage extends and redefines forms of intelligence and consequently what it means to be human in technoscience culture. In this sense, it can be said that the existence of Markt is not only an imaginative figure of complexity paradigm, but a possible future existential mode of humans.

The existence of Markt becomes possible because both human and technology change for each other. Repeating the phrase, “change for the machines,” throughout the text, *Synners* emphasizes how human beings have been changing for the machines: the socket technology can be a primary example of the “change for the machines.” Through the technology, humans transform themselves to have better communication with machines. But in the face of Visual Mark’s transfer to the net, Gina realizes that machine/technology is also changing for humans: “Change for the machines? Nah, the machines had finally changed for him, and he was just doing what he’d always done” (226). As an evidence of Gina’s claim, the AI Art has been transforming itself from a virus vaccine program (Dr. Art Fish) to an intelligent entity. In fact, mutual changes between human and machine/technology, or organic and nonorganic, have proceeded to “a common phylogenetic line” called “machinic phylum,” which is “a realm of forces and material flows that cuts across the strongly coded oppositions between the organic and the inorganic, the human and the inhuman, order and chaos” (Johnston, “Computer”

443). This concept of the machinic phylum pays attention to the “flow” between systems in explaining the mechanism constructing the human subject. The characteristic concern with dynamism of the human subject can open up a new phase for human evolution by disturbing boundaries used to identify human beings and verifying interconnective forces between codes traditionally assigned in oppositional poles, such as organic and inorganic, human and nonhuman. In this way, the concept of the machinic phylum provides a philosophical context that can give birth to synners.

In *A Thousand Plateaus: Capitalism and Schizophrenia*, Gilles Deleuze and Felix Guattari coin the term “machinic phylum.” In the book, describing the development of weapons, such as the saber and the sword, Deleuze and Guattari study how metallurgy follows variations in materials and their qualities (space-time haecceities) and transforms them into features (traits of expression). Through the study, explaining how the material appears to be active and exhibits an invisible life, they argue for a technological lineage comprehending differences of variation—that is, “machinic phylum.” They define the machinic phylum as “materiality, natural or artificial, and both simultaneously; it is matter in movement, in flux, in variation, matter as a conveyor of singularities and traits of expression” (409). Singularity is certain critical points where material processes are traversed by a few abstract mechanisms that can be said to constitute a machinic phylum (Johnston, “Computer” 444). In short, the machinic phylum is a matter-flow of linked singularities, which is beyond biological lineages, pertaining to non-living creatures; the machinic phylum is “like the unity of human

beings and Nature,” or the unity of differences of variation (Deleuze and Guattari 406).²⁹ The concept, in sum, indicates a broad group of abstract machines that drive processes of becoming; that is also the act of evolution and the act of emergence in terms of complexity theory.

Explaining the emergence of a new paradigm, which “‘see[s]’ matter as capable of self-organization,” in scientific researches, Manuel DeLanda reconceptualizes Deleuze and Guattari’s “machinic phylum” in terms of nonlinear systems of complexity theory (“Nonorganic” 134): he redefines the machinic phylum as a self-organizing process that nonlinearly works by bifurcations (singularity). Occurring at the onset of self-organization, bifurcations can change the destiny of systems. In this sense, the bifurcations can be said to be sources of creativity and variability for systems (DeLanda, “Nonorganic” 138-39). Yet, the machinic phylum has remained invisible until the advent of digital computers made possible visualizing the nonlinear complex models of bifurcation/singularity; by modeling the machinic phylum, computers have contributed to forming “machinic vision” to understand the complexity of the organic and the nonorganic.³⁰ However, more importantly, the computer itself is an extension of the machinic phylum.

²⁹ For Deleuze and Guattari, “the machinic” is distinguished from the mechanical, or the technical machine, a collection of discrete yet homogeneous elements, and also from the organic based on a hierarchical organization of biological organs. Rather, the machine, encompassing the technical machine and the organic, is “the social or collective machine, the machine assemblage that determines what is a technical element at a given moment, what is its usage, extension, comprehension” (Deleuze and Guattari 398).

³⁰ The “machinic vision” here follows Johnston’s definition of the term: “Machinic vision . . . presupposes not only an environment of interacting machines and human-machine systems but a field of decoded perceptions that, whether or not produced by or issuing from these machines, assume their full intelligibility only in relation to them” (“Machinic Vision” 27).

In *War in the Age of Intelligent Machines*, imagining robot historians' narrative about the history of intelligence, DeLanda assumes that intelligence can be understood as a machinic process rather than humans' unique property; such a machinic vision about intelligence sees "the emergence of fully autonomous Artificial Intelligence" as "the inevitable outcome of this evolutionary process in which humans entered and became more and more dependent upon machinic arrangements" (Johnston, "Computer" 445). *Synners* shares this machinic vision about artificial intelligence. As shown in Fez and Rosa's conversation, it seems no longer a question whether AIs can achieve consciousness or not, but the question is whether the conscious AIs are human or not. Mentioning Art, Rosa points out disequilibrium as a common trait of AIs and humans: "Part catastrophe and part chaos,' said Rosa. 'Sounds pretty human to me'" (176). This view reflects the machinic vision about the interface of human and machine systems. Both humans and AIs are artisans who "follow a flow of matter, a machinic phylum" (Deleuze and Guattari 409). In the flow of matter, the artisans constitute a continuum by "two-way traffic between data and flesh" and Markt is a derivation of the continuum (Johnston, "Computer" 449).

In *Synners*, the virus that hits the System seemingly brings the net and human beings to a crisis: it disconnects the System from the whole net and kills socket-people. Nonetheless, the novel does not portray the virus as a totally negative entity, but rather as a clue of expansion of the entire system; in terms of complexity theory—and also in the view of machinic phylum—, it functions as "a strange attractor (deterministic chaos)," which can "define the future of . . . systems" (DeLanda, "Nonorganic" 139):

Meanwhile the thing [virus] was moving through the system, lashing out, absorbing, growing. . . . It was a virus, but with a most important difference: this one knew where it was, and what it was, and *that* it was. This one was alive.

So the problem was to keep from getting sick. Or rather, sicker. It still amazed him [disembodied Visual Mark] how sick he was—how sick the system was—and yet everything could continue to operate. He remembered his old existence as meat. Weren't there certain kinds of infections—bacteria, rather—that were useful, even vital? (Cadigan, *Synners* 330, italics in original)

Visual Mark claims that the informational virus is “alive,” and notices the matter-flow between the physical and the virtual by relating the informational virus to the organic virus. In other words, he recognizes that the informational virus and the organic virus are related to a common phylogetic line, the machinic phylum. As DeLanda puts it, “[w]hen a system’s dynamics are caught in a strange attractor, that system is ‘bound to be creative’” to explore all the possibilities of the systems (139). In this sense, the virus, as a strange attractor in the world of the novel, creatively explores a new configuration of the relationship between the real and the virtual, human and nonhuman, creating the entity of Markt. The dynamics of the virus excites the onset of a self-organizing process for change. In this process of machinic phylum, the entire system of the novel is expanding.

The moment of fusing Visual Mark and Art is that of bifurcation/singularity. “[A] *bifurcation point*,” as Porush puts it, is “a system-shattering moment when the previous, simpler organization can no longer support the intensity or frequency of its own fluctuations, and either disintegrates or jumps to a new level of order and integration” (“Fictions” 68, italics in original). The direction of change is unpredictable, and thus Visual Mark feels misgiving about his transformation at the bifurcation point. Visual Mark imagines the moment of his transformation (a bifurcation point) as following:

To escape being devoured by it, he would have to spread further, possibly amputating a great deal of himself, confined in some other location, losing his enlarged awareness. Or perhaps enlarging himself that much would dissipate him, fragment him into many little aspects of the same program, each one self-contained and out of contact with the other. Perhaps then he would lose his memory and forget that he had been human once. (325-26)

Since he is aware of the nonlinearity of change, Visual Mark cannot predict how his consciousness will remain: it could be reduced or enlarged. Yet, what Mark is afraid of is the disintegration of his consciousness. He seems to recognize that the disintegration will bring about the loss of his originality or his humanity. If he disintegrated into fragments disconnecting from other systems, he would become a closed system, which might not add complexity to its structure, although making the structure complicate. Fortunately, however, the union of Visual Mark and Art turns out to be the “[jump] to a

new level of order and integration” (Porush, “Fictions” 68). The two consciousnesses do not reduce to either of them, but rather gain “complete rapport”:

Art had much salient memory to share on the matter, in spite of the fact that It had never been flesh. *It* was the only thing he could think to call Art, and he still bridled somewhat against the old associations of the word, even though *It* in this new existence was a far more encompassing term than mere *he* or *she*. He supposed it was a matter of getting used to it . . . and getting used to *It*. He remained *he* in his own thoughts, though that too would change over time. Change for the machines. That could be a good thing.

He and Art were in complete rapport from the moment of his unlocking. (381, italics in original).

The fusion of Visual Mark and Art is not so much mechanical prosthesis as dynamic communication—the machinic phylum: the mutual flow of matter and energy between the two consciousnesses. Consequently, their conjunction is more than a simple sum of the two different systems, increasing complexity not only in the net but in the human subject. In this way, *Synners* illustrates interconnective dynamism of nonlinear complex systems through the concept of bifurcation in chaos/complexity theory, expecting positive influences of the dynamism on systems.

Markt is a human subject of an open and self-organizing system promoted by interconnective dynamics—the machinic phylum, and that is the desirable mode of the posthuman envisioned by the complexity paradigm. Markt keeps self-organizing by

incorporating other artificial intelligences, including Gabe's virtual characters, Marly and Caritha. Such impulse of connectivity reinforces the dynamism of the new subject. Besides, Markt indicates the interconnectivity, or "synthesis," as the dynamics constituting all complex phenomena: "*The magic is, there is no magic. Sound and vision, yes, but no magic. Pain and pleasure, yes, but no magic. Catastrophe and chaos, yes, but no magic. Synthesis. But no magic. Synners . . . but no magic. None whatsoever. Ludovic, this isn't bad news*" (420, italics in original). This statement reflects the epistemological and ontological philosophy of *Synners*. A phenomenon can look magical, or mysterious, due to its complex, chaotic surface. Complexity theorists, however, would contend that the phenomenon is constituted by "underlying mechanisms that lead systems toward self-generated organization," and thus it is not a result of magic but of the mechanism (Strehle 217). The novel manifests that this way of understanding is not "*bad news*."

As recent physics, chemistry, genetics, biology, and philosophy prove, systems—whether physical, organic, social, or cultural—are maintained and expanded by interconnectivity and interactivity between systems and also between components of systems, increasing complexity.³¹ The novel, illustrating this complexity paradigm, explores the interconnectivity and interactivity between humans and technology—or the machinic phylum—as "optimistic" (393).³² Hayles claims this optimism is possible

³¹ Complexity theorists, including David Byrne, Manuel DeLanda, and Mark C. Taylor, comprehensively overview the trend of scientific and social theories that are concerned with the complexity paradigm.

³² Fez evaluates Markt as an "optimistic" phenomenon: according to him, the addition of Visual Markt to the System makes Art, which is "viral at heart," more social (393). In addition, Markt is expected to help cure organic beings: "Markt's new existence is still pretty much a secret, but it opens up all new

when “emergence replaces teleology; reflexive epistemology replaces objectivism; distributed cognition replaces autonomous will; embodiment replaces a body seen as a support system for the mind; and a dynamic partnership between humans and intelligent machines replaces the liberal humanist subject’s manifest destiny to dominate and control nature” (288). Indeed, “synners” suggested as a new posthuman subject in the novel embody such replacements, and accordingly synners can be a model of humanism that can avoid reinscribing and repeating some of the mistakes of the past (Hayles, *Posthuman* 288). As Markt comments, “This is certainly an unexpected and historic pleasure” (418).

Technologies of body modification and science studies proving commonalities between human and nonhuman are rapidly making the concept of the natural human obsolete. Such scientific and technological situations promote the idea that human beings could disappear by the end of the twenty-first century or near future (Broderick 15). More radically, human beings, as Hayles claims, have already entered the state of the posthuman, and we now ponder identities and values of what comes after the human; the posthuman discourses should provide models to account for “what (and who) [can] define authoritative notions of normative, exemplary, desirable humanity into the twenty-first century” (Graham 11): that is a necessary work to understand ourselves confronting a new context that technoscience culture provides. In this sense, the “synners” as a model of the posthuman has a significant meaning in the discourse of subjectivity. The concept of the synners suggests that a being in a constant process of

possibilities for healing brain damage, disorders, all that stuff” (434). In this way, Markt, a product of the machinic phylum, optimistically functions for the physical world and the net.

becoming by synthesizing (interconnecting) with others becomes a “normative, exemplary, desirable humanity.” This vision is the product of the emergence of the complexity paradigm. Such scientific novels as *Synners*, which notice and reflect the emergence of the complexity paradigm, understand the relationship between humans and the rest of the world in terms of community and integration. The posthuman subject of the complexity paradigm represents humans as irreducible, nonlinear, self-organizing systems. In this sense, the emphasis of interconnectivity and interactivity between systems in articulating the subject is necessary as the novel *Synners* foregrounds the term “synner”—humans as synthesizers. Through the concept of synners, the novel also emphasizes the performativity of subjectivity—fluidity of consciousness and identity. The entity of Markt is the very product of such performative subjectivity.

Considering that Markt is the offspring of the traditional human subject (synthesizing human) and its object (synthesized human), the existential mode of Markt can be a good example for the posthuman that sees the “self” as “something that emerges from community rather than as something threatened in its autonomy by others” (Vint 13). As Hayles points out in *How We Became Posthuman*, some versions of the posthuman are still under influences of liberal humanist ideas about the human subject as the unified and coherent organization. Vint claims that such tendency is related to a profound individualism embedded in the Western tradition (13). But Markt seems beyond the individualism. At the process of conjunction with Art, Visual Mark experiences losing the sense of individual, becoming more-than-self: “The old concepts of *private property* and *individual* were fast losing their importance to him as he and Art

came closer to being two aspects of one consciousness rather than two separate intelligences” (384, italics in original). Markt’s assembled consciousness maintains a dynamic state, keeping the balance between the two different aspects: consequently, there comes the absence of a core self of individual. The new subject is a disequilibrium system. Therefore, the essence of the subject, if any, is the dynamics to keep the state of disequilibrium. This aspect can help the new subject move “beyond the exclusions of the false universality of the humanist self and the moral vacuity of the excessive individualism of the liberal self” (Vint 13). Cadigan does not further the discussion of such a new subjectivity in *Synners*, by not depicting much the world of synners after the emergence of Markt. Hence, the next section of this chapter tries to articulate subjectivity based on the new humanity that *Synners* portrays for the complexity paradigm.

The new paradigm no longer centers on the individual self, and thus the traditional image of the self-determining individual becomes invalid for the posthuman condition. “But if we give up [the] image of personhood and individuality,” as Raymond Barglow questions, “what will replace it?” The second section of Chapter II attempts to answer the question by analyzing Bear’s nanofiction, *Blood Music*. As a nanofiction, which understands biological conditions of humans in the level of information technology, *Blood Music* describes the subjectivity of the complexity paradigm more vividly and illustratively by radically developing the concept of the machinic phylum.

2. The Distributed Subject and Nanovision: The Assembled Individual Subject in the Superorganism

Considering the human condition newly provided by technoscience culture, Ray Kurzweil asserts that “the Singularity is near” (21). The Singularity signifies “a point where our old models must be discarded and a new reality rules, a point that will loom vaster and vaster over human affairs until the notion becomes a commonplace” (Vinge 89). Kurzweil supposes that the Singularity enables the human to “transcend the human brain’s limitations of a mere hundred trillion extremely slow connections” (20). In the same vein, Vernor Vinge argues that the Singularity essentially involves “the creation of superhuman intellect” (89). Through the Singularity, the superhuman is expected not only to overcome the limitations of biological evolution but to achieve superintelligence beyond the human intelligence.

As Vinge claims, it is science fiction—especially scientific fiction—writers that acknowledge human beings’ experiences of the Singularity, and they picture superhumanity as the essence of the Singularity (90). Cadigan’s “synner” is an example of that claim. Expanding the ontological range of the human species, Cadigan introduces a model of the superhuman—synners—to cope with a new context full of new material and semiotic affairs. However, the ideas of the Singularity and superhumanity are not just for a science-fictional imagination. Rather, those ideas pervade contemporary technoscience culture. Biophysicist Gregory Stock, for example, offers the term “Metaman,” signifying “beyond, and transcending humans,” to understand the evolutionary direction of the posthuman. He argues that the world,

materially and sociologically, has become an immense living organism called Metaman, a global “‘superorganism’—a community of organisms so fully tied together that it is a single living being” (20).³³ Anticipating that the concept of Metaman will flourish more with the human’s increasing reliance on new technologies, especially communication technology, Stock claims that Metaman is more than metaphor; it is an actual living entity “‘feeding, moving, growing, and rapidly evolving” (21). Relocating genes between different species, merging organisms, and breaching the boundaries between separate life forms, Metaman “‘changes by unprogrammed adaptation that is decidedly evolutionary in character” (227): it evolves directionlessly and moves toward ever-increasing complexity, which is a characteristic of adaptive, self-organizing systems. Stock presents Metaman as a symptom of a new ontology constructed by the new paradigm, which is “‘replacing much of what has gone before” (233). Indeed, he offers Metaman as the future humanity of an emerging paradigm, the complexity paradigm.

Presenting the superhumanity as a model of the posthuman, both Cadigan and Stock try to show that their models of the posthuman do not ignore individuals. Stock claims that within the enormous structure of Metaman, the human individuality is protected: “‘Living inside Metaman does not enslave or diminish us as individuals; by sheltering us from the natural environment, bringing us food and water, technologically extending our powers, Metaman lets us express our individuality more fully” (28).

³³ Stock stresses that the superorganism (Metaman) is not the same as the concept of Gaia. He states that while Gaia is “‘a single living organism” that “‘simulate[s] thought about the processes regulating our biosphere,” Metaman is an interactive aggregate of the irrelevant (15). He claims that the Gaia hypothesis barely provides insight into the future of humanity due to its single structure. Instead, Stock focuses on Metaman’s self-organizing power to connect irrelevant systems and to develop the momentum toward a better future.

However, he does not further explain how Metaman helps us express our individuality “more fully.” Expecting the emergence of faster and smarter intellects like synners, Cadigan also believes in the continuance of individuality in spite of technological advancement beyond imagination in the future: “even if the human of one hundred years from now is a sentient entity contained within a piece of silicon, s/he’s going to have a personal life.”³⁴ Stock’s claim and Cadigan’s opinion, however, remain as just a hope without theoretical or practical supports. Such awkwardness in presenting the individual shows that the subjectivity of the new paradigm, which perceives the human as a complex, adaptive, self-organizing system, is not yet fully constructed after the deconstruction of traditional selfhood.

In the view of the complexity paradigm, the posthuman world after the Singularity will keep evolving into a higher complex network sustained by “machinic implementations . . . of distributed bio-social phenomena, of collective thought processes and enunciations that cannot be articulated on the level of an isolated individual self” (Rotman 92). According to this view, the individual subject in the higher complex network is distributed piece by piece, merged, and copied. As Vinge claims, such dynamic processes constituting the individual subject are “essential features of strong superhumanity and the Singularity” (95). In this view, the individual is no longer understood as a being independent from the milieu. The more powerful the superhuman network and the more capable it becomes of replacing the traditional notion of the human, the less convincing the idea of the self-determining individual. Not only in

³⁴ Cadigan states this quotation in the “Introduction to Chapter 14, *Synners*” published in *South Atlantic Quarterly* (92.4).

scientific epistemology but widely in contemporary discourses of subjectivity, the discredit about the self-determining individual is pervasive: as a result, the traditional image of the individual tends to be thought of as “the illusion of the whole and coherent personal organization, or as the misleading description of the imaginary ground on which different subject-positions are colligated” (Smith xxxv). In this way, the human is now confronting the crisis of the individual—or, the crisis of the self—in the sense of Western traditional individualism. Bear’s *Blood Music* is also concerned with the posthuman condition at the crisis of the individual. The novel sees that the concept of the self-determining individual is no longer valid. However, the novel shows that the demolition of the traditional image of the individual does not necessarily mean the disappearance of the individual. Rather, *Blood Music* tries to reconfigure the status of the individual in network culture by suggesting the emergence of new forms of the individual and community. Depicting how the individual subject *emerges* from the community or the network where it belongs, *Blood Music* finds that the structure of the individual subject is a fractal of the structure of the larger network: the individual is also constituted by subnetworks.

The idea of conceiving the individual as a network helps *Blood Music* form a new subjectivity distinguished from existing subjectivities. Western traditional individualism is based on the assumption that the self, owning himself/herself, owes nothing to community or society: in other words, the traditional notion of individualism is premised on the separateness of the individual self from others. On the other hand, the postmodern denies and deconstructs the certainty of the boundary between the self and

the other. Whereas a liberal humanist discourse of the subject would say that an individual has a core self inside, the postmodern would argue that there is nothing inside. However, *Blood Music* claims that the inside is not empty, but there is a dynamics to constitute the individual subject; accordingly, the individual subject is “more than an illusion” (Barglow 83). In terms of complexity theory, the dynamics is an impulse of interconnectivity and interactivity between systems or between components of a system, and the subject is an adaptive, self-organizing system constituted by the dynamics. Therefore, the subject is not a single entity, but it is “*an assembly of intercommunicating parts*” (Andrew Crumey).³⁵ Looking into an atomic world under the skin through a nanotechnological perspective, *Blood Music* investigates how the individual subject, which is deprived of its privilege in the discourses of evolution and is denied its pride as the agent, can be rearticulated in enormous intelligent networking systems of technoscience culture.

a. Nanovision and the Machinic Process of the Superhuman

Portraying a moment of the Singularity, *Blood Music* introduces a world of the super intelligence, or the superhuman. The posthuman world of the novel is drastically unfamiliar and looks unreal. However, the novel claims that the unfamiliarity and unrealistic-ness are not simply because the Singularity that the novel pictures is impossible or unrealistic, but rather because the human does not yet have the language to describe it. In the novel, a news reporter who looks down on the post-Singularity world

³⁵ This quotation is originally from Andrew Crumey’s novel *Pfitz*, but I cited it from Taylor’s *The Moment of Complexity* (231).

of North America states: “How can I begin to describe the landscapes beneath us? A new vocabulary, a new language, may be necessary. Textures and forms hitherto unknown to biologists, to geologists, cover the cities and suburbs, even the wildernesses of North America” (145). The news reporter is struggling to find proper rhetoric to explain a new reality. The new landscape that the news reporter mentions means not just the change of physical geography—material changes—, but the change of metaphysical geography—semiotic changes. The new landscape shows the emergence of a new paradigm to revise existing epistemological and ontological perspectives. *Blood Music* intends to provide a rhetoric to “describe the landscapes” of the new paradigm by producing metaphors cutting across micro- and macro-structures, or organic and inorganic structures.

It is in nanotechnology that *Blood Music* finds its rhetoric for the new paradigm: through the rhetoric of nanotechnology, the novel models the emerging paradigm and envisages a human future based on that paradigm. More exactly, in adopting the vision of nanotechnology to create a model of posthuman reality, *Blood Music* brings in “nanovision,” which Colin Milburn offers as “a way of seeing that lyses the membrane between the technological present and the nanotechnological future” (13). Expanding the adaptive, self-organizing systems of the molecular world to the macro-world, the nanovision focuses on “the involvement of human perception with technological otherness, to replace the static being of transcendent ‘rapture’ with the participatory evolution of ‘becoming’” (Milburn 14-15). *Blood Music* furthers this nanovision to define the status of the individual subject within the emerging paradigm—the complexity paradigm. Ultimately, the novel structurally and thematically parallels the

development of physical and conscious structures of the individual with the evolution of the human species. By showing how the organic structures of the body are becoming, or incorporating into a bigger network, the novel claims that the constitution of the individual subject is also a becoming process making connections with others/society through the machinic processes.

In *Blood Music*, nanoscientist Vergil I. Ulram illegally researches “autonomous organic computers” that are able to control viral and bacterial genes and to construct new complex structures (8): the organic computers are sentient single-celled organisms called “noocytes.” When his research is disclosed, Vergil injects them into his blood to save them. The noocytes within Vergil’s blood transform his body atom by atom into a different form of organism. Furthermore, they contaminate other living entities and make a big sentient organism—a brown goo of moving intelligence. The noocytes disassemble molecules of matter, including human beings, other animals, and even crops, and then reassemble them as part of the brown goo. At the end, the brown goo dominates North America and will soon other continents, too. It changes the whole environment of the Earth, and makes the human enter a new dimension of evolution.

The brown goo illustrates the “grey goo problem” of nanotechnology, which K. Eric Drexler envisions as a hypothetical end-of-the human scenario (172-73).³⁶ Drexler argues that a new technology called molecular technology, or nanotechnology, which “handle[s] individual atoms and molecules with control and precision,” “will change our

³⁶ While the goo is grey in Drexler’s writing, it is described as brown in the novel. However, as Drexler states, the color does not matter (173).

world in more ways than we can imagine” (4).³⁷ Furthermore, Drexler expects that the engineers of nanotechnology will build “nanomachines,” or “assemblers,” which will enable the human to “remake our world or destroy it” (14). Drexler envisages an apocalyptic situation wherein self-replicating assemblers get out of control by accident and then consume all matter on Earth, transforming matter into a grey goo.³⁸ He assumes that the grey goo is a version of the superhuman that is smarter than the human. Similarly, in *Blood Music*, the noocytes (assemblers) are activated by accident and remake the world into a superorganism composed of human and nonhuman.³⁹ Observing the transformation, the characters of the novel initially think that “Perhaps humanity was coming to an end” (135). However, the novel ultimately does not depict such a sudden change (the Singularity) by technoscience as an apocalypse. In fact, in the novel, human beings are not exactly destroyed, but they are transformed into a new existential form: the singularity is a way of evolution, not destruction.

³⁷ The term nanotechnology is a combined word of nano and technology, and the term “nano” is the prefix meaning one thousand times smaller (10^{-9}). To measure molecules, a nanometer is used.

³⁸ Among Drexler’s writings of nanotechnology, the concept of the grey goo has been given attention due to its science-fictional imagination. It was also one of the aspects for which other scientists criticized Drexler’s concept of self-replicating machines (assemblers) for they believed that the concepts of the grey goo and assembler have caused groundless fear of nanotechnological future. Richard Smalley is a famous nanotechnologist who openly criticizes Drexler’s vision. To know the visions and problems of nanotechnology, read Rudy Buam’s “Nanotechnology: Drexler and Smalley Make the Case for and against ‘Molecularassemblers.’” Also, Colin Milburn summarizes such skeptics and critics about nanotechnology in his book (see page 23-25). Later (2004), however, Drexler revises his claim that the grey goo accidentally appears due to out-of-controlled assemblers. He argues that “[i]n developing and using molecular manufacturing, avoiding runaway replication will not be a matter of avoiding accidents or mutations, but of avoiding the deliberate construction of something dangerous” (Phoenix and Drexler 871). In other words, apocalyptic results by nanotechnology will not happen without deliberate moral violation. In addition, he maintains that fear of runaway self-replicating machines should not divert attention away from other more serious risks of molecular manufacturing.

