RETHINKING OUR COMPOSING, RECOMPOSING OUR THINKING:
COMPOSITION STUDIES AND COGNITIVE PSYCHOLOGY
CONSIDER WRITING

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Thanks to the many communities that support and nourish me. I am so grateful for the love of so many.

This thesis is dedicated to the human community—may we always work with all that we have to find better ways of being with one another in the world, and may we celebrate the journey.

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ABSTRACT

RETHINKING OUR COMPOSING, RECOMPOSING OUR THINKING:
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This thesis strives for an interdisciplinary conversation between composition studies and cognitive psychology. Under particular consideration is the role of automatic thinking in reading and writing and how certain pedagogies of writing might move students away from automatic thinking and towards deliberate, intentional thinking. Of particular interest is the pedagogy of Ann E. Berthoff, who is placed in a lineage of interdisciplinary thinkers including Lev Vygotsky, I.A. Richards, and Paulo Freire. Concepts advocated by Berthoff's composition theories and by her contemporaries, including David Bartholomae, Anthony Petrosky, and Mariolina Salvatori, closely correlate with cognitive psychology principles regarding how to overcome automatic thinking and reestablish executive control, responsible for intentional thought, within the brain. Berthoff's concepts include the use of the dialectic, collaborative learning, and time. These concepts are considered theoretically, scientifically, and within the practical context of the first-year writing classroom. Surrounding the theoretical discussion is the question of what the role of the first-year writing classroom can play in preparing students for a rapidly changing, increasingly unpredictable world and how interdisciplinary work can enhance understanding within and potential for the field composition studies.

CHAPTER ONE: COGNITIVE HUH?: WHAT COGNITIVE PSYCHOLOGY IS AND

WHY TEACHERS OF WRITING SHOULD CARE

There are no simple acts anywhere in our lives. But we do well to forget this except when

forgetting makes us unjust, dogmatic, or unimaginative toward our own or others'

meanings." I.A. Richards

When I was in college, I spent a summer working as an intern for an environmental

nonprofit that raised money to support the nearby National Park. My boss was a smart,

calculated man who wrote sizable grants to fund projects within the park, often biological

research that would be carried out by scientists. George, my boss, took ideas that scientists

had and translated them into language that would "sell" to grant funders. If the grant was

awarded, he would spend more time taking the field reports from scientists and translating

them into comprehensible updates for funders. George often said that if the science field

had more people who could write in clear, plain English, a lot of frustration and

miscommunication would be solved. While George worked primarily with scientists, his

statement holds true, I think, for all disciplines whose jargon puts a hold on sharing their

knowledge with others.

I was reminded of George and his work as I began my thesis project and came

across the difficulty of interdisciplinary discourse. For this thesis, I wanted to explore how

certain pedagogical practices in the writing classroom could possibly change the way our

brains think, or at least how the way we think changes or justifies certain pedagogy. But to

do that I have had to meddle between two fields—composition theory and the wide world

of, for lack of a better word, science. I thought I would just do some research on the brain,

but it turns out that a lot of people do research on the brain. There are cognitive neuroscientists, plain-old neuroscientists, cognitive psychologists, and the vaguely named cognitive scientists. Each of these fields has its own set of protocols and its own vocabulary—and let me just say that dorsolateral prefrontal cortex is not a term that I often come across while reading within my own discipline. And my "own discipline," that of composition theory and rhetoric, is so new to me that even this discourse community often feels foreign and inaccessible. Perhaps the most perplexing part of the project are the responses that I've received from members of the composition field—that by trying to have an interdisciplinary conversation, I'm doing something noble, daring, or terribly unexciting. I've merely seen connections between what I've read and heard, and perhaps for thinking that I can enter two discourse communities at the same time with skill, I am more naïve than daring. But I think the resulting conversations are worth having, perhaps even necessary.

In the initial stages of this project, I ran into the popular news journal, *Newsweek*, featuring a cover story titled, "The Creativity Crisis in America." In the story, journalists Po Bronson and Ashley Merryman report about the steep decline in Torrance test scores among American children since the early 1990s. For the past fifty years, the Torrance test, a 90-minute series of psychologist-administered discrete tasks, has evaluated children on their creative aptitude, and the test has proven a strong indicator (a more accurate one than IQ) of future creative accomplishment, from businesses founded, to public policies written, to dances performed (45). In May of 2010, Kyung Hee Kim of the College of William and Mary found, after analyzing 300,000 Torrance test scores, that the scores were significantly decreasing, particularly in children currently in kindergarten through the

sixth grade. One speculated reason for this decline is what University of Georgia professor Mark Runco calls the "art bias," the commonly held idea that creativity is limited to work within artistic disciplines (46). But Bronson and Merryman clarify that the "accepted definition of creativity is production of something original and useful" and that, as far as Torrance Test scores go, art majors and engineers often score the same (46).

From a cognitive psychology perspective, creativity really only needs two components to thrive—convergent and divergent thinking. Creativity first requires divergent thinking where the brain is "generating many unique ideas," followed by convergent thinking, "combining those ideas into the best result" (45). Creativity is often seen as idea generation, while critical thinking is seen as way of combining ideas, but when creativity is looked at as a cognitive process rather than an artistic phenomenon, the creative and the critical are no longer binaries but parts of the same process. Thus, though some individuals seem to be "naturals" at creativity, it is not an inborn process. Rather, the frequent shifting between divergent and convergent thinking required in creativity is a *thinking* process that can be practiced and developed over time (46).

Creativity, then, is not confined to the art class, but is a broad-reaching habit of mind. An IBM poll of 1,500 CEOs cited creativity as the number one "leadership competency" of the future, and further notes that schools within the European Union and China are all explicitly focusing on curricula that develop creativity (45). Back in the U.S., *Newsweek* reports that many school systems don't feel like they have the time to teach creativity within the confines of their demanding curriculums, but researchers like Runco argue that by bringing creativity out of the art room and into the home room, teachers can

foster creativity and meet curriculum standards (45). How can we encourage our students' creativity, though, when our idea of creativity is, in and of itself, uncreative?

This article is just one reflection of the larger discourse that is currently occurring in America about the state of education and our students—we are certain that creativity, cognitive flexibility, and critical thinking are necessary for students to adapt not just to a changing job market but to a changing world, and yet we aren't always certain about how to adapt our practices to fit the need. I sense that part of what limits our ability to educate our students in the ways of creativity and cognitive flexibility is the fact that many of us involved in the discourse are speaking from different communities, without a lot of crossover. Educators are, perhaps, unable to think creatively themselves. It is necessary for us to engage in interdisciplinary discourse because the contemporary world is anything but pigeon-holed. Modern English educators, for example, not only need extensive knowledge of their field as they always have, they now also need to know how to integrate technology into the way they teach their field.

Of course, I'm not here to solve the major problems in education. As an idealistic graduate student, I lack both the credentials and the experience to make such large speculations. But I think that it is good to recognize the context in which my thesis is emerging—we are in a rapidly changing world and our students need all sorts of skills. In fact they need more than skills. They need a whole different way of being in order to meet the demands of this rapidly changing world. Furthermore, the world, with its rapidly increasing population, its decrease in consumable resources, its increasingly stressed ecosystems, its political instability, needs a generation that can exhibit human thinking at its finest.

The question of my thesis, then, is this: what part does or can the writing classroom play in helping to furnish this kind of thinker? Obviously the writing classroom has a generally limited scope of influence in the overall life of a student. Usually students are required to take just one or two writing classes —even in the semester a writing course is taken, it is one of four other classes that fall into the larger scheme of a student's life with its high degree of social activity, organizations, sports, and demanding life choices. Yet, it is easy for me to speculate about all the possible ways that the writing classroom, even in its limited scope, could influence the development of a student's thinking, but that just won't suffice. As I said earlier, I'm interested in learning how practices we engage in the writing classroom might actually— physically—change students' brains. Admittedly, there aren't a whole slew of scientists out there right now studying how practices of the writing classroom are affecting our brain makeup, so I've had to draw connections between available research and writing and reading theory. The connections I've drawn between scientific and psychological data and writing theory are not a proven matter, but are carefully considered possibilities.

The field of composition is weary of any kind of discussion involving empiricism, which threatens to turn complex work and complex students into mere data and limited entities. In Mike Rose's seminal article, "Narrowing the Mind and Page: Remedial Writers and Cognitive Reductionism," Rose critiques both empirical fields of study (he refers particularly to psychology and neurology) and compositionists who, in an effort to construct a theory, "diminish cognitive complexity and rely on simplified cognitive opposites" (268). Ann E. Berthoff is even less hospitable, noting that "empirical researchers leave out of account meaning because they have no means of accounting for

it" and that empirical research can "institutionalize the pedagogy of exhortation" (*The Sense of Learning* 14). I have taken these warnings of over-generalized and misapplied theories into consideration, and while the threat of "cognitive reductionism" remains, it should not stop the attempts for interdisciplinary conversations. Besides, doesn't it just seem like the writing field ought to be engaged in interdisciplinary conversations? Isn't it something that we make our students do? Of course the work is hard—in the psychological terms explored later, we have to make our brains work to regain executive control over thinking that our brain usually does automatically. In Burkian terms, we have to move past our terministic screens. We have to identify with the other and let ourselves and our pedagogy be transformed by what we learn. In my old boss George's terms, we have to broaden our vocabulary and be able to turn academic jibber jabber into something that can be shared across disciplines. In short, I'm not going to argue against the basic principles of psychology and neuroscience, nor am I willing to give up well-constructed writing theory— I want to take both as established realities within their own discourse communities and see what they have to say to one another in a language that most of us can understand.

