DEVELOPING HEALTHY AND BALANCED MINDS: HOW CREATIVE, CRITICAL AND MORAL THINKING PROMOTE GOOD COGNITION

A Synthesis Project Presented

by

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Critical and Creative Thinking Program

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ABSTRACT

DEVELOPING HEALTHY AND BALANCED MINDS: HOW CREATIVE, CRITICAL AND MORAL THINKING PROMOTE GOOD COGNITION

May, 2009

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My experiences with the Critical and Creative Thinking program have given me time to articulate and reflect on how creative, critical and moral thinking relate to a healthy and balanced mind. This paper explores each of these three thinking styles individually through reflection and literature review, and then combines them into coherent pictures like a biphasic cyclical machine and a garden of components to be cultivated. I propose that by promoting and balancing creative, critical and moral thinking, we can develop healthy and balanced cognition for both ourselves as individuals, and as groups.

DEDICATION

I'd like to dedicate this to all of my teachers, formal and informal, who had the patience and fortitude to deal with such a smartass student. I'm especially grateful to those who had no choice in the matter, namely my parents, James and Miriam and brother Paul. I love you and will never forget the lessons you have taught me, intentionally or otherwise.

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CHAPTER 1

INTRODUCTION

The Purpose

When I first came to the Critical and Creative Thinking (CCT) program, I had been working as a surveyor/engineer and an IT recruiter after earning a BS in psychology. I suppose it was a pretty typical progression: I took classes that consisted of acquiring the knowledge in the textbooks and then demonstrating that knowledge, followed by jobs that consisted of learning the way things run and then following those heuristics to get the job done. Something happened while I was working as an IT recruiter that shook that standard color-by-numbers type of thinking taught to me. The president of the company asked me to, "Think outside the box." What did that mean? How was I supposed to accomplish this different style of thinking? What would this other thinking style lead to? Then I came to the CCT program through a desire to broaden my horizons and was exposed to all sorts of practices and ways of thinking that seemed to capture what my former boss had asked of me.

I have always had a high level of concern over justice and social issues, which led me to ponder traditional business practices and ways of thinking through a moral perspective, though I still was not entirely sure what morality really meant either. In the two years I spent in the program, I have had a lot of time to reflect on and formulate my own thoughts on creative, critical and moral thinking. In short, I now see creative thinking as the expansive and open style of thinking, critical thinking as the analytical, selective and precise style of thinking and moral thinking as the guiding way of thinking. This paper is meant to further explore these three mindsets, some of their parts, misconceptions, activities and ways of thinking that support or

hinder them, ways in which they interact with one another. Chapter five presents some metaphors that may help solidify the combined total picture of how creative critical and moral thinking seem to work. Based on my experience and the research herein, I have come to realize that understanding and utilizing these three thinking styles is a robustly beneficial step toward developing a healthy cognitive environment.

It is my own desire and future goal to become a teacher in one form or another and so much of this exploration keeps the educational system in mind. Education is also a social issue, and so my desire to see creative, critical and moral thinking incorporated into our educational practices extends a little beyond my own desire to utilize some of their principles in my own future teaching methods. The CCT program is a part of the Graduate College of Education, which has given me opportunity for ample dialogue with the many practicing teachers who I have had the privilege of learning both along side and from. The vast majority of their experiences have been very discouraging; much of the educational system seems to treat students like warehouses of information that needs to be retained just long enough to pass the standardized tests. I initially found myself empathizing with that teaching philosophy because much of my own education followed the same pattern. My experience with CCT has taught me that storing information should not be the whole picture. In order to compete effectively in almost any domain, people not only need to have information at hand, but need to be able to work with it. Being able to remember facts is nice, but being able to use them effectively and in novel ways is a whole other level of thinking ability. I'd also like to note that for my purposes, in this paper, I have a wide view of what a teacher is. I consider almost any interaction where one person is informing or guiding another as a teaching interaction. While some of my focus is through the classroom setting, the implications extend to business meetings, co-worker

dialogues, family gatherings, political debates and so on. We are all teachers, in one form or another, and I would like to share my thoughts on creative, critical and moral thinking because they have helped me both in my own thinking, as well as in how I work with others, and they may be helpful to my readers as well.