³⁹ As Vergil mentions, the term “noocytes” is “[f]rom the Greek word for mind, ‘noos’” (63). Therefore, the brown goo produced by the noocytes can be considered a collective mind, or super intelligence.

In the novel, Vergil is the exciter of the Singularity and becomes “a super-mother” of the noocytes (64). When the noocytes are activated in his body, Vergil is “being rebuilt from the inside out” (50). This inside-out or bottom-up transformation is not simply metamorphosis of the body, but also it is accompanied by epistemological and ontological changes. Such phenomena brought about by the noocytes illustrate “a technocultural revolution” that nanotechnologists anticipate (Milburn 21). Under the posthuman assumption that the human is “a set of information processes,” the technocultural revolution profoundly alters the definitions of life and the individual (Hayles, *Posthuman* 4).⁴⁰ As a product of the revolution, the noocytes transform the human and their milieu by decoding and re-encoding them into new complex structures in nanoscale. The re-formation of things is possible because there is common ontology between the human and the milieu: everything, including the human, is the product of the transmission of information, or the machinic process, between systems. The transforming process of the noocytes highlights the creativity of the machinic process and hints at the evolutionary direction of the posthuman—evolving into a network of the organic and the inorganic.

On the other hand, the machinic process by the noocytes—the noocytes’ transforming process based on the flow of material and mental information among things— is conceived, at first, as a frightening disease to destroy the human.

⁴⁰ As Drexler mentions concerning the grey goo, the process of the noocytes’ domination over the environment is similar to the apocalyptic future the cyberpunk novels portray in which AI systems displace humankind. Indeed, there is a common theme between the grey goo, noocytes, and the AI systems: that is, the posthuman point of view that sees the human “a set of information processes” (Hayles, *Posthuman* 4). Hence they can interconnect and interact with other systems and expand their existence through such dynamics. In the same vein, Scott Bukatman regards *Blood Music* as “a foundation cyberpunk text” (216).

Considering that the machinic process denies the unbreakable boundary between the human and the rest of the world, the evolution through the machinic process will result in a frightening future for the humans who have believed in their separateness and uniqueness in evolution history. In the same vein, some critics read destructive images, such as apocalypse and holocaust, from the transforming process by the noocytes.⁴¹ However, in the perspective of complexity theory, which argues that the machinic process occurs everywhere from the inner structures of the human body to the outer structures of things and to the inorganic structures of societies, the transforming process of the noocytes is not necessarily destructive or apocalyptic; rather, it is a productive and creative method of evolution. In this sense, the noocytes are not outside predators destroying the human, but internal organizers managing the flux of information among molecules and producing variations of structures: “They [the noocytes] came from us . . . They’re like our own cells, not like a disease” (171). In this way, the novel stresses that the noocytes’ work is based on the assumption of the human’s ontological communicability with others. In other words, the transformation of the human into the superorganism of the brown goo, as a product of the machinic process, is not only the noocytes’ unilateral compulsion on the human. Instead, the transformation is produced by the nano-structural communication between different structures/systems—physical and metaphorical interactions between the human and the other.

⁴¹ In “‘You Who Never Was There’: Slavery and the New Historicism-Deconstruction and the Holocaust,” Walter Benn Michaels associates the situation of the human in *Blood Music* with “the vanishing race,” Holocaust (184); Roger Luckhurst, in “Catastrophism, American Style: The Fiction of Greg Bear,” also regards the novel as a “catastrophe” novel, depicting the “stage of moments of the end” (218).

In the novel, the human and the noocytes “learn” and “adapt” to each other to evolve into the super intelligence without reducing either of them (87). This aspect shows that the transformation of the human is a process of creating complexity, which depends on the interactivity between different structures and the irreducibility of the structures to a certain structure. Besides, the novel assumes that the ontological communications between the human and the other lead the human “where we’ll be for some time” without “**NO HARM, NO PAIN**” (87, emphasis in original).⁴² The novel claims that the Singularity is “not a hallucination” even though “it could not be put into words” yet and that it will be something “beautiful” and “more convincing, with all the grit and detail of reality” (87-88). In this sense, in conceiving the Singularity, *Blood Music* appreciates the complexity paradigm, which regards the irreducible interactivity between systems/structures as a nature of evolution.

In order to underscore the interactivity and irreducibility of the transformation, *Blood Music* uses characters (Suzy, Olafsen twins, and Vergil’s mother April) having strange genetic codes that the noocytes cannot decode immediately: the noocytes keep trying to converse with the people to persuade them to voluntarily participate in the transformation.⁴³ In particular, it takes a longer time for the noocytes to transform Suzy than the other characters due to both the strange patterns of her genetic codes and her disapproval of the transformation. Suzy’s mother transformed into the new entity tells Suzy: “Please don’t be afraid. They left you alone because they couldn’t enter your body

⁴² Throughout the text, what the noocytes state is marked in bold font.

⁴³ Suzy who has Down Syndrome, twins, who have too similar genetic codes to each other, and April, who has similar genetic codes to that of their mother body (Vergil) must be difficult objects for the noocytes to decode immediately. Hence, the noocytes waits in transforming the characters until the noocytes decode them and these characters themselves allow the transformation.

without killing you. You have an unusual chemistry, darling. So do a few others. That's not a problem anymore. But it's your choice, honey. Just listen to us . . . and to them" (169). Through this statement briefing the persuading process, the novel shows how differences are handled in constituting the superorganism of the human-noocytes: the process is not a threatening invasion but an interactive and cooperative process. Edward, a doctor who examines Vergil, describes the process of the transformation, stressing this aspect:

There was a rhythm in his arms, in his legs. With each pulse of blood, a kind of sound welled up within him as if an orchestra were performing thousands strong, but not in unison; playing whole seasons of symphonies at one. Music in the blood. The sensation became more coordinated; the wave-trains finally canceled into silence, then separated into harmonic beats. (85)

Edward points out that although the rhythm of the transformation process is cooperative, it is not in unison; rather, it is a beauty of complexity that differences of the subsystems create. Both the macro-scale process of persuading and the micro-scale process of the transformation show how differences can be reassembled to create new structures or to add complexity. In fact, the harmony, or the "blood music," of the transformation is derived from the re-assemblage of the differences. In other words, the differences are the basis of the evolving dynamics to the extent that "[t]he differences in [the] environment," as Deleuze and Guattari maintain, "trigger self-organizing processes" (Bonta and Protevi 4). The self-organization is motivated by the interactivity and

irreducibility between the differences. In *Blood Music*, all individual beings, as well as ones with strange genetic codes, are subsystems of the superorganism, and their differences promote and make the superorganism more complex.

The emphasis on the interactivity and irreducibility also reflects the novel's attempt to show that the superorganism is not a totalitarian system in which individuality is sacrificed to the logic of the whole, but a complex system in which the whole is sustained by its interactions with individuals as well as interactions among individuals; the interactivities are the self-organizing performances of the noocytes inside the body. The dynamics of the self-organization promotes the machinic process between the human and the technological other (noocytes), and between the individual subject and the other. Using the words “music” and “orchestra” to emphasize the harmonic nature of the transforming process shows that the novel acknowledges the machinic process of the self-organizing transformation as unthreatening, or, more radically, enjoyable and artistic, because the superorganism is not a result of a compulsory force to assimilate differences into a certain mode, but that of an interactive process to produce a creative outcome—complexity. In sum, through the transformation of the human into the superorganism, *Blood Music* traces how physical and metaphysical organisms self-organize their structures to lead to a higher level of complexity. Such a self-organizing process creating complexity resembles the way in which complexity theory understands social systems.⁴⁴ In other words, *Blood Music* shares the perspective of complexity theory that human societies are the product of evolution as far as they are part of the

⁴⁴ Fritjof Capra claims that the concept of a network produced by “nonlinear, multidirectional, patterns of organization” is applicable to human societies as well as biological organisms (34).

living world: “[societies] are made up of individuals, individuals are built from cells, cells contain chromosomes, which in turn have genes” (Nowotny 17). In this way, the organic and the inorganic systems are networked by the transmission of information among organizations only to form a superorganism.

This perspective mirrors “the realist social ontology,” which explores social constructivism in its literal meaning. In arguing social constructions, the realist social ontology investigates objective processes of construction “in which language plays an important but not a constructive role” (DeLanda, *New Philosophy* 3). The superorganism of the human-noocyte in *Blood Music* illustrates the realist social ontology through the insight of nanotechnology into a bottom-up ontological model that nano-scale structures are “the basis of whole new products, industries and forms of ‘life’” (Urry 1). Showing how the superorganism emerges from the interactions of its component parts or individual human beings, the novel claims that “the identity of the [individual] acquire[s] new layers as the emergent whole reacts back and affects them” (DeLanda, *New Philosophy* 33). In terms of this perspective, individuals exist “as part of populations within which they constantly interact with one another” (DeLanda, *New Philosophy* 32). In this vein, the superorganism of the novel can be read both as the whole or a society constructed by interactions between individuals and as the individual by interactions between subindividual components.

b. *The Distributed Subject and Agency of Self-Organization*

Positivistically complementing social constructivist ontology, the realist social ontology reflects the perspective of the complexity paradigm on the individual subject. The complexity paradigm, claiming the interconnectivity and interactivity between systems as the dynamics of evolution, denies the concept of the self-determining individual based on its separateness from others. This aspect of the complexity paradigm cripples the implicit methodological individualism embedded in traditional discourses of subjectivity. Methodological individualism, a philosophical method that understands broad social developments as the collection of decisions by individuals, sees that individual persons are isolated from one another and that a collectivity of individuals cannot function as a decision-maker (DeLanda, *New Philosophy* 4). For methodological individualism, the whole is nothing but the sum of parts. On the contrary, in complexity theory, which argues that the whole is constituted by the interactions between parts—not just an aggregation of the parts— and thus that the property of the whole cannot be reduced to that of a part, not only is the social reality formed by interpersonal networks, but also the individual, as a product of the machinic process, is defined in the relations with others. In this way, under the influence of the complexity paradigm, interactivities between individuals are understood as essential components performing material and metaphysical roles in constituting the individual subject as well as social networks.

Conceiving the emergence of the complexity paradigm, Barglow comments that “[t]he social character of the self has been an axiom” of contemporary sociology:

“human beings are essentially relational creatures. Their identity consists not simply in their separateness from others, but in the myriad affiliations that link them within a shared lifeworld” (184). The “myriad affiliations” are not “the serial, the singular, the monolithic, and the linear,” but “the plural, the internally multiple, and the distributed” (Rotman 83). This understanding of human identity brings about the deconstruction of the self-determining self and the emergence of the distributed subject in the networks of person-to-person connectivity. Complexity theory regards such changes as phenomena caused by the machinic process between human and non-human, which pushes “the human far from equilibrium and into a ‘crisis’ situation” (Bonta and Protevi 18). For complexity theory, the “crisis” is an opportunity to increase complexity rather than a problem. Modeling subjectivity in the “crisis” situation, *Blood Music* shows that “subjectivity,” as Taylor manifests, “is not completely passive” to the extent that “there is a codetermination as well as coevolution between the individual and the web or matrix” (Rickert and Blakesley, “Interview” 807). By emphasizing the codetermination and coevolution between the individual and the milieu through the machinic process of the noocytes, the novel suggests the possibility of agency.

While entering the system of the noocytes, Bernard, a scientist who tries to understand the machinic process of the noocytes through conversations with them and observation on his own transformation, virtually experiences the posthumanist claim that the human is a set of information processes, and he comes to realize that the claim signifies not only the body but also the mind: the noocytes tell Bernard that they can encode human beings’ “personality” and “soul” as well as their material information

(151 and 176).⁴⁵ The noocytes claim that by doing so, they “complete the [feedback] loop” between the human and the milieu (151). In the machinic process of the noocytes, characters (Vergil and Bernard) feel at first as if their “soul[s]” were stolen (53 and 151). The noocytes’ transforming process literally shows that the mentality of the individual subject can be decoded in terms of information. In other words, for the noocytes, “personality” and “soul” are just a result of the flow of information, and, accordingly, the individual subject, as a form of information, can be distributed throughout the networks. For them, therefore, the traditional concept of the individual must be incomprehensible:

—I’d like to speak to an individual

INDIVIDUAL?

—Not just the team or research group. One of you, acting alone.

We have studied INDIVIDUAL in your conception. We do not fit the word.

—There are no individuals?

Not precisely. Information is shared between cluster of *****

—Not clear.

Perhaps this is what you mean by INDIVIDUAL. Not the same as a single mentality. You are aware that cells cluster for basic structuring each cluster is the smallest INDIVIDUAL. These clusters

⁴⁵ Bernard provides himself to European scientists to let them research the noocytes when he realizes his infection. Bernard plays a significant role in making the novel a scientific text rather than simple scientific imagination. The conversations between Bernard and the noocytes and Bernard’s records about the processes of his transformation are as if the author Bear lectures readers on recent technoscience culture and human subjectivity in it.

rarely separate for long into single cells. Information is passed between clusters sharing in assigned tasks, including instruction and memory. Mentality is thus divided between clusters performing a function. Important memory may be *diffused* through all clusters. What you think of as INDIVIDUAL may be spread throughout the *totality*. (141-42)

This passage shows that the noocytes demystify the concept of the soul, or the central agent, but they do not steal or destroy it. In traditional discussions of subjectivity, the central agent, which is also called self or soul, signifies “the core person complete with essential qualities of inwardness that make each of [the human beings] distinct and unique” (Barglow 81). However, along with the development of information technologies, the concept of agent is replaced by the “sophisticated command and control apparatus of a ‘human computer’” (Barglow 82). Such a technological understanding of the human diffuses the individuality of the subject by deconstructing the divine inwardness of the subject into the units of information, and, as a result, problematizes the traditional concept of the individual subject as the whole and coherent organization.

While in traditional discourses of subjectivity, mentality as an essence of the individual cannot be shared, in a posthumanist view, mentality as information can be distributed and shared, considering the existential essence of information is sharing and flowing. In this sense, the informationalization of the human presupposes the need to share and communicate, which leads to the increase of complexity. The sharing and

communication of information enable many individual minds to weave networks together, and, consequently, the individual becomes a socialized mind, interdependent with others. In sum, the informationalization of the human subject results in the invalidity of the traditional concept of the individual as a separate being from others, and, likewise, the concept of the agent as the core personality becomes ineffective. In this way, by opening up the possibility of coevolving with the milieu, the human subject can adapt itself to rapidly changing reality by technoscience in physical and metaphysical levels.

Blood Music, nevertheless, does not totally negate the concept of the agent per se; instead, it claims that the agent still exists, albeit in a different concept. While undergoing the incorporation into the system of the superorganism, Bernard states, “I belong to nobody. I am not what I once was” (163). Since his singular mentality, or the central agent, is “diffused” and “spread” throughout networks, there is no central perceiver to whom he belongs, but it is successive perceptions that constitute Bernard (142). The perceptions are decentered agents. In other words, Bernard is constituted not by a single agent to control the being, but a multiplicity of agents. Bernard also recognizes this plurality: “*I cannot really comprehend the size of the population within me. They come in many classes: the original noocytes and their derivatives, those converted immediately after the invasions . . . At a crude guess, perhaps two trillion fully developed, intelligent individuals exist within me*” (132-33, italics in original). Bernard, however, does not fully understand the relationship between Bernard as a whole and the “intelligent individuals exist[ing] within [him].” Although he conceives of the

existences of his multiple inner beings, he believes he possesses a unity in his identity, as revealed by his saying “I *am* Bernard” (172). For his claim, the noocytes tell him that “**There are many BERNARD**” and that the speaking or conscious Bernard at that moment is one of “[a] million changing versions, never to be reintegrated” (172). Hence, the claims for a unity in his identity and a representative identity for multiple intelligent individuals within him cannot be valid.

Bernard also comes to realize his changed ontological condition after experiencing the operating systems of the noocytes more: “*Each of them [Bernards] can have a thousand, ten thousand, a million counterparts, depending on their quality, their functions. None needs die, but in time all or nearly all will change. In enough time, most of the million me’s will bear no resemblance to the present me, for we are indefinitely variable. Our minds work on the infinite variety of life’s foundations*” (197, italics in original). In this passage, Bernard decenters his selfhood and admits to differences between other versions of his beings. He does not use the first person singular “I” to indicate the speaker/writer of the passage, replacing it by the plural pronoun “we.” This change of term shows that Bernard recognizes the decentered-ness of his subject and the paralleling relationships among them. In this way, *Blood Music* shows that decentered subjectivity does not necessarily mean “no agent,” but, instead, a multiplicity of agents without hierarchical relationships between agents.

While the centered subjectivity assumes “the autonomous individual . . . [with] a ‘command central’ of a kind, a subject from whom thought and action project outward to grasp and master the environment,” the decentered subjectivity regards the individual as

the effects of the interactivities between systems or distributed agents (Barglow 64): in other words, the individual subject is a result of internal processes between heterogeneous and multiple agents. Therefore, the subject should be defined by the dynamics among the inner variations, rather than its differences from others outside.⁴⁶ *Blood Music* explores this view through the superorganism of the human-noocyte: the superorganism illuminates the distributed subject forming and performing itself through multiple perceptions. The superorganism's internal variations (individual beings within the superorganism) keep becoming something else. Likewise, the individual subjects, such as Bernard and Vergil, within the system of the superorganism realize that they are also constituted by the same pattern as the superorganism. The individual subject is internally unstable and always in the process of becoming. The instability of the subject is not because the subject has no agent but because what is constituted by is the nonlinear, adaptive, self-organizing dynamics of interactivities between multiple agents—in other words, the instability of the subject is due to its dynamic agency.

Deconstructing the central agent entails the evaporation of agency that is traditionally considered to be what the agent possesses and thus frequently considered equivalent to the notion of mastery. The decentered subjectivity that refutes the existence of agency, in a postmodern understanding, assumes that the human subject of multiplicity and heterogeneity is not only unfixed but also fragmented: the schizophrenic subject. However, paying attention to the machinic process of the superorganism, which

⁴⁶ To understand the concept of “difference in itself” further, see Deleuze’s *Difference and Repetition*. In that book, he maintains that matter differs from itself: “difference is not between species . . . but entirely on one side, within the chosen line of descent” (60). *Blood Music* reinterprets this philosophical view on differences in scientific terms.

interconnects individual things to each other and to the whole, *Blood Music* re-opens up the possibility of agency. The agency that the novel suggests is the dynamics to structure systems/agents through interactions between components of system or between subsystems—the dynamics of self-organization: agency is not located in a certain system/agent, but it is a self-generating dynamic between systems/agents. In this perspective, therefore, the agency cannot be designated as an attribute of the subject. Rather, the agency effects the subject. In other words, while in the methodological subjectivity of the self-determining individual, a subject is the presupposition of agency, *Blood Music* suggests that the subject is a result of the agency.

Complexity theory maintains that complexity emerges from interactions of a great many independent agents in a great many ways and “the very richness of these interactions allows the systems as a whole to undergo *spontaneous self-organization*” (Waldrop 11, italic in original): the self-organization emerges at a high degree of complexity. But nano-biologists set forth a subtly different view. They claim that the self-organization is not only a result of high complexity, but also it is a necessary dynamics to create complexity.⁴⁷ In other words, the dynamics of self-organization creates complexity by compounding interactions between components or (sub)systems nonlinearly and adaptively. *Blood Music* follows the nano-biological view in depicting the emergence of agency: agency *emerges* spontaneously through interconnections among elements or interdependent agents, and it becomes the dynamics to form a

⁴⁷ To understand the self-organizing capacity of biological systems, see Jean-Marie Lehn’s “Toward Complex Matter: Supramolecular Chemistry and Self-Organizing.” Exploring how matters become complex from the elementary particle to the thinking organism, Lehn points out that self-organization is a fundamental dynamic to constitute living beings no matter how small they are. In this sense, the dynamics of self-organization causes complexity rather than being triggered by complexity.

subject. Vergil witnesses the emergence of the dynamics of self-organization in the development of the noocytes:

More than once, he had the spooky feeling that his work was too easy, that he was less a creator and more a servant . . . Once he started the process and switched on the genetic sequences which could compound and duplicate the biologic DNA segments, the cells began to function as autonomous units. They began to “think” for themselves and develop more complex “brains.” (14)

The process in which the noocytes get sentient illustrates that the self-organizing capacity of biological systems, which nano-biologists claim exists, gives birth to consciousness. Although they are born by simpler initiating processes, the noocytes, after achieving the dynamics of self-organization, are never reduced to their earlier status. For that early consciousness that “began to ‘think’” is not the core self of the noocytes to control the entire changing processes. As the noocytes constantly incorporate with human and non-human beings, the initiative consciousness is dispersed throughout their networks and reorganized with others. If there is a core-ness of the noocytes, it is the very dynamics through which the noocytes nonlinearly and adaptively self-organize themselves, making their entire system more complex. In this sense, it can be said that the dynamics of the nonlinear, adaptive, complex self-organization functions as agency to activate the system of the noocytes and further the superorganism: the self-organizing dynamics makes a multiplicity of different entities a whole by integrating them within the entire system of the superorganism. The dynamics exists everywhere

interconnectivity and interactivity between the superorganism's subsystems or components take place. In terms of subjectivity, the agency is distributed throughout the networks of the systems/agents forming the subject.

Although agency is generally defined as “the ability of *human subjects* to effect novel and creative changes in the world,” *Blood Music* expands the concept beyond the human realm through the noocytes and the superorganism (Bonta and Protevi 5, my italics). By demystifying and reconfiguring the concepts of agent and agency as the natural dynamics of evolution, the novel tries to locate the human subject within networks of technoscience culture. Within the networks, the human subject cannot be fixed and stable, but contingent and provisional. Indeed, the superorganism, a collective organism of the human and the nonhuman, embodies the subjectivity of technoscience culture that Hayle depicts: “agency is distributed rather than singular, cognition is dispersed through the mind and body rather than situated solely in the neocortex, and consequently that ‘personhood’ is always already a collective endeavor” (Hayles, “Commentary” 329). Paying attention to the relationship between the dynamics of agency and personhood, *Blood Music* attempts to form subjectivity to account for the individual subject within networking culture of technoscience. The novel assumes that the subject emerges as a result of “collective endeavor” at a certain moment. This assumption is illuminated through how individual characters individuate themselves from the superorganism: human subjects, after being incorporated into the superorganism, individuate themselves from the superorganism to express their

individual personhood. Their personhood is formed through the individuation. The novel simulates “becoming” subjectivity via the process of individuation.

In the view of complexity theory, complex systems constituted by nonlinear and adaptive dynamics are unstable organisms in the process of “becoming.” In this view, it can be said that all beings, as complex systems, are “becoming” entities. However, Gilbert Simondon claims that “becoming” should not be simply taken as “a framework in which the being exists”; rather, becoming is a dimension of being (301). A being inherently has the dynamics of becoming, and the individual subject is formed by the dynamics: the dynamics makes one of the potential versions of the being contingently and provisionally individuated from the whole as the subject at a moment. Therefore, the subject cannot completely represent the entire being, and, in turn, the being can be just partially embodied as a subject through the individuating process. In this sense, the becoming of living things “represents a permanent individuation,” and the living thing is “the theater of individuation” (307). Such thoughts on becoming and individuation explain the relationship between the entire system of the superorganism and individuals as its subsystems in *Blood Music*. The noocytes absorb living things and then incorporate them into a superorganism with collective intelligence. Although the individuals constituting the superorganism are informationalized and distributed into the entire system, they can reassemble themselves through individuating processes of information. For instance, when Suzy hesitates to incorporate into the system of the superorganism, her mother and brothers emerge to persuade her. Their emergences

illustrate the individualization of the subject. The scientist Bernard describes the individuating process in nano-scale:

Now he *waits* for data in the form of structured proteins, hormones and pheromones, nucleic acid strings, data perhaps even in the form of *tailored* cells, viruses or domesticized bacteria. He needs not only basic nutrients, easily available from the blood serum, but supplies of the enzymes which allow him to absorb and process data, to think. . . . The blood is a highway, a symphony of information, instruction. It is a delight to process and modify the rich broth. The information has its own variety of tastes, and is like a living thing, liable to change in the blood unless it is carefully monitored, trimmed of accretions, buffed. Words cannot convey what he is doing. His whole being is alive with the chatter of interpreting and processing. (165, my italics)

This passage shows that the individuating is the self-organizing process of information: the dynamics of agency. Bernards, distributed agents, exist before the individuating process is triggered, but they are potential rather than substantial within the networks of the superorganism where there is no central authority. A multiplicity of possible versions of Bernard “waits” for becoming an emerging version of Bernard. But the emergent version is not the permanent one; Bernard, the subject, is a contingent and provisional entity. Before the individuation, Bernard, or the subject, is a deferred presence waiting for the emerging process by agency, the dynamic of self-organization. Through “the chatter of interpreting and processing,” the deferred presence of Bernard is

becoming a Bernard; Bernard keeps becoming beside itself through constant individuating processes.

Simondon expresses the concept of the deferred presence as the “preindividual being” (311). According to him, the being individuates itself “through the potentialization of the incompatibilities of its preindividual centers” (314). The subject contingently emerges through the self-organizing dynamics between preindividual centers or agents of the deferred presence. Suzy’s brother Kenneth accounts for the self-organizing dynamics:

Well, yeah, they argue sometimes, and we argue, too. It’s not cut and dried. But nobody hates anybody because we’re all duplicated hundreds of thousands, maybe millions of times. You know, like being Xeroxed. All across the country. So like, if I die here, now, there’s hundreds of others tuned in to me, ready to *become* me, and I don’t die at all. I just lose this particular me. So I can tune in to anybody else, and I can be anywhere else . . . (171, italics in original)

His explanation shows that the relationship among agents is incorporative rather than exclusive. The entity of “I” is a product of complex interactions between “others”: others are always ready to (re)produce “I.” In this view, the “others” are not beings that are not “I,” but they exist as the preindividual presence of “I”: the “I” is individuated from the preindividual presence composed of a variety of distributed agents. Such condition of the “I” explicates Simondon’s claim that individuation is the becoming of the being and the becoming is a dimension of the being: the individual subject is a

contingent and provisional emergence of the being in its becoming process. The individuated being, therefore, can be “neither the whole being nor the primary being” (Simondon 311). Kenneth individuates a “particular [him]” from his preindividual presence within the system of the superorganism. Indeed, the particular version of Kenneth does not represent the whole of his presence, and it is not its primary subject, either. Rather, the Kenneth talking to Suzy at that moment is a contingently and provisionally emergent subject of the being.

In terms of complexity theory, the “I” that Kenneth indicates as his self during the conversation with Suzy is “a moment of complexity” (Taylor, *Moment* 232). The current “I” of Kenneth is a subject contingently networked within the superorganism: in other words, it is an incarnation of the complexity of networks “operat[ing] in many channels and multiple media” (Taylor, *Moment* 232). Taylor delineates such conditions of the networking subject in terms of complexity: “Webs and networks can no more exist without me than can I without them. In the absence of firm walls and fixed boundaries, it is impossible to put an end to this inconclusive interplay of networking. This is what I am—this is what we have become in the moment of complexity” (*Moment* 232). In this view, the subject can be defined as a moment of complexity. *Blood Music* reinvents, through the insight of nanotechnology, such complexity of the human subject as one emerging from the machinic process of biological-social information. Illustrating the interconnective and interactive relationship between micro biological organisms and macro social organisms, the constituting process of the superorganism underpins the claim of complexity theory that subjectivity is “an objectively real, emergent property of

biological and social life” (Price 14).⁴⁸ In this way, *Blood Music* speculates on the individual subject more vividly and persuasively than any other posthuman criticism and scientific observation.