All About Brains and How They Came to Fascinate Me

Here is the story about how I got into brains. A year ago, I was sitting in a "Fundamentals of Teaching Writing" class learning about the 500 approaches of getting students to write and the 400 reasons why that writing was important. One theorist who had me hooked before I could even understand what she was saying was Ann E. Berthoff. Her writing was filled with the imagery of an entire universe—chaos and limits and

ambiguity all in delicate balance within the working student's mind. Her work spoke of something that resonated deeply within me—that of making meaning.

With these kinds of ideas bouncing around in my head, I went about my daily work, like mopping my kitchen floor, while listening to American Public Radio's *Speaking of Faith*, now called *on Being*. Host Krista Tippett interviews people about everything from the theories of Einstein, to fly-fishing, to peace-making, to poetry. The common tie is that, through their life's work, these people are reflecting on "the big questions at the center of human life" (*Krista Tippett on Being*). The day I was mopping my floor while listening to *Speaking of Faith*, Tippett was interviewing a renowned developmental cognitive neuroscientist named Adele Diamond. I didn't really know what a cognitive neuroscientist was, but I knew that what Diamond had to say was fascinating. She was talking about the education of very young children and how activities like play and dance and singing and story-telling were all essential components of the learning process. In fact, these kinds of activities shaped the way that these children thought, not ideologically, but physically.

Diamond studies children's executive function, an umbrella term that describes a number of mental functions including inhibitory control, which Diamond defined as the ability to stop and think before you speak. It's a limit we impose on ourselves. Executive function also includes working memory, our ability to hold things in mind and work with them, essential for creativity; and cognitive flexibility, the ability to flip perspectives or see the other side of the story. Executive function takes place in the brain's prefrontal cortex (the part front and center), which was the last part developed in the evolution of the human brain, and the last to mature and the earliest to age over the course of the human

lifespan (*Tippett*). The program was exciting for me as Diamond spoke about how these "childlike" activities of dance and storytelling were doing something extremely complex within the children's development, noting that "what nourishes the spirit hones the mind."

These activities are all creative acts (what Berthoff would call the forming of structures) and acts of mind, just like the act of writing. As an act of mind, I saw many parallels that writing had with the way Diamond described executive functions—it seemed like working memory and cognitive flexibility correlated to the way Berthoff described the uses of chaos and limits. I wanted to believe that writing could change people's brains in a way that encouraged them to engage in higher order thinking. But throughout this project, I have had to remember the warnings of Rose and Berthoff. To forget that executive function is just one part of our brain's functioning and to forget that this executive function occurs within and is superseded by a human context is nothing but cognitive reductionism. I don't want to reduce this complexity, but I do hope to shed light on a fascinating part of the whole. For there still remains a power within writing in that it engages students in making structures, in a kind of play, just like dancing or storytelling. If they actually write about a topic that they care about, it could even nourish and hone the mind. I think that in certain ways of teaching writing (I'm going to focus on Berthoff's methods in particular) there is a potential to jolt students from cruise control and send their brain into a different mode of thinking.

Absolutely fascinated with prefrontal cortex, I started on a quest to learn more about the brain. I first looked at Diamond's work directly, but she is a developmental cognitive neuroscientist who focuses mainly on young children. In looking for information on what Diamond talked about—like inhibitory control and the prefrontal cortex, I

suddenly found myself in a dizzying maze of, for lack of a better word, cognitives—

cognitive psychology, cognitive neuroscience, neuroscience, and cultural cognitive

neuroscience to name a few.

The relation between these fields of study is pretty complex, but here is the best

way I can think to describe the relationship between cognitive psychology and cognitive

neuroscience, the two fields I, after some confusion, realized I was working in. There are

different lenses for working within psychology, much like the different schools of literary

criticism. Cognitive psychology is one perspective in the larger psychology discipline.

Cognitive psychology's focus is on, according to the *International Encyclopedia of Social*

Sciences, "the mental processes that underlie behavior…including attention, memory,

perception, thinking, reasoning, problem solving, decision making, mental imagery, and

motivation and concept formation" (Darity 596). It seems like an obvious attraction to me

that cognitive psychologists, in their quest for understanding mental processes, would

eventually be drawn to how the brain physically functions, which is called neuroscience.

Neuroscience, in its own right, is a purely biological discipline (no social science

here) devoted to those specific brain processes. When neuroscience, the physical science

of the brain, is combined with the approaches of cognitive psychology, cognitive

neuroscience results. Cognitive neuroscience, then, "combines the basic research

techniques and issues from cognitive psychology with various methods (e.g., brain

scanning, event-related potential, and single-cell recording) to evaluate the physiological

functioning of the brain" (598). Cognitive neuroscience explores the same kinds of

questions as cognitive psychology but with the added element of brain imaging, most

often with an fMRI, which stands for functional Magnetic Resonance Imaging. An fMRI

is captured in a regular MRI scanner but the image reveals where glucose and oxygen are present in the brain during certain processes, which would thus suggest elevated brain activity within those regions. This is how Diamond and other scientists have determined that executive functions occur in the prefrontal cortex. When people engage in cognitive tasks that use executive function as defined by cognitive psychology, the prefrontal cortex shows activity in an fMRI.

Because fMRI research is both expensive and is limited in the physical tasks that a subject can engage while motionless in the MRI scanner, cognitive psychologists still engage in research without the added neuroscience component. And since the neuroscience of cognitive neuroscience is both so new and so expensive, there isn't as much of a body of research as there is the more established discipline of cognitive psychology. For this thesis, it's important to remember that I'll be talking about cognitive psychology and cognitive neuroscience, and hopefully now you'll understand the parallels and differences between the two and why I'm using both.

In those early days of trying to understand what exactly I had gotten myself into, I was fortunate enough to encounter the book *Why Don't Students Like School: A Cognitive Scientist Answers Questions About How the Mind Works and What it Means for the Classroom* by David Willingham, who is actually a *cognitive psychologist* from the University of Virginia. Willingham points out some interesting basics about how the brain works in cognitive psychology terms. The most surprising one to me was that the brain is not designed to think—which Willingham describes as "solving problems, reasoning, reading something complex, or doing any mental work that requires some effort" (4). Willingham summarizes this cognitive principle this way: "People are naturally curious,

but we are not naturally good thinkers; unless the cognitive conditions are right, we will

avoid thinking" (3). He further explains that much of what we consider "thinking" is

actually a process of our complex memory:

> We normally think of memory as storing personal events (my wedding) and facts
>
> (George Washington was the first president of the United States). Our memory also
>
> stores strategies to guide what we should do: where to turn when driving home,
>
> how to handle a minor dispute when monitoring recess, what to do when a pot on
>
> the stove boils over (7).

Willingham doesn't go into the specifics of this cognitive process in his book, but it's

called automaticity. Automaticity is a heuristic, or a "rule of thumb," involving a selective

search for solutions. In the case of automaticity, the brain automatically retrieves a

solution stored away in the complex memory system.

The cognitive opposite of automatic thinking is algorithmic thinking, which is

what cognitive psychologists call effortful thinking. If the brain does not have an

established heuristic on hand to address a given problem, the brain engages in algorithmic

thinking, where it must methodically go through every possible solution until one is

reached. Consider the difference between automatic and algorithmic thinking with this

problem: if someone asked you to show them the solution of two plus three using M&Ms,

you, like most adults and older children, would know automatically to count out five

candy pieces. Your knowledge provides you with a shorthand heuristic solution to the

question. But a young child who is just learning to add would not automatically think this

way. They would most likely need to count out two M&Ms and three M&Ms individually

and then count them all together to see that they equal five, an algorithmic way of

approaching the problem. If a child doesn't need to do this, then they are already engaged in automatic thinking—they know that two plus three equals five. They no longer need to methodically think out the problem. Math is a simple example, but our brain is stock full of "memories" of established shortcuts that allow the brain to avoid the time consuming, laborious algorithmic thinking.

As a teacher in the first-year composition classroom, I can think of a hundred ways that automatic thinking affects students reading, writing, and thinking. For example, last year I, in my naiveté, assigned a paper where students had to explore their educational values. At least one-third of the papers I received were about how the student valued education because education meant success. Students didn't try to define what this success was, but they had certainly equated it with education. Somewhere along the line, some of the students had begun to automatically associate "education" with "success" and so when prompted to write about education, their writing turned to the automatic—education meant success. To revive the assignment, I had to revise the way I asked students to engage with the ideas of education and success. I asked them to reconsider their idea of education, moving beyond the formal sense of the word as we had in class, and to consider what particular valued features of their education they felt would move them into the realm of "success." Furthermore, I had to engage students in considering what the idea of "success" meant to them, and if it was an inherent feature of education. I had to, in fact, figure out ways for students to move beyond their automatic associations and engage in more laborious, algorithmic thinking.

Although the brain isn't set up for the most efficient thinking, people still take pleasure in certain kinds of thinking. Neuroscientists think that when we solve a problem

our brains might actually release the chemical dopamine, which plays a part in both learning and pleasure (12). Willingham is quick to note that problem solving is "any cognitive work that *succeeds*" (emphasis mine) (11). Thinking is tricky because if a problem is too easy, then the person becomes disinterested and the brain does not release the pleasurable dopamine. If the problem is too difficult the person will disengage when the problem appears unsolvable and, again, there is no pleasurable chemical reward.