The healthy cognitive environment that I'm proposing is one in which the creative, critical and moral faculties are both balanced and well developed. While some particular activities, like transcendental meditation, playing, and specific methods of teaching critical thinking, are covered, my goal is more general. I'm not proposing a specific program or designing a specific lesson plan. Rather, my goal is to share my understanding and reflections on this idea of a healthy cognitive environment in order to raise the awareness of these concepts in the public at large. The domain of physical health has been highly studied with incredible advances over the last century or so. With that advancement, the general public has benefited by increasingly improved common sense and intuitions about what is entailed by a healthy lifestyle. Generally speaking, people are perfectly aware that things like eating fruits and vegetables and exercising are beneficial to one's health while things like too much candy and sedentary lifestyles are detrimental to one's physical health. Unfortunately, our advances in psychology and understandings of thinking do not seem to have undergone this type of enhanced understanding in the general public. The mother of the Virginia Tech shooter, for example, saw warning signs that some emotional and social abnormalities were surfacing in her son. Her reaction was to send him to one church youth group after another. The leaders of at least one such group recommended that she bring her son to a doctor because they suspected autism or some other neurological disorder. She refused. I think it is clear that the situation would have been dealt with better if she had a more updated understanding of how the mind works. The mind is a much

more elusive and mysterious thing than the body. It is so easy to see it as something too elusive and nebulous for anyone to have an in-depth knowledge of its inner workings. Psychology is seen as a 'soft science' and yet there have been decades of incredible advances in our understanding of the machinery within our heads. One of my hopes is to help update the mass-consciousness on some of the concepts and principles of what I've come to find as being robustly beneficial toward developing a healthy cognitive environment.

Early Thinking

To understand what something is and how it works, it is often helpful to examine its origins. One of the ways early man exhibited control over his own thinking was by taking drugs. Although, the mechanisms of their effects were a complete mystery, it was well known that if you eat this fungus, inhale the smoke of that plant, or drink that old liquid one could alter their own consciousness. As with almost everything that was not understood, religious or godly rationale was used to explain the effect. Later, philosophers would begin to explore the nature of morality through critical thinking, laying the foundational groundwork for the psychology of today, which has opened new insights into the mechanisms and origins of our moral intuitions.

Greek philosophers are some of the earliest known examples of people categorizing and figuring out the nature of intangible, elusive things like thoughts and intuitions. Plato wrote about Socrates encountering his old friend Euthyphro. Euthyphro was indicting his own father for accidentally killing a slave. This launches a conversation about the nature of piety and morality. Socrates asks Euthyphro, "Is the pious being loved by the Gods because it is pious, or is it pious because it is loved by the Gods?" (Plato, 399BC) This form of question could easily transfer to other moral questions like murder. I could ask, "Is murder wrong because it is inherently wrong, or because we deem it to be wrong?" In the process of their conversation they

discover that objective matters may be easily resolved but subjective matters are more vulnerable to dispute. For example, it's easy to argue about the aesthetic value of a vase, but the measurable volume or height of the vase is far less debatable. These early ponderings and insights into the landscape of thinking and reasoning serve as great starting points for thinking about the nature of the abstract and intangible parts of our experience.

Later philosophers took a more explicit look at the mind and its nature. Rene Descartes was a famous philosopher in the first half of the 1600's. When I was in high school he was my favorite philosopher because he was in the habit of staying in bed into the late morning hours reflecting. Descartes knew that his senses could deceive him and so they could not be fully trusted to bring absolute truths. His captivating phrase "I think, therefore I am" is more than a 1600's t-shirt slogan. It was seen as the most basic irrefutable claim of truth one could make. The physical world could be denied but thoughts and the mind are self evident by the very thinking required to postulate the question in the first place. That conceptual separation between the mind and body is called dualism. Dualism is the theory that the mind is one thing with its own nature, which does sometimes interact, often conflictingly (as the body is bound by natural physical forces but the mind is not), with the body, which has its own nature. The mind may not be entirely connected to the body; a concept revered, perpetrated and endorsed by Christian clergy, who benefited by asserting parallel claims for a soul. The church even launched campaigns expressing the inner trinity of the mind, body and soul as a metaphorical aid for understanding the Holy Trinity of God. The church's efforts were quite effective at instilling dualism into the mass consciousness. I could still hear ripples and echoes of this rhetoric during my years in the church as a teenager.