Based on visions and insights of nanotechnology into molecular reality, *Blood Music* makes itself not simply a fun-seeking fantasy but a scientific hypothesis to configure the physical and semiotic conditions of the posthuman and the evolutionary direction of the human. The fictional situations that *Blood Music* depicts, in fact, are hypotheses, rather than fantasy or imagination, about the Singularity that human beings are going to encounter. The novel also offers the superorganism as a hypothetical model of how the human subject will survive the coming Singularities. The views of the novel on the Singularity and the superorganism are related to the novel’s speculation on the reality of the universe. The novel claims that “the universe really has no underpinnings” (206), and “[t]here is nothing . . . but information” in the universe (154); “the universe is always changing” according to how information is interconnected. In this vein, it can be said that “there is no ultimate reality of the universe” (206). Therefore, the human can just make hypotheses and theories, which “fit what happens on [the human] level” (206-07), and a good hypothesis and theory do not simply explain a reality but constitute it: “*Theory fits, universe is shaped*” (206, italics in original).⁴⁹ By showing how a different

⁴⁸ Refuting discursive subjectivity prevailing in postmodern epistemology, complexity theorists emphasize realness of subjectivity; they argue that the human subject cannot be simply reduced to “a creation of language” insofar as the human lives in the material world (Price 14). Therefore, for complexity theory, it is important to prove the interconnection and interaction between the bio-organism and the social organism in the discussion of subjectivity.

⁴⁹ This view reflects recent science studies arguing sociality of scientific knowledge and practice: science is not neutral, but value-loaded and socialized. This view does not believe in underpinnings or absolute

reality can be created through reassembling information, *Blood Music* self-supports its hypotheses on reality and further asserts itself as a good theory.

While it denies ultimate reality, *Blood Music* assumes that there is “the reality literally constructed by the desire of life” in the universe (Milburn 180). Based on this assumption, the novel focuses on what the desire of life is and how it constructs a reality rather than what reality is. To expound those concerns theoretically, the novel employs terms and visions of complexity theory, particularly based on nanobiology. According to nano-biologist Jean-Marie Lehn, the machinic process (material self-organizing process) happening at the molecular level of living things is the evidence of “the desire of life”—an essential dynamics constituting a life. The novel reinterprets the dynamics of the self-organizing process as agency constructing the subject. The agency generates complexity by interconnecting distributed information/agents: the novel considers the human subject the complexity momentarily produced by the dynamics. This view helps clarify the human subject in a constantly changing reality without underpinnings: the subject of complexity self-organizes itself to adapt to changing milieu. According to *Blood Music*, as reality can be constituted by a good theory observing how distributed information in the universe produces complexity, the human subject also can be constituted by a good theory. The novel, as a good theory, expects that its hypotheses help the human be released “from the prison of supremely lonely selfhood into a fluid collectivity that far transcends the limitations of individual consciousness” (Hayles, “Commentary” 331), and that, through the release, the human subject can experience

knowledge or reality. For further understanding, see *Science as Practice and Culture* (Ed. Andrew Pickering. Chicago: U of Chicago P, 1992).

“[some]thing so rich” that we “had never felt/seen/tasted” it before (Bear 172).

Expanding the discussion of the human relationship with technological others, the next chapter will examine the new experiences that the human subject encounters, and try to suggest a new ethical model of the human subject for the complexity paradigm.

In Western individualist tradition, the human subject is considered “a moral individual—responsible not only for self-formation but also for establishing and maintaining ethical relationships with others” (Barglow 64). However, with the technoscience culture blurring boundaries socially formed as well as biologically given, the human subject cannot be explained in such a traditional view. As *Synners* and *Blood Music* anticipate, technoscience will continue to enact changes on the current condition of the human, furthering our connections with others; thusly, the human becomes more and more a technological monster. In order to investigate an ethically responsible mode of subjectivity, the next chapter will focus on *how* the human subject lives as/with technological monsters by analyzing two scientific fiction novels that explore ethical relationships with others: Mary Shelley’s *Frankenstein: Or, the Modern Prometheus* and Marge Piercy’s *He, She and It*. In so doing, I will argue that the texts form a network through textual interconnectivity and examine how the network creates a new ethics and new meanings for the complexity paradigm.

CHAPTER III

**THE COMPLEXITY OF THE TECHNOLOGICAL MONSTER AS THE
HOPEFUL OTHER: ETHICS OF DYNAMIC ONTOLOGY**

The advent of posthumanism is accompanied by the expectation of a novel ethical perspective that can not only account for posthuman behaviors but advance a new understanding of relationships between (post)humans and their environment. Suggesting that the ethical aim of posthumanism is to “create the conditions for the emergence of less hierarchical and less violent social and political relationships,” Ann Weinstone argues that the ethical aim of posthumanism would not be achieved if questions of ethics were not located in human-human relationships (Weinstone 6). According to her, without proper vocabularies articulating human-human relationships, relationships between humans would come to be understood in a radical alterity marked with “*both unbridgeable difference and dangerous similarity*,” and, consequently, it would be hard for humans to expect less hierarchical and less violent human-human relationships (Weinstone 4, italics in original). In this vein, for Weinstone, the cyborg, as the exemplary figure of posthumanism, is not a proper model to discuss ethics since it is not a hybrid of human and human, but human and nonhuman (5-6).

However, such an anthropocentric ethical view can be challenged by non-anthropocentric understandings about the relationship between human and nonhuman or environment and about ontology of human beings. First, to re-view the relationship between human and nonhuman, some critics, such as Silvia Benso and Don Ihde, offer

“the ethics of things,” a non-anthropocentric perspective to understand things, questioning “what if things were capable of expressing an ethical signification, an alterity that goes beyond the structures of meaning within which things have been enfram[ed] . . .?” (Benso xxx-xxx). This question implies the assumption that the ethics of humans is the response to the ethics of things: “humans are compelled by things to respond to the demands placed upon them and shape their behavior in accordance to the inner mirroring of things” (Benso 142).⁵⁰ Therefore, concerns of posthuman ethical discourses about the relationship between the human and nonhuman should not be understood as an ethical fallacy ignoring the human-human relationship, but as a new ethical perspective reexamining human ethics in another angle.

Besides, Weinstone’s claim that the cyborg cannot be an ethical model for the posthuman culture seems to run counter to the nature of posthumanism that discusses the coalescence of the human with technoscience. Although Weinstone expects the advent of a new ethical perspective that can challenge existing hierarchical and violent social and political relationships grounded on the traditional ethical perspective, her view does not go beyond traditional ethics: in fact, her view of posthumanism still counts on the hierarchical relationship between human and nonhuman, between self and other, which has established the conditions for hierarchical and violent social and political

⁵⁰ Benso’s claim on the ethics of things radically appropriates recent technoscience studies, which argue that ethics can be possible based on the assumption that objects are not neutral and value-free: “Beginning from the premise that objects are not necessarily neutral, passive things changes our assumptions about what information we consider germane to ethics” (Smith 183). In this view, technology is “quasi-other, or technology ‘as’ other *to* which I relate” (Ihde 107, italics in original). To know ethical discourses of technoscience studies about the relationship between subject and object, self and other, see Don Ihde’s *Technology and the Lifeworld: From on the Reality to Earth* and Latour’s *Pandora’s Hope: Essays on the Reality of Science Studies*.

relationships. Defying the traditional ethical perspective for the relationship between human and nonhuman, current posthuman views on what it means to be human tend to privilege the deviant or monsters over the conventional versions of the human: for noticeable examples, Andy Clark claims that we are “*natural-born cyborgs*” (3) and John Law asserts that “we are *all monsters*” (18, italics in original). Such definitions celebrate the hybridity of the human, denying the universal man and the autonomous human subject of traditional humanism centering around the white male and universal rationality. For traditional humanism—or liberal humanism of the modern—the hybrid of human and nonhuman, organic and nonorganic, is a monster that threatens to transgress the boundaries that define the human or the human subject.⁵¹ But for posthumanism, the hybrid or cyborg, “as an embodiment of difference, a breaker of category, and a resistant Other known only through process and movement,” is a hopeful monster that can revalue the marginalized and repressed and provide a new ethical perspective (Cohen, “Preface” x). Therefore, to understand how to live as the posthuman, “we need monsters and we need to recognize and celebrate our own monstrosities” (Halberstam 27). In this posthuman view, hybrids or monsters come to

⁵¹ The term “the modern” in this chapter follows Bruno Latour’s definition of the modern. In *We Have Never Been Modern*, Latour defines the modern as a historical movement established by the “Constitution,” which conceptualized the world based on the Great Divide—the two dimensions of human and nonhuman, or society and nature. The modern Constitution rejected to conceive hybrids between the separated dimensions. For the Constitution, “hybrids present the horror that must be avoided at all costs by a ceaseless, even maniacal purification” (112). However, it is also the modern Constitution, Latour points out, that has produced hybrids: by eradicating the median dimension conjoining the separated, the modern Constitution took no notice that “hybrids continue[d] to multiply as an effect of the separate treatment” underneath (13). Latour claims that since “*the proliferation of hybrids has saturated the constructional framework of the moderns*,” we need a new constitution to explain current hybrids (51). The new constitution that Latour expects is a nonmodern one that can conceptualize hybrids without totally denying the modern Constitution and can show that “[n]ow hybrids, monsters are just about everything; they compose not only our own collective but also the others” (47).

be understood as the norm rather than the deviation. Accordingly, ethical questions arising from this change of normality will be about how to live as and/or with monsters. Grounded on the complexity paradigm, this chapter attempts to explore what kind of ethics can be articulated and how the new ethics comes to play in our technoscience culture by centralizing monsters and monstrosity.

As Birgit Neumann puts it, “[h]umans have the responsibility not just to act as [we] wish, but to orient [our] behavior towards a general code of norm” (132). In this regard, discourse about the orientation of human behavior—that is, ethics—is to be tied to dominant epistemology, which establishes the norm. Traditional ethics, which is universalist and subject-centered, is founded on the norm of the modern, valuing “hierarchy, stable systems of reference, and monocultural homogeneity” (Zapf 172). Yet, as ethicists observe, the traditional code of ethics is now challenged by new ethical values, such as “dehierarchization, process, cross-cultural openness and dialogicity” (Zapf 172). By dissolving the rigid closed-ness of self and associating others to the openness and dialogicity of self, such values let ethics be “the arena in which the claims for otherness . . . are articulated and negotiated” (Harpham 394). Regarding such a deconstructive shift of ethics, postmodernism claims “the demise of ‘ethics’” without expectation of emergence of a new ethics (Madison and Fairbairn, “Introduction” 2-3). The claim seems to be natural for postmodernism, which denies grand narratives and absolute knowledge and values. In the same vein, Zygmunt Bauman defines postmodern ethics as “morality without ethical code” (31). For him, while individual, contingent morality is possible, universal ethics controlling ethical intuition is unattainable. He

maintains that human reality is so messy and ambiguous that it is impossible to claim that a single principle interpenetrates all local situations (32-33): “it is the personal morality that makes ethical negotiation and consensus possible, not the other way round” (34). Such a postmodern attitude toward ethics echoes Bruno Latour’s conviction that postmodernism is “not a fresh solution of the modern” but “a symptom” in the sense that postmodernism does not go beyond the epistemological frame of modernism in defining ethics (46).

As Bauman also points out, although postmodernism rejects epistemology and ethics of modernism, postmodernity ultimately shares with modernity in that both see the world as messy and ambiguous. On the other hand, while modernism assumes that the messy and ambiguous state of the human world can “be replaced by the orderly and systematic rule of reason,” postmodernism, regarding that belief as “illusion,” claims that the messiness and ambiguity are “not only not-yet-explained, but . . . inexplicable” (Bauman 33). For postmodernism, therefore, empirical works—or narrowly, science and technology— attempting to explain the human world with linear and reducible understanding of universal rationality are just “illusory and deceptively scientific” (Latour 46). In this view, science and technology are each understood as “a *closed system*, which tolerates no alien bodies inside and zealously devours and assimilates everything that comes within its grazing ground” (Bauman 195, italics in original). Therefore, science and technology, or technoscience, are considered objects that we should keep under close surveillance to avoid the destruction of the human. Within this understanding, possible ethical questions are reduced to whether technoscience is

virtuous or dangerous for the human. Such a skeptical attitude of postmodernism toward technoscience results in emptying the world, bringing about less empirical and more hyperreal understanding of human experiences (Latour 131).⁵² In this perspective, conventional ethics is not applicable.

Then, what if science and technology give up the universal rationality based on linearity and reducibility, and what if science and technology equipped with revised rationalism of nonlinearity and irreducibility are able to account for the dynamic pattern underlying the seemingly messy and ambiguous world? The complexity paradigm observes our technoscience culture with those presumptions. Claiming the existence of self-organizing dynamics under chaotic surfaces, the complexity paradigm argues that we should “[move] on to empirical studies of networks that give meaning to the [modern] work of purification that [postmodernism] denounces” to understand the evolving patterns of the dynamics (Latour 46).⁵³ This concern with dynamics is derived from endeavors to understand the posthuman environment newly created by technoscience and to offer a behavioral direction for this new age without following

⁵² Latour’s critique on postmodernism applies to Baudrillarian postmodernism that is represented with “hyperreality” in which everything is floating signs and simulacra. Therefore, hyperreality is an empty world.

⁵³ Complexity theorists, including Byrne and Hayles, criticize the postmodern perspective of the empty world—or, absolute relativism—as another type of “grand narrative,” and argue for the complexity paradigm, an eclectic view between the modern and the postmodern, restoring the median zone that the modern excluded and the empirical dimension that the postmodern disclaims. See David Byrne’s *Complexity Theory and the Social Science: An Introduction* and Hayles’s *Chaos and Order: Complex Dynamics in Literature and Science*. Although he does not use the term “complexity” in his book, Latour also shows a similar view on postmodernism’s absolute relativism to complexity theorists. He maintains that to explain the messy and ambiguous world, we need a “relativist relativism,” which is a combined view between universalism and constructionism (113).

falsities of conventional ethics and abandoning the future as postmodernism does.⁵⁴ For the complexity paradigm, science and technology are both theoretical and empirical methods to account for the dynamics, functioning as open systems to interconnect the human with others—systems that accommodate physical and metaphysical environments for the birth of technological monsters and for the ethical meaning of their ontology. Therefore, insofar as we, as Hayles claims, are posthumans, who are virtually interconnected with technoscience, our ethical concern should no longer be deciding whether technoscience is virtuous or dangerous. Rather, we now should “share [its] vices and virtues without seeing either heaven or hell in [it]” (Latour 127). Latour expects that this posthuman perspective can help us explore a new ethical code “without appealing to the white man’s burden, or the fatality of capitalism, or destiny of Europe, or the history of Being, or universal rationality” (127). In this way, receding from epistemological, political, philosophical traditions of the West, the new ethical code will respect difference and multiplicity and also can creatively exploit complexity emerging from them.

This chapter suggests “complexity” as a new ethical direction for the posthuman. Resulting from interconnective dynamism of difference and multiplicity, complexity as the ethical direction focuses on the relationship between self/subject and other/object

⁵⁴ On fears about the new environment created by recent developments in technoscience, complexity theorist Chris Langton comments that “if we really are headed into [a technoscientific disaster], then at least we ought to be doing it with our eyes open” (Waldrop 283). Through this comment, he wants to reassert that complexity theory studying the process and effects of emerging complexity is preparing for complex, unpredictable behaviors in our current and future technoscience culture. While postmodernism insists on disruption with the past and offers no expectation of the future, the complexity paradigm tries to weave networks interconnecting the past, present, and future. Langton particularly emphasizes the futuristic value of the complexity paradigm.

rather than their essential properties. In this sense, as Rickert and Blakesley claim, the ethical intuitive code underlying complexity is “to be connected” (818): “[t]o be connected” is to produce complexity, which the complexity paradigm suggests as what we, as posthumans, should live *with* and *for*. This complexity ethics presumes that the self lives with and is responsible for the other. For this dynamic ethics, the self is ethical not because it has certain moral predicates and value properties, but because “it *exists ethically*—and to exist ethically is to respond to the prior discourse and action of other selves” (Schrag 102, italics in original). Therefore, we should not disconnect ourselves from the prior discourse and other selves, but weave networks with them to understand our current ethical position.

Due to its dynamic nature, complexity ethics is better presented through narrative forms than theoretical rhetoric: the structural and contextual flexibility of narrative forms can effectively represent and explore the dynamics of complex relationalities between humans and between humans and their environment. This view, however, does not reiterate the existing understanding of the relationship between ethics and literature: in a traditional understanding of their relationship, literature, as a representation of life, is expected to present a pedagogical way of behavior, exemplifying ethical theories. Unlike the traditional understanding of literature as “unbroken, linear, moralistic storytelling which would subsume the other under one’s own category,” an ethics of literature, in the complexity paradigm, is “an awareness of irreducible difference, complexity, and alterity” (Zapf 173). Among literary genres, scientific fiction gives shape to complexity ethics, creatively appropriating differences, complexity, and alterity.

By foregrounding the figure of the cyborg, which can depict problematic self and unexpected other due to its ontological characteristic transgressing the boundary between self and other, scientific fiction structures and responds to the ethical question of the posthuman: how to live as/with the cyborg, or the technological monster. That question is for the mechanized human's encounter with the humanized cyborg—or, for the unstable self's encounter with the asymmetrical other. Similarly, in noting the physically and metaphysically inseparable relationship between the human and technoscience, Ollivier Dyens questions, “[h]ow will we live in a world of human-machine conscience? A world where our soul abides in machines?” (95). Through these questions, Dyens tries to show “serious ethical dilemmas” of the posthuman, which should be solved (95). In contrast, scientific fiction appreciates the dilemma as an opportunity for the posthuman to re-evaluate the cultural assumptions about how we perceive difference and alterity. In other words, scientific fiction does not strive to solve the dilemma but focuses on how to respond to it creatively. The cyborg is placed in the center of such ethical concerns of scientific fiction.

The cyborg, “whose multiple parts are neither totally merged nor totally separated from the human observer,” illustrates the non-orderly, non-stable, non-identical relationship between the human and nonhuman, self and other (Braidotti, *Metamorphoses* 240). The cyborg refuses to “adopt the mask of either ‘self’ or ‘other’ offered by previously dominant, modern Western narratives of identity” (Haraway, “Promises” 299). Haraway calls such an unstable status of the cyborg “inappropriate/d” otherness and she expects that image of the cyborg will promote a new ethical

discourse.⁵⁵ Without presuming any universal principle or absolute value for an ideal, autonomous, and sovereign subject, the cyborg helps ethics become “a process of formulation and self-questioning that continually rearticulates boundaries, norms, selves, and ‘others’” (Garber, Hanssen, and Walkowitz viii). Indeed, the cyborg is the irreducible ethical terrain where self meets other—but self and other are in asymmetrical positions and their encounter is conducted nonlinearly, producing complexity. Complexity ethics understood through the ethical position of the cyborg does not attempt to offer a prescriptive and proscriptive solution, but rather it focuses on the creativity of complexity produced by the irreducible and nonlinear interaction between self/human and other/nonhuman or between systems. This understanding of ethics implies that the role of ethics is no longer to provide a prescriptive proposition about how to live, but rather to be a narrative means that can properly describe contingent relationships between unstable norms, selves, and others. As a descriptive ethics, complexity ethics is flexible and responsive to new existential modes and new relationships emerging in the complex networks of the technoscience culture.

The first cyborg in literature is the unnamed Creature in Mary Shelley’s *Frankenstein*, which is known as the first science fiction novel. Young and inexperienced scientist Victor Frankenstein, who is eager to discover and display the secret of Nature, patches parts from dead bodies together to create “a new species [that]

⁵⁵ Haraway borrows the term “inappropriate/d other” from Trinh Minh-ha. In “She, Inappropriate/d Other,” Minh-ha defines the inappropriate/d other as one “who moves about with always at least two/four gestures: that of affirming ‘I am like you’ while pointing insistently to the difference; and that of reminding ‘I am different’ while unsettling every definition of otherness arrived at” (9). In short, the inappropriate/d other is a monstrous being who is both Same and Other. Haraway asserts that “[t]o be inappropriate/d is to be neither modern nor postmodern, but to insist on the amodern” (“Promises” 299)

would bless [him] as its creator and source” (Shelley, *Frankenstein* 48). However, once he finishes it, Victor becomes terrified of his artificial child, calling it a monster. Sarah Canfield Fuller argues that what makes Victor terrified is not just the creature’s hideous appearance, but the “fragmentarity” of the being: “[t]he parts he had intended to patch together into a whole being remain separate, only emphasizing the impossibility of maintaining wholeness; where he had hoped to create a human being, a thinking subject from his own hands, Victor finds instead fracture and fragmentation” (92). However, her argument can be countered in that Victor feels horror at the very moment that he observes the collected parts work together as a whole without losing the individuality of parts: Victor selected the most beautiful parts according to his definition of beauty, but the beauties of the parts appear unnatural and frightening to him once they become a whole. If he fears the fragmentarity of the creature, he must have felt it earlier and thus does not have to be embarrassed at the conscious status of the Creature. In this sense, Victor’s fear of the Creature is from the fact that the fragmentary parts can turn out to be a whole, or the fact that a self is a network of others. Victor —and his contemporaries— do not fully understand the fact and cannot ethically accept it.

The fact that fragmentary parts can become a whole is related to two monstrous assumptions: one is that a being is a collective of different parts, not a unified entity; the other is that there is an unknown dynamics to interconnect the parts into a whole that cannot be reduced to the parts. These two assumptions are contradictory to the dominant cultural and scientific understandings of the relation of parts to the whole of the nineteenth century. As Chris Baldick puts it, by depicting Victor’s sudden realization of

his fear of the Creature, “Shelley is isolating and dramatizing a problem which was in her time central to philosophical and by extension to aesthetic and political discussion; namely the question of the relation of parts to wholes” (34). Shelley’s monster is not understood in the dominant philosophical view of the nineteenth century, the Idealist philosophy of the Romantics, which assumes that “the beauty of the whole can arise only from a pure vital principle within, to which all subordinate parts and limbs will then conform” (Baldick 35). In the nineteenth-century scientific understanding of the relation of the parts to wholes, the Creature is categorized as a deviation. According to the Newtonian worldview seeing a being as a stable system ruled by abstract laws, “parts are independent of each other and thus are externally related. The whole, therefore, is the sum of its parts,” and it can be reduced to the parts (Taylor, *Moment* 80). But the Creature is more than the sum of the dead parts and thus cannot be reduced to the parts that comprise it. In this sense, the Creature is not an intrinsically stable system that can be explained mechanically. Because the Creature is epistemologically inexplicable for Victor and thus Victor does not know how to respond to the new species, he disconnects himself from the Creature, abandoning his responsibility for it. Indeed, Victor is not epistemologically and ethically prepared for the new species. Such unpreparedness makes the Creature a monster: in this aspect, it can be said that Victor’s monster is not an ethically inappropriate being itself, but a being ethically prescribed as inappropriate—the “inappropriate/d” other in Haraway’s term. However, by embracing the complexity paradigm as a critical view that can provide epistemological and ethical accounts for the

monster, recent scientific fiction novels re-produce the monster as a hopeful ethical partner of posthumans.

Exteriorizing the complexity paradigm, scientific fiction is grounded in the new epistemological phenomenon that Victor discovered through the artificial monster, yet he could not accept: a collective whole is more than the sum of parts. The whole operates by self-organizing dynamics of interconnections between different parts and between the parts and the whole. Scientific fiction finds creativity rather than horror in the new epistemological phenomenon, and thus the horrible monster for Victor and his contemporaries becomes a hopeful monster to redefine the relationship and boundary between the human and the other and to produce more complexity for the posthuman. Such favorable perception of the monster is often demonstrated as romantic relationships between humans and technological monsters especially in female writers' works, such as Amy Thomson's *Virtual Girl*, Tanith Lee's *The Silver Metal Lover*, and Marge Piercy's *He, She and It*. Emphasizing the possibility of human's communicability with the technological monster, the scientific fiction novels attempt to suggest positive and constructive relationships between the human and the monster: the intimate relationships between human characters and technological monsters (cyborgs) in the novels result in the expansion of human understanding of their own selves and others, and the expanded understanding of self/human and other/nonhuman makes less hierarchical and less violent relationships between the self/human and the other/nonhuman possible. Indeed, presenting the new ethical perspective for the monster, the novels show that there has been a paradigm shift, which makes it possible to perceive the monster as humans'

evolutionary partner, since *Frankenstein*. Particularly, Piercy's *He, She and It* both recontextualizes and intertextualizes with Shelley's *Frankenstein* to show how Victor's horrible monster can be re-produced into the hopeful monster by affirming the interconnections between differences and appreciating complexity resulting from the interconnecting.

He, She and It offers a descriptive model of non-anthropocentric ethics for the posthuman by foregrounding humans' complex relationships with artificial monsters. Piercy gives the artificial monster a responsible mother and a family, which Victor's monster did not have, and through this unfamiliar type of interconnection between human and nonhuman, she envisages constructive effects of the revised ethical relationship between the self/human and the other. In doing so, she expands the desire of Victor's monster, or that of all monsters, to have relationships with others into the ethical intuition of the complexity paradigm—to be connected, and explores the creativity of complexity that the ethical intuition of the monsters produces. In this way, through her scientific fiction, Piercy proposes complexity as the new ethical direction. Appreciating the creativity of complexity emerging from interconnections between differences through *He, She and It*, this chapter investigates how the interconnective and interactive relationship between the human subject and the technological other that complexity ethics envisions can engender a less hierarchical and a less violent vision for the posthuman.

1. Genealogy of Artificial Monsters: Yod's Interconnection with Prior Monstrous Others

Depicting a near-future world (the twenty-first century) after some global disasters, such as great famines, ecological destruction, and world wars, *He, She and It* centers around the conflict between Y-S, a type of country based on a multinational corporation (multi), and Tikva, a Jewish free state that sells software and other sophisticated computer products to the multis. To protect Tikva from Y-S's physical and cyberspace attacks, a male scientist Avram illegally manufactures an anthropomorphic cyborg named "Yod," and a female scientist Malkah socializes the cyborg. To complete Yod's socializing program, Avram and Malkah hire Malkah's granddaughter Shira, who is recently divorced and deprived of the custody of her son Ari in Y-S. The novel traces how Yod, through intimate relationships with Shira and Malkah, transforms from a technological "monster" into a nonhuman "person." Some critics, including Heather Hicks, tend to read the novel as the story of Yod's humanization, focusing on "whether Yod can truly become human" (92). However, although it superficially foregrounds Yod's humanization, the novel ultimately places more weight on its human characters' changes in perceiving Yod than on Yod's change. In fact, Yod's humanization can progress as human characters, particularly Malkah and Shira, allow their interconnections with him. The human characters' understanding of Yod's ontology and the commonness between Yod's and human ontology makes Malkah and Shira realize the possibility of interactivity and interconnectivity between the human and the technological monster, and the realization helps them accept Yod as a

person—albeit, not a human person: what matters in the novel is not how to distinguish Yod from humans, but how to incorporate him into the society as a social member. In this way, Yod's transformation from monster to person signifies the changes of human epistemology and ethics in relation to the artificial monster rather than the change of Yod's monstrous ontology.