One aspect that makes some thinking successful and some not is simply a matter of the available space in a person's working memory. Like different types of thinking, the brain also has two different types of memory. The first type is called long-term memory and that's where all those facts and procedures are stored that help you opt out of thinking (you create an automatic link to these facts and procedures and thus achieve automaticity). The other memory type is called working memory (also referred to as short-term memory) and that is what Willingham terms, "the site of awareness and of thinking" (28). Working memory is where you hold information from your long-term memory in your mind while you work with it, and it is very limited in space. Information that is easily retrieved from long-term memory is typically highly integrated with other information. This integration is called "chunking." When you think "The Pledge of Allegiance," for example, your brain will likely pull up the entire, integrated pledge as a whole, rather than separate parts. This kind of information chunk can be more easily held in the working memory. Information that has not been tightly integrated must be held in the working memory as many discrete elements, and this is very hard. The more of the needed information for a given problem that is integrated into your long-term memory, the more space you have to "play" with the information in your working memory.

I recently took my comprehensive exam in rhetoric. The exam required me to take factual knowledge (that of rhetorical theories) and apply it to everyday problems (like the responsibility of rhetoric in society). The more rhetorical theory I have integrated and stored in my long-term memory, the more space I have to work with the complex idea of rhetoric's role in society. If I am still trying to hold all the pieces of the rhetorical theory of Aristotle or Burke in my working memory, I will have less space to work with the more complex application of their theories.

The automatic pathways the brain creates to access these highly integrated stored memories are extremely efficient and helpful in everyday life. At times, though, automatic thinking can limit our ability to effectively solve problems or to engage critically and creatively with ideas. Functional fixedness is an example of such ineffective automaticity. Karl Duncker in 1945 described the limitations of functionally fixed automaticity and presented a now classic experiment in cognitive psychology to demonstrate the problem. Duncker gave a participant tacks, a candle, and a box of matches. The aim for the participant was to mount the lit candle to a wall so that it burned without damaging the wall. Can you figure this one out? Here is the answer: you take the box of matches and empty it. You tack the box to the wall and use it as a platform for the candle. If you didn't get the answer in that short time span, don't be disappointed— it's because of your brain's functional fixedness. We quickly and efficiently recall our knowledge about boxes, most likely that a box is for containing something. This automatic association is highly integrated into our long-term memory and limits our ability to see the box in other ways. Duncker's is a simple problem that would perhaps be important to figure out if we were without power, but the implications of functional fixedness are broad. The occurrence

reveals just how limited our thinking can be, not because of choice but because of the need for efficient thinking within the brain. Re-establishing executive control over automatic thinking in order to engage in more effortful thinking is difficult work.

Thinking about Thinking: Ann E. Berthoff

If there ever was a teacher who wanted students to put forth effort in thinking and didn't fear the difficult work it might require, it is Ann E. Berthoff. Over the years, Berthoff's thinking has become a cornerstone in compositional theories—including those of David Bartholomae and Mariolina Salvatori. Berthoff's writing is not after direct solutions and prescriptive pedagogical practices—rather her work constructs a theoretical framework for the teaching of composition that emerges out of Berthoff's extensive knowledge of rhetorical, psychological, and literary theory. While difficult to grasp at times, Berthoff's work holds a wealth of understanding about how writing can be a truly humanitarian discipline, for, like Adele Diamond studying the play of children, Berthoff connects writing to our very humanity. Berthoff advances a theory of writing that can successfully engage students in thinking that is less automatic and more critical and creative. Berthoff's work, then, takes on a new relevancy in the context of a world in more need of these types of thinkers.

Berthoff's view of composition reflects her worldview at large, and that worldview is that humans are meaning-making beings. It is the making of meaning that makes us human, be it through music, dance, art, math, the sciences, or language. Reality is not something "out there" and language is not just a medium used to relate our view of that

outside reality. Rather, language is a way we create and audit reality as actor and observer. Knowledge and reality are not absolute, but created in a social context.

Berthoff relies heavily on three thinkers—I.A. Richards, Paulo Freire, and Lev Vygotsky. The remarkable aspect of these three thinkers, and Berthoff herself, is how interdisciplinary their work is, resulting in rich and provocative theories. Richards was trained in philosophy but notably contributed the most to the fields of rhetoric, linguistics, and literature. From him, Berthoff draws the idea of auditing the meanings made around us, both by others and ourselves. Vygotsky was trained as an attorney and a philologist but made the intellectual leap into studying developmental psychology and education. From Vygotsky, Berthoff draws the idea that language and learning arise, and are shaped by, a social context. Freire was also trained as an attorney but spent his life reforming education systems across the world, and from him Berthoff takes the idea of a "pedagogy of knowing," which underlies her entire philosophy of composing.

 This pedagogy of knowing, Berthoff explains, is "a species-specific capacity for thinking about thinking, for interpreting interpretations, for knowing our knowledge" (*The Sense of Learning* 11) and stands in opposition to a "pedagogy of exhortation" that relies on a view of language as a medium of communicating thought, rather than thought and language being inseparable parts of a whole (12). Berthoff refuses to accept the idea that composing is a linear process in which writers are trying to simply find the correct words to convey their opinions. Rather, language and thought occur together, a tenet established by Vygotsky. Until we put an idea into language, it is a formless generalization. Through the use of language, we can see what our thoughts are, and refine both the thought and the language. Composing, then, occurs just like thought and language—all at once. Berthoff

calls this phenomenon, appropriately, *allatonceness* (all-at-once-ness). She writes, "everything has to happen at once or it does not happen at all. If there is not something to think about, if there are not ideas to think with, if language is not in action, if the mind is not actively engaged, no meanings can be made" (30). A lot of conditions need to simultaneously occur for composing to happen in a meaningful way—the mind (thus the student) must be actively engaged, they must have language, and lots of it, at their use, and they need ideas to think with—again, more than one. Berthoff argues that language is the "essential essential" in the composing process (i.e. the forming of structures) (29).

It seems a little obvious to me that language would be essential in writing, but what Berthoff is trying to overcome are students who think that they must have their thoughts fully developed in their mind before they write them out. Berthoff contradicts this assumption, declaring, "Nothing comes of nothing… How can you know what you think until you hear what you say? See what you've written?" (30). It is only after language is out that a student can see what they've written or hear what they have said—and begin the audit of meaning. In order to audit meaning, Berthoff stresses that students must feel comfortable with both tentativeness and chaos—their written language is not permanent but susceptible to change. Creating all this tentative language can feel chaotic, but, again, Berthoff feels that there needs to be language and ideas to work with, so you need a good deal of material.

Once all of these ideas are out in language, students can conduct the continual (not a onetime deal) audit of meaning and begin, through the use of the dialectic, to form a concept. Just like composing, reading is, to Berthoff, a process of making meaning and ought to be taught alongside writing. As writers must embrace tentativeness, readers must

embrace ambiguity. Readers must accept their own uncertainty with what a writer is trying

to say. Only through reading with ambiguity can readers open themselves to the wide

variety of possibilities within a text. Berthoff, though, is not an advocate of reader

response, in which any interpretation of the reader is deemed accurate. Rather, she argues

that the text can defend itself and we must teach students to support their interpretations of

the text with the words of the text itself. Like writing, the best way to engage readers is

through the use of the dialectic, particularly through the dialectic of dialogue, which

Berthoff deems the "best" dialectic (*The Sense of Learning* 36).

    To Berthoff, the dialectic is an essential part of the meaning-making process and

thus to her theory of composition, and is a pivotal practice that can help students break

automatic thinking. Dialectic, though, has a long intellectual history reaching back to

Ancient Greece, and it's important to understand how Berthoff's use of the term differs

from the traditional, Platonic use of it. For those who might be reading from outside of the

composition discipline, a little background on dialectic's history might be instructive.

    To Plato and Aristotle, the dialectic was also essential in the quest for knowledge.

Plato, however, believed that knowledge and truth were fixed and unchanging, and the

dialectic was the way for philosophers to reach the truth of the matter. A lovely visual of

this is that truth was like the center of the onion and by use of the dialectic, a philosopher

and his student could peel away the layers of onionskin, separating them from the truth.

To Plato, the dialectic was a highly structured art form.

    Berthoff places as much importance on the dialectic as Plato, though she doesn't

see it in the same way. Berthoff relies much more heavily on I.A. Richard's concept of

dialectic as the "continual audit of meaning." The dialectic must be continual because

Berthoff believes in knowledge-creation, rather than knowledge-finding or knowledge-understanding. Thus, the dialectic is the way that writing teachers aid their students in learning how to overcome "insubstantial and formless generalizations" (*The Sense of Learning* 29) and instead form concepts through defining. Berthoff writes that the only study question ever needed is, "How Does Who Do What and Why," a dialectical question in that the parts (the who, the how) cannot stand alone but must work together to define. The dialectic, to Berthoff, is the tool (what she calls a power of the mind) for writers and readers to form concepts through the use of defining thoughts in a continual manner. Berthoff writes that in a dialectic composing process, the *what* and the *how* continually inform each other.

The process of this continuous informing is non-linear: instead it is constantly employing feedback and what Richard's called *feedforward* (30). Berthoff is aiming at the fact that writers must project into what they know and what they want to know continually through writing. In the writing of this piece I know, for example, that I have written so far about Berthoff and the dialectic as the audit of meaning, but I simultaneously know that I need to talk about the types of questions that Berthoff uses to prompt the dialectic in students. Thus, my composing isn't occurring in a linear fashion because I know both before me and behind me and I have a supporting slew of chaos to work with as I move throughout my knowing.