Despite the popularity of dualism, there were those who disagreed. Spinoza argued that the mind originates from, and is highly interested in, the body. Not only did Spinoza postulate that the mind is of the body, but also that our emotional processes are mostly subconscious. His heretical critical examination of holy books and doctrines earned him excommunication, curses, damnation and a big cold shoulder from his Jewish community. It is rumored that when the community made Spinoza an unwelcome person, he replied, “You’re not asking me to do anything I wouldn’t do on my own anyway.” Although his ideas of integration between mind and body got him a ‘Dear John’ letter from his Jewish community, those insights also opened important avenues of insight into useful ways of examining our thinking. As we will see, Spinoza apparently held the more accurate view of the nature of the mind; that it is intimately connected to, and is a product of, the physical body.

Contemporary Thinking

There are so many subtle, nuanced and elusive elements to our cognitive environment that our intuitions tend to seem vague or nebulous, yet there are some properties that are not too soon to point out. For example, some people have the disposition of having low tolerances or thresholds before aggressive action (that is, they "have a short fuse"). Is it not easy to see that heightened aggression is a generally detrimental disposition to possess in the modern world? Perhaps emotional impulsive reactions were beneficial back when we were pouncing on prey, fighting for mating rights and dodging predators, but it is a less desirable trait in the modern world. Greater tolerance of opposing views means more time to collaborate, organize and problem solve in ways more mutually beneficial for all involved parties. There are tricks that people can use to lengthen their fuse, so to speak, like practicing a calming mantra or focusing

destructive impulses through more beneficial venues like sports or other physical labor. This paper aims to further explore some of the properties of the cognitive environment and how to improve it.

One of the most important properties to keep in mind is our ability to remold or change our thinking. Every psychology textbook, class and teacher I've ever encountered stressed the fact that our minds are plastic, or adjustable. People often seem to say things like, "He's just a very aggressive person," "She's just shy," or "I'm just not creative." While our inherent or natural conditions do have a lot of variation, we also have the plasticity to change. I'm not suggesting that there is one "best" way to think or be, but that we don't have to sit back and accept those parts of our thinking that we would like to alter or improve. In my own studies and practices, there have been three umbrella-like categories that stood out as particularly important. I have found creative, critical and moral thinking to be highly conducive to a healthy and well-balanced mind. Chapters two, three and four will explore each of these three thinking modes in further depth.

CHAPTER 2

CREATIVE THINKING

Introduction to Creative Thinking

Before I came to the CCT program, my concept of creativity was probably a lot like how most people think of it. It seemed like something used to describe artists and performers. I thought creativity was something relatively isolated to the arts and was the kind of trait someone either had or did not have. The CCT program has helped me realize a much more fulfilling, satisfactory and broad view of what creativity is, and how it can be fostered. Like critical and moral thinking, there is no single comprehensive definition that encapsulates the entirety of what creativity is. The purpose of this chapter is to review some of the literature on creativity to help define what it is, what encourages it, diminishes it, and clear up some misconceptions about it.

Generally speaking, I've come to see creativity as the parts of our thinking that help increase the quantities and varieties of ideas at hand. Creativity is an expansive and open mode of thinking. Having a greater number and variety of ideas is a beneficial part of the thinking process because having more options increases the likelihood of finding the best possible solution or idea. Putting more ideas on the table increases the chances of having a really good

idea on the table. The process of expanding and broadening ideas is something we all do to varying degrees. Deciding what to have for dinner, planning a vacation, and shopping for motor oil all involve creative thinking. Furthermore, creative thinking is something that can be enhanced through a wide variety of practices explored herein. The ability to think creatively diminishes the stressful sensation of having very limited options. For these reasons, creative thinking is a key factor in promoting a healthy cognitive environment.

One of the major areas where creativity appears to be particularly beneficial is problem solving (Baer 1998, Brophy 1998, Weisberg 1999). Creative problem solving is a process that involves continual cycles of questioning, exploring and reflecting in order to find both new insights into the nature of the original problem and novel solutions that incorporate the newly discovered nuances. In many cases, creative problem solving results in a perceptual transformation of problems into opportunities. For example, when I was an undergraduate there was a student whose car had broken down and his fraternity was short on the cash needed to apply for official recognition. His solution (after undergoing a process I later recognized as creative problem solving) was to raise money for the fraternity by holding a 'dollar per whack' event where people could pay to take a sledgehammer to his car. The money raised covered the application fees, granting the fraternity official recognition. As a token of gratitude, the fraternity pitched in to help the student with his transportation needs.