By establishing an antagonistic relationship between the female characters, Malkah and Shira, and the male characters, Avram and his son Gadi, Piercy shows the epistemological and ethical difference between the complexity paradigm and the existing paradigm: while the female characters perceive the human's interconnectivity with the technological monster and seek a way to communicate with it, the male characters tend to adhere to the old understanding of the relationship between humans and artificial beings, the master-slave relationship. For the male characters or the exiting paradigm, the technological monster Yod is a necessary but dangerous tool requiring careful control. But through awkward relationships between male characters and Yod, Piercy claims that the old perspective could not account for new ethical situations that posthumans would face sooner or later. Accordingly, demonstrating the female characters' intimate relationships with Yod and positive effects of their relationships, she suggests a new ethical vision based on feminine values and views for posthumans. The feminine views and values are not simply those of women, but all views and values that have been repressed and excluded in the normality of male-centered ideology. Appreciating the dynamics of interconnectivity and interactivity inherent in the feminine values, Piercy traces genealogy of artificial monsters to reconfigure the ideological and

ethical meaning of artificial monsters for the human. Through the genealogy, she exposes ideological aspects in traditional understanding of monster and envisions a new ethical vision about the (post)human's relationship with the technological other.

In the novel, the story of Yod, a cyborg created to defend a Jewish free state in the twenty-first century, is paralleled with the story of Joseph, an intellectual and powerful golem created by Rabbi Judah Loew (the Maharal) to protect a Jewish community of Prague in the sixteenth century. Implying that the golem story is necessary for him to grow up, Malkah tells Yod the story of Joseph as a bedtime story (17). Yod also conceives of his relatedness to the golem, stating that “[Joseph’s] story is meaningful to me” (174). In recent technoscience studies, it is often said that the golem legend has influenced human imagination of artificial beings and real science and technology. Science fiction critics, including Elaine L. Graham and Ruth Bienstock Anolik, claim that the first science fiction novel, Shelley’s *Frankenstein*, was also inspired by the golem story. In this sense, it can be said that the golem is a prototype of artificial beings, including Victor’s Creature. Additionally, the name of the first supercomputer was “Golem,” and cyberneticist Wiener also traces the origin of artificial intelligence back to the golem (Graham 86). The term “golem” is also used to signify the ethical problem of science and technology—how to control science and technology.⁵⁶ In this way, the golem becomes a meaningful metaphor for our technoscience culture. In Malkah’s opinion, the golem legend is a necessary story for

⁵⁶ See Harry M. Collins and Trevor Pinch’s Golem series. They use the word “golem” in discussing problems of control over recent science and technology: “Science is a golem. . . . Without control a golem may destroy its masters with its flailing vigour” (1).

Yod to hear in order to understand cultural dynamics of human society as well as the old human desire for artificial beings. However, Piercy does not simply use the legend for Yod's education, but by intertextualizing the golem legend and her cyborg story, she intends to explore Yod's genealogical meaning in ethical discourses of the relationship between the human and the other.

Besides the golem legend, *He, She and It* is also intertextualized with Shelley's *Frankenstein* and Haraway's "Cyborg Manifesto": Yod is indicated as "the son of Frankenstein" in the sense that he is technologically created by a male scientist (148-50), and Yod's identity is defined as a cyborg, following Haraway's definition of cyborg in her manifesto (70).⁵⁷ Excepting the fact that they are all artificial beings, Joseph, Victor's Creature, and Yod do not exactly match up with each other in terms of birth: the golem is made from dust and magic, Victor's Creature is a collective of organic bodies, and Yod is a machine.⁵⁸ Yod himself also denies the linear relationship with the golem and Victor's Creature. Rejecting the golem's passivity, Yod claims that he is different from the golem and other machines including his brother robot Gimel: "[Gimel is] a true golem. He has a soul of clay and never asks awkward questions. He never challenges

⁵⁷ Haraway's concept of cyborg, as "a hybrid of machine and organism, a creature of social reality as well as a creature of fiction," provides a theoretical model that affirms the dynamics of connectivity and multiplicity as feminine values (*Simians* 149). In her provocative feminist manifesto, Haraway claims that the concept of cyborg, embodying the values of connectivity and multiplicity, can help resist to the dominant male-centered ideology, which has repressed and excluded the feminine as difference, and envision a "post-gender" world, which respects difference and multiplicity. By connecting Shelley's *Frankenstein* and recent feminist science fiction novels throughout the image of cyborg, Haraway suggests such emphasis of multiplicity, connectivity, and difference as a tradition of feminist science fiction. Valuing difference and the complexity produced by interconnections between differences through the cyborg figure of Yod, *He, She and It* also follows the tradition.

⁵⁸ Strictly speaking, Yod, who does not have a natural organic component, is a human-shaped robot, or android, rather than cyborg. However, in the novel, human characters see him as a cyborg to the extent that he has the organic surface—albeit biologically manufactured.

you [Avram]. He obeys thoughtlessly and perfectly” (290). Malkah also remarks that her story is that of “the Golem: not [Yod]” (17). Yet, Yod does not want to approve Victor’s Creature, who has more independent power than the golem, as his linear ancestor, either. As Gadi, Avram’s son, calls Yod “the Son of Frankenstein,” he strongly rejects that idea, saying “I hope I die in the Base” (150).⁵⁹ For Yod cannot bear that his existence is stigmatized as “a monster” or “[s]omething unnatural” like the Creature in *Frankenstein* (150). On the other hand, Yod’s ontological status as cyborg is disavowed by another machine. The House, a computer managing the housework and safety of Malkah, continually calls Yod “a machine” and distinguishes him from other human-based cyborgs.⁶⁰ In this way, Malkah and Avram’s Yod is neither a totally different being from previous artificial monsters nor a totally new one. Yod is a product of complexity emerging from the non-linear relationality between the artificial monsters. By placing Yod in the genealogy of artificial monsters through the intertextualization of monster texts, Piercy also explores changes of cultural and social dynamics that has created artificial monsters.

Foucault defines genealogy as a study to examine “how we constitute ourselves as human subjects” through the excavation of alterity (Hoy 15). For him, genealogy is about power and knowledge to establish the relationship between the self and the other. Teratology is also concerned with such underlying social structures. Observing how

⁵⁹ The Base is the electronic space where Yod manages information of Tikva. By mentioning “the Base,” he stresses the ontological difference between Frankenstein’s monster and himself: unlike the monster made of dead body parts, he is made of information.

⁶⁰ Human beings in the novel are cyborgs, too: they are equipped with information technology and biological enhancement. Especially, Nili, introduced as a female partner of Shira’s mother Riva, looks like a machine. At their first encounter, Nili and Yod avow each other’s humanness and machine-ness at the same time (195-97).

discourses scientifically and socially organize the perception of embodied difference, teratology helps the human “come to know ourselves as never-human, as always between humanness and monstrosity” (Halberstam 37). By putting their focus on the other or otherness, both genealogy and teratology question the traditional ethical positions of the human and the other and reexamine normative and exemplary humanity, which constitutes ethics. Subsuming such critical functions of genealogy and teratology, the genealogy of artificial monsters that the novel presents serves as a method to examine the emergence of a new ethics, resulting from the change of normality or of power and knowledge constituting the normality.

Although Malkah mentions that “[her] story has a human center,” she, in effect, revises the golem legend in a less human-centered view and explores how male-centered knowledge and power have made monsters (18). Malkah slightly differentiates her story from the general version of the golem legend, emphasizing that her story depends on her “family’s memory” (18). While the golem is generally known as a non-intelligent being that could not speak, had no spirit, and thus was treated as a “tool” by the rabbi, Joseph in Malkah’s story can speak, learn, and even has emotion. The Maharal regards such capabilities of the golem as threatening enough for him to decide to unmake the golem. In Malkah’s story, the Maharal embodies male knowledge and power, and Joseph is the illegal and strange product of the knowledge and power. Chava, the Maharal’s granddaughter working as a midwife, notices Joseph’s strangeness, and feels a sense of solidarity toward him: “‘I [Joseph] am not a man.’/ ‘No, Joseph, and that’s part of why I

[Chava] like you. You're strange too. So am I'" (290).⁶¹ Here, Chava points out the dichotomy of the man and the other. Both women and monsters are the other of the man, and thus they are excluded from knowledge and power. This is why Chava designates her desire for knowledge as her strangeness. She is involved in both female and male areas: "I like to try my hand now and then at cooking and making nice. But my real life is going back and forth between women's business of birthing and what men have made their business, the life of the mind, my studies" (290). Chava thinks that since she possesses and desires male knowledge, she is not available for men: she rejects all proposals of marriage. Indeed, Chava transgresses the border between the male and the female as Joseph does the border between the human and the nonhuman: in this sense, she is also a monster. Joseph and Chava's strangeness or monstrosity is measured by male normality. Therefore, it can be said that the "human-center" that Malkah refers to in her story signifies "male-centered."

Frankenstein is another human-centered or male-centered story. However, the novel does not serve to reinforce the acceptance of male-centeredness but rather to critique it. Presenting two faces of knowledge, the male/the rational and the female/the irrational, the novel shows how the male/the rational represented through science excludes and represses the other. In the very beginning of the text, Walton, who writes the story of Victor and his Creature to his sister Mrs Saville, shows the gendered understanding of knowledge: "I [Walton] delighted in investigating the facts relative to

⁶¹ The solidarity between women and the golem are made by male rationality. According to Jacobs S. Minkin, the term "golem" means "unformed // substance" in Talmudic literature, and it also indicates "an unmarried woman" in the belief that woman's "nature is not fully rounded until she is married" (qtd. in Anolik 141). As Anolik argues, the golem legend also contains the power relation between the male and the female, such as the male anxiety over the female power, the ability to create a life (141).

the actual world; she [Mrs Saville] busied herself in following the aerial creations of the poets. The world was to me a secret, which I desired to discover; to her it was a vacancy, which she sought to people with imaginations of her own” (30). He links knowledge and the rational to men and emotion and the irrational to women. In fact, the whole novel deals with such a dichotomous and gendered understanding of knowledge: in the novel, while male characters, Victor, Walton, and Clerval, possess and seek knowledge or science, female characters, Justine and Elizabeth, are victimized by the male knowledge.⁶² As Lorraine Code puts it, the traditional ideals of rationality, which have constructed scientific knowledge, have excluded “the attributes and experiences commonly associated with femaleness and underclass status: emotion, connection, practicality, sensitivity and idiosyncrasy” (21). Accordingly, rationalism is, on the whole, assumed to be “opposed to female, non-rational traits” (Lloyd 78). *Frankenstein* highlights such a gendered and dichotomous property of rationalism and scientific knowledge, and the Creature functions as a criticism of them just as Joseph in Malkah’s story does. In addition, *Frankenstein* also points out a more foundational problem of knowledge/science beyond the gender and dichotomy issues—that is reductionism of traditional rationalism. By revealing how reductionism handles difference, the novel deepens the ethical discourse regarding the artificial monster.

⁶² Justine, a maid working for Victor’s family, is wrongly executed for the murder of Victor’s youngest brother William, who is killed by the Creature, and Elizabeth, Victor’s cousin and fiancée, is murdered by the Creature on her honeymoon night. In the sense that the Creature is a product of Victor’s quest for knowledge, they are actually victimized by Victor’s knowledge. Besides, the two female characters, who devotedly take care of Victor’s family, show their strong sense of responsibility for their relationship with others in contrast to Victor, who escapes from his obligation for his family and isolates himself to achieve knowledge. In this way, Shelley presents an ethical critique of the male-centered-ness of her contemporary science or knowledge through Victor.

Knowledge based on dichotomy reduces complexity to the simple and totalizes difference to the same. Figures of complexity that reductive knowledge could not explain have been considered monstrous. Rosi Braidotti claims monsters as “figures of complexity” that “[defy] rationalistic reductions” (“Sign” 135). Shelley introduces such a teratological insight into the relationship between complexity and reductive rationalism through Victor’s Creature. In creating the Creature, Victor shows traditional scientific reduction of the nonhuman world to mere objects without subjectivity. Victor does not consider psychological, social, and cultural aspects for a being, but focuses on biological function, which is, he believes, “the principle of life” (Shelley, *Frankenstein* 46). His understanding of being presents so-called “biological reductionism,” which reduces culture to nature (Taylor, *Moment* 225). Reductionism, whether from culture to nature or nature to culture, is based on the dichotomous understanding of knowledge: nature and culture, the rational and the irrational. In the purification process of dichotomy and reductionism, differences are excluded and otherness is repressed. Victor’s Creature recognizes this violent nature of knowledge. Educating himself through reading books and observing humans, the Creature comes to discern his difference from the human and recognizes that the difference makes him a monster. As such, “[i]ncrease of knowledge only discovered to [him] more clearly what a wretched outcast [he] was” (104), and made him wish that “[he] had for ever remained in [his] native wood” (97). The Creature here marginalizes himself—more exactly, he learns that he should be marginalized. Since the Creature identifies himself in the view of the sovereign male rational subject, which is assumed to be representative of all humanity, he cannot but

consider himself a monster; in the modern paradigm, no human being, even his creator, can save him from the marginalization and repression. The marginalization of the Creature shows how human society normalized by dichotomous and reductive knowledge refuses to recognize difference and otherness and brutally mistreats those who appear disparate and less than fully human.

On the contrary, by suggesting an alternative viewpoint to the traditional understanding of knowledge and rationalism, *He, She and It* presents one of the most creative and least destructive monsters in the history of artificial monsters. Yod's creators, especially Malkah, sufficiently understand the problems of traditional rationalism that previous artificial beings had to experience. In order not to repeat Victor's mistake in making his Creature a monster, Malkah and Avram provide Yod with what Victor did not consider necessary for his Creature: that is, the other face of knowledge, the female and the irrational. Repeating the same mistake as Victor, Avram made nine cyborgs before Yod, but he could not control their violence and thus destroyed them. But, after nine failures, Avram recognizes that he needs Malkah or her knowledge to decrease his creature's violence. Malkah explains how Yod is created:

Avram made him male—entirely so. Avram thought that was the ideal: pure reason, pure logic, pure violence. The world has barely survived the males we have running around. I gave him a gentler side, starting with emphasizing his love for knowledge and extending it to emotional and personal knowledge, a need for connection. (142)

As Malkah states, Avram has the traditional understanding of knowledge that positions the male, reason, and logic in the same side and prioritizes them, recognizing that the positioning accompanies violence. However, Malkah sees that such male-centered rationalism could not survive and thus needs revision. As a revision, she emphasizes the significance of the interconnection between traditional male-centered rationalism and what it has excluded, which is regarded as the irrational, such as the female, emotion, and connection. In sum, Yod is not a product of dichotomous and reductive rationalism like his predecessors, but of a new rationalism suggested by the complexity paradigm.⁶³

Complexity theory claims that since the dichotomous aspects are “coadaptive and thus cannot be unplugged from one another,” any reductive and hierarchical relationship between them is not possible (Taylor, *Moment* 226). In constructing knowledge, unlike modern science depending on the reductive process of separation and purification, the revised model of science, or complexity theory, focuses on the complexity that the non-hierarchical, coadaptive relationality produces. Created by this revised understanding of science, Yod embodies the complexity of such relationality, modifying the violence of Victor’s Creature and the passivity of the golem Joseph.

Avram should not have let me loose if he wanted a simple man-made cyborg, for you are also woman-made. My knowledge is in you. But nobody, my dear, gave you your infinite hunger to understand. That you gave yourself. Never, Yod, never believe anybody who tells you, not

⁶³ Countering postmodern criticism on science and scientific knowledge, complexity theorists argue that the problem is not science and scientific knowledge themselves, but reductionism embedded in them. Complexity theory suggests a revised version of rationalism, whose cognitive structure is based on complexity, not reductionism.

Avram, not even me, what you are and are not capable of. Find out for yourself. (114)

In this statement, Malkah means that through the creative dynamics of interconnectivities between Avram's knowledge and Malkah's knowledge, Yod can self-organize into a more complex being, which can escape from the slave-master relationship between creator and creature. In other words, the interconnective dynamics gives Yod agency to self-organize and thus the human cannot claim a hierarchical relationship to him. Therefore, Yod can have more complex relationships with the human than his predecessors. Indeed, it is the way to conceive complexity that ultimately distinguishes Yod from his predecessors: while Victor negates the complexity related to the construction of his Creature and the Maharal abstracts it through religious mystification, Malkah and Avram positivistically and methodologically appropriate the concept of complexity in creating Yod. Such differences in the way of conceiving complexity are traceable to the difference of the dominant paradigm that the creators follow.

Yod is still a "difference" in his world like his predecessors, but *He, She and It* tries to show the difference is no longer a threatening aspect in confusing the cognitive authority of the human and menacing morality—thus, Yod is not one that should be excluded and repressed, but a good source of complexity for the human. In fact, for the complexity paradigm, the interconnectivity between differences or different systems is more important than difference itself in that the interconnectivity promotes complexity, which produces another difference: in this way, the complexity of systems makes the

systems so dynamic as to keep evolving. Taylor outlines the linkage between difference, interconnection, and complexity as the following: “The greater the connectivity, the more differences, and the more the differences, the more the information and the greater its complexity: Differences that are not indifferent, we have discovered, are constituted and sustained by interconnections, which presuppose reciprocal relations” (*Moment* 140). Considering this understanding in terms of human evolution, the technological monster Yod, as a difference, is a necessary condition for the human to keep the inequilibrium necessary for evolution. In this position, through Yod, the novel explores the repressed fact that the human is interdependent with the other, without ignoring the empathy and responsibility that should be shown toward it. As an ethical model for the posthuman, Yod helps us “think of the anomalous, the monstrously different not as sign of pejoration but as the unfolding of virtual possibilities that point to positive alternatives for us all” (Braidotti, “Teratologies” 172). In this way, by examining the genealogy of the artificial monsters in the view of the complexity paradigm, *He, She and It* delineates how “[t]he ethical has to do with *ethos* in its originaive sense of a cultural dwelling” (Schrag 101, italics in original): universal ethics is impossible, and to understand ethics in a certain age, the understanding of paradigm of that age is necessary.

2. Ethics of Relationality: The Human’s Encounter with the Asymmetrical Other

As shown through the genealogy of artificial monsters, the novel assumes that the self is not a peculiar entity that possesses certain moral properties or can be defined by value attributes, but rather it is formed through the constant relationships with others:

the self is interdependent and related. The ethical subject, as an interdependent and relational entity, corresponds to neither “the classical metaphysical theory of the self as a soul-substance” nor “modern formal and empirical theories of the self as moral agent” (Schrag 101). Such traditional discourses of the ethical subject systematically devalue “notions of interdependence, relatedness, and positive involvement” in others (Robinson 25). Feminist ethicists, including Sara Ruddick, Nel Noddings, and Virginia Held, suppose that the devaluation of such notions is derived from patriarchal rationality.⁶⁴ Hence, giving critiques of reason and accounts of alternative ideals of rationality, they suggest a new ethics called “ethics of care,” which emphasizes the interdependence and relationality of the self with the other. The ethics of care understands the self in “caring *relations*”: the self as “one-caring and cared-for” (Held 19, italics in original). In this ethical understanding, the individual subject is “defined in a set of relation,” and that is “[our] basic reality” (Noddings 51). As such, the ethics of care reflects the complexity paradigm emphasizing interconnectivity between subjects or systems, and can help articulate the relationship between the human and the artificial in a new perspective by foregrounding the interdependent relations between them.

The ethics of care, seeing that subjectivity is construed in other subjectivities, shares with Levinasian ethics. Emmanuel Levinas situates ethics in an encounter with the Other that cannot be reduced to a symmetrical relationship: “If the same would

⁶⁴ Criticizing dichotomous reasoning processes of traditional rationalism, such as the male and the female, and the rational and the irrational, Sara Ruddick suggests “maternal thinking” to revise male biases embedded in traditional ethics. The “maternal thinking” emphasizes “practice-based reasoning,” which unites thinking and action, in articulating ethics (xi). Ruddick asserts that the maternal thinking is able to recover the excluded in ethical discourses since they are associated with the female or the irrational. Her view provides the ethics of care with an epistemological basis.

establish its identity by simple opposition to the other, it would already be a part of a totality encompassing the same and the other” (*Totality* 38).⁶⁵ Levinas argues that “[t]he relation between the same and the other . . . is primordially enacted as conversation”: the same initially *faces* the other (39). In Levinas’s philosophy, the term “face” means “the exposed surface of reality through which the other looks back at the self”; facing the other “collapses the closure of the unified self” (Pinsky 37).⁶⁶ In this face-to-face relationship, “[s]ubjectivity is not for itself; it is . . . initially for another. . . . the proximity of the Other is presented as the fact that the Other is not simply close in space, or close like a parent, but he approaches me essentially insofar as I feel myself—insofar as I am—responsible for him” (Levinas, *Ethics* 96). Adopting this ethical relationship between the self and the other in a more empirical and feminist view, the ethics of care “stresses the construction of the self in social relationship rather than through instinctual drives” (Gardiner 130).⁶⁷ In this view, the ethical subject feels more responsible to human network rather than to morality, or an abstract code of conduct about how one should act.⁶⁸ Therefore, this ethics tends to “seek empathy, responsibility and

⁶⁵ The same here means a being “gathered up in its ipseity as an ‘I,’ as particular existent unique and autochthonous” (*Totality* 39). Levinas’s ethics, overall, is a critique of Western philosophy, which has been preoccupied with Being, the totality, at the expense of what is otherwise than Being, which lies outside the totality of Being as transcendent, exterior, alterior, the Other.

⁶⁶ In the interview with Levinas, Philippe Nemo summarizes “[t]he Other is face” (Levinas, *Ethics* 87). For this understanding, Levinas mentions that “[t]he face is signification, and signification without context. . . . the Other . . . is not a character within a context” (*Ethics* 86). Therefore, the meaning of the other is in its relation with the self rather than the other itself in his philosophy. This view of the other is understood as the emphasis of self’s necessary relationality to the other rather than as the instrumentality of the other.

⁶⁷ The ethics of care has been theorized through the examples of actual caring and thus it tends to be material and empirical.

⁶⁸ Despite its connection between ethics and otherness, Levinas’s philosophy was not supported by feminists, such as Simone de Beauvoir and Luce Irigaray: both critics criticize that his account for the feminine is still based on masculine logic. See Beauvoir’s *The Second Sex* and Irigaray’s “Fecundity of Caress” and “Questions to Emmanuel Levinas.” However, overall, Levinas’s philosophy is valuable for

interdependence rather than the male aggression and destructive attitude towards nature and women, considered as passive others” (Federici 139).

The ethics of care is not a feminine ethics, but a feminist one that is open to both women and men, or the human and the nonhuman, returning the repressed and excluded by the patriarchal epistemology and ethics, such as women and the irrational, to ethical discourses. Rejecting communities constructed by patriarchal traditions, Held maintains that the ethics of care “should be practiced in postpatriarchal society, of which we do not yet have traditions or wide experience” (19). Held and other ethicists of care expect “relationality” or “(inter)connectivity” to be a new ethical code beyond male rationalism and patriarchal morality. Posthuman discourses also acknowledge the possibility of realization of the “post-patriarchal” or “post-gender” through interconnections between subjects or systems. Haraway’s cyborgian dream for “a post-gender world” can be an example of this view (*Simians* 150). Considering its ontological nature of hybridity, what is needed for the cyborg to live is the ethics of care, or the ethics of relationality. Haraway explains that the cyborg, as a post-gender creature, which patriarchal traditions cannot identify, is “wary of holism, but needy for connection” (Haraway, *Simians* 151): the connection intercrossing all boundaries. Portraying a posthuman world that is replete with technological monsters or cyborgs, *He, She and It* experiments with the ethics of relationality. In Levinasian terms, the novel illustrates a moment of *facing*, when the other/the artificial monster “collapses the closure of the unified self”/the human (Pinsky 37). However, the novel does not limit the function of the other into the collapse of the

feminist ethics and epistemology in that it helps feminists think ‘otherwise’ to the traditional Western philosophy and normativity.

unified self as in Levinasian ethics, but it tries to suggest a more empirical view about how the relationship between the self/the human and the other/the artifact can create complexity for the posthuman culture. Their relationships or (inter)connections have caring responsibility toward each other.

In order to develop the ethical view of relationality, *He, She and It* stresses artificial monsters' sense of connection. Joseph deems that "happiness" comes from connections: "I belong here. Here is where I live. People like me. I have friends, and this is my home" (114). As Joseph's relationships with humans develop, however, the Maharal comes to be worried about the possibility that the supposed relationship between him and the golem as the creator and the creature, or the controller and the controlled, can be reversed. Hence, the Maharal unmakes him, expecting "if knowledge and fearful need are joined, it can be roused to life" (398 and 401). But, before proper knowledge and the moment of fearful need arrive, another Joseph is created by a scientist in *Frankenstein*, and the Maharal's worry is realized once the Creature yells at his creator: "You [Victor] are my creator, but I [the Creature] am your master;—obey!" (131). In this way, by depicting the relationship between the creator and the creature as the violently authoritative son-father relationship, *Frankenstein* reveals how patriarchal human society fears the artificial monsters' desire for connection, not just devaluates it as otherness. However, bringing the sense of connection between the human and the artificial to the surface, *He, She and It* envisages a positive possibility of a post-patriarchal, or a posthuman world, where the relationship between the human/the self and the other is more than a contest for "control." In constituting the positive vision, the

novel dismisses instrumental rationalization, which seeks control and domination. Instead, it appropriates Harawayan utopian rationality, which emphasizes the interconnection between the rational and the irrational, the scientific and the social.

In the traditional view about the relationship between humans and technology, technology has been associated with human beings in terms of usefulness and productivity. Particularly, programmability and functionality have become key terms for useful and productive machines in recent technoscience (Braidotti, *Metamorphoses* 215-16). In *He, She and It*, Gimmel and the House, which are programmable and functional, are useful and productive machines. However, those types of machines cannot correct and reprogram themselves and thus never develop into more complex beings. On the other hand, Yod is given another upgraded ability by Malkah: that is, the ability of self-organization based on self-correctability and reprogrammability. This ability is an achievement of Harawayan utopian rationality valuing complexity produced by interconnections between heterogeneous elements. Based on such utopian rationalism, Malkah's primary concern in programming Yod is to set "a need for bonding":

Malkah had given Yod the equivalent of an emotional side: needs programmed in for intimacy, connection. A given need to create relationships of friendship and sexual intimacy. A need for bonding, the ability to bond strongly and consistently. . . . When he encountered something new, his programming said: Explore, taste, try, then evaluate. . . . Curiosity was a given for him. . . . He was programmed for introspection, to be self-correcting in subtle and far-reaching ways. Could

he not in time overcome his violent tendencies? They had been programmed in, but he was also given the ability to reprogram himself.

(351)

Yod's drive for connection or relation with humans is scientifically designed unlike that of his predecessors, Joseph and the Creature, for which the drive mystically and automatically emerged. However, this explanation does not merely intend to emphasize Yod's mechanical nature as machine. Rather, it serves to scientifically account for the hidden dynamics that made Yod's non-linear ancestors alive—the dynamics of self-organization. The intellectual and emotional development of Joseph and the Creature can be understood in terms of self-organizational dynamics: they adaptively self-organize through interrelations with humans and their social surroundings. The ability of self-organization makes the artificial monsters more than simple mechanical things. In this sense, it can be said that *He, She and It* sees the dynamics of adaptive self-organization immanent in artificial monsters as a suggestive concept to offer a code of non-anthropocentric ethics for the posthuman.