Another way that Berthoff poses the dialectic is by asking, "what does it mean to say that thus and so is X rather than Y?" instead of "Is it x or is it not?" ("Killer Dichotomies" 15). Berthoff stresses that we must do more than just name something—we must use the dialectic to define it. Try a simple example… "is it a cat or is it not" is a

much different question than "what does it mean to say that this mammal is a cat rather than a dog." The first question requires a somewhat automatic, yes-no answer, while the second question asks to define why the animal is a cat and not a dog—a much more detailed, algorithmic answer is required. Think of the difference such a question makes in the composition classroom. Asking "what does it mean to say that this writing is effective rather than not" pushes students to both think about particular aspects of the writing that make it effective, rather than giving it a blanket quality judgment of "good" or "bad." Thus, the student must begin to form through defining a broad and abstract idea.

Berthoff and cognitive psychology may not seem to have much in common right now, but it is important to have a working knowledge of both topics before entering a conversation that attempts to integrate two disciplines that, at times, seem like they couldn't be more opposed. Berthoff's composition theories and cognitive psychology both have an interest in the processes that make us human, and thus actually complement and work well together. Berthoff and cognitive psychology are both, through different lenses, investigating the same elephant. The same what? One day I was talking to my thesis committee member Dr. Gordon of the psychology department. I was expressing to him, after he enlightened me that short-term and working memory are actually the same thing, that I felt bogged down to have my brain reaching into so many different disciplines, and that I was worried I wasn't going to express myself "correctly" for all camps. And then Dr. Gordon told me the story of the three blind men and the elephant.

Three blind men went to inspect an elephant. When they returned, the first one said that the elephant must be some kind of snake like creature; the second one said the elephant was, in fact, like a tree; and the third said it was like a rope. Of course, one had

investigated the trunk, one the leg, and one the tail. But the point is that they were all investigating the same elephant. Dr. Gordon challenged me to think about what the conversation would have been like if the three blind men had talked before they left the elephant, maybe even as they investigated the elephant. It's a lovely story because it highlights that we in our different disciplines are still studying the same process through different lenses (as Dr. Gordon said, there is only one process), but also it suggests the power of dialogue and how, in working together and in sharing through language our own investigations without fear of offense, we can create a fuller picture of any process.

So here we go.

CHAPTER TWO: READING, WRITING, AND THE BRAIN

This year at Western Carolina University, the First-year Composition Program adopted a new text book, *Ways of Reading*, edited by David Bartholomae and Anthony Petrosky. The book is a compilation of texts both alien and difficult to the average freshman—from Michel Foucault's "Panopticism" to Paulo Freire's "The 'Banking' Concept of Education." The difficulty of the included reading can be intimidating to instructors and students alike. The students in my classes have often returned from their solo reading ventures dismayed and disheartened—they don't, they say, know what is going on. As an instructor, I'm occasionally stunned by the misreading that my students do. They pick up on a marginal thread within the reading and can't move on to see bigger picture issues. In reading Susan Bordo's "Beauty Rediscovers the Male Body," the students seemed obsessed with the provocative images of scantily clad men. Initially they couldn't move past the images and their connections to homosexuality and move into discussions of racism, ageism, the changing ideal man, and consumer capitalism.

There are two levels of difficulty occurring within reading such texts as Bordo. The first level of difficulty is the way in which the text itself is written—many of the texts in *Ways of Reading* feature non-linear styles, complex arguments constructed over many pages, highly-specialized terminology, intricate sentences, and a multitude of outside voices. The text is inherently difficult. A tenured faculty member in the humanities will likely read these texts fluently despite their inherent difficulty, but for first-year students a second level of difficulty lies between them and the text—their unfamiliarity with these

particular types of texts. Psycholinguist Frank Smith has studied reading for over thirty years and, in his book *Understanding Reading*, he writes:

> the advantage of an experienced reader over a neophyte reader lies in familiarity with a range of different kinds of texts, not in the possession of skills that facilitate every kind of reading. For beginner and experienced readers alike, there is always the possibility of fluent reading and the possibility of difficult reading (137).

He concludes that, "the more we read, the more we are able to read." Smith argues that comprehension has less to do with skill or intelligence and more to do with experience. Students in the first-year writing classroom, then, are inexperienced in certain kinds of texts, specifically texts that draw on the humanities discourse community.

In this chapter, I'm going to argue for the reading of texts that are both inherently difficult and pose difficulty for students trying to read and understand them in the first-year writing classroom, exploring both the scientific and theoretical reasons why we ought to engage in such work and how we might go about it. I want to look specifically at how the cognitive processes of automatic and algorithmic thinking interact with working memory and how these processes play into the way that college students read texts. I will include in the discussion of difficult texts a student's own writing, taking the view that, once begun, a student's text, if engaged in a dialectic way, is another difficult text which a student must work through.

Automaticity and Working Memory in Reading

One of the key cognitive processes to address when exploring how students read and write is that of automaticity, the heuristic process in which the brain automatically retrieves a solution stored away in the complex memory system. The first important point to remember about automaticity is that it is usually helpful but sometimes not. Automaticity, besides helping a driver know where to turn the car to get home without thinking, also helps readers process the syntax of reading or the meaning of words. But it is not as helpful when it leads to a fixation— for example not considering possible alternative meanings of a word.

Automaticity is operating in several ways when a reader, such as one in the first-year writing classroom, comes across a difficult text. The text may be difficult for the reader because of lack of experience with the grammatical syntax, vocabulary, or outside references. In other words, an aspect or some aspects of the text cannot be processed with automatic memory because the reader, having no experience with the aspect, doesn't have that automatic pathway established. When automatic processing fails, the space in working memory, which is not infinite but limited, is then used to work with that which the student doesn't understand (for example, keeping in mind and working with complex sentence structure in order to decipher the meaning of a sentence). If the space in working memory is being used to grapple with the form of the text, then less space is available in working memory (the sight of creativity) to work with deeper meanings or how the textual parts relate into a greater whole. It doesn't mean that our students aren't capable when they

can't understand Bordo on the first read, it just means that their working memory is overloaded with information.

I am arguing that a reader may, despite a taxed working memory, be able to recognize certain words or concepts since the natural cognitive response to any stimulus for which there is an already stored memory is automatic retrieval of that memory. This automatic retrieval is the efficient process of automaticity. In a 2009 study published in *The Journal of Experimental Psychology*, Katherine Rawson and Erica Middleton provide clear evidence of the role of automaticity in the comprehension of texts and demonstrate how automaticity emerges.

The article provides an insightful background discussion on automaticity that I would like to note before attempting the more technical details of the study. Like the term executive function, automaticity is a kind of umbrella term that has evolved over time. The early, simple definition of automaticity was that it was a cognitive process that was quick, autonomous, and outside the reader's conscious awareness—like knowing which of your keys starts your car without having to try each one of them in the ignition (353). The "knowing" is automatic. As the field of cognitive psychology has evolved, so has the meaning of automaticity. A process is no longer automatic just because it is unconscious. Rather, it is automatic because it is a memory-based process that operates in a fixed, efficient manner.

Automaticity may be more understandable in contrast to its cognitive opposite of algorithmic processing. Algorithmic processing is when the brain works through a problem step by step to get to a solution. Instead of just knowing which key to use, you would algorithmically inspect and evaluate each key to positively identify the correct

option before attempting to start your car. Algorithms are always successful but they are slow and they tax your cognitive process.

In the Rawson and Middleton study, participants were tested for their algorithmic versus automatic comprehension of text. Since they were evaluating the comprehension of text, the findings seem relevant to me. The text of interest was novel or atypical noun-noun pairs. Typical noun-noun pairs include phrases like "poster child" or "dog sled" (356). The researchers created atypical noun-noun pairs whose meaning was ambiguous to readers. For example, the term "bee spider" is atypical and ambiguous. Because these word pairs were unusual, they could not be comprehended through automatic processes as the phrase "poster child" could be. Instead, their meaning had to be derived algorithmically. When looking at the term "bee spider," for instance, initially we must consider all the meanings that could be implied by the combination of bee and spider. This word pair could describe spiders that have a special relationship with bees. Perhaps these spiders prey on bees? On the other hand, perhaps a bee spider is a spider that looks like a bee (359). In processing the novel term, "bee spider," we would algorithmically develop multiple meanings and then try to resolve the actual meanings by continuing to process the text until the meaning is clear. Again, this is slow and taxing.

Rawson and Middleton were first looking for evidence of the laborious nature of algorithmic comprehension. For evidence they measured their participants' reading time for each phrase in a short passage. They argued that reading time for a phrase following an ambiguous term would be longer because the participants would be working hard to algorithmically resolve the ambiguity. Further, they argued that if the phrase following the ambiguous term was inconsistent with the meaning most often assigned to the

ambiguous term, then reading time would slow even more. This would occur because the participants had to work to reconsider the meaning they had just derived.

Indeed, Rawson and Middleton found that reading times for the phrase after the ambiguous terms were very slow. Further, the times were much slower if the phrase was inconsistent with the meaning usually assigned to the ambiguous term. This slow reading was taken as evidence of the workload placed on the participants' cognitive processes by algorithmic comprehension. In other words, when a reader must work hard to comprehend, the rate of reading slows.