Eastern and Western concepts of creativity are quite different (Lubart, 1999). The Eastern view of creativity is a very inner-focused perspective. To the East, creativity is about personal growth and insight. Eastern religious beliefs are cyclical in nature, and this plays out in the continual cyclical way they interpret creativity. A creative idea may be one that is new to the individual, even if not to the society at large. The West, on the other hand, has a linear

beginning-middle-end religious perspective that plays out in their view of creativity. The West typically views creativity as having a product after undergoing "preparation, incubation, illumination and verification" (Lubart, 1999 p. 341). Western creativity appears to raise the bar, requiring an idea or product to be entirely new to the collective, not just one's self. Nickerson (1999) wrote an article describing a wide variety of ways that people have viewed or interpreted creativity. Some scholars believe that creativity requires the recognition and approval of others to be deemed worthy of being considered a creative insight or product. Others have argued that a truly creative work must influence the domain in a revolutionary way. What I find most interesting about the cultural variations of creativity is that they share many of the same qualities. Both involve an expanding of ideas and finding or inventing novel methods, insights or products. For my purpose in this paper, I would like to take on a more Eastern view of creativity. In my experience, the process of generating a variety of novel ideas is very creative, even if they are only new and novel to myself, and not society at large. As long as something expands the number and variety of ideas available, I would consider it creative. Even if there is no product in the end, the creative thinker still practiced, and gained value from, the divergent thinking process.

Misconceptions about Creativity

When people are asked to reflect on creativity they often talk about particular activities that are deemed inherently creative. It's easy to see how painting or performing music are creative, but other domains like engineering, research, or even cooking dinner are also great venues through which creativity can flourish. Anything we do that involves decision-making or idea generation also involves elements of the creative process, like generating and exploring a

range of options. It is not true that accountants do exclusively critical and calculating work and artists do exclusively creative work. All domains and activities involve mechanisms and elements from both thinking styles. As artists gain expertise with their medium, they develop a far more thorough understanding of the intricacies and nuances of their work. For example, a painter may develop knowledge and rules of thumb about mixing colors, choosing subject matter, utilizing the canvas space efficiently, relaying a message, and brush techniques. All this knowledge builds up into a structured way of going about the process of painting. The ability to critique (or critically examine) a painting is enhanced by this structured perspective along with greater critical insight into how the field works. A novice may produce a painting that does not look quite right, and be unable to determine why his intentions are not being properly portrayed. It is the expert with the knowledge base and critical insights that can say things like, "Those colors clash in an uncomfortable way. If you want your painting to convey relaxation and comfort, you may want to choose cooler colors." It is a much more precise articulation and recognition of what is wrong and why. Painting is, indeed, a very creative process but it is the more critical painters who are more likely to envision and foresee how it will all fit together and preemptively plan accordingly. Critical and creative thinking have much in common and are involved in all of our endeavors. In fact, separating them can be surprisingly tricky from time to time.

On the other side of the coin, accountants are seen as exclusively critical, but they may invoke creative thinking in their practice as well. They can creatively structure their days, work methods, or office arrangements. Every domain contains elements of creativity, and the CCT program has helped me recognize that creativity permeates all domains in one form or another.

Another common misconception is that creativity is inherently static or unable to be adjusted. Both the scientific literature and my own experiences suggest that, like critical and moral thinking, creative thinking is highly susceptible to enhancement through a wide range of activities. Likewise, there are factors that can have a diminished effect on our creative faculties.

Creative Blocks and Hindrances

Davis (1992) set out to identify the barriers and roadblocks to good creative thinking. One of the first factors he identified was habit. It is not that habits are inherently anti-creative, rather that we tend to learn a routine or method and stick to it. In time, that routine goes from being 'A' way to do it, to 'THE' way to do it. We are naturally creatures of habit and the vast majority of what we do is repetitive and habitual, but we should remain mindful and open to other possibilities and methods. Another type of hindrance comes in the form of rules and traditions. Like habits, rules are an important part of how we function and guide each other, but they also tend to be restrictive, often in subsequently unseen ways. For example, a solid concrete status hierarchy may let people know clearly who reports to whom, but it can also intimidate lower level employees from being open and honest about their suggestions, ideas or concerns. Davis noted a relationship where higher levels of formalization can inhibit innovation and creativity. Cultural and social influences can also play an inhibitory role. Just as humans are naturally creatures of habit, we are also social creatures who concern ourselves very much with fitting in and being accepted. Surprisingly, kindergarten is a time when children's creativity drops. The new pressures and conformities of peers and new social settings was isolated as a significant variable causing the creative decline (Davis 1992). Once again, I'm not suggesting that we all suddenly stop caring completely about what others think. I'm suggesting that our