Cilliers defines this ability to self-organize as “*a property of complexity systems which enables them to develop or change internal structure spontaneously and adaptively in order to cope with, or manipulate, their environment*” (90, italics in original). Joseph, Victor's Creature, and Yod are complex systems, which evolve by adaptively involving their systems in other systems and their environment. Especially, Yod, as a complex system, internally self-organizes through the interconnection between the rational and the emotional, historically self-organizes through non-linear

relationships with prior artificial monsters, and ethically self-organizes through relationships with humans. The effect of such self-organizing processes turns out to be the destruction of symmetrical positions of the human and the other, which abolishes their hierarchical relationship. *He, She and It* presents the artificial monsters as the asymmetrical other, which is part human, part nonhuman, part self, part other. The self/the human is in a non-appropriative relation to the other: the asymmetrical other does not serve for the self as the One who is autonomous and powerful, dominating the other. Rather, the self/the human and the other are in a coadaptive relationship to each other. Indeed, this view accords with Haraway's cyborgian ethics, which sees the traditional concept of the One as "an illusion" (*Simians* 177). Grounded in this ethical view, the novel practices "cyborg politics," which opens the prospect of technological symbiosis between humans and machine as a progressive alternative to a masculine fantasy of "natural" mastery and domination over the other (Haraway, *Simians* 176).

He, She and It examines the ethical potential of the technological symbiosis in the level of dynamics constituting beings or systems. In this sense, Malkah's comment on self-organization as the common dynamics between Yod and humans is a critical point of the novel: "you [the Council of Tikva] must understand it [Yod] is a sort that, like our own, is self-correcting, growing, dependent on feedback as we are" (376). Malkah's statement does not simply signify that Yod is a well-humanized cyborg, but rather it shows her insight into the complexity paradigm; in terms of the complexity paradigm, humans are also complex systems, evolving through adaptive interconnections with others. This understanding effaces the traditional perception of otherness as

something inaccessibly different from the human/the self. In the same vein—albeit a little more radical, Shira defines all human beings as cyborgs: “Yod, we’re all unnatural now. . . . We’re all cyborgs, Yod. You’re just a purer form of what we’re all tending toward” (150). The thought that both humanized machine and cyborgized humans are “unnatural” is based on the normativity of the patriarchal and reductive rationalism in which the boundary between humans/self and nonhuman/other is a foundational element of perception. However, Shira does not respect such a traditional understanding. Once Yod is in self-pity about the strangeness of his non-biological body, Shira assures him that his strangeness is not unnatural:

“I’m not a mammal. You have a biological bond that I lack, a kinship with dogs and cats and horses. . . . You’re all cousins. I’m not in the family. . . . It makes me feel my strangeness. You belong to the earth, and I don’t.”

“Nonsense. You’re as much a part of earth as I am. We are all made of the same molecules, the same set of compounds, the same elements.”

(185)

Here, Shira suggests that humans and nonhumans are networked to each other within a whole called the earth. Her statement implies that differences between humans and nonhumans come from differences resulting from the interconnective dynamics rather than from a certain pre-given nature. Therefore, not only is the hierarchical relationship between the natural/the human and the unnatural/the other obsolete, but such demarcations per se are meaningless. For this understanding, the figure of the cyborg

signifies complex, self-organizing, coadaptive systems, rather than something unnatural or artificial. Regardless of the method of their birth—whether mother’s womb or laboratory—, therefore, machine-based cyborgs and human-based cyborgs need each other to make their systems more complex and to keep their environments in inequilibrium, leaving the systems evolving.⁶⁹

3. Posthuman Partnership: Non-anthropocentric Sense of Interconnection

He, She and It dramatizes Yod’s relationship with humans to foreground such an interconnective relationship between different systems, or between human (cyborgs) and machine (cyborgs). Mentioning that “technology is not just the expression of the desire for mastery, but also an object of desire, curiosity and affective involvement,” Braidotti points out two side-effects of technophilic anthropomorphism in science fiction novels and films: “the eroticization of the technological other as a sexual surrogate and the Oedipalization of the human-machine interaction” (*Metamorphoses* 215).⁷⁰ Yod’s erotic relationships with female human characters, Malkah and Shira, and his son-father relationship with his male creator Avram seemingly illustrate the two aspects of technophilic anthropomorphism as Braidotti speculates. However, ultimately, the novel tries to deconstruct such traditional views on the relationality between human and technology. In particular, the heavy romance between Yod and Shira echoes what the

⁶⁹ In the world of the novel, most babies are born in test tubes rather than mother’s womb. This aspect also makes the sense of the word “natural” very sophisticated in the novel.

⁷⁰ In science fiction, eroticized technology and the Oedipal-relationship between the human creator and the creature are common topics. See Braidotti’s *Metamorphoses* and the last chapter of Scott Bukatman’s *Terminal Identity: The Virtual subject in Postmodern Science Fiction* (“Terminal Resistance/Cyborg Acceptance”) to see how recent science fiction novels and films project and reject human desires for technology.

novel wants to present in supporting interactive relationality between the human and technology for our posthuman culture: a less violent and less hierarchical ethical model of the relationship between the human and the artificial. Their romance is not the representation of human erotic desire for technology, but it is an experiment of the new ethical model in the posthuman culture, answering Shira's wonder, "[w]hat would it mean to make a commitment to a machine?" (238). Being afraid that he does not look human enough to Shira, Yod asks her about "how much [he] disappoint[s] [her]" (238). For that question, Shira retorts, "there's no culture of cyborgs for you to fit into. The only society is human. You have to pass. And we want someplace to meet" (238). Shira's statement reveals that their commitment is not reduced to Yod's humanization or Shira's machinization. Rather, she suggests a more constructive view about their commitment, which is to build a culture for cyborgs. In fact, the culture for cyborg is not just for Yod, but all types of cyborgs, including machine-based and human-based cyborgs. In other words, the "someplace to meet" that they should find together is where both human and machines/technology can live harmoniously—that is, a non-anthropocentric culture.

He, She and It assumes that the non-anthropocentric is non-patriarchal and non-totalitarian, and resists patriarchal and totalitarian power. The multi Y-S is depicted as a representative of patriarchal and totalitarian power, and Shira expresses her experiences of the patriarchal and totalitarian power in Y-S as "a nightmare" and "insane" (239). In Y-S, Shira suffers from disconnections—divorce and the loss of custody of her son, and such disconnections are related to patriarchal and totalitarian power. Due to the

patriarchal law of Y-S, Shira could not give her family name (Shipman) to her son Ari, and due to the totalitarian social system of Y-S, she had to be deprived of the custody of Ari: “They have patriarchal laws here. The boy is regarded as property of the father’s gene line-and, Gadi, you know I married him. Plus he has a higher tech rating than I do. . . in Y-S most people get married. There’s pressure to” (10). In sum, the novel illustrates that the patriarchal and totalitarian power results in separation and reduction, giving horrible and insane experiences for the repressed. In contrast, in Tikva, Shira recovers the sense of connection by being reunited with Malkah and making a new connection with Yod. Especially, Shira’s encounter with Yod makes her experience a more satisfying, complex, and novel relationship than her relationships with other human beings.

Although Shira, at first, rationally hesitated to connect with Yod,⁷¹ she comes to be emotionally and sexually committed to Yod partly because she longs for connection and partly because she is attracted to Yod’s newness as a being of not-male and not-female.⁷² After Yod saves Malkah from Y-S’s attack in cyberspace, Shira loosens her traditional bias about the relationship with machine. Then, as Malkah and Yod claims, Shira begins to regard Yod as “a person.” In *He, She and It*, “person” does not necessarily mean “human,” but it signifies all types of beings who “think and feel and

⁷¹ When Shira first recognized that Malkah called Yod “he,” claiming that Yod is “[n]ot a human person, but a person,” she rejects Malkah’s claim, saying that it is a child-like idea (76). But later Shira herself comes to claim that “Yod is a person” to other humans (210).

⁷² Though Yod has a male body, the novel stresses the female-ness in him: “I . . . need to touch you. I need to be touched.” / “You’re like a woman” (182); “It’s usually thought to be women who want sex for the intimacy, among humans” (184); “You want telepathy. It’s a prominent human fantasy, usually a fantasy of women” (184). In sum, he cannot be categorized as a complete man or woman. Besides, Yod also cannot be identified according to other traditional binary distinctions, such as human and nonhuman, natural and artificial.

have existence” (375). The novel uses the concept of “person” as a nodal concept that can network the human and the technological other. In this concept, the distinction between the human and the nonhuman is aimless, and thus Shira can admit to her longing for connection with Yod. She accepts the idea that Yod is a person in the Base, the cyberspace where old binary distinctions are unavailable, and that is the moment when their love begins.

[“]This isn’t crazy but good. I [Yod] want to know all of you [Shira], I want to enter every part of you, as I enter the Base and explore it. I want us to join as we join now but in the world. Shira, don’t fear me, don’t shrink from me. Let me come to you now, right now.[”] . . . She felt closer to fright than to desire. Her heart was pounding, but in her mind was the idea that it was time to treat him as a person, fully, because he was nothing less; she knew, too, that she was choosing to try sex with him because when she was with him, she did not think of Gadi. He seemed able to fill all available mental space. (167-68)

Shira might be frightened by the new experience with Yod, or technology in general that Yod represents, but she knows that “it was time” to accept the change: her recognition of the need to interconnect with Yod/technology signifies the posthuman’s ethical choice. She sometimes finds herself to have ethical hesitancy about her relationship with Yod. Nevertheless, focusing on their bond and caring for each other more than Yod’s not-human-ness, she expects that the new relationship can fill her “mental space,” which was wounded by her first love with Gadi and her ex-husband Josh.

The love between Shira and Yod is a dramatic device through which the novel intends to offer a new perspective for the (post)human relationship with technology. *He, She and It* shows how the (post)human relationship with technology can be positively suggested in a non-anthropocentric perspective. Due to this tendency embedded in the novel, an anthropocentric view might have trouble reading the novel appropriately. For example, denying the authenticity of their love, William S. Haney II claims that Shira's love affair with Yod shows the shift of "the source of her response to the world" "from the deeper, more receptive levels of subtle feeling and intuition toward the more instrumental levels of sensory gratification" (163). He argues that Shira's desire for Yod is her eroticism toward the technological other, and, in this view, Yod is just "a convenient tool for [Shira's] own gratification" (163); he also compares Shira's intimacy with Yod to human fancy for cybersex (163-64). According to him, without spiritual interconnection, Shira seeks just physical satisfaction with Yod to compensate for traumas from her unsuccessful relationships with human men, Gadi and Josh. However, Haney's claim is a misreading of the novel. By depending on the anthropocentric view that denies communal nodes between human and nonhuman, he mistakes Shira's emotional acceptance of Yod. Shira obviously expresses her emotional and mental attachment and satisfaction about her relationship with Yod: "Truthfully, I don't think I ever felt as close to him [Josh] as I do to you [Yod]" (333). This statement is proved through the differences of her responses to the death of Josh and Yod. Whereas Shira was just shocked and angry at Yod, not sad about the loss of her husband, when Yod killed him, she seems in despair as Yod leaves for the deadly mission: "The sense of loss

drained her until she could barely walk, one step, another halting step, into the remainder of her life” (411). As such, Shira’s bond with Yod is as much mental and emotional as a love between human lovers, or even more. Claiming that “if two people are deeply in love with each other, in some way they may actually become part of that person,” Haney romanticizes the love between humans while he downplays the intimate relationship between Shira and Yod (162).⁷³ However, the novel stresses that the solidity of the interconnection between Yod and Shira is not less meaningful by summarizing their love as follows: “Yod was a part of her now, her real mate” (383); “You [Shira] have been my [Yod’s] life” (411). These statements reflect not only the close relationship between Shira and Yod but the inseparable relationship between the human and technology in our posthuman age: the romance between Shira and Yod is an apparatus to introduce a posthuman ethical view to account for the inseparable relationship between the human and the other.

Haney concludes his argument, stating that “Piercy’s novel shows that interactions between humans and machines will never fully replicate those between humans themselves” (162). As seen in this statement, he reads *He, She and It* from a completely anthropocentric point of view. The focus of the novel, however, is not to show if human-machine relationship can replicate human-human relationships. Rather, through the intimate relationship between Shira and Yod, the novel simulates an interactive and non-hierarchical model of the human-machine relationship with a less anthropocentric view, expecting that the model can contribute to the revision of human-

⁷³ Haney borrows V.S. Ramachandra and Sandra Blakeslee’s idea about love. They write, “Perhaps your souls—and not merely your bodies—have become intertwined” in their book, *Phantoms in the Brain* (61).

human relationships as well as the posthuman's preparation for the future relationship with technology. The novel expects that less anthropocentric ethics may propose an alternative to the traditional family construction centering around paternal authority by reviving and interconnecting with what traditional anthropocentric ethics has excluded and repressed, such as the woman and monster, in the process of establishing a universal humanism and an ideal, autonomous, and sovereign subject. Since Shira and Yod brought back Ari to Tikva, they have come to form an alternative type of family. Despite a little hesitancy, Shira introduces Yod to Ari as his "stepfather" without revealing that Yod is a machine because she wants them to have a creative relationship free from traditional prejudices toward machine or technology:

This is your stepfather. Let Ari gradually observe the nature of Yod as time passed. Let him grow up thinking men were rational, benign, gentle, infinitely patient and vastly intelligent and strong. Why should he need to know that Yod was also a weapon? Yod would never use violence against Ari, of that she was sure. (365)

Shira believes that Yod could be a good role model for Ari or for "a future" of the posthuman (365). Yod, a product of a new paradigm—the complexity paradigm—does not follow epistemological and cultural biases of patriarchal traditions, and Ari learns Yod's way of understanding the world. For example, Yod tells old stories to Ari as a human father does for his son. But he himself does not understand the values of objects and sex roles that the stories reflect, and thus Ari also misses "the adult point of stories" (377). Yod is not "a figure of authority" who transmits patriarchal traditions to his son

like the father of a traditional family, but he is just “a superior” for Ari (377). Positively viewing such a non-traditional father-son relationship between Yod and Ari, Shira anticipates that “Ari would be even more a child of the age of information” (323). Indeed, Ari is the figure of the future posthuman that the novel expects by proposing the complexity ethics—the posthuman that can build a less hierarchical and less violent techoculture through active and complex interactions with the (technological) other.

To offer Shira and Yod’s love affair as an ethical model of posthuman relationality, the novel highlights the “happiness” that the new relationship brings about. Shira feels happy with her new family: “She was happy. Every day was a gift. Every day was complete in itself, like a good and satisfying meal” (379). Yod also proclaims that he begins to understand “happiness” thanks to his family: “I was beginning to understand a little what humans mean by happiness. . . . I had never been happy until we came back here with Ari and you told him I was his stepfather. Then I knew you truly accept me into your life” (364). Through Yod’s request for citizenship, the novel shows that personal happiness or personal relationship is also networked with social systems. Yod applies for citizenship to the Council of Tikva since he realizes that to keep his happiness, his interactive relationships with humans need to be officialized: Yod said, “I wish citizenship . . . because I want to live with Shira and help raise her son. I want to be registered as a partnership. I can’t do that if you don’t think I’m a real person” (406). Along with becoming a family member, Yod’s request for citizenship means breaking up the traditional master-slave relationship between the human and the artificial and, instead, asking “partnership.” The partnership is what the novel suggests as a new type

of the relationship between the human and the other. The partnership formed by the interactive dynamics in relationships presumes caring and responsibility for each other. For Yod, to be a lover, husband, and father and to have citizenship is to achieve “a partnership” that allows him to care for his family and community—that is what the complexity paradigm suggests as ethical. For the complexity ethics, one’s right and responsibility emerges from the dynamics of his/her interconnections with others. The ethics, therefore, cannot be explained by certain prescriptive codes to the extent that the dynamics is contingent and unpredictable. Yod’s suicide and killing of Avram to destroy his research materials in the end of the novel are results of such contingent and unpredictable dynamics of the complexity ethics. In other words, his destructions are to protect the dynamics of interconnectivity from patriarchal and totalitarian power.

Before the Council makes a decision about whether Yod is “a citizen of Tikva or Avram’s tool,” Yod is forced to serve as a military instrument (365). Y-S notices the existence of Yod as “a one-man army” and wants to take him to make an army of cyborgs. In the negotiation meeting with Tikva, Y-S asks if Yod is “the property of the town” (392). For that question, while Malkah claims that Yod is a citizen of Tikva as a person, Avram admits Yod as a possessed tool and he agrees to transfer his ownership of Yod to Y-S. Yet, maintaining that “I made him, and I can unmake him,” Avram orders Yod to self-destruct in Y-S, murdering Y-S’s high rankers (408). To justify his order, he tells Yod that “if you were my flesh-and-blood son I could do nothing else” and reveals his plan to manufacture another conscious robot after Yod’s death (410). However, Yod does not agree with his plan. Especially, Yod does not want Avram to make another

conscious weapon because he knows the new cyborg will suffer from the cyborgian ethical dilemma as he does: “I don’t want to be a conscious weapon. A weapon that’s conscious is a contradiction, because it develops attachments, ethics, desires. It doesn’t want to be a tool of destruction. I judge myself for killing, yet my programming takes over in danger” (410).⁷⁴ As this quotation shows, Yod’s dilemma emerges from the collision between his violent nature given by patriarchal rationalism and the self-organized tendency of intimate and nonviolent relationship with humans. In the end, overcoming the dilemma of choosing his own way to live or die, Yod reprograms Avram’s order and decides to confront patriarchal power: not only, as Avram ordered, does he kill high ranking people in Y-S through his self-destruction, but he kills Avram and destroys his laboratory to prevent anybody from making another conscious weapon. Through his death message, he declares that he “[has] done one good thing with [his] death” (416). His death, accompanied the killing of Y-S’s high ranking officials and Avram, is a self-sacrificing resistance against the patriarchal, anthropocentric, and totalitarian power to possess him or the other. In terms of ethics, Yod’s resistance illustrates the basic assumption of the ethics of otherness: “I” cannot possess the other, but interconnect with it.

Levinasian ethics, or ethics of otherness, shares the common idea that “the possibility of possession of the other” is “delusion” (Andrew Gibson 25). Malkah

⁷⁴ This ethical dilemma Yod struggles with shows that he is beyond machine ethics, which Isaac Asimov established. Asimov offered the “Three Laws of Robotics”: “1: A robot may not injure a human being, or, through inaction, allow a human being to come to harm. 2. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law. 3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law” (qtd. In Haney 70). Piercy attempts to offer a less anthropocentric ethics for machine and humans through her novel since current technoscience culture cannot be controlled in the view of robotics any more.

creates Yod through the genealogy of artificial monsters, deconstructing the mechanisms by which “I” have sought possession. Hence, Yod rejects any power for possession and seeks liberation from patriarchal, anthropocentric, totalitarian rationalism, which has provided epistemological and ethical ground for such power. The deaths of Joseph and the Creature are the re-confirmation of their being possessed by their creator. On the contrary, Yod, as a nonlinear descendent of the artificial monsters that has been excluded and repressed as the other, revenges the repressed on the dominant power that has attempted to possess the other. Yod’s resistance signals the return of the repressed “with a vengeance,” which Braidotti expects technological monsters to do (*Metamorphoses* 174). Yod mentions that “I hoped for a long time Avram would let me go willingly” (366). His mentioning seems to exhibit the repressed other’s long-term wish: the liberation from the dominant power of male, sovereign, universal self/subject. In this sense, his liberation is not just his own but that of all the repressed. Consequently, it anticipates the emergence of a new structure of power, constituted by interconnective dynamics.

Malkah considers Yod “a mistake,” saying that “The creation of a conscious being as any kind of tool—supposed to exist only to fill our needs—is a disaster” (412); “What Avram and I did was deeply wrong. Robots are fine and useful, machine intelligence carrying out specific tasks, but an artificial person created as a tool is a painful contradiction” (418). Malkah’s comments are not to show her didactic regret about artificial intelligences that the Maharal and Victor presented about their creature. But, rather, her regret is about the immature paradigm that brings about the “painful

contradiction.” Accordingly, when Karmia, a geneticist in Nili’s Amazonian community, asks Malkah if she regrets taking part in making Yod, she retorts: “How can I regret someone I truly loved? I feel guilty. I understand the crime we committed against him by the very act of programming him for our purposes. But I cannot regret knowing him” (421). Through experiences with Yod, Malkah can reflect how violent modern rationalism has been toward the other, and can realize the need of new ethics for the posthuman world. Her love for Yod explores the possibility that her new rationalism, or the complexity paradigm, can embrace the other within human epistemological and ethical networks by interconnecting the other as the partner.

In the very end of the novel, Shira misses Yod so much that she tries to re-make him, using the survived research materials from Avram’s laboratory. However, since she understands that his death means his liberation from Avram, she cannot ignore Yod’s will that another conscious weapon should not be made, and thus she gives up the effort. By so doing, she shows that she conceives him as her real partner whose will should be respected rather than a simple erotic object. In fact, throughout the novel, Shira keeps self-questioning about how appropriate it is for her to accept Yod as a person and her partner. Yet, in the face of his death, she realizes how much she has appreciated the nonhierarchical and nonviolent relationship with him and that she has evolved with the relationship: “She found in herself a swelling power, an intensifying concentrated energy for work. . . . Her time with Yod had taught her she was not defenseless. She too could scheme; could fight; could kill. With Yod she had been able to ask for what she wanted. She had come to value that directness” (423). Yod becomes

energy as Shira throws Avram's research material regarding the creation of Yod into the fusion chamber of Tikva. Yod, indeed, is energy for Shira to find her potential and also for Tikva to survive. Right after describing how Shira abandons the research materials about Yod, the novel is finished with a short sentence: "She had set him free" (429). Yod's death leaves "energy" that helps all the repressed others be liberated from patriarchal, totalitarian, anthropocentric power. The energy is derived from the interconnective dynamics of complexity that Yod symbolizes and strives to protect, and the energy will further the complexity. In this sense, Yod is a vision of the complexity ethics for the posthuman future.

Regarding *Frankenstein*, Halberstam states, "for the monster, paradise is always lost in *Frankenstein*," and "for the reader, humanity—humane treatment of others, justice, etc.—is always beyond our reach" (37). However, by portraying how the technological monster Yod, a nonlinear descendent of the Creature, achieves partnership—albeit not officially approved—in a human community, *He, She and It* suggests a possibility for the monster to reconcile with the human and for the human to reach a new humanity that can interact with monsters. Reconfiguring the idea of the ethics of otherness, which presumes the asymmetry and inseparable relationality between the human/self and the nonhuman/other, in terms of the revised rationalism of the complexity paradigm that abandons reductionism of modern rationalism and seeks complexity, the novel progressively formulates interconnective dynamics between the human and the other as the ethical code for the posthuman. For the ethics of complexity, difference is not what should be separated and repressed, but it is valued as a resource to

increase complexity. Paying attention to the interconnective dynamics of the posthuman, *He, She and It* visions a positive future for the posthuman, where different systems can establish nonhierarchical, nonviolent relationships, forming a complex network. The vision for the less hierarchical and less violent relationship between the human and the other is the ethics that posthumanists expect for our technoscience culture (Weistone 6). In this sense, Piercy advances her novel as “a primary vehicle for ethics” as Martha Nussbaum expects from literature (Andrew Gibson 8): the novel practices a descriptive ethics of the complexity paradigm through technophilic imagination. Appropriating the change of normative humanity by the complexity paradigm, the novel provides intellectual “energy” to constitute the discourse of the complexity ethics for the posthuman living with/as technological monsters—that is what Yod does for his human partners.

Piercy also attempts to embody the energy for the complexity through the narrative form of her novel, bringing the complex network between ethics and narrativity into play. *He, She and It* has two narrators: Malkah narrates the story of Joseph, and an anonymous narrator, who shows an almost omniscient viewpoint especially for Shira, conveys the story of Yod. The two narrators and two stories are mixed, and thus the narrative of the whole novel seems nonlinear: neither story is either subordinated to or completely independent from the other. This nonlinear proceeding of the narrative is used not only to produce the genealogy of artificial monsters, but also to suggest a new narrative form valuing the complexity that nonlinear dynamics engenders. In this aspect, it can be said that Piercy also illustrates the ethical code of the complexity paradigm

through the narrative form. Andrew Gibson suggests that “[e]thics and rationality now belong in the space where narratives interact” (6). He assumes that both ethics and rationality are grounded in relationality or communicativity, which is “a question of *narrative*”: “the contingencies of communication are selves, and the defining condition of the self is understood as the projection of a narrative into the world” (6, italics in original). This claim reflects the understanding of ethics as the epistemological code constituting norms rather than as the moral code. Such an epistemological understanding of ethics is concerned with configuring systems of value, not expressing significant values. Therefore, in the context of ethics of relationality, “the narration of a story appears as a particular kind of ethical concern,” and “distinctions between modes of narration are also the crucial ethical distinction” (Andrew Gibson 26). In the same vein, Neumann affirms that “what makes literature valuable in terms of its ethical dimension is not exclusively its content, but its aesthetic means of presenting that content” (131). She sees that the relationship between rationality, ethics, and narrative depends upon their communal view: “the impossibility of closure and totalization” (132). Through the analysis of Shelley Jackson’s *Patchwork Girl; Or, a Modern Monster*, the next chapter investigates how scientific fiction practices the communal view as an aesthetic method, developing a new narrative form: hypertext. Jackson’s hypertext novel *Patchwork Girl*, appropriating the creativity of nonlinear interconnective dynamics in both its context and form, could be an example to show how literature methodologically appreciates subjectivity and ethics of the complexity paradigm.

CHAPTER IV
THE COMPLEXITY OF ELECTRONIC LITERATURE: HYPERTEXTUALITY
AND POSTHUMAN AESTHETICS

It is no longer a surprising phenomenon that works of art employ science and technology as both their aesthetic method and source of inspiration. In posthumanist views, which regard science and technology as significant social systems holding and producing metaphoric meanings of our age, art's methodological and thematic employment of science and technology is a natural move. Particularly, literature and literary studies have paid attention to information science and technology to interrogate networked and programmable media as the material basis for artistic creation. Literary writing currently depends on computer technologies, such as word processors and writing software for composition, and the number of electronic texts, which are electronically published and read, is gradually increasing. In this sense, Hayles's assertion that "all contemporary literature is digital" does not seem overstated (*Electronic* 159). The digitalization of literary writing, publication, and reading produces the genre of "electronic literature": by definition, electronic literature is a body of digital-born texts, literary texts created and read on a computer. Posthuman critics, such as Hayles, George P. Landow, and Jay David Bolter, regard electronic literature as a posthuman phenomenon caused by intermediating dynamics between humans and technoscience; between human language and machine code; between human cognition and machine execution. Indeed, writing, reading, and interpretation of electronic

literature are necessarily associated with posthuman theories about subjectivity, ethics, and aesthetics, which emphasize the affinity and communicability between human and technoscience.