Rawson and Middleton's second question focused on the emergence of automaticity. They wondered whether repeated experience with the ambiguous terms would allow the participants to develop automatic comprehension. Would reading times quicken if the participants encountered the ambiguous term over and over again? This is exactly what happened. Further, to show that automaticity is a function of experience and not an inherent quality of the words themselves, they demonstrated that participants could learn to automatically comprehend either the preferred or non-preferred meaning of the ambiguous terms. With experience the participants eventually developed an efficient, automatic understanding of the term that they carried with them into different reading contexts.

This study is important to the teaching of composition for several reasons. First, when students don't have access to an automatic comprehension of meaning, they must work very hard to determine what the text means. Second, if students have a meaning available they will refer to that meaning. They are trained to take the shortcut and comprehend a term as they have always understood it. This automaticity bypasses other

meanings and narrows the readers' reading comprehension. Thus, in order to have students see familiar issues in a new perspective, they must break this automaticity. Finally, the last and most promising point, learning and new comprehension can emerge with experience. Rawson and Middleton showed that experience can allow a reader to move from difficult algorithmic comprehension to efficient automatic understanding.

Obviously, in most cases automaticity serves us well, but when it comes to working critically with texts, an overloaded working memory and automaticity of terms creates what can be a perfect storm for the commonly called 'misreadings' of students. The point here is that students can't be expected to "get it" in their first attempts with difficult texts, and in working with this difficult landscape, students are more likely to depend on automatic thinking when they do come upon a concept or term that they understand. Students grappling with Bordo's rambling, non-linear style, for example, have less room to work with her concepts, but seeing something that they do recognize, like homosexuality, they are more likely to rely on automatic processing for that term in order to continue navigating the difficult text, even if the text works against the student's definition—thus, a student whose initial perception of "Beauty ReDiscovers the Male Body" is that it's about male homosexuality.

We have a limited amount of space to work creatively and critically with ideas. If foreign "textual conventions" are taking up that space, then the student will be unable to work critically with the ideas presented in the text, like Bordo's idea that the gay community shaped the fashion and ideal body image of straight men. As Smith stated earlier, it's not because the students are "weak readers" that they have trouble with texts—even strong readers can have difficulty when working with a complex text. In a graduate

class I took last year, we were asked to read a long section of work written by Mikhail Bakhtin. In this piece, "Discourse in the Novel" from the *Dialogic Imagination*, Bakhtin explores how the novel (a relatively "novel" form at the time) gave way to a breadth and depth of voices—how it expanded language and how the reader could interact with it. He begins this discussion by comparing the form of the novel to that of poetry, which as a form was relatively constricted at that time in history.

The first two pages of reading took me what felt like an eternity (but most likely a couple of hours) because I had no idea what Bakhtin was talking about. Who were the Russian Formalists? What is heteroglossia? Does he define it somewhere? Like my students reading Bordo, I latched on to what I could understand—that Bakhtin despised poetry. Why did he hate poetry? I disagreed with him on virtually every point. Like me, other students in the class were also able, despite the overall difficulty of the piece, to latch on to what became a three hour debate over the virtues of poetry, when our instructor was, as she later announced, hoping that we would discuss the deeper layers of Bakhtin's argument about language and the novel. My working memory was, I think, overloaded with trying to keep in mind terms like Russian formalism and heteroglossia and it didn't allow very much space for working with the bigger ideas of Bakhtin. I was, however, able to latch on to a minor theme to which I could relate, to which I had prior experience.

If my graduate class had worked with Bakhtin just that one night, then overtaxed working memory and misapplied automaticity would have had the last word in this discussion, suggesting that our brains just weren't ready for the complexity of the reading. But the story doesn't stop there. Another week was devoted to Bakhtin—forcing us to re-

read and read more, to dialogue with the text through writing about it, and to dialogue with one another about what Bakhtin meant. We worked with the text over time, and understandings eventually came. I think that in the long run, our working memories were able to recover from the shock of Bakhtin's complicated style and vocabulary and we began to read for meaning. And it is here that I think that difficult texts are valuable, not just in the graduate classroom but in the first-year composition classroom as well. Difficult texts are so rich in meaning that they stand up to a second, a third, a fortieth read and the form of the text challenges a reader to slow down, engaging executive processes such as algorithmic comprehension, in order to explore meaning. I think that difficult reading is beneficial because of its difficulty— it isn't easy to reengage executive function after a process (like reading for a specific meaning) has become automatic and I think the more alien the text, the more likely that executive function will reengage.

The 2006 study "Automaticity and Reestablishment of Executive control—an fMRI Study" provides helpful background information about the physical processes occurring in the brain during the cognitive process of automaticity. The study also describes what occurs when executive control is reinstated. Cognitive neuroscience has established through the use of the fMRI that when a process becomes automatic, it no longer registers much activity within the brain. Unsurprisingly, when something new is learned, fMRI studies show that various parts of the brain become activated, including the prefrontal cortex, the site in the brain where executive functions occur. These executive functions include working memory, inhibitory control and cognitive flexibility. As a process becomes more automated, activity in the prefrontal cortex disappears and the smaller amount of activity that does occur is in the middle and hind brain. Once this

transition has occurred, it is hard to increase the prefrontal activity and restart executive functions.

A classic cognitive psychology phenomenon, called the Stroop task, reveals how difficult it is for people to block automatic processes. In the task a subject is asked to say the color of a color name. For instance the word "red" might be printed in purple, and the subject must say "purple," the color, rather than red, the color name. The task reveals, state the authors of "Automaticity," "the faster automatic word-naming operation tends to interfere with the slower color naming, despite the subject's best (executive) intentions" (1331).

With this background information in mind, researchers Kubler, Dixon, and Garavan wanted to study what parts of the brain are activated when a participant successfully reengaged control over an automatic task. In the study, the researchers study fMRIs of participants as a visual search task (VST) becomes automatic. The researchers then switched up the VST to study how the brain reacted to the change in task. The fMRI scans reveal that the participants did not reengage their entire brain, as they would when learning a new task, but rather they relied heavily on their dorsal lateral prefrontal cortex—the portion of the brain responsible for executive control. The researchers note that activity in the prefrontal cortex is "well known to play a crucial role in executive functioning, that is in controlling overt, deliberate, intentional (nonautomatic) behavior" (1339). The participants activated that portion of their brains that granted them executive control over the task. Their thinking shifted from automatic and to deliberate and intentional and their brain activity showed this change.

Overt, deliberate, intentional thinking is what the first-year writing classroom aspires for. The above study reveals just how difficult reengaging executive function can be when automaticity has taken over, but also demonstrates that automaticity can be overcome. So what is required for students to reengage their executive function and move into this kind of thinking? One possible way to engage this thinking is through working with difficult texts, which can throw a wrench in students' automatic processing. The texts require students to begin thinking about the ways they read. Since the reading is not straightforward, students can't as easily reduce the complexity of the text to a single meaning. First attempts at meanings are confounded by second readings that move students past original associations—they begin to see layers involved through extended work with the text. This is a way for students to also begin to feel out how writing plays into thinking—how they can work through various meanings of the text in their writing. They can put their ambiguity on the page and this writing serves to show them how to dialogue with the text. Returning to the writing in class is a way for them to see how their thoughts come out in language, for them to dialogue with themselves. What is required for this kind of thinking are time, the dialectic, and collaboration—all of which find their way into rich theoretical discussions with the composition field, particularly between thinkers such as Berthoff, Bartholomae and Petrosky, and Mariolina Salvatori.

Working with Difficult Texts: The Why and the How

In their companion text, *Resources for Teaching Ways of Reading*, editors Bartholomae and Petrosky ague that, from their experience, using difficult texts in the

writing classroom is both achievable and valuable. "We have learned," they write in their introduction, "that the problems our students had lay not in the reading material (it was too hard) or in the students (they were poorly prepared) but in the classroom—in the ways we and they imagined what it meant to work on an essay" (Bartholomae & Petrosky 1). It is important to note that Bartholomae and Petrosky are not advocating teaching reading for comprehension in terms of "right" answers and "correct" interpretations, but are rather advocating for *working* with difficult texts—moving beyond "skimming textbooks, cramming for tests, strip-mining books for term papers" into responding to and extending the thinking that occurs within a text (1). There is a rich theoretical tradition that explores "working with" texts, of which Berthoff is also a part.

Upon first hearing the concept of "working with" a text, in which the teacher is not "teaching" the text, some writing teachers may associate the concept with reader-response theory. In her essay "Killer Dichotomies: Reading In/Reading Out," though, Berthoff argues for a theory of reading that refuses to choose between the dichotomy of reader response and positivist theories of reading, particularly new criticism. Rather, Berthoff advocates for a way of reading in which the making of meaning is paramount. She writes that reading is the making of meaning, and that meaning is subject to interpretation; in fact, as part of the semiotic process, it must be (18). In the process of making meaning, students must both read in (associate themselves with the text) and read out (the text as authority) — which Berthoff terms construing and constructing. She expands on the ideas of I.A. Richards, writing:

> as readers explore the range of meaning of the words of the text and the kind of
> divisions and differentiation definition requires, they are letting the process of

construing guide and direct the process of constructing, and vice versa: the

meanings we are making become the means of reviewing the meanings we have

made (19).

 In other words, the text and the reader must be engaged in the making of meaning. The

reader is not subordinate to the text, and the text is not defenseless against the

interpretation of the reader, but must be taken into account as well in the construction of

meaning. Reading, Berthoff asserts, must be taught as a triadic activity between reader,

writer, and text. She writes that "triadicity, as an idea to think with, can help remind us

that reading for meaning requires that we bring meanings to the text in order to take away

further, other meaning" (18). The idea of triadicity is supported from a cognitive

psychology perspective. In order for students to integrate new ideas into their long-term

memory (i.e. for the ideas to have a lasting effect on the student), they must be able to link

the ideas to previous experiences in order to integrate the new knowledge. At the same

time, they must also be able engage inhibitory control (the ability to withhold judgment) to

consider what the text has to say that may not align with their current thinking.