natural fear of being different and desire to fit in can easily have more influence on us than we realize. Another barrier to creative thinking is our own perception. Often referred to as a perceptual set or functional fixity, we often miss seeing something in a new way because we're so accustomed and comfortable with the old familiar pattern. These fixed perceptions often lead us to jump to conclusions or avoid alternatives. I'm comfortable with what I think I know and that, in turn, effects how I see things. If someone is arguing a political position that I have heard before, I may be anticipating their line of reasoning and thinking of a rebuttal instead of remaining open to possible alternatives or nuances being presented. By understanding and recognizing these patterns we are able to tamper their negative effects.

Emotions are another major potential creative thinking retardant. Heightened states of emotion can clutter, fog, and confuse our thinking, causing reduced performance or even decision-making paralysis. In a search to further understand the nature of creativity, Davis (1992) wrote an article describing factors that block creative thought. Among his rather extensive list were high stress levels, fear of criticisms, and numerous social fears. Anger, fear, insecurity, and anxiety can cloud and fluster our ability to be open and receptive. As mentioned above, politics and religion play into both social inclusion and emotional reactivity. I suspect that is a big part of the reason for diminished creativity when dealing with those domains. The final barrier identified by Davis was the resource barrier. The cold hard reality is that many of our creative endeavors require some resources to implement. We may be able to come up with a great new innovation or method, but without the required people, money, time and so on, it won't happen.

Playing, Humor and Creativity

Playing and humor are not just for kids, nor are they the antithesis of work. Play some fun and loud music while cleaning, make a game out of the monotonies of your profession, or just find a little extra time to have a good laugh with some friends. Humor and play are being increasingly applied in businesses and classrooms for its multitude of benefits like increased productivity, efficiency, social bonds, physical and mental health and reduced stress and stress-related illnesses (Caudron 1992, Hellman 2007, Scott 2007 and University of Missouri-Columbia 2007). Creativity encourages finding innovative new ways to solve problems and streamline processes. Although inventions like the paperclip are few and far between, imagine finding an entertaining way to file papers faster, boost office morale' or dealing with unruly customers. Beyond innovation, humor and creativity also enhance general productivity in businesses. Work per hour goes up and sick days taken goes down. What employer wouldn't want that?

Humor is particularly linked to creativity. In the early 1900's creativity was considered to consist of "long and sometimes tortuous mental operations." (Ziv, 1989 p. 100) Luckily, we have since managed to lighten the process to somewhat effortful. The connection between humor and creativity was first noticed by a French philosopher named Penjon (Ziv, 1989). In 1891 Penjon coined the phrase 'cognitive playfulness' which described the light-hearted and free or unrestricted type of thinking, as opposed to the more rigid and structured critical thinking process. There are a number of theories about the basis of humor, not the least of which are surprise, incongruity, bisociation and novelty. Despite the wide array of variations in humor and creativity it has been quite convincingly illustrated that the connection between humor and

creativity is very deep and robust (Ziv, 1989). That connection grants us tools like pranks, jokes, silly stories and other forms of humor to enhance our creativity at will.

Meditation and Creativity

Another activity that seems to have a robustly positive effect on creative thinking is transcendental meditation (TM) (Jedrezak et al., 1985). As noted above, stress, anxiety and fears can have a very detrimental effect on creative thinking. TM is known to reduce this family of negative emotions. So why couldn't someone just deal with their stress by relaxing for a while and then attempt some creative problem solving? Well, that's not an unreasonable theory. Cowger and Torrance (1982) tested this theory by measuring two groups of participants split by practice in relaxation techniques and TM.