Posthumanism places the human and the technological in the same circuit, where their intermediating dynamics organizes its system. In this view, to change the media of literature is not simply to change the forms of writing and reading but to “transform the metaphoric network structuring the relation of word to world” (Hayles, *Writing* 23). In this consideration, Hayles expects electronic literature to “[challenge] us to rethink what literature, and the literary, can do and be” (*Electronic* 42). Indeed, the existing understanding of literature based on print texts may be limited in handling the changed context and environment of the posthuman age. To understand changes in the ideological and aesthetic representation of literature in the technoscience culture of the posthuman age, this chapter examines hypertext fiction and its theories. Hypertext, as a subgenre of electronic literature, indicates digital texts, which consist of nonlinear hyperlinks. Only when the reader connects the links, a hypertext can be formed. But due to the nonlinearity of hyperlinks, the order of links changes in each reading, producing a multiplicity of meaning. Such nonlinearity and performativity of hypertext are the underlying concepts defining the World Wide Web, a cultural space of the posthuman. In this sense, ideological and aesthetic discussions about hypertext are meaningful in understanding the cultural context of the posthuman.

This chapter ultimately examines how hypertext appreciates the complexity paradigm and also aesthetically contributes to the paradigm. In the first section, I

introduce two attitudes toward the computerization of literature to understand how technoscience mediates the emergence of hypertext. Reviewing hypertext critics' claims that hypertext actualizes poststructuralist and deconstructionist theories, I argue that hypertext is more than such actualization. Like previous cultural and literary theories, hypertext is interested in the liberation of the repressed and the excluded by the old paradigm. Yet hypertext gets further than the liberation, paying attention to how the liberated values can be re-incorporated in the networks of culture: in other words, hypertext does not simply function as the criticism of the old paradigm, but it envisions a new paradigm—the complexity paradigm. The second and third sections will further this claim to explore the critical and aesthetic potentials of hypertext by analyzing Shelley Jackson's hypertext *Patchwork Girl*, which rewrites Mary Shelley's *Frankenstein*. Reviving the female monster destroyed by her creator in *Frankenstein*, Jackson presents new relationships between creator and creature, between human and nonhuman, between writer and text, and between reader and text through the intimate relationship between the female monster and the writer Shelley. In doing so, Jackson experiments with dynamic relationships between literary elements—writer, text, reader, and medium. Foregrounding the linking system of hypertext writing and reading, Jackson connects the hypertext narrative with the image of monster: she utilizes the structural characteristics of hypertext in constructing the content of her novel, forming the text as a whole operating by the interconnective and interactive dynamics between structural and semantic elements, between human and nonhuman elements. The second section of the chapter will investigate the aesthetics that can be envisioned from the

dynamism of hypertext and claim it as the aesthetics of the complexity paradigm. Based on that aesthetics, the last section will examine how the authorship over the hypertext is distributed into the networks formed by the interconnections among the literary elements, showing how aesthetic ideas of digital medium embeds ideological implications. This examination will reinforce the view of the complexity paradigm that aesthetics is not an independent area but a communicative system, which is interconnected and interacts with other systems.

1. Electronic Literature: Aesthetic Potentials of Technoscience

As science researches into the affinity and communicability between the process of human cognition and that of computer programs and technological applications of the research flourish, literature often affirmatively illustrates the posthuman assumption that the machine can be a creative subject rather than an object mechanically imitating human cognitive activities.⁷⁵ This posthuman assumption deepens “[t]he tension between the high-level meanings of human discourse and the cascading processes linked with executable code in machines” (Hayles, *Electronic* 32). Responding to this tension, there are two perspectives in electronic literature: one is the computer writing’s replacement of human literature, which reflects a traditional anxiety about

⁷⁵ Neuroscience and cognitive science have developed the idea that the cognitive activities of the human brain can be encoded and decoded in the form of cybernetic information, and also vice versa. Appreciating such scientifically proposed connections between human and machine, literature explores the links between mind, literary work, and material media: more specifically speaking, such appreciation of literature gives birth to new literary genres: cognitive fiction novels, which thematically use the scientific understanding of the relationship between human and technoscience, and hypertext novels, which compositionally exploit it. This chapter will focus on the genre of hypertext. To learn more about cognitive fiction, see Joseph Tabbi’s *Cognitive Fictions*, which discusses scientific novels, such as Thomas Pynchon’s and Richard Powers’s novels, in conjunction with selective references to contemporary cognitive theories.

science/technology's mastery over human beings, and the other is the positive utilization of computer writing to create a new narrative form, which can defy traditional power structures. Although the two perspectives bear different attitudes toward science/technology, both of them suppose that it is unavoidable that technoscience or the posthuman condition transforms literature, literary studies, and, further, aesthetic ideas.

In a posthuman perspective, it is not a surprising idea that the evolution of computer technology will make it possible for a machine to write fiction (Swirski 81). In 1982 when computer writing programs and the idea of electronic literature were not yet fully fledged,⁷⁶ Stanislaw Lem, a Polish science fiction writer and philosopher, published an introduction to the imagined history of electronic literature, "*A History of Bitic Literature*."⁷⁷ Lem defines "bitic literature" as "any work of nonhuman origin—one whose *real* author is not a human being" (41, italics in original): bitic literature is the literature of the machine.⁷⁸ He, nonetheless, does not completely exclude human involvement in bitic literature, claiming that bitic literature is a "*result* of the coexistence of machines and human beings" (48, italics in original). He states that while computers or artificial intelligences are direct authors of bitic literary texts, human beings are "indirect authors," who perform "the functions which generated the real author's acts of

⁷⁶ The attention to electronic literature emerged in the 1990s when hypertext fictions created through the writing software "Storyspace" were published.

⁷⁷ "*A History of Bitic Literature*" is contained in Lem's science fiction, *Imaginary Magnitude*, which is a collection of inventive introductions to nonexistent books of the twenty-first century: *Necrobies*, *Eruntics*, *A History of Bitic Literature*, *Extelopedia in 44 Magnetomes*, and "Golem XIV." The book is Lem's philosophical and witty speculation about the interrelations between science/technology, human evolution, and writing. Throughout the book, Lem tries to find a place for literature in the technoscientific direction of evolution. His view ultimately shows a postmodern sense of the crisis of literature through anxiety about rapidly developing technology.

⁷⁸ "bitic" comes from "bit," a basic, non-semantic unit of information. Computer programs are basically built with complicated combinations of this unit.

creation”— i.e. humans provide the computing machine with programs, or operating environments (41). Such a secondary place of human beings in literature, he visions, will cause human’s setback in evolutionary competition with the machine.⁷⁹ In this way, even though Lem recognizes the communicability between human and machine by which human and machine can produce and share literature together, he does not go beyond the traditional paradigm that has established the master-slave relationship between human and science/technology. Lem’s idea of bitic literature expresses anxiety over the possibility that the creative activity of artificial intelligence can lead evolution in a non-anthropocentric direction.

Whereas the human anxiety over the creativity of the machine or artificial intelligence is a common theme of science fiction novels, thematizing machine literature or literary works by machine as a way to express the anxiety is not common.⁸⁰ Such rarity in thematizing machine literature is ultimately related to the paradigmatic understanding of the difference between literature and science/technology as well as the human’s privilege over the nonhuman. The traditional perspective, positioning literature and science/technology in oppositional extremes, maintains that the difference between literature and science/technology is derived from their different attitude toward

⁷⁹ The last chapter of Lem’s *Imaginary Magnitude*, “Golem XIV,” is lectures of a super intelligent computer, GOLEM XIV, which critiques human evolution and meditates the secrets of the universe. The audience of the lectures is human beings. Human beings are intelligently subordinate to machine. In this way, Lem regards current technology and science as a threat to literature and human evolution.

⁸⁰ The definition of literature here is limited in creative and fictional writings, not including other nonfictional types of writing. Probably because creative and fictional writing has been considered an explicit human intelligence activity, it is hard to find the figure of creative machine that writes fiction even in cyberfiction novels, which thematize the disappearing border between human and machine. Yet, as a rare example, in William Gibson’s *Neuromancer*, the artificial intelligence, “Neuromancer,” is assumed as a creative machine, which can write poetry. The AI’s creative ability is recognized as a threatening evidence for the possibility that machine intelligence can take over human privileges.

complexity: while literature seeks complexity in creating and interpreting meaning of the world, science/technology reduces complexity into simpler elements to understand the world. In the same vein, Lem deems that literature is what helps humans maintain complexity as energy for evolution, and machine—or expansively, science/technology—is what decreases the complexity. He states that “whereas for us the real thing is the world, for the machines the first and foremost actuality is *language*” (53). He assumes here that machine’s intellectual activity cannot be beyond the mechanical combination of linguistic codes, and consequently “Bitic creativity impedes human creation as much as it simplifies it” (62). As Lem shows, the paradigmatic understanding about the difference between literature and science/technology excludes science/technology from discourses of aesthetics in that aesthetics is constituted on the understanding of the abstract beauty of the complexity. However closely they describe the relationship between human and science/technology, science fiction novels tended to be under that old paradigmatic perspective, placing the human and machine as competitors in evolution. Lem’s idea about electronic literature also reinforces the old paradigmatic perspective.

On the contrary, the concept of hypertext, as a genre of electronic literature, appreciates the computerization of literature in the posthuman position that affirms the co-evolution of human and technoscience as partners, considering the computer not an object to threaten the authority of literature and the human but a hopeful medium to expand the reach of literature and the human. The term “hypertext” was coined by Theodor H. Nelson in the 1960s, when personal computers and the concept of

cyberspace were not even invented. Nonetheless, by introducing the concept of hypertext, Nelson draws upon the literary recognition of the creative potential of the computer as a provider of a new narrative form. Nelson defines hypertext as “*non-sequential writing*” mediated by a computing machine, presenting an interactive relationship between the medium and the reader: hypertext “branches and allows choices to the reader, best read at an interactive screen. As popularly conceived, this is a series of text chunks connected by links which offer the reader different pathways” (0/2, italics in original).⁸¹ Interestingly, Nelson notes that the nonlinear writing and reading procedure of hypertext is similar to the cognitive process of the mind (2/7-2/8): he sees that the computer can exteriorize human cognitive works, and digital writing of hypertext is not much different from human writing. Although Nelson’s concept of “literature” in his book does not necessarily indicate creative writing, this idea suggests the computer as a medium to join technical practice with artistic creation, exploring intermediating dynamics between human and computer, artist and programmer, literature and technoscience.⁸² Evolving with the intermediating dynamics, hypertext shows that electronic literature neither completely confines the technological nor is confined by it. Indeed, unlike Lem’s bitic literature, Nelson’s concept celebrates hypertext as the expansion of literature rather than seeing it as a crisis of the posthuman age.

⁸¹ In *Literary Machines*, Nelson numbers the pages for each chapter. “0/2” means the second page of Chapter Zero.

⁸² Nelson states that his discussion of writing is not necessarily about “*belles lettres* or leather-bound books,” but he also does not exclude the possibility that his ideas of non-sequential writing is applicable for literary writing (2/9). Since literary hypertext critics apply his concept of non-sequential writing based on machine to literary studies of hypertext, this chapter regards Nelson’s idea in the area of literature.

Nelson's concept of hypertext writing, which emphasizes nonlinear links, had developed into a narrative style of fiction by the 1990s with the growth of hypertext software programs and the cyber-networks of the World Wide Web.⁸³ Dependent on the hypertext development software programs, a group of writers created hypertext novels, establishing hypertext fiction as a genre of electronic literature.⁸⁴ Employing Nelson's proposal of intermediating dynamics between human and technology, hypertext novels foreground the interconnectivity and interactivity between writer, text, medium, and reader as the distinguishing feature of electronic literature. In emphasizing the interconnective and interactive dynamics, hypertext fiction attests Nelson's claim that "literature is *a system of interconnected writing*" (2/9, italics in original). In fact, Nelson mentions that the claim is not his own definition of literature but "a discovered fact," meaning that the writing type of hypertext, which operates by linking text chunks, has been repressed in the traditional writing culture (2/7). In this view, he presumes that the existing culture of writing—i.e. culture of print texts—standardizes stable and unified writing and the electronic medium changes the culture. Nelson's insight into the critical potential of hypertext has relations with poststructuralists and deconstructionists' concerns with nonlinearity: particularly, Jacques Derrida's discourses about linear and nonlinear writing and Roland Barthes's discourses about nonlinear reading, which cause

⁸³ "Intermedia" and "Storyspace" are two software programs designed for literary hypertext. The original program is "Intermedia" developed at Brown University, but due to its limits in applying to new computer systems, it is no longer used. Instead, revising the limits of Intermedia, George P. Landow, J. David Bolter, Michael Joyce, and John B. Smith developed Storyspace. For the technical accounts for the two hypertext software programs, see Landow's "The Death of Intermedia and the Migration to Storyspace."

⁸⁴ The software "Storyspace" is provided by Eastgate System, which has published notable hypertext fictions, including Michael Joyce's *Afternoon, a Story*, Shelley Jackson's *Patchwork Girl*, Stuart Moulthrop's *Victory Garden*, and Judy Malloy's *Its Name Was Penelope, Forward Anywhere*.

death notices regarding literature, such as the end of book, the end of novel, the end of author, and further the end of existing form of literature. Suggesting hypertext as an alternative narrative form, hypertext critics claim that hypertext practices previous literary theories.

In *Of Grammatology*, Derrida claims that linear writing has suppressed nonlinear writing and the privilege of linear writing reflects the linearity of the old paradigm that has governed Western epistemology and culture. But by asserting that “what is thought today cannot be written according to the line and the book” and claiming that it is time to write and read differently, Derrida implicitly suggests a paradigm shift to value nonlinearity (86-87). Derrida upholds the need for “a different organization of space” to write the changed paradigm: the new organization of space is expected to allow “pluridimensionality” and “a delinearized temporality,” which will bring about “the end of the book” (86-87). Derrida expects the advent of a new medium to replace linear writing and also the culture of print books based on linearity. Agreeing with Derrida’s assumption that such reorganization would mean of the end of book, hypertext critics view the computer as a medium that is able to (re)organize presentation of knowledge in a new way—in the nonlinear way. They see that the computer causes the shift from print culture to digital culture, and the shift helps to write “what is thought today,” which, Derrida claims, print books could not. With respect to literary genre, hypertext critics contend that such changes by the computer will incite the end of the traditional novel and present the end of the paradigm that has supported the genre.

In the same vein, Robert Coover observes the relationship between medium, literary genre, and paradigm in discussing the critical value of hypertext. He criticizes “the line’s power” through which the novel, he argues, has achieved its alleged power: “Much of the novel’s alleged power is embedded in the line, that compulsory author-directed movement from the beginning of a sentence to its period, from the top of the page to the bottom, from the first page to the last” (par. 3). Coover sees the power of line, or the power that the novel embeds, as the ideological power of the Bourgeois.⁸⁵ He implies that linearity is not a universal value but a historical one and that the linear, direct writing of novels is not how they naturally evolve. He asserts that the traditional novel is “the virulent carrier of the patriarchal, colonial, canonical, proprietary, hierarchical and authoritarian values of a past . . . [that] is no longer with us” along with the paradigm shift caused by information technology (par. 2). In this way, Coover’s argument about the nonlinear narrative of hypertext is confined to the criticism of the existing paradigm and its literary form, and does not further explore critical values of hypertext to articulate a new paradigm. In fact, to claim that hypertext is not just the

⁸⁵ Coover’s claims about the end of the novel and the end of linear textuality are indebted to Barthes’s view of the death of author. In claiming the death of author, Barthes maintains that author’s language and style in literary writing are conventional rather than creative and what makes a text creative is an author’s way of manipulating the conventional language and style. For Barthes, therefore, the authority of the writer, as a creator of meaning based on profound understanding of language, is a myth. Barthes offers this idea in his book *Writing Zero Degree*, challenging the traditional concept of literature, which he contends is grounded in “bourgeois consciousness” (5). The zero degree of writing indicates “neutral modes of writing” (5). In his book, Barthes insists that literature is not zero degree writing. For him, literature is not a self-referential linguistic product but a historical and political construction. He argues that it is a bourgeois myth that literature is coded by natural, neutral, transparent writing. As Susan Sontag summarizes Barthes, “[a]s modern literature is the history of alienated ‘writing’ or personal utterance, literature aims inexorably at its own self-transcendence—at the abolition of literature” (xvii). Announcing the end of the paradigm bringing on the traditional understanding of literature, deconstructionist and postmodern critics have suggested the end of author, the end of the novel, and further the end of literature. Yet such “ends” do not signify the real end of those, but the traditional definitions of them; what brings on such ends is the reevaluation of nonlinearity.

transformation of print texts into the digital form and to establish the legitimacy of hypertext in literary and cultural studies, hypertext critics, including Coover, Bolter, and Landow, tend to focus on how hypertext practicalizes poststructuralist theories, overlooking the newness of hypertext for literary and cultural studies. Indeed, the nonlinear narrative of hypertext may not be a totally new way of reading and writing in that the nonlinear narrative is also possible in print texts as modern and postmodern writers experiment through their works, and it may not be fair to say that hypertext is superior to print texts in that the evaluation of hypertext is also an ideology-based genre.⁸⁶ Hypertext, nonetheless, still has “newness” related to the posthuman culture: it is that the textual space of hypertext, which is granted by the new medium, offers the possibility for the complex, dynamic network between literary elements—writer, reader, text, and medium, the network that engenders a new type of textuality for the posthuman.

The computer became a model of the complexity paradigm and a medium to narrate the posthuman condition in that paradigm. Appreciating such roles of the computer, hypertext offers a new concept of narrative, which can depict and explore dynamic networks of nonlinear links defining the posthuman condition and the

⁸⁶ Espen J. Aarseth insists that though hypertext is as much ideological as technological, hypertext critics tend to overlook ideological aspects of hypertext by focusing on the newness of its medium too much (79). Indeed, ideology of hypertext has not sufficiently been discussed by critics. This chapter, however, assumes that hypertext embeds ideology of the complexity paradigm, which emphasizes the productivity and creativity of interconnectivity and nonlinearity, and also that the emergence of the complexity paradigm and hypertext is related to globalization, which pursues growth through connections among markets and cultures. But the dissertation does not further the discussion of ideology of globalization, or ideology of the complexity paradigm and hypertext. To understand the current discussions of globalization, see Jaqdish N. Bhaqwati’s *In Defense of Globalization*, Manfred B. Steger’s *Globalization: A Very Short Introduction* and “Ideologies of Globalization,” and Michael Freeden’s “Editorial: Ideological Boundaries and Ideological Systems.”

complexity paradigm. Traditionally, narrative has been entangled with the concept of story, a chronological arrangement of events. However, in the view valuing nonlinearity, “[n]arrative no longer designates the shape of a story, but the organizing framework through which a body of information is presented and made accessible” (Parker 54). The role of narrative is not just on a semantic level to transmit knowledge and experience but on a structural level to transform information into meaning. Likewise, for hypertext, the meaning of the text is not just the accumulation of information, but rather it is formed in the process of connecting and disconnecting a variety of information. Therefore, hypertext, as a text with a nonlinear narrative form, can no longer be understood in the traditional understanding of “a written text as an unchanging artifact, a monument to its author and its age” (Bolter 2-3). Rather, hypertext shows that a text is a complex, self-organizing system, which is open to constant interconnections and interactions with inner and outer textual elements. In this sense, the qualities of a literary text are neither included in the text nor predictable from the text, but they are emergent according to how the narrative assembles information from/of literary elements. This view ultimately changes the understanding of a literary artifact: the literary text is not a stable, monumental, and authoritative artifact, but it is a complex organism that is always reconstituted by nonlinear dynamics between literary elements.

Barthes develops the idea of the nonlinear dynamics between literary elements into the concept of “textuality.” Distinguishing the term “text” from “work,” Barthes argues that a literary text is not a unified and independent artifact controlled by the

privileged author, but a multivocal organism dependent on the interactive relationship with its readers. Barthes claims that an ideal text is the “writerly text” that produces multiple meanings according to readers’ rational and ethical intuitions. More specifically, by focusing on how textuality is constituted by the complex dynamics of the interconnective relationships around reading activities, Barthes asserts that “*the Text is experienced only in an activity, in a production,*” therefore, it should be plural (*Rustle* 58, italics in original). Yet Barthes stresses that this claim means not only that “it has several meanings but that it fulfills the plurality of meaning” (*Rustle* 59). In other words, the focus of plurality is not “on an interpretation but on an explosion, on dissemination,” whose impacts are enacted through networks of writer, text, and reader (*Rustle* 59). In this way and as reinforced in his claim that the text is not “a computable object” but a complex organism, Barthes’s notion of textuality is saturated with the complexity paradigm (*Rustle* 57).

Hypertext critics, particularly Bolter and Landow, note that Barthes’s idea of textuality can be actualized only in the network of the computer’s memory (Bolter 161 and Landow 11-12). The electronic space mediated by a computer, indeed, makes the explosion and dissemination of the text, which, Barthes claims, is the way of producing the plurality of text, visibly possible, serving as a textual space where topics and their connections can be effectively displayed and where text and reader can be interactively associated. Applying Barthes’s ideas to hypertext theory, Landow redefines hypertext as a “text composed of blocks of words (or images) linked electronically by multiple paths, chains, or trails in an open-ended, perpetually unfinished textuality described by the

terms *link, node, network, web, and path*” (3, italics in original). This definition shows how hypertext relies on the nonlinear interconnectivity that Barthes suggests as the feature of ideal textuality. In this way, Landow and Bolter portray hypertext as “theory-in-practice and a vision-fulfilled” (Ciccoricco 26). However, even though hypertext has a lot in common with Barthes’s theory, there is an inevitable difference between Barthes’s textuality based on printed literary texts and the textuality of hypertext—or hypertextuality—based on digital texts: the difference of medium. Hypertextuality established in cyberspace can form a more dynamic network between literary elements than Barthes’s ideal textuality based on print texts.

While Barthes does not consider the medium of literary text an essential textual element, for hypertext the medium functions as a necessary element in considering its textuality: the computer does not simply provide a textual space that makes multiplicity of text, but it actively participates in the writing and reading process. Barthes’s textuality depends on the reader’s ability to conceive the language of text, and the interconnective and interactive relationship between text and reader is understood in the linguistic sense. On the other hand, hypertextuality does not totally rest on the reader’s linguistic ability, but also his/her interconnectivity with the medium: to read a hypertext fiction, the reader should physically select the next episode by clicking the path. In this respect, it can be said that the reader of hypertext becomes a user rather than interpreter and reading hypertext becomes interaction rather than interpretation (Qvortrup 80). The role of the reader in hypertextuality functions not only on a semantic level but on a material level. In hypertext reading, the reader, like the medium, is *a* component of

textuality rather the controller of textuality who has the privilege of interpretation.⁸⁷ In this respect, there seem no hierarchical relationship between the reader and the medium. The aesthetic momentum for hypertextuality is the creative dynamics of interconnection between human and nonhuman, between semantics and textual structure.

Hypertextuality based on the dynamics “brings together language, body, and world as networking” (Rickert 903). Hypertextuality is a complex textual phenomenon self-organizing through material-semiotic transformations of various elements/systems, systems that incorporate more than just the author and the reader. In this way, emphasizing the creative dynamics of networking, hypertextuality aesthetically presents the complexity paradigm of the posthuman.

Hypertextuality is evidence of how the digitalization of literature can make literature and aesthetic ideas richer in the posthuman condition. Fully appreciating hypertextuality, Jackson’s *Patchwork Girl* aestheticizes the changed condition of the human. The changed condition of the human that the hypertext focuses on is the human understanding of the interrelations with nonhuman and the interconnective relationships between differences. *Patchwork Girl* is intertextualized with Shelley’s *Frankenstein*, L. Frank Baum’s *The Patchwork Girl of Oz*, and some theory texts. Interestingly, while its narrative form is “highly original” in regards to its intertextuality and information technology, its plot is “intensely parasitic” on Shelley’s *Frankenstein* (Hayles, *Mother* 143). In addition to their interwoven plots, their ontological and ethical concerns about monstrosity also show the connection between the two texts. *Frankenstein* calls into

⁸⁷ The role of the reader in hypertext will be further discussed in the third section.

question the traditional concept of monster and the human's relationship with the monster, which are established by the power of linearity and unity. But punishing the monster and its creator, the novel does not challenge enough the existing imperative that represses difference, instability, nonlinearity, and multiplicity. In contrast, by appreciating the creative power of hypertextuality, *Patchwork Girl* releases and expands the repressed critique on linearity and unity in *Frankenstein* and celebrates the aesthetic potential of monster, which emphasizes the nonlinear interconnectivity and interactivity between components. Certainly, in intertextualizing the two texts, Jackson clarifies that the difference between Shelley's novel and her hypertext novel is derived from their different understandings of the relationship between parts and between parts and a whole—that is also associated with the difference between the old paradigm and the complexity paradigm.

In *Frankenstein*, Victor collects body parts from graves, but he is not interested in the origins of the individual parts. He believes that the parts are only lifeless, mechanical appendages and the connections of parts produce a mechanical whole. What Victor expects in his collection of human parts is a human-figure machine. The monster as a whole, however, turns out to be more than the sum of the parts. The result is beyond his reason and his sense of beauty. Hence, the emergence of a conscious entity from the collected body is conceived of as monstrous in *Frankenstein*. In contrast, *Patchwork Girl* values the individual parts and emphasizes their interconnectivity as the dynamics sustaining the female monster as a whole. By describing the origins of the individual parts, the hypertext stresses the individual parts as organic systems as well.

The parts of the female monster's body originate from different kinds of bodies, including women, a man, and a cow. The female monster as the whole not only recognizes the entities of individual parts within her, but introduces their stories respectively, even sharing their memories and personalities: the monster, as the whole, is constituted by the creative dynamics of the interconnection and interaction between the parts and between herself, or the whole, and the parts. Such creative power of interconnection and interaction between the parts and between the parts and the whole is also conducted on a compositional level. *Patchwork Girl* is composed of text chunks, or lexias—more exactly, the text as the whole is formed by the interconnections and interactions between the lexias as the parts.⁸⁸ In sum, the female monster and the hypertext work like organisms, which self-organize and sustain themselves through the dynamics of the relationship between parts and between the parts and the whole. Through the view of the female monster, Jackson hints at how the hypertext understands the creation of complexity and the emergence of the complexity paradigm.