Berthoff's idea of triadicity stems from the thinking of Richards. In his essay "The

Reading of Reading," Bartholomae puts into conversation Richard's text, *How to Read a

Page* with Mortimer Adler's *How to Read a Book*. The two publications, which were

published around the same time, both address how to approach reading. Bartholomae

acknowledges that Adler's advice to novice readers in how to deal with "the difficulties of

a long and complex text" is generally unsurpassed even today. And the guidelines that

Bartholomae summarizes are very good:

You need to preview a book before you read it, begin with a sense of the subject

area and the problems the writer wants to solve; you need to make connections

between what you are reading and other books you have read, other courses you

have taken or with your own experience; you need to look for the key terms in a

discussion and distinguish between an author's use of them and common usage;

readers should withhold judgment, ask questions while they are reading and not

later, and put complex passages in their own words; readers should learn to write in

the margins and develop the ability to talk back to a writer (60).

Bartholomae notes that "fifty years of reading research has offered no improvement on the

suggestions that (Adler) makes to adult readers." This rich advice is much better than the

advice that Richards gives in his book *How to Read a Page*, but Bartholomae states that

Adler's downfall is that he is "not talking about reading, as reading involves interpretation

or decisions about meaning. He is talking, rather, about how to manage a book" (61).

Richards, on the other hand, can offer no practical advice in didactics, but instead

demonstrates the process through which words become meaningful, and how the meaning

of the words change what one reading means compared to another (63). Thus, Richards is

demonstrating the making and audit of meaning through use of the dialectic, which

Bartholomae describes as "both a way of handling texts and a way of handling one's

relations to others, a way of being present without erasing the presence of others" (60).

What Berthoff is getting at in "Reading In/ Reading Out" is the same thing that

Bartholomae is working towards in the comparison of Adler and Richards—that the

meaning- making process is what is important, in both reading and writing. Adler's tools

for negotiating a complex text are important in helping students learn how to work with

the form of a text, and they should not be underestimated in a first-year writing classroom.

But teaching students how to read a difficult text in order to decipher what a great mind

has to say to the average student isn't the point. What matters to thinkers such as

Bartholomae, Berthoff, and Richards, is for students to establish a method of making

meaning with a text. Bartholomae writes, "With what Richards calls a "method" for

attending to words, a reader's reading becomes less automatic, less routine. Readers can

learn to put aside their desire to make a text too stable ("the easiest way to control a

meaning is to pin it") (65). The method Bartholomae and Richards are striving for

necessarily involves making a reading *less automatic*. Rather, the method requires what

Berthoff calls embracing ambiguity. From a cognitive psychology perspective, when you

embrace ambiguity you cannot rely on simple heuristic comprehension.

Berthoff's goal is for readers to embrace the idea of ambiguity, just as writers must

tolerate chaos. Thus, Berthoff thinks that teachers should teach reading in a way that

encourages students to detach themselves from the need to "pin" a meaning as quickly as

possible and instead embrace a willingness to not "understand" the text. By reading this

way initially, a reader is able to become accustomed to a reading landscape—the working

memory, in trying not to process everything it comes across semantically, may actually be

working with the textual form, and in working with form come to understand the

correlated meanings. Likewise, embracing ambiguity, students are learning to withhold

immediate judgment—they're learning to listen to the text.

Returning to my 101 students and Bordo, we can see that teaching them how to

negotiate a complex text is helpful and necessary. Most likely, after practice, the process

of navigation will become more automatic. But learning to comprehend the *meaning* of the text should not be a matter of "practicing" a single meaning until it becomes automatic—rather a theory of Berthoff advocates for students to be able to read the text in a way that they can work with its ideas and various interpretations and create something out of it through algorithmic comprehension. As Bartholomae and Petrosky state in the introduction to *Ways of Reading*:

> Reading is not simply a matter of hanging back and waiting for a piece, or its author, to tell you what the writing has to say. In fact, one of the difficult things about reading is that the pages before you will begin to speak only when the authors are silent and you begin to speak in their place, sometimes for them—doing their work, continuing their projects—and sometimes for yourself, following your own agenda (1).

Berthoff also wants students to make a mark on a text, to work with it, because it is a way of working within the world. Rather than students regurgitating fact or automatically leaping to simple meaning, Berthoff wants them to become active participants in the making of meaning, in the forming of structures, in the process of shaping our world.

A theory that puts students in the role of "meaning makers" is provocative and inspiring, but how does the theory translate into pedagogy? How can teachers of writing go about teaching such a theory? Recently in one of my current 101 classes, my students and I embarked on a reading of Freire's "The Banking Concept of Education." The students were less than thrilled; they complained of Freire endlessly repeating himself, of words they didn't understand (like Jasperian), of Freire's use of Portugese and French, of

Freire's obscure audience (which obviously wasn't them), and of not understanding much of the essay. They did understand the one point he kept repeating—that students were like containers waiting to be filled with facts by the teacher, which is dehumanizing, and that problem-posing education makes us critical thinkers. They had a decent summary of Freire's basic argument, and through working with the text over a series of class periods, they began to pick up on the broader societal implications of Freire's work. What my students needed more than anything to increase their understanding of Freire is relatively simple but highly coveted in and outside of the classroom—time.

I almost feel like it's too obvious to even discuss at length, but the fact is that if students are not given enough time to work with difficult texts, students and teachers will leave the experience frustrated and contemptuous of the reading they embarked upon. Bartholomae and Petrosky use their textbook exclusively at their home institution of the University of Pittsburgh. In one semester they may cover as few as three and no more than five essays, allowing at least two weeks to work with every essay (*Resources* 10). Their decision to work so in depth with each reading is based on their desire for "students to feel their achievement as readers and writers. If we were moving quickly from one essay to the next each week, we worry that students would feel only frustration at their failure to understand" (10). If we think back to cognitive psychology, students initially might overload their working memory with the technical complexities of the text. Initially, their understanding is likely to be constrained to connections that they were able to make automatically with the text— relating to the text from prior knowledge that may confine rather than expand the discussion of the text. It will require time for students to familiarize themselves with the text through various readings of it.

Likewise, Berthoff advocates that teaching a composing model based on the idea of *allatonceness* (continually rediscovering how "forming, thinking, and writing can be simultaneous and correlative activities") also requires slowing down (31, 40). As with reading, time is required to move beyond original drafts and to engage the text in a "continual audit of meaning" so that students can learn to explore how meanings are made rather than trying to immediately pin one. But time in and of itself will not improve students' reading and writing—what is further required is for students to move beyond passive reading and writing and instead to actively engage with the text.

In her essay, "Towards a Hermeneutics of Difficulty," Mariolina Salvatori lays out how she keeps her students engaged with a difficult text over an extended period of time. Students are asked to read a piece of writing and then to write about the difficulties that they encountered when reading the text. Salvatori argues that these questions reveal real points of examination within the text—the goal is to move students from seeing these points as things that they can't understand or discourse of which they are not a part into points of departure for critical examination. When students come to class with the problems they've had with the text, Salvatori serves mainly as a mediator in service of the dialectic. She writes about this classroom discussion:

> they speak; I write on the chalkboard; and for every feature they identify, I ask them why it constitutes a difficulty for them; what kind of understanding they were constructing that this feature works against or disrupts; what they expected to be there instead. My questions are meant to show my students that they can solve some difficulties through a careful reading of the text; to solve other difficulties,

however, they must rely on different ways of knowing, even on others knowing

(84).

Salvatori is not providing answers for her students, nor is she leaving them to navigate the difficulties of the text alone; rather, she is serving to further her students thinking in a dialectic manner by asking them to relate one feature of the text to another, by asking what ideas could have stood in opposition to the ones that are actually presented and what it means that one is there instead of the other. After this class period, students are then asked to re-read and write again about their difficulties. Then they are asked to read a series of notes and critical essays on the piece and see how those readings change their interpretation. Salvatori's main goal is to move students from being taught about the text to engaging with the text in a critical manner.

The way that Salvatori has her students engage with the text relies on three factors: time, collaboration, and the dialectic. Like Bartholomae and Petrosky, Salvatori is obviously engaging with the same text over an extended period of time. Furthermore, she is going beyond what she calls "didactics," such as Adler's guidelines for working with complex texts, and advocating instead for students to create various meanings through a process of critical inquiry (93). The way that Salvatori has her students work through their difficulties with a text is a dialectic practice—they are both becoming more familiar with the form of the text through this work and, through answering the question "what did you expect to be there," investigating a range of possible meanings lying beyond and within the text. The voices of others also serve as a way to engage in the dialectic. The students hear how other voices engage with the same text and hear how these readings might differ

or line up with their own readings. These voices are also collaborative voices, ones which help shape the student's eventual meaning.

In addition to the ways that Salvatori has her students engage with texts dialectically, Berthoff provides other practices for developing the dialectic as a power of mind. One suggestion is for students to gloss paragraphs. To Berthoff, the paragraph is the best rhetorical unit to analyze, providing more of a whole thought than a sentence does. Glossing involves summarizing a paragraph in what Berthoff calls a "double phrase" – the reader/writer opposes what is said against what is not said, which teaches the ability to anticipate. Like Salvatori's oral exercise, Berthoff is teaching students both to assess what is there and what is not, showing students how meanings are formed in writing. Glossing is also applicable to the texts that students author themselves, though it may be more difficult work in that case. If students are unable to effectively gloss their own or a peer's paragraph, then it is likely the paragraph needs reshaping. Glossing, then, serves as a dialectic between students and their own texts—the gloss speaks back to what is present and what is not.