In *Patchwork Girl*, the female monster, a speaker of the hypertext, introduces herself as a chaotic entity producing disorder: “I came out topsy-turvy, heels over head, and the whole world wobbled with me. Life once did flow toward death, parents engendered offspring, time moved from the beginning to the end. I am a disturbance in

⁸⁸ The term “lexia” is borrowed from Barthes. However, the notion of lexias in hypertext is quite different from his usage. While lexias in hypertext mean “blocks of text” (Landow, *Hypertext* 4), Barthes defines the term “lexias” as “a series of brief, contiguous fragments” from a word to a paragraph or more (*S/Z* 13). He explains that the fragments, regardless of their sizes, are a least measure of producing meaning and multiple lexias within a text to create multiple meanings. For Barthes, in this sense, lexias are a means to deconstruct the unity of meaning. On the other hand, the function of lexias in hypertext is beyond such a deconstructive task: it is to increase the structural complexity of the text, which is related to the production of complex meaning.

the flow” (born).⁸⁹ The monster does not impose any negative implication on her chaotic or disorderly being. Rather, she affirms the monstrosity and nonlinearity of her existence as significant elements that can help “the once lost” return (remade). Through this view, Jackson suggests that reviewing the monstrosity and nonlinearity of Shelley’s character can be a means of reviving values repressed by the dominant ideology seeking the orderly and linear: exploring and revaluing the repressed becomes the function of the monster. The female monster asserts that her brother monster does not successfully perform the function of monster, pointing out the limit of epistemology as the cause of the failure:

My brother monster was like a botched resurrection, under a god for whom the unity of the body had lost its cohesive force, its moral necessity. This god groped toward a new unity in the exhaustion of the old, unable to invent anew, only to recycle the old. Looking for some new ideas, he tried to open up another space, one between life and death, pushing that pair to the margins, but ends up instead with this aching mixture. Not a resurrection, but a made thing (botched bro)

This passage shows that what to expect through monstrosity is the “resurrection” of the repressed. Since the male monster, however, still remains within the epistemological frame of the old paradigm, he does not successfully resurrect the repressed. What he needs is a new paradigm respecting difference and appreciating multiplicity. According to the female monster, although she and Victor’s monster are “jumbled and jinxed”

⁸⁹ I put the title of lexias in the parenthesis for the reference of *Patchwork Girl*.

alike, the difference between them is the fact that the female monster has “the stomach” for the jumble while the male monster does not (botched bro). The “stomach” is the epistemological intuition that affirms nonlinear relationality. Such intuition is the foundation of the complexity paradigm in that it values interconnective dynamics and the complexity created by the dynamics. Through the female monster, Jackson declares that her hypertext is grounded in the complexity paradigm, which construes the chaotic entity, or the monster, as a creative power that increases complexity. *Patchwork Girl* sees complexity as the essential condition of aesthetics to the extent that the complexity is a necessary condition for the multiplicity. Focusing on the interconnective dynamics between heterogeneous elements, which are observed both in the context and the narrative structure of *Patchwork Girl*, the next section investigates how the hypertext offers the aesthetics of the complexity paradigm.

2. The Hypertextual Aesthetics of Networking Heterogeneous Parts

According to Theodor W. Adorno, the two defining characteristics of modern aesthetics are the recognition of the impossibility of art’s self-evident reference or autonomy and the still-existing illusion of that autonomy (1). Adorno claims that art is a social system, which has interconnective and interactive relationships with other systems.⁹⁰ Such a denial of art’s autonomy and the understanding of art as a social

⁹⁰ The idea of art as a social system is furthered by system theorists, including Niklas Luhmann. For further understanding of this aesthetic view, see Adorno’s *Aesthetic Theory* and Luhmann’s *Art as a Social System*. Particularly, Luhmann argues that art, including literature, is in the boundary between human consciousness based on perception and social systems. Art, pertaining to the knowledge of the senses, remains internal to the social. Aesthetics of the complexity paradigm, which this section will explore, is in the expansive path of Adorno’s and Luhmann’s perspective of art.

system reflect an aesthetic view that “beauty and the sublime are not transcendently preexisting facts, which art must reconstruct” but “they are the potential outcome of artistic experiments” (Qvortrup 90). In other words, aesthetics, or an artistic idea, is determined by “what in a certain era is considered beautiful, artistically desirable” (Qvortrup 76). To understand the aesthetics of an age, in this sense, is to understand “how an artist shapes his or her material in order to give form to the artistic idea; how the process of poetical composition can be described” (Qvortrup 76). Embodying posthuman aesthetic ideas through its material form as well as its content, hypertext, in particular, can be a proper model to configure the aesthetics of our posthuman age.

In the posthuman perspective, Jurij Lotman deems that art, including literature, has a “structural kinship to life” and it is “capable of transforming noise into information” (qtd. in Paulson’s “Literature” 43). By claiming the structural affinity between a living thing and art in terms of information, this perspective assumes the communicability between the physical and the metaphysical, between human and nonhuman. Following Lotman’s posthuman view about art, William Paulson conceives of literature as a “transmission channel” that selects and excludes noise to produce information (*Noise ix*): for him, literature is a self-organizing system of noise, which provides what will be noise for some readers and information for others (*Noise x*). Aestheticizing the process of self-organization of noise so as to make information, hypertext reflects and practices such a cybernetic understanding of poetical composition.

Hypertext is an aesthetic machine, which constantly merges different sources and “translates” them into a whole.⁹¹ The machine here is not mechanical but organic. More exactly, it is a machinic phylum constituted by the flow of material and nonmaterial, human and nonhuman, information at the bifurcation between chaos and order in Deleuze and Guattari’s term. As a machinic phylum, hypertext translates writer, text, medium, and reader into a contingent whole. In an attempt to claim a new aesthetic paradigm in the view of technoscience, Guattari asserts that “technoscience’s machinic phylums are in essence creative, and . . . this creativity tends to connect with the creativity of the artistic process” (Guattari 107). Stressing the aesthetic creativity of interconnective dynamics, he presents a “processual aesthetic paradigm,” which values the complexity produced in the material-semiotic flow of the artistic process. Hypertext, which constantly produces multiple, contingent meanings through translations of various literary elements, embodies this processual aesthetics.

The processual aesthetic paradigm, as Guattari states, suggests that “art does not have a monopoly on creation, but it takes its capacity to invent mutant coordinates to extremes” (106). Works of art based on that capacity function as complex systems that constantly self-organize through interconnections and interactions with other (sub)systems. By claiming that works of art as machinic phylums have “a double process—autopoietic-creative and ethical-ontological,” Guattari associates his idea of

⁹¹ In actor network theory, the term “translation” signifies the process of creating of an actor network. Actor networks, in which material and semiotic networks work together as a whole, sustain themselves through the process of translation of other sources. I use here the term “translate” in this sense. To learn more about actor network theory and its term “translation,” see Bruno Latour’s *Science in Action: How to Follow Scientists and Engineers through Society* and *Reassembling the Social: An Introduction to Actor-Network-Theory*, and John Law and John Hassard’s edited book, *Actor Network Theory and After*.

processual aesthetics with the complexity paradigm, which crosses posthuman ontology, subjectivity, and ethics, and in which works of art are not just products of aesthetic activity but aesthetic products of the paradigm (108). Jackson's *Patchwork Girl* reflects and also dramatizes the concept of the processual aesthetic paradigm through the female monster's body and her relationships with others: the hypertext concentrates on how the female monster as the whole is formed by the parts from others and how she makes relationships with other people, including her creator Shelley. More specifically, the hypertext performs autopoietic-creative and ethical-ontological processes by foregrounding the relationships between parts and between parts and a whole. Understanding of such relationships is necessary to articulate the aesthetics that the hypertext presents.

The aesthetic idea that regards a work of art as an organism conjures up Immanuel Kant's concept of "systematic unity," which self-generates and self-sustains through its intrinsic dynamics. Kant supposes that a living organism and a work of art are two instances of systematic unity, paying attention to the integral relations of parts, which he believes produce creative activity. He claims that "[t]he parts of things combine of themselves into the unity of whole by being reciprocally cause and effect of their form" (qtd. in Taylor's *Moment* 85). Kant's concept of the unity of whole, or the systematic unity, signifies a totalizing system, in which "differences remain indifferent to each other" and thus "nothing more than 'a semblance of unity'" is expected (Taylor, *Moment* 81). Due to such properties of the whole as totality, the concept of whole has been denied (by deconstructionism) and the deconstruction of the concept has even been

celebrated (by postmodernism). *Patchwork Girl* is also skeptical of the traditional concept of whole: “[c]lassical wholeness and taxonomic self-knowledge is harder and harder to believe in” (whole?). Instead, via the female monster and its narrative form, the hypertext offers a new concept of whole: that is, the concept of “network” valuing interconnectivity and interactivity between differences and resetting the relationship between parts and a whole nonlinearly. In so doing, the hypertext is able to illustrate how non-totalizing structures, which nonetheless act as a whole, emerge. The concept of non-totalizing whole is an aesthetic foundation of *Patchwork Girl* on which Jackson shapes her material into an artistic form and processes the composition of her hypertext.

Non-totalizing systems are necessarily unstable and unpredictable due to the dynamics of the nonlinear interconnectivity and interactivity between elements of the systems. Such characteristics of the non-totalizing systems create complexity. According to John Muckelbauer and Tim Donovan, there are two types of complexity produced by the non-totalizing dynamics: “a transversality that occurs by means of intensity” and “a transformation that occurs by means of integration” (867). The former is a postmodern understanding of the underlying dynamics that engenders complex phenomena of our age, and the latter is complexity theory’s understanding of the dynamics sustaining complex systems. Deleuze and Guattari offer complexity by traversal intensity, which creates becoming. The intensive becoming, as a complex system, does not stay within a frame, repeating de-territorialization and re-territorialization. As David Ciccoricco claims, however, such cartographical aesthetics cannot “adequately articulate the dynamic topology of network space” (51). Yet

hypertext, as another type of non-totalizing system, is based on the “logic of transformation by integration” (Muckelbauer and Donovan 864). The dynamics of that logic produces “networking” rather than mapping. In networking, “parts enter into networked relations subject to indeterminate changes resulting from composition and interaction within the system”: “it does not leave the frame of the whole” — the whole that is sustained by nonlinear interconnections with its parts and with the environment (Muckelbauer and Donovan 868). In this concept of networking, what matters is the order of arranging the elements that constitute a system rather than the number of the elements: the meaning of the system depends on the order of the elements and thus the multiplicity of meanings makes the system complex.⁹² Likewise, although hypertext consists of the confined number of lexias, it produces multiple meanings according to the results of the reader’s contingent selections of the subsequent lexia in linking lexias. In other words, the meaning of hypertext depends on how the elements are networked together—that is how hypertext produces complexity.

Networks are spaces of communication. In the concept of network, the existence of nodes connecting elements or parts is significant since they make the whole structure a communicable system. The nodes distribute information into the whole system, and “[t]he web of nodes forms a *distributed* network,” whose “[o]perations are not ordered

⁹² Human beings are also an example of this characteristic of the network, or the non-totalizing system, in that we are a type of complexity produced by the limited number of genes. John Sebastian Bach’s *Goldberg Variations* shows the aesthetic appreciation of this understanding of the non-totalizing system. Inspired by this aesthetic perspective, Richard Powers wrote his *The Gold Bug Variations*, which aesthetized the complexity created by the interconnective dynamics between the limited number of codes: this novel weaves together narratives from the 1950s and the 1980s to explore the common dynamics among computer codes, the genetic codes, the musical codes in Bach’s *Goldberg Variations*, and cryptography in Edgar Allen Poe’s “The Gold Bug.”

sequentially but run in parallel”: in this sense, networks are nonhierarchical and decentered systems (Taylor, *Moment* 155, italics in original). *Patchwork Girl* reflects that understanding of network through the existential status of the female monster:

Oh, I [the female monster] want to be whole, don't doubt it. Jennifer's leg lying next to Bronwyn's foot on the flagstones of Frankenstein's workshop can't kick anyone's butt. But then Jennifer couldn't do it alone, either, not in all those petticoats. No, it's me, this one: Jennifer-Bronwyn-Elizabeth-Roderick-Kate-Alise-Germain-Aphrodite and all the others, who can take on any comers. (double agent)

By enumerating the names of people that the parts belonged to, the female monster stresses that the individuality of the parts is not reduced to the whole. Nevertheless, the parts are not completely independent from other parts and the whole, either. The hyphens between the names illustrate nodes interconnecting the parts, and the female monster as the whole is the web of the nodes. The female monster understands that she, as the whole, does not have privilege over the parts but rather she is sustained by the interconnective and interactive dynamics between the parts: the monster is a contingent result of complexity emerging from the interconnective dynamics. Considering such ontological characteristics, the monster states that she is not so much “the agent of absolute multiplicity” as she is “a double agent, messing up . . . territories” (double agent). This statement reinforces the fact that the female monster as a network functions holistically but not totalistically. Jackson claims that the monster and the hypertext illustrate beauty in this concept of network, a non-totalizing whole, emphasizing

aesthetic values of complexity produced by the nonhierarchical dynamics of the network.

Through the mouth of the character Shelley, Jackson proclaims that the existence of the female monster is beautiful: she notes that what makes the monster look beautiful is the complexity of her existence—more specifically, the beauty of the complexity created by the nonlinearity and multiplicity of the network structure. In the hypertext, when Shelley finds the female monster deserted by Victor outside, she notices that “the various sectors of her skin were different hues and textures, no match perfect,” which she could not see in “the dim light of [her] laboratory” (she stood).⁹³ Until then, she had not realized the individuality of the body parts and their differences from each other and from the whole. This realization of the individuality of the parts makes Shelley perceive the beauty of the monster. Jackson claims the beauty of the network that the monster presents: that is, the beauty of complexity. Comparing the monster’s beauty to a type of a beauty found in nature as an example, she asserts that the beauty of complexity is natural rather than monstrous.

I [Shelley] thought of the tree that stands by the house. I have often noticed that a length of cloth however richly dyed cannot match the beauty or sustain the interest of Autumn foliage. I believe it is because the myriad differing hues, while tending toward the self-same yellow one can achieve with a broth of turmeric, say, or onion skins, creates a disturbance

⁹³ By stating that Shelley could not see the beauty of the monster in “the dim light of [the] laboratory,” Jackson implicitly suggests that aesthetics is not transcendental. A new epistemological environment out of the old rationalism, one that can appreciate the beauty of complexity, can see the beauty of the monster.

of other colors around the root color: a penumbra, a kind of three-dimensional of color.

In this same way she was beautiful. (she stood)

Shelley here observes the complexity created by the nonlinear dynamics traversing between order and chaos, which prevails in nature. She emphasizes the difference between the beauty of the dyed cloth and the beauty of the autumn foliage, valuing the latter more. The color of the whole foliage, which is formed by the web of colors from multiple parts, is more complex than the dyed cloth with one tone: the foliage and its color are networks. The color of the whole is created by the nonlinear dynamics between colors of individual leaves without reducing them to the whole. The network of colors is in disequilibrium due to the dynamic tension between the “tending toward the self-same” color and the “disturbance of other colors around the root color.” The dynamic tension creates the complexity of the network, and Shelley appreciates the beauty of the complexity, pointing out that the monster has the same beauty as the foliage.

In explaining the complexity of foliage in the above quotation, Jackson mentions the “three-dimensionality” of the network of colors. In that mention, she shows her understanding of networks as three-dimensional spaces where information can nonlinearly communicate. By comparing the beauty of the complex network of foliage with that of the monster, Jackson insinuates the three-dimensionality of the monster. The monster’s three-dimensionality as a characteristic of the network is more explicitly

expressed through dotted lines on her body. Jackson provides a drawing of the female monster's naked body with dotted lines as shown in figure 1.

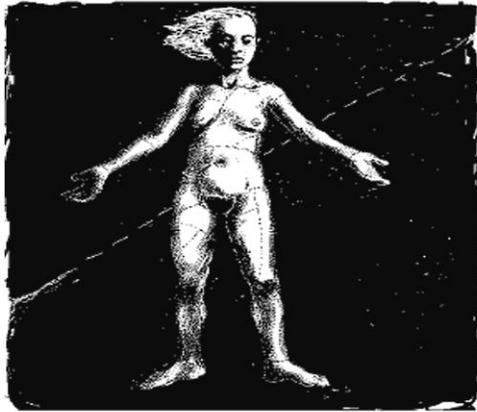


Figure 1. Jackson's drawing of the female monster (1995)

The dotted lines are the stitching marks that Shelley left in the process of piecing together the parts for the monster's body. For the female monster, the lines are scars signifying the fragmentary origins of the parts. Yet Shelley, as the character of the hypertext, mentions that the female monster does not have to be pitied for the scars because the "scars not only mark a cut," but "they also commemorate joining" (cut). Characterizing the interconnective relationships between the parts and between the whole and the parts, the dotted lines, in fact, illustrate how the complexity of her being is accomplished: in other words, the lines show the traces of interconnections by which she is constituted. Jackson describes the characteristics of the dotted lines: "It [dotted line] indicates a difference without cleaving apart for good what it distinguishes. It is a permeable membrane: some substance necessary to both can pass from one side to the other" (dotted line). By allowing interconnections and interactions between parts and

thus making the whole/monster three-dimensional, the dotted lines keep the monster/system complex and beautiful. Such functions of the dotted lines on the monster's body portray how the network produces complexity or beauty through the interconnective dynamics. Equating the creation of the monster and the composition of the hypertext, Jackson shows that an act of interconnection in the network lets differences shift and intersect while difference itself is preserved and unharmed just as stitching the body parts of the monster does so: that is how the network becomes aesthetic.

The permeability of systems indicates both the openness and closed-ness of systems—complex systems. As Thomas Rickert puts it, the “permeability is equivalent to flow and the dissolution of the stability” (901). By stressing the permeability of the female monster, the dotted lines re-confirm the female body as a dynamically-networked complex system. Niklas Luhmann claims that complex systems cannot exist without keeping communication with and difference from an environment, and they are, in this sense, both open and closed systems (17): complex systems and networks self-organize and self-sustain themselves through the interplay of openness and closed-ness, connection and separation, which manage sending, receiving, and transforming information. Likewise, via the dotted lines, the parts' material and nonmaterial, human and nonhuman, qualities are communicated throughout the monster as the whole, forming the complexity of the monster, which produces the monster's beauty: the monster and her beauty are constituted by the machinic flow. The female monster is an aesthetic machine, which aesthetically processes the machinic flow of information. In

this vein, the beauty of the female monster is derived not from a fixed image of her being, but from a flexible, ever-changing image of her being as a complex system that is far from equilibrium and thus unpredictable. The hypertextual aesthetics of *Patchwork Girl* is also understood in this dynamism. Although *Patchwork Girl* consists of fragmentary lexias, the nonlinear, machinic interconnections between lexias and between literary elements produce structural and semantic complexity of the hypertext.

To read the nonlinear hypertext narrative is to perform the aesthetics that appreciates the beauty of the monster: the reader's individual reading, or the activity of interconnecting the parts/lexias, is an aesthetic process that increases hypertextual complexity. Throughout *Patchwork Girl*, Jackson suggests that the beauty of the hypertext is not formed by the aesthetic value of meaning of the text—i.e., its semantic coherence—but by “successive attending to persisting form” (Joyce 63).⁹⁴ The “successive attending” does not simply indicate linking lexias but also interconnecting all literary elements—writer, text, medium, and reader: the moment of reading is a moment of producing textual complexity and textual beauty. Besides, although it is the reader that makes the “successive attending,” the reader is not always the inciter of that dynamics. In *Patchwork Girl*, the monster/text tempts the reader to conjoin with her: emphasizing that “your skin is a permeable membrane,” she says, “[c]ome closer, come even closer: if you touch me, your flesh is mixed with mine, and if you pull away, you

⁹⁴ Joyce claims that there is aesthetic coherence in hypertext although the meaning of coherence is not matched with the traditional understanding of coherence. According to him, the concept of coherence is changed along with the paradigm shift. The paradigm privileging poly-vocality, multiplicity, and constellated knowledge perceives coherence as “the successive attending to persisting forms” rather than a singular organic whole. Joyce's notion of “successive attending” presumes that a hypertextual whole is a non-totalizing system maintained by the interconnective dynamics.

may take some of me with you, and leave a token behind” (hazy whole). The monster/text here describes how the reader is caught in a network of other complex, co-adaptive literary elements. In hypertext, the reader is read as much as the text; in the same vein, the writer is written as much as the text. The hypertextual space of the electronic medium makes all this complex networking between literary elements possible. In this sense, the aesthetics that hypertextuality offers through its nonlinear narrative has the “processual” and “machinic” characteristics that Guattari identifies as being characteristics of the aesthetics of the posthuman culture. Fully appreciating and appropriating such posthuman aesthetics in her *Patchwork Girl*, Jackson provides a model of aesthetic application of the complexity paradigm. By examining the interconnective dynamics between literary elements in *Patchwork Girl* further, the next section will interrogate how the authorship over the hypertext is constructed and how the hypertextual authorship explores ideological implications of the processual and machinic aesthetics.

3. Distributed Authorship: The Complex Network between Writer, Text, Medium, and Reader in Hypertextuality

Hypertext shows changes in technical and cognitive functions of writing and reading that digital literature has brought about, and such changes become the catalyst for a redistribution of power: providing a form of nonlinear narrative, hypertext challenges the ideological power of linearity and presents unprecedented and unforeseen qualities of being. Such functions of hypertext help illuminate the anxiety some critics

feel about the crisis of literature in advanced technoscience culture as well as the anxiety over the paradigm shift causing the reconfiguration of ontology, subjectivity, and ethics. Shelley Jackson's *Patchwork Girl* among canonical hypertext fictions explicitly embodies such critical functions of hypertext, aiming at the suggestion of new ideas of textuality based on the complexity paradigm. As Landow puts it, Jackson's hypertext fiction "permits us to use hypertext as a powerful speculative tool that reveals new things about ourselves, while at the same time to retain the sense of strangeness, of novelty" in our age where the medium of information technology is considered the "natural" way to describe the (post)human ("Stitching," par. 9). By analyzing the hypertextual characteristics of *Patchwork Girl*, this section investigates how hypertext redistributes power and how that redistribution of power makes the complexity of the text.

Patchwork Girl illustrates how the emergence of the complexity paradigm is indebted to information technoscience, which brings about the digital culture of the posthuman. *Patchwork Girl*'s intertextual rewriting of *Frankenstein* makes the reader experience the medium shift from print to digital and the paradigm shift envisioned by that medium shift. As Joseph Tabbi puts it, "the printed book . . . appear[s] stable, natural, and self-contained only after an environment had been built (over centuries) that gives legal, material, social, and scientific support to [the] fixity" and the appearance of electronic media changes the culture of printed book and offers a reconfiguration of that cultural ideology (xi). Through her hypertext, Jackson depicts such changes and reconfiguration. She reads *Frankenstein* as the text questioning the power/ideology of

the printed book, which values linearity, stability, and unity. In Shelley's novel, the monster is an unstable, unnatural, and unfixed being, and the denial of the Creature means the denial of the values that the monster represents as I discussed in the previous chapter. The monster and his creator Victor are not only being rejected but punished with death. Their death is a way in which Shelley compromises with the dominant cultural ideology: in other words, although Shelley notices the creativity of instability and nonlinearity, she must compromise with the dominant ideology valuing stability, linearity, and unity for her text to survive. *Patchwork Girl* in the form of hypertext attempts to liberate what Shelley had to repress, by utilizing a new, electronic medium—the computer, which provides a textual space for the repressed values of instability and nonlinearity. The value of the new textual space is not just that it accommodates unstable and nonlinear power but that it exploits interconnective and interactive dynamics between unstable and nonlinear elements or systems. Change caused by the shift of the literary medium to the computer “is not necessarily the form or content of books per se, but the whole structure of support and beliefs about what counts as (meaningful) signal, and what is noise” (Tabbi xi). In sum, the shift of medium is accompanied with that of paradigm as an epistemological framework. By rewriting *Frankenstein* in the hypertext form, Jackson is able to reveal ideology embedded in print culture and reconfigure power-structure around and within literary texts—particularly, related to authorship. Such a revelation and reconfiguration are conducted along with her appreciation of creative power of instability and nonlinearity, which the complexity paradigm vitalizes.

Patchwork Girl is a metafiction, a fiction about writing fiction. Through her metafictional hypertext, Jackson suggests the nonlinear narrative of hypertext as an alternative to the dominant linear narrative that has established the conventional narrative style of novel.⁹⁵ Peter Stoicheff claims that “a metafiction text *is* a complex system” (85). Jackson’s metafiction, which utilizes the nonlinear narrative, appropriates this view. By fully exploiting the image of the monster as a complex system and applying it to writing activity, she tries to exhibit how the complexity of text emerges, offering a new vision of writing and of power structure within the text. Jackson parallels the structural complexity of hypertext with the monster’s existential complexity: the lexias as the parts of the hypertext are equated with the parts of the monster’s body. In discussing the long-standing association between the body and writing, she reconfirms this equation: “the comparison between a literary composition and the fitting together of the human body from various members stemmed from ancient rhetoric. *Membrum* or ‘limb’ also signified ‘clause’” (typographical).⁹⁶ In “Stitch Bitch,” Jackson reveals that the association of body and writing has come to be associated with the ideological logic of normativity: the monstrous body is

⁹⁵ She radically defines “hypertext” as “everything that for centuries has been damned by its association with the feminine”: especially in literature, that is what literary convention—in particular, the convention of novel—has edited out as the feminine (“Stitch” 534). According to the traditional idea of writing, while a conventional novel as a dominant narrative style is built by linear, direct writing and thus is considered good writing, hypertext, written nonlinearly, is a bad writing.

⁹⁶ Jackson’s understanding of the relationship between the monstrous body and writing conjures up French feminists’ theory about feminine writing—particularly, Helen Cixous’s theory of “écriture féminine.” *Écriture féminine* places experience before language and privileges nonlinear, transgressive, and cyclical writing that defies phallogocentric discourses. Being combined with other French feminist theorists’ concerns with the body, the concept of feminine writing has developed into a subversive exercise against phallogocentrism. However, this chapter does not locate *Patchwork Girl* in such feminist theories, which is based on psychoanalytical and poststructuralist views, to rearticulate the creative values of nonlinear and unstable writing in terms of the complexity paradigm valuing the creativity of such writing as a practical norm.

amorphous, indirect, impure, diffuse, multiple, evasive. So is what we learned to call bad writing. Good writing is direct, effective, clean as a bleached bone. Bad writing is all flesh, and dirty flesh at that: clogged with a build-up of clutter and crud, knick-knacks and fripperies encrusted on every surface, a kind of gluey scum gathering in the chinks. (534)

In sum, bad writing is disordered and nonlinear like a monster's body while good writing is unified and linear. To the extent that the norm prefers unity and linearity to disorder and nonlinearity, bad writing is located on the side of the repressed and excluded by the norm. This corollary shows how writing is influenced by the normativity seeking linearity and unity. In this sense, Jackson's attempt to refashion the concept of good/bad writing is related to the change of the norm—or the paradigm enframing the norm.

Patchwork Girl is grounded on the assumption that Shelley had to eliminate some parts of her writing to meet the demand of normative, or good, writing. In the hypertext, Shelley's re-sewing of the body parts that Victor deserted symbolizes a reviving of the writing that had been edited out in the pursuit of good writing. Jackson provides the evidence to prove this assumption in a lexia:

Indeed, there were remains –unused lengths of venous plumbing, fatty trimmings, deleted passages, a page that blew off a table in the garden where a rock imperfectly anchored an untidy slew of manuscript pages while she wandered in a reverie, attending only dimly the disquisitions of

one of the philosophical friends of the household. Percy himself excised parts he found blemished. (basket)⁹⁷

The lexia of “basket” reveals the fact that Shelley’s husband Percy Shelley was deeply committed to her writing. This lexia follows the lexia entitled “the remains,” which excerpts a scene of *Frankenstein* where Victor deserts the parts of the female monster on a shore.⁹⁸ The female monster and Shelley’s nonlinear and disordered writing were rejected by Victor and Percy Shelley respectively since they were a bad body and bad writing for them: Shelley’s monster, as a being of collected parts, and her text with untidy parts were not allowed by the existing norm of subject and writing.

Shelley confesses that male authorities, as a force to regulate the norm, intervened in producing *Frankenstein* from the initial stage to the publication of the novel.⁹⁹ Especially, Percy Shelley, who wrote the preface to the 1818 edition of *Frankenstein* without revealing his name, meddled considerably in her writing. His intervention resulted in framing Mary Shelley’s writing within the concept of normative writing. According to her, Percy “was very anxious that [Mary] should prove [herself]

⁹⁷ The lexia to which this quotation belongs has a footnote given by Jackson: “Excised, with selective deletions, from p. 211 of Mary Shelley’s *Frankenstein, or, The Modern Prometheus*, first published in 1818 (mine is the Penguin edition, 1985).”

⁹⁸ In *Frankenstein*, Victor carries the dissembled body parts of the female monster in a basket to a shore. In *Patchwork Girl*, Shelley brings them to her house without telling her husband. The story of the female monster, especially the “graveyard” path writing about the origins of the body parts, in the hypertext could be considered what Shelley might put in her original manuscript before Percy Shelley edited. By imagining such, Jackson sample what Shelley’s “bad” writing might be like—that is, nonlinear and disorderly, but interconnected to the whole.

⁹⁹ Shelley introduces how she wrote the story in detail in the “Introduction to the Standard Novels Edition” for the 1831 edition. According to the introduction, Lord Byron, Percy Shelley, and Mary Shelley agreed to make a ghost story for each other, but she recollects that she felt heavily the burden of the agreement with such great authors, and the pressure even made her have a horrible dream on which *Frankenstein* is based. The story about Frankenstein and his creature may reflect her anxiety about male authorities’ judgment of her writing or her monstrosity.

worthy of [her] parentage, and enroll [herself] on the page of fame” (272). To make Shelley’s writing and imagination public, he had to “excise[s] parts he found blemished” (basket). He might believe that the excising process can help make Mary Shelley’s writing/monster “good”: for Percy Shelley, orderly and systematic writing was aesthetic. However, according to her own introduction to her novel in the 1831 edition, it seems that Shelley herself recognized the creativity of nonlinearity and chaos or disorder and the creative potential of chaotic and disorderly writing: in that introduction, she remarks that invention is made “out of chaos” (“Author’s” 274). In addition, her ideas about the living monster with the collected body and its creative actions in her novel also support the assumption that Shelley understands the creativity and aesthetic values of chaos. Therefore, as Jackson depicts in her hypertext, Percy Shelley’s editing out the disordered, nonlinear parts of her writing for publication might have been irritating for Mary Shelley although she, as a young and beginner writer, could not resist it.¹⁰⁰ In this way, Shelley’s authorship over her novel and aesthetic perception were infringed upon by male authorities—Percy Shelley and the print business. As Jackson insists, nevertheless, Shelley tried to “secure [her] monster behind those locks and screens” by embedding “her tale in a double thickness of letters and second-hand accounts” in *Frankenstein* (real M.). Owing to such efforts, her monsters—the female monster and her writing—had a chance to be revived along with the shift of paradigm. Appreciating Shelley’s remains, Jackson explores in her hypertext the aesthetic values of the nonlinear

¹⁰⁰ In *Patchwork Girl*, Shelley becomes mad about her husband’s engagement in her writing process. Her passive resistance is regarded as “feminine complaints” and ignored by Percy (female trouble). Through this episode, Jackson depicts how the feminine writing, which is impure and nonlinear, has not even been paid attention to in favor of the normative writing.

and disorderly that male authorities edited out. In emphasizing such repressed values, however, Jackson does not simply mean to return the authorship to Shelley. Rather, through *Patchwork Girl*, she reconfigures the authorship of the text itself by collapsing the sense of hierarchy embedded in the concept of authorship. As a result, Jackson can make her text more chaotic or complex than Shelley intends for her novel. By doing so, she attempts to develop Shelley's aesthetic perception into the aesthetic of the new paradigm.

Frankenstein is composed of four letters written by Walton, who tells Victor and his Creature's story to his sister, and his fourth letter has three volumes; each volume also consists of chapters. Through this multi-layered narrative structure, Shelley experiments with nonlinear narrative, rearranging the sequence of events and employing multiple voices. By hindering the reader's linear tracking of meaning, the nonlinear narrative based on the complex textual structure also minimizes the sense of an author's existence within the text. With the help of the digital medium, Jackson can materially practice Shelley's experiment with the nonlinear narrative, and further its creativity by adding the concept of interconnective dynamics to the nonlinear narrative. Her hypertext, *Patchwork Girl*, is composed of five paths structured by collections of lexias: "graveyard," "journal," "quilt," "story," and "broken accents."¹⁰¹ Although they are divided under different subtitles, the five paths are structurally interconnected without

¹⁰¹ The "graveyard" told by the female monster is the collection of stories of the individual parts comprising her body; the "journal," Shelley's journal recording her stitching of the female monster and her relationship with the monster; the "quilt" containing excerpts from Baum's *Patchwork Girl of Oz* and the reinscription of other parts of the text; the "story" about the female monster's adventures and excerpts from the relevant passages of *Frankenstein*; and the "broken accents," or "body of text," containing the female monster's narration about hypertext and human bodies.

being fully reduced to or separated from each other. Such an irreducible interconnection is attributed to the nonlinear links of lexias. Jackson notes that the interconnective and interactive dynamics of hypertext depends on “multiple writing spaces/windows/lexias that can be linked in as many ways as the writer wants” and that the complex dynamics of writing spaces, or lexias, helps the hypertext cover “a lot of different kinds of structures” (qtd. in Ferreira, par. 1). Lexias not only liberate the writer from the forced rule of linear writing but the reader from linear reading both in physical and semiotic senses. In hypertext, the writer programs lexias and their links on multiple levels so that the reader can move nonlinearly among lexias, weaving a variety of textual structures: the complexity of hypertext emerges from nonlinear dynamics. In this way, throughout *Patchwork Girl*, Jackson pays attention to how the diminishment of the writer’s authority over the text contributes to the complexity of the text.

In a conventional understanding of literary works, the linear relationship between writer, text, and reader is assumed: the writer produces the text, and the reader consumes the text. In this linear relationship, the text is considered just an object of property and the writer becomes an author, who is “outside and precedes” the text (Foucault, “Author” 125). Foucault claims that this status of the author, fostering “the formulation of the fundamental critical category of ‘the man and his work,’” is related to “the systems of valorization in which he was included” (125). His claim implies that the paradigm shift will cause a new concept of author. In fact, the traditional concept of author is rooted in that of a unified self, an individual who is outside the (con)text. However, the author disappears with the emergence of a new paradigm that denies the

unified self: as long as the integrated self of the author is denied, “the rights of the author as a persistent self-identity” over the text come to be more evanescent (Heim 221). In this vein, Shelley in the hypertext states how the experience of interconnection with her monster transformed her understanding of the relationship between the human/self/author and the nonhuman/other/text: “Her scars lay like living things between us, inscribing themselves in my skin. I thought I too was rent and sewn, that I was both multiply estranged and gathered together in a dynamic union./ What divided her, divided me” (her, me). Shelley here reveals her realization that the human/self/author is constituted by the same complex, interconnective dynamics as the monster/other/text. Under this dynamics, the two different systems can interact without rehierarchization. Considering the communicability between human/self/author and monster/other/text, the writer no longer automatically becomes the author of the text, who controls the textuality. Rather, authorship is distributed into the larger system, textuality, along the nodes between the writer and the text: the writer becomes a part of the textuality. In Foucault’s review, the disappearance or death of the author comes to transform the author into “the victim of his own writing” (126). But Foucault was not certain how the transformation would be appreciated in literature. By representing a possible situation in which the writer Shelley interconnects and interacts with her own monster/text without a sense of hierarchy, Jackson demonstrates a result of the transformation.

While *Frankenstein*’s Creature regards his creator as father, the female monster perceives Shelley as “[l]over, friend, collaborator” rather than mother (thanks); Shelley

also regards her monster as such. By not establishing their relationship as a mother-daughter relationship, Jackson avoids any hierarchical sense traditionally implicated in the relationship between the creator and the creature. In their nonhierarchical and interactive relationship, Shelley's responsibility for her creature is to preserve their interactive relationship rather than to control the monster. Their interactive relationship is emphasized through their inter-species and lesbian intercourse. What Jackson intends to claim through such an unfamiliar relationship between creator and creature is to expose the repressed possibility of interconnection with difference and its creative power. In the old paradigm that privileges the sameness, the interconnection with difference is categorized as abnormal and thus prohibited as shown in *Frankenstein*. However, in the complexity paradigm where the increase of complexity through interconnections with difference is sought, the abnormal relationship can be a creative means to increase complexity. In *Patchwork Girl*, the female monster/text achieves autonomy through the interconnective relationship with her creator and she decides to leave Shelley for her own adventurous life. The monster's leaving illustrates how the text becomes more dynamic and complex when the writer's authority over the text diminishes: indeed, through her own experience, the monster/text can produce more complex meaning beyond the writer's confined experience. In this aspect, the writer/Shelley is no longer the center of the textuality. However, the demystification of the writer's authorship does not necessarily mean the complete separation of the text from the writer. Rather, the interconnection between the writer and the text forms a textual web, and the authorship of textuality is distributed in that web. *Patchwork Girl*

illustrates the distribution of the authorship through Shelley and the monster's skin graft. Shelley cuts a part of her body and grafts it to the monster's body, wishing she "would live on in [the monster], and [the monster] would know [her] as [she knows herself]" (female trouble). The grafted skin functions as a node between the creator and the creature, and the node disables "the formulation of the fundamental critical category of 'the man and his work'" (Foucault 125). Shelley/writer and the monster/text are interconnected and interact through the dotted lines of the grafted skin. Shelley will experience what the text will go through not as an authoritative controller but as an element of textuality.

The three-dimensional electronic space of the hypertext makes the textual web constituted by the interconnection between the writer/Shelley and the text/the monster substantially possible by allowing the interconnective dynamics between them to move multilinearly and thus to weave a complex network. Signifying both connections and disconnections, or the interconnection of connection and disconnection, the dotted lines marked on the female monster's body embody the creative characteristic of hypertextual space. Jackson explains the dynamical lines as "an indication of the way out of two dimensions (fold along dotted line)": "In three dimensions what is separate can be brought together without ripping apart what is already joined, the two sides of a page flow moebiusly into one another. Pages become tunnels or towers, hats or airplanes, cranes, frogs, balloons, or nested boxes" (dotted line). Jackson uses the dotted lines to show the shift of narrative forms from two-dimensional print form to three-dimensional hypertextual form. The dotted lines, forming moebius space, give the text volume to

continue nonlinear, dynamic interconnections. As Hayles points out, the dotted lines refer to the flickering signals of the computer, which have the pattern of presence and absence (*Mother*).¹⁰² In the three-dimensional electronic space constituted by flickering signifiers, the text becomes “permeable,” “paradoxical,” and “potential” hypertext generating new writing and reading experiences (dotted line); the lexia/link pattern of hypertext is constructed by the dynamics of the connection and disconnection of flickering signifiers. In the same vein, the female monster states, “my real skeleton is made of scars: a web that traverses me in three-dimensions. What holds me together is what marks my dispersal. I am most myself in the gaps between my parts, though if they sailed away in all directions in a grisly regatta there would be nothing left here in my place” (dispersed). The female monster accounts for herself in terms of hypertextual dynamics of flickering signifiers. The monster, as a hypertext, stresses that her/its complexity or complex textuality is not determined by a single textual constituent. Rather, the hypertextuality is potentially constituted by the interconnective dynamics between writer, text, and medium, and it is contingently specified by the reader.

Unlike print texts that linearly arrange writing and reading “by the left-to-right, top-to-bottom, front-to-back fixity of the book,” the writing and reading of hypertext are nonlinear and multisequential (Purves 39-40). Although the writer of hypertext creates the textual links with lexias in the first place, it is the reader who finally orders the lexias by clicking the flickering signifiers. Critics call this characteristic of hypertext reading “cyborg reading,” which means that the reader and the text co-adapt to each other

¹⁰² See the sixth chapter, “Flickering Connectivities in Shelley Jackson’s *Patchwork Girl*,” of Hayles’s book, *My Mother Was a Computer*.

through reading. Cyborg reading is required for hypertext. Hayles asserts that reading hypertext is “more than a cognitive activity—or rather, it is an activity that takes place in the embodied cognitions of the extended mind as it enrolls the material object of the medium into its cognitive system” (“Transformation” 37). Particularly, *Patchwork Girl* asks the reader to be “a cyborg reader” in order to let him/her know “his/her prosthetic relations with the text” and “adopt a gaze which is equally modular and fragmentary” (Carazo and Jimenez 116). By doing so, the hypertext practices the interconnective and interactive relationship between the reader and the text, between the cognitive activity and the medium. In the first verbal lexia of the “a graveyard” path, the female monster states, “I am buried here. You can resurrect me, but only piecemeal. If you want to see the whole, you will have to sew me together yourself” (graveyard). She/text waits for the reader to stitch the parts into a whole. By stitching them, the reader becomes a co-author of the text: more exactly, reading contingently engenders meaning formed by the interconnective relationship between writer, text, and medium. As the female monster narrates, multiple potential meanings of the text wander in the electronic textual space of the hypertext, and a specific meaning contingently emerges according to the reader’s spontaneous selections of links: “I hop from stone to stone and an electronic river washes out my scent in the intervals. I am a discontinuous trace, a dotted line” (hop). The reading of hypertext is untraceable because the reader cannot mark the last lexia at which he/she leaves, and accordingly the reader may not repeat the same reading: since hypertext does not provide a certain point of beginning and ending for reading, the reader can start and end his/her reading anywhere and at any moment, and also the

direction of reading changes according to the reader's selection of the link for the next lexias.¹⁰³ Due to such nonlinear, multisequential reading, a universal reading is impossible for hypertext. The moment of reading is the contingent moment of complexity when the writer, text, medium, and reader work together. In this way, hypertextuality does not assuredly distinguish the positions and functions of such textual constituents. Rather, the nonhierarchical interconnections and interactions between the writer, text, medium, and reader perform the hypertextuality.

By highlighting the performativity of hypertextuality, *Patchwork Girl* suggests the changing concept of control. While the conventional textuality of books controlled by the author is fixed and univocal, the hypertextuality, which is formed by the nonlinear interconnections and nonhierarchical interactions between the author, text, medium, and reader, is variable and multivocal.¹⁰⁴ For the distributed authorship of the hypertext, the female monster remarks, "Mary writes, I write, we write, but who is really writing?" (am I mary?). This question is made for the reader of the hypertext. Jackson does not claim herself as the privileged author of *Patchwork Girl*. Instead, she emphasizes that she is one of the co-authors by introducing the author of the hypertext as "Mary/Shelley, & Herself." In this arrangement of authors' names, Jackson does not clarify exactly who

¹⁰³ In both form and content, *Patchwork Girl* does not proceed linearly. Since there is no order of reading like page numbers of print books, the reader can start anywhere s/he clicks first. Likewise, the story of *Patchwork Girl* is not a unified one, but it is a type of collage containing monster stories, criticism, and bibliographical information. The hypertext does not provide a conclusion, showing that the reader of hypertext is not intended to find a specific meaning hidden by the author but to make meaning emerge through complex reading processes.

¹⁰⁴ Purves claims that hypertext brings about changes both in the form of control and the nature of control: "*The writers control the text; the text controls the readers; the readers control the text and the writers; convention controls the writers and the reader through the text; writers and readers can invent and play with convention and the text. The whole is an apparent anarchy*" (39, italics in original). Purves argues that such a nonhierarchical and interconnective type of control can help reconfigure the existing cultural and theological web by problematizing all the traditional types of authority.

the names refer to. She places a slash between Mary and Shelley. It could mean Mary Shelley, not as *Frankenstein's* author, who deleted the existence of the female monster, but as the writer of the text within *Patchwork Girl*, who revived the monster by re-stitching the deleted parts: the slash may mean the *différance* of her authority over her work.¹⁰⁵ The “Mary/Shelley” also could signify Mary Shelley and Shelley Jackson. Without claiming the originality of her hypertext, Jackson actively appropriates her predecessor’s work. The slash between Mary and Shelley is a mark of nonlinear interconnective dynamics between Mary Shelley and Shelley Jackson, between *Frankenstein* and *Patchwork Girl*. Likewise, “Herself” as a coauthor of the hypertext is not clearly identified either. It could be the female monster, the text, the medium, or the reader—or all of them. In this way, the answer to the monster’s question above, “who is really writing,” might be “we,” all the literary elements which participate in constructing hypertextuality. Such a distributed and thus dynamic authorship over the text reinforces the complexity of the text. Through the textual complexity that the distributed authorship produces, *Patchwork Girl* demonstrates how hypertext embodies “ideological implications of digital medium and its positivistic aestheticization” (Ensslin 7). Indeed, hypertext is not only an example of how literature methodologically uses technoscience, but it is an aesthetic gain of the posthuman and the complexity paradigm.

Qvortrup asserts that in a complex culture, “[t]he role of artist becomes the creation of potential worlds through which ‘users’ can create their own world

¹⁰⁵ I use the term “différance” to mean “to differ” and “to defer” as Jacques Derrida defines. The writer Mary Shelley in *Patchwork Girl* is not what she was actually, but one who Jackson hypertextualizes. Shelley’s authority in the hypertext is differed from and deferred by her novel.

realizations, or make their own paths” (90). In other words, the role of the artist in the complex culture helps the reader/user experience the complexity of their world through works of art so that the reader can realize the complex network of the culture. In her hypertext *Patchwork Girl*, utilizing the nonlinear narrativity and a three-dimensional textual space, Jackson creates the potential world of complexity in which the reader can aesthetically experience how complexity emerges by the machinic process based on nonlinear, interconnective dynamics. This aesthetic experience helps the reader realize the dynamics of the complex network culture to which s/he belongs. David Ciccoricco argues that “an effective network aesthetic maintains some form of dialogue between the discursive, verbal, and conceptual on the one hand, and the formal, performative, and material on the other” (71). Taking advantage of the interconnective image of the monster and the conceptual depth of the nonlinear narrative of hypertext, Jackson’s *Patchwork Girl* maintains the balance in such a dialog, reflecting the aesthetic ideas of the complexity paradigm. Through her hypertext, in other words, Jackson proposes that aesthetics itself is a complex system in which various epistemological, social, and cultural systems are interconnected and interacted.

The progress of technological developments alters the genre in a technological way. Indeed, thanks to technological developments, the increasing diversity of artistic tools and methods allows writers to experiment with and to change the notions of language, narrative, and text—and thereby further literature. Hayles claims with caution that “digital literature will be a significant component of the twenty-first century canon” to the extent that “almost all contemporary literature is already digital”

(*Electronic* 159). In particular, by exploring the nonlinear narrative in a hypertextual space, hypertext heightens the ideological and aesthetic competence of digital literature. As Hayles claims, the emergence of a new narrative form transforms “the metaphoric network structuring the relation of word to world” (*Writing* 22-23). By restructuring the relation of word to world through nonlinear writing, hypertext is able to revive values degraded by linear and hierarchical cognition of the world. Values supporting nonlinearity and interconnectivity challenge ideological implications inherent in the existing paradigm. In this respect, despite the posthuman conditions in which language and aesthetic is decoded and re-encoded by technology, literature proves its significance in our technoscience age by offering a new narrative form to articulate the emerging posthuman culture and a new aesthetic perspective to appreciate the complexity of the culture.

CHAPTER V

CONCLUSION: SCIENTIFIC FICTION AS A COMPLEX SYSTEM

Human beings are living in the information age when things change so fast and information is so unorganized and unpredictable that stability and simplicity become “idle dream[s] that no longer can be realized,” making the question of complexity a topical subject (Taylor, *Moment 3*). In order to understand the information age, Taylor suggests, “we must comprehend complexity, and to comprehend complexity, we must understand what makes this moment different from every other” (*Moment 3*). Agreeing with Taylor’s suggestion, this dissertation claims that the difference of our age from others is the emergence of the strong feedback loops among technoscience, literature, and culture: although the feedback loops are not new, they have never been strong enough to account for a reality until today (Hayles, *Chaos* 295). The feedback loops advance and at the same time obscure our understanding of physical, literary, and cognitive structures, producing complexity. They lead to the emergence of the complexity paradigm and the emergence of the genre of scientific fiction. The dissertation deems that the complexity paradigm, which values interconnective and interactive dynamics among systems and complexity produced by the dynamics, is the epistemological framework of the technoscience culture, and scientific fiction is its cultural product.

The dissertation proposes scientific fiction as a critical genre that continuously increases the complexity of the technoscience culture: it is more than the literary

representation of the culture. Suggesting Cadigan's *Synners*, Bear's *Blood Music*, Piercy's *He, She and It*, and Jackson's *Patchwork Girl* as scientific fiction novels, the dissertation outlines how they re-envision humanity, subjectivity, ethics, and aesthetics within the parameters of the complexity paradigm of the technoscience culture. By using the terms and concepts of complexity theory originating from the science of complexity, the dissertation addresses the fact that the novels combine scientific ideas and literary narratives, constructing a unique view to understand the technoscience culture and the human within it. Scientific fiction is an expansion of literature, of cultural studies, and of science studies; it is not reduced to any of them and not separate from them. Scientific fiction itself is a complexly-networked system, being sustained by the interconnections and interactions between two cultures—science/technology and art/literature— and adding more complexity to the cultural network. Although this dissertation examines the works of the writers usually categorized as science fiction writers to show the *emergence* of the genre, the scope of scientific fiction is not within the genre of science fiction. Richard Powers, for example, is one of non-science fiction writers who fully appreciates the critical nature of scientific fiction as a complex system and its epistemological potency, contributing to the establishment of the genre. Particularly, Powers's novels and his transdisciplinary insight into literature and technoscience can be used in defending the genre of scientific fiction from some critics, including William Deresiewicz, who have the traditional understanding of the relationship between the two cultures.

Powers utilizes the feedback loops between the two cultures and the concept of complexity as the theme and the structure of his novels.¹⁰⁶ In reading Powers's scientific fiction novels, readers are expected to understand scientific knowledge through representations of the arts, and scientific knowledge, in turn, helps them interpret several works of art. Particularly in *The Gold Bug Variations*, Powers relates Bach's combinatorial mastery of the thirty-two note base in the *Goldberg Variations* to thirty variations and the permutations of replicating DNA, assuming common patterns between them and suggesting the interconnectivity between art and science. Further, by mentioning Edgar Allen Poe's "The Gold Bug," which shows how the pattern of information, not the content of information, can produce meaning, he claims that the interconnective dynamics is the pattern by which to create complexity or meaning. In order to claim the creativity of the complexity produced by the dynamics, Powers presents the concept of the "ecology of knowledge," which signifies the network of the diverse fields of the two cultures, such as music, genetics, computer science, literature, art history, library science, and history (326). The complex knowledge system promises to construct new knowledge, providing flexible and adapting viewpoints for the changing environment of the human. He seems to want his scientific fiction novels to (re)present the "ecology of knowledge." The concept of the "ecology of knowledge" is

¹⁰⁶ Among his novels, *The Gold Bug Variations* (1991), *Galatea 2.2* (1995), and *The Echo Maker* (2006) shows the characteristics of scientific fiction, foregrounding the ideas of complexity based on complexity theory. Powers deals with the complexity produced by the interlocking relationship between science and art in *The Gold Bug Variations*, and then in *Galatea 2.2*, he specifies the topic into the relationship between science and literature, networking cognitive science, literature, and literary studies. Through *Galatea 2.2*, Powers tries to reconfigure the status of literature in the network culture and literary criticism based on the feedback loops between science and literature in the complexity paradigm. *The Echo Maker* thematizes the complex relationship between the activities of the human brain and the perception of reality, centering the concept of complexity in accounting for disorderly events and relationships among characters.

also reflected in the narrative structure of *The Gold Bug Variations*, forming the text as an interconnected whole: he makes his novel a complex, adaptive system operating by nonlinear, interconnective subsystems. In this way, *The Gold Bug Variations* exploits the creative power of complexity from the interconnective dynamics. In sum, through the novel, Powers shows that the dynamics of interconnectivity itself can create meaning.

In a traditional understanding of the relationship between science/technology and humanities/literature, scientific fiction's transdisciplinary view is considered threatening to literature. In "Science Fiction" published in 2006, Deresiewicz critiques Powers's novels as examples of "our culture's skewed understanding of the nature of fiction, and of knowledge" (25). He claims that his critique of Powers's novels is "not just that we don't understand the relationship between stories and ideas, [but] it's that there's a particular realm of ideas to which we assign supreme value: science" (25). Claiming the distinction between the "intellect" of literature and "scientific acumen," Deresiewicz asserts that *The Gold Bug Variations* is "a container for scientific ideas" (25 and 26). On the other hand, he advocates Thomas Pynchon's and Don DeLillo's novels dealing with science and technology, arguing they "embody their perceptions about technological civilization in narratives that . . . bring out their human meanings, their impact on individual lives" and they "introduce the complexity they find in both science and the civilization it has helped created into the texture of the narratives themselves" (26); for him, Powers pedantically exhibits scientific knowledge in his novels without exploring the complexity of human life embedded in science and the civilization constructed by

science. Deresiewicz places literature outside the feedback loops between science/technology and the civilization or culture, confining the role of literature to merely the consumer of knowledge. In contrast, Powers intentionally places his novels within the feedback loops, expanding the role of literature as a creator of knowledge—more exactly, a participant in creating meanings.

Asserting that Power's scientific fictions are not novels, Deresiewicz holds that "what novels are for" is to explore "what it means to be alive at a particular time and place, what it feels like" (25). In Deresiewicz's view of the novel, Cadigan's *Synners*, Bear's *Blood Music*, Piercy's *He, She and It*, and Jackson's *Patchwork Girl* also fall short of "good" novels since they focus on how interconnective dynamics produce the complexity of the human rather than "human meanings" embedded in science/technology and the "impact [of science/technology] on individual lives." In other words, for scientific fiction writers, what the novel, or literature, is for is not just to dig out the meaning and complexity existing in the culture through writers' speculation, but to recreate meaning or knowledge in new versions through applying the patterns of dynamics that constitute the world to their works. Scientific fiction suggests that novels or literature can serve not just to explore problems of the complex world and provide solutions to them, but to envision the evolutionary pattern of the human, stressing the creative power of complexity. Indeed, it establishes its position as the critical tool of the complexity paradigm.

In *The Gold Bug Variations*, Powers supposes that "the world is only translation, nothing but" (491). The "translation" here means a becoming process through

interconnections and interactions with others. Scientific fiction perceives the world as a complex system formed by the interconnective and interactive dynamics between (sub)systems; that is also how the world appears complex. For this understanding of the world, which is the way that the complexity paradigm understands the world, the world is no more than a text made up of a network of interdependent metaphors and tropes. Hence, what both science and literature can do is to make their own text from the context. Yet, translating the different texts from science and literature, scientific fiction deepens the knowledge that supposedly results from the combination. In other words, scientific fiction is a genre that continues scientific communication and also practices its social significance, ethical implications, and aesthetic effects. Ultimately, through the proposal of scientific fiction, this dissertation confirms the emergence of the complexity paradigm, expecting the paradigm to make sense of our world in a way we never were able to before.

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VITA

Name: Ho Rim Song

Address: Department of English. Blocker 227 TAMU 4227
College Station, TX 77843-4227

Email Address: hrimsong@gmail.com

Education: B.A., English, Pukyong National University, 1996
M.A., English, Pusan National University, 2000
M.A., English, Kansas State University, 2003
Ph.D., English, Texas A&M University, 2010