Persona paraphrase is another practice that Berthoff advocates in helping students learn to both read and write. In a persona paraphrase, a term credited to Phyllis Brooks, students take a passage of an established work (mostly likely of paragraph link) and recreate the syntactical structure with a subject of their choosing. The process teaches on both a reading and a writing level—readers are more attuned to the writer's creation of meaning (what they are saying and how) and are learning in writing how syntactical structure affects what they are trying to say. As Berthoff states, persona paraphrase shows how "changes in sentence structure change the way a text can be read" (111).

I assigned this exercise in my class last semester with mixed results. Students worked with a syntactically difficult paragraph out of their difficult readings. One student said she spent a lot of the time working with a dictionary because she couldn't imitate a paragraph that she didn't understand. Thus, she both came up with a wonderful paragraph and said that she finally understood what Mary Louise Pratt was saying in that particular paragraph of "Arts of the Contact Zone." Other students, though, gave up because they couldn't follow the syntax of the paragraph exactly, and others yet abandoned the author's syntax all together and lost the whole purpose of the assignment. From that take- home exercise I learned two important lessons. The first was that the persona paraphrase was effective in halting any automaticity that might be occurring. The students were unable to rush through both the reading and the writing, and thus had to move into intentional thinking. The second lesson I learned was that the exercise was too demanding and ambiguous to attempt by oneself.

This semester I repeated Berthoff's suggested practice, though this time we did the paraphrase in class and students worked in pairs. The paraphrase took an hour of class, but the results were telling. Instead of some successful paraphrases and some failures, the entire class had succeeded at the assignment. The students were able to master the punctuation to serve their own very creative meanings. I think that part of the success of the assignment was that students were able to dialogue with other students and with me through the process.

Collaboration generally holds an esteemed place in the first-year writing classroom. As Kenneth Bruffee states in "Collaborative Learning and 'The Conversation of Mankind'":

To learn is to work collaboratively to establish and maintain knowledge among a community of knowledgeable peers… We establish knowledge or justify belief collaboratively by challenging each other's biases and presuppositions; by negotiating collectively toward new paradigms of perception, thought, feeling, and expression; and by joining larger, more experienced communities of knowledgeable peers (646).

The first-year writing classroom is a place where knowledge creation can occur on a micro-level in the same way that it occurs in larger situations—collaboratively. When the classroom is a place where students "challenge each other's biases and presuppositions," then dialogue is in action.

Last year my students wrote reflections on their work with the readings from *Ways of Reading*. Nearly every student in the class commented on how working through the texts with other students during class helped them the most in furthering their understanding of the text. One of my students wrote of his secret method for helping him through a difficult text when reading it for the first time—what he referred to as "phoning a friend." He was quick to note that this was not him taking advantage of his friend, but a reciprocal relationship in which the students were helping one another establish meaning from the text. What is troublesome about the student's reflection is that he wanted to be sure that he wasn't associated with "cheating" because he wasn't coming to knowledge solely on his own. It's evident to me that these texts tax students' cognitive processes— they aren't something that a student can or should have to manage on their own.

But that doesn't mean that they can't manage them as a larger group. In his work *Mind and Society*, Lev Vygotsky argues that knowledge precedes the capability to

complete a task individually. While studying young children, Vygotsky noticed that children were able to achieve tasks at a higher level when they were working with peers or adults. Children were able to verbally work through a problem with others that they weren't actually able to solve on their own. In working with others, the children were able to perform on a higher developmental level. Vygotsky termed the difference between their individual abilities and their abilities when working with others the zone of proximal development: "It is the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (86). Children are able to work at a higher level when working together.

Although Vygotsky was studying the development four and five year olds, the zone of proximal development still appears to affect the way that college students learn. While there are some students who are "more capable peers" because of their previous experiences, I've found that all students have some part to play in being the one to provide a clue to the larger meaning. I recently read the reflections that my students wrote about their experiences (initially despised) with Freire's "The Banking Concept of Education" and I was surprised how each one of them had picked up on a different, important thread in the work and how these threads came out in their group discussion. One student had thought about "consciousness as consciousness of consciousness," one knew from her years in French class what the John-Paul Sartre quote written in French meant, one student had picked up on the connection between banking education and society. As the students grow more comfortable dialoging with one another, I think that they are also able to challenge one another—to serve as the dialectic for one another by bringing up counter

points or alternate interpretations. Likewise, as Salvatori describes in "Towards a Hermeneutics of Difficulty," the instructor can also provide a critical role in the dialectic by asking students to think through their difficulties and expectations.

When students work as a class to establish knowledge, the results are beautiful. Students who, at the beginning of class can only complain about how they didn't understand anything become engaged and thoughtful when entering group work—they actually seem to, as a group, enjoy sharing the experience of reading and the experience of scouring the text for meaning. The classroom, then, is an example of the zone of proximal development at its finest, for students are learning from one another how to work with a difficult text and how, as a group, knowledge is constructed. For me, this engagement of thinkers with one another is one of the joys of a difficult text—it makes us stop, reflect, and, as a group, determine meaning.

For my students, class and group discussions focused on the text were the primary way for the students to hear other people's struggles and perceptions of a shared text. It helped them work with their own ideas out loud—to see what might need revising and what they felt confident in, and it often clarified parts that they were unsure of. Conversation, then, seems to serve two intertwined purposes. One purpose is to hear our own ideas. Berthoff advocates Vygotsky's idea of the "unit of meaning" – the thought puts meaning into the word, but the word also shapes the meaning of the thought. The other purpose is to hear what others are saying about the same text so that we can engage in the discursive process of forming knowledge.

Berthoff asserts in the prologue to *The Sense of Learning* that writing, like conversation, also has two purposes—" as a mode of learning and a way of knowing" (3).

When applied to reading difficult texts, writing can be seen as a conversation we have with ourselves about what we have read—what we think we know and what we have yet to learn. Sharing this writing with others is just an extension of our spoken conversation and is also beneficial in our construction of knowledge. As Bruffee states, writing is merely "internalized conversation re-externalized" and sharing this conversation can only help us, in several ways, construct meaning (641). Writing then, is another kind of dialectic process in making meaning out of complex texts.

Here we can see the symbiotic relationship between reading and writing. Writing serves as a way of thinking through reading, but writing moves beyond the service of reading—the reading is giving material to students to write about. Complex reading can alter the automaticity that might occur in writing. If writing is a reflection of our thoughts, then it is prone to the same process of automaticity—of generalizations and clichés that are the first ideas that students come across. Writing about complex readings is a way to make students think through ideas with a more algorithmic process. Asking them to write about difficulties they have with the text also helps them become comfortable with ambiguity within the text by allowing them the space to try out various meanings, including ones that they feel particularly unsure of.

Even without difficult reading, the practices of time, the dialectic, and collaboration in writing might have similar results in disrupting students' automaticity. Berthoff's suggestion of glossing, for example, is applicable to students in assessing their own and others' writing. Their writing, when critically (algorithmically) engaged, can often become the most difficult text. But with Ann Berthoff's dialectic question, "How does who do what and why?" working with their own text can become as edifying for

students as working with one by Freire and Pratt. With the dialectic, time, and collaboration, students are able to explore the range of possibilities that lie within their written words; they are able to turn the general into specifics, to play with the way that the thought and the word interact, to challenge and reconsider their own thinking.

The discussion about automaticity and algorithmic thinking is just one of many that could be had between cognitive psychology and composition theory. In Willingham's column for the *American Educator* called "Ask the Cognitive Scientist," Willingham gives a brief synopsis of studies in reading comprehension. He notes that several cognitive psychology studies have found that, in adults, reading comprehension is directly correlated to listening comprehension. Reading differs from listening mainly in the fact that, if listening in a conversation, the listener is able to question the speaker for further clarification. If questioning is one way that listeners improve their listening comprehension, then it seems like learning to ask questions in reading would also have the potential for increased comprehension in reading. Asking questions of the text and of others is the purpose of the dialectic. If listening and reading are so connected, it makes me wonder if learning to engage the dialectic in reading could also make students better listeners, both in conversation and in their reading of texts. If listening requires us to hold our own opinions at bay, called inhibitory control, then students could be, again, practicing executive functions that make their thinking less automatic and more intentional.

Regardless of those future conversations, I think pedagogies like those of Berthoff and Bartholomae that embrace the dialectic have potential for halting dangerous automatic thinking and encouraging thinking that is more executive and critical. In learning that meanings aren't perfect, in learning how to become an equal with texts by way of auditing,

students could learn to question meanings around them—thus the dialectic becomes part of a pedagogy of knowing—a true problem-posing education. Students who are able to pose problems with texts, including their own writing, are thus able to pose problems with the world—to hold a reciprocal relationship with the reality around them. And in the process, the prefrontal cortex and executive function are engaged. I'm not advocating that one part of our brain trumps all others. The experiences and knowledge each person has are individual and invaluable. But the prefrontal cortex is certainly the space in which problems of the world will be both posed and hopefully solved. It is exciting that pedagogies of dialectic and difficult reading and chaotic writing are likely taxing daily automaticity in a way that might help our students practice a way of innovative thinking that might affect the world around them.

CHAPTER THREE: THINKING ABOUT THE FUTURE: THE ROLE OF PROBLEM-

POSING EDUCATION IN THE "AGE OF THE UNTHINKABLE"

The most difficult piece of this intellectual work for me has been the desire to keep

what I was advocating in terms of practice tied to current scientific understanding about

how cognition and the brain work. I've wanted to have a respectful exchange between two

fields of study that go about the process of knowing in different ways—in cognitive

psychology, knowing is constructed through observable behaviors; in cognitive

neuroscience knowing is constructed through observable phenomena in the brain; in the

field of composition theory, knowing is constructed through experience and reflection, or

praxis and theory.

I think that I got myself into this project because I'm drawn to conversations that

dare to explore the human condition in its entirety—not limiting the complexity of a

person to how they perform or what they perform in this set of terms or that set of terms,

but rather a willing exploration of the complexity, even when the terms aren't there to

describe the experience. It seems to me that thinkers like Adele Diamond, Ann Berthoff,

and Lev Vygotsky are so compelling because they are willing to blur traditional discourse

boundaries in an attempt to create larger meanings. In the introduction to Vygotsky's

Thought and Language, editor Alex Kozulin writes about Vygotsky's view of psychology:

> to him, psychology was a method of uncovering the origins of higher forms of
>
> human consciousness and emotional life rather than of elementary behavioral acts.
>
> This preoccupation with specifically *human* functions, in opposition to merely

natural or *biological* one, was to become a trademark of Vygotsky's lifework. Moreover, it suggests that Vygotsky never believed that psychological inquiry should be considered as a goal in itself. For him, culture and consciousness constituted the actual *subjec*t of inquiry, while psychology remained a conceptual tool, important, but hardly universal (xv).

I'm not trying to suggest that psychology is a lesser discipline—rather I want to point out that the danger of any discipline occurs when our loyalty lies with the discipline, be it psychology, composition, or art, rather than with the subject; i.e. when we forget that our disciplines are not absolute ways of viewing the world but tools for doing so. If the field of composition's true subject is the teaching of writing to students, then we can't draw lines around our own experiences and disregard what other disciplines might contribute to our subject.

I think the duty of all educators at this point in time is to engage in the difficult work of educating students for cognitive flexibility and creativity. In the past few weeks alone there has been evidence of a quickly changing world, including the growing unrest across the entire Middle East, protests and economic gridlock in the United States, and terrible earthquakes in New Zealand and Japan. Economist, journalist, and director of Henry Kissinger's Kissinger Associates, Joshua Cooper Ramo writes in his 2009 book *The Age of the Unthinkable*:

We are now at the start of what may become the most dramatic change in the international order in several centuries…As much as we might wish it, our world is not becoming more stable or easier to comprehend. We are entering, in short, a

revolutionary age. And we are doing so with ideas, leaders, and institutions that are
better suited for a world now several centuries behind us (8).

Ramo's warnings, as unsettling as they may be, emphasizes the need for students who are
truly prepared to think about their world with a flexibility and creativity that spans across a
varied body of knowledge. The world needs integrative thinking— and so too, then, does
academia. It's foolish to believe that our teaching occurs in a vacuum. We can't pretend
that reading and writing in the world haven't changed. We can't ignore that most of
students' everyday writing occurs in the forms of texting and facebook posting and,
likewise, that what they are reading are tweets and texts and abbreviated news headlines
on their homepage. I'm not suggesting that we just abandon the virtue of a well-structured
paper or that we dumb down our readings to abbreviated messages, in fact, I would argue
the contrary. I'm reminded of the theories of Neil Postman, who, in his book *Teaching as
a Conserving Activity*, advocates that education must serve as a thermostat to the outside
world. In his article, "The Case for Slow Reading," educator Thomas Newkirk
summarizes Postman's argument:

> Schools, Postman argues, should act on a thermostatic principle… schools should
> act to check—and not imitate—some tendencies in the wider information
> environment. Schools need to take a stand for an alternative to an increasingly
> hectic digital environment where so many of us read and write in severely
> abbreviated messages and through clicks of the mouse… we have to slow down
> (Newkirk 2).

As the outside world quickens its pace, places of learning must slow down the pace of information consumption to make way for true learning. Slowing down our thinking is not a quick or easy process, which is precisely why we don't generally engage in this kind of algorithmic thinking. There may be a counter desire to move quickly to attract the apparently impoverished attention of our students. But if they don't slow down in the classroom, where and when will they slow and really think in order to comprehend?

From the cognitive perspective, Postman's argument makes sense. Students' technology use is not only fast-paced, in a lot of ways it is automated. They can't help writing "u" instead of "you" in their papers because that is the automated use of the word for them. The writing that they do is fast paced and, if I dare say so, most likely automatic, unchecked thought. The writing classroom, then, doesn't become less important but more so. It is one place where students must slow down not only the pace of their reading and writing, but the thinking that precedes, accompanies, and emerges from reading and writing. In slowing down, they have the opportunity to work with the dialectic, with ambiguity and chaos and limits. They have the ability to create knowledge.

I'm interested in students becoming better writers. I'm thrilled to see them engaged in their work, attentive to their audience, intent on conveying their purpose. But I'm not interested in students becoming better writers so that they can all write grammatically error- free texts or so that they can write a better report in their future employment, though those are certainly both positive outcomes. In her article "The Silenced Dialogue: Power and Pedagogy in Educating Other People's Children," Linda Delpit stresses that educators must make explicit the rules of power that silently govern both classroom behavior and the

society at large, to which I agree. Students need to be aware of the rules, and, for example, grammar is one of those rules that can make a difference between others taking someone's voice seriously or not. Students, though, should also be aware of the way to use the rules to change the rules—how they must undertake convention to progress a nonconventional thought. Students ought to learn how to strategically go with and against the grain of life. In order to learn both the rules and the divergence of rules, we must have the Freirian capacity to think about our thinking in order to participate in a problem-posing education.

I see problem-posing as an act of creativity in its broadest sense, in that students are participating in the creation of the world around them. In the writing classroom, this creation reveals itself in the ability to tolerate a meaning's ambiguity in difficult reading, to make a mark upon the reading by writing about it, to question and tease out meaning and to form structures out of it. This balance of flexibility, tentativeness, and creation is what students need in a changing world. And the world needs them. If we are going to be able to address the pressing issues of our time, we are going to need flexible, thinking people. We are poorly served by people who view reality as something fixed and absolute, something "out there" and beyond their control. For people like this, following the rules is the only way of working in the world. But more and more, the absolutes and certainties just do not exist. It is true that in college students need to "bank" facts. But they also need an arena where they cannot just respond automatically. They need a place to participate in the creation of the world around them.

Through certain strategies, teachers of writing can engage the parts of the brain that direct the process of idea creation—a place where we work critically and creatively

with information, a place where we inhibit our natural automaticity so that we can stop and listen. At our finest moments of teaching and at our students most engaged points, we all might be developing our ability to listen. We might be developing our ability to question ourselves. We might be learning how to form structures, the activity which Berthoff defines as the one that makes us human. In forming structures in our reading and writing, we are certainly encouraging a tradition of structures such as dance, music, and storytelling, that define humanity at its best.

These structures, though, are not five paragraph essays. Students in the first-year writing classroom are almost all familiar with that structure already. What they aren't familiar with is having something that they feel compelled to say and how to say it. Students have spent a good deal of time working on "form" as a hollow, automatic shell that often holds back meaning. "Form" is not something that they necessarily need to learn anew. What they need help in is creating chaos. They need to learn to generate ideas and how to work with the ideas that they stick with, how the form and the idea are joined together in Vygotsky's "unit of meaning." As we shape form, we shape the idea. As the idea comes forth, it dictates the form. Viewing language as this kind of tandem allows for the making of meaning and the true forming of structures.

Likewise, in reading a text students can learn to engage with it in such a way that various meanings are revealed. They are learning to move beyond functional fixedness and tolerate ambiguity. In making their mark upon the text (as Bartholomae says) students are truly creating—they are engaging in a creative process that demands not regurgitation but engagement. In the first-year writing classroom we can teach (automate) superficial

structures or we can help guide our students in a process of forming structures, in truly engaging their brain by overcoming automaticity and using their working memory to work problems out.

I'm like my students, because I am still a student myself. In the process of writing this thesis, I've wanted to rely on automaticity and not on the painful process of having to think. I've wanted to read these complex cognitive psychology and neuroscience studies and understand their meaning the first time around. I've wanted to extract their knowledge solely for the purposes of creating my own knowledge. I've fussed over ideas in my mind without ever seeing them on paper. I want what comes out to be right, to be perfect, especially since I feel like I am a guest in a foreign country (really two foreign countries), trying to explain these cultures, of which I know just a little, to natives of those very foreign lands.

Of course, the process has proven to be something altogether different—messy, chaotic, humbling. In learning, I've only realized how little I know—about composition theory, cognitive psychology, about teaching and my own writing process. If I were to study even for another year, I would likely come back to the work that I've created and find it to be flawed—for example, I already know that reading and writing are more complex than a simple automatic processing, that it's a little simplistic to reduce the discussion to one element of our cognitive process. I would likely be embarrassed, as I have been since I was a little girl, to go back and re-read what I once wrote, to see how vulnerable the words are when left to fend for themselves on the page. But I couldn't deny, for one second, that I hadn't learned something in the process of this thesis. I've

struggled with the difficult texts and constructed my own meaning from them, and for that

Berthoff would, I think, be proud.

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