> Mediators attained statistically significant gains in heightened consciousness of problems, perceiving change, invention, sensory experience, expression of emotion/feeling, synthesis, unusual visualization, internal visualization, humor and fantasy. Relaxation training Ss [participants] manifested significant drops in verbal fluency, verbal originality, figural fluency and figural originality and significant gains in sensory experience, synthesis and unusual visualization. (Cowger and Torrance 1982 P.211)

So relaxation did show a couple of gains but at the cost of several other factors whereas TM showed a neutral to positive effect. TM also embodies the individual with encouraging words, a feeling of confidence, a positive attitude and alternative viewpoints. All of these are linked to enhancing the creative process. So and Orme-Johnson (2001) also tested TM against rest and no practice groups across seven measures of cognitive abilities, including creativity. 326 high school students in Taiwan were asked whether or not they would be interested in learning TM after a lecture on the topic. Those who were interested were placed into two groups, TM and

rest. The students in the rest group were told that due to limited resources they would have to wait for their training. Those who were not interested were to go about their regular day and served as a no interest group. The TM and rest groups would meditate or rest, accordingly, for 15-20 minutes twice a day. After comparing the pre and post testing across the seven measures the TM group emerged as having the greatest significant gains, especially on the creativity measure. This study supports the claim that TM not only increases creativity but also does so significantly better than rest alone. This study also shows that average teachers can be taught how to facilitate TM to a high enough standard to induce this effect.

Although TM has a cumulative effect that increases its benefits over weeks and months of practice, people often report feeling more positive and refreshed after each individual session as well. TM appears to offer a cocktail of benefits that enhances creative thinking by both removing many creative blocks and enhancing creative thinking patterns.

Cahn and Polich (2006) conducted a meta-study to examine the physiological effects of various forms of meditation, including TM, on the brain. Through reviewing hundreds of studies employing several neuro-imaging techniques, several trends and distinctions emerged. For one thing, those who were more practiced in TM had considerably more blood flow to certain regions of the cerebral cortex during meditation. Without going into too much detail, they found that practicing TM can induce a kind of twilight or stage 1 sleep without the associated drowsiness. By comparing and contrasting alpha, beta and other brain waves they were able to determine that self-reports describing sleep without loss of consciousness have neurological support. More than just brain waves, blood flow to the brain increases during meditation, as opposed to sleep, which decreases blood flow. As practitioners of TM become increasingly proficient this effect expands into deeper and deeper levels of sleep until some level of awareness and consciousness remain

relatively persistent, even throughout the deepest levels of sleep. Conscious awareness during dreams is referred to as lucid dreaming. Imagine having complete control over your dreaming experience. You can fly, tell off your boss, and walk through walls or whatever you can imagine. For people seeking heightened creativity, this grants a wonderful creativity-boosting resource.

Dawson (2003) wrote a paper, in which she claims that sitting in silence, preferably meditating is a crucial element in fostering independent and creative thought. The busy schedules and lifestyles in academia rarely offer students and teachers the opportunity to sit quietly and reflect on the lessons of the day. She suggests that reading and writing, although very important aspects of education, do not offer the inner silence need to calm the inner noise and regain our inner composure. The world of academics expects thoughtful, reflective and creative work, yet it offers few to no opportunities to engage in the practices, like TM, that foster this level of work. If students are to take their education and learning process seriously then they should seek out every opportunity to enhance their own potential to create novel work.

Sarath (2006) described a program he designed in which meditation was a key element of the curriculum. He called the program creativity and consciousness studies. It involved integrating meditation into the student's education. Meditation helps students diminish the effects of certain biases and conditioning that can hinder creativity. He noted that conventional education focuses on gaining a third-person knowledge. Through meditation, second and first person knowledge about the curriculum can be incorporated, granting the student a higher level of understanding of the subject matter. We often hear that information will stick better when it's seen as personalized so that it means more to the student but the tools and methods for making the material personal are rarely taught. Sarath claims that meditation can help students achieve

that first person perspective, granting them "…mental clarity, inner calm, insight, compassion, and creativity." (P.1816).

Stamatelos and Mott (1986) reviewed and conducted studies about meditation and creativity and suggested that meditation may help individuals labeled as developmentally delayed. They argue that allowing additional incubation time opens the student up to explore their ideas before presenting any concrete response. They also argue that meditation, although not identical, is very similar to subconscious incubation and may help promote it. "Incubation and meditation are the underside and surface of the same stream." (Stamatelos and Mott 1986, P.229). Meditation enhances internal imagery, which has the effect of breaking down the concreteness of perceptions. Internal imagery allows the person to more readily perceive alternatives and variations, which helps diminish the idea that there is just one right answer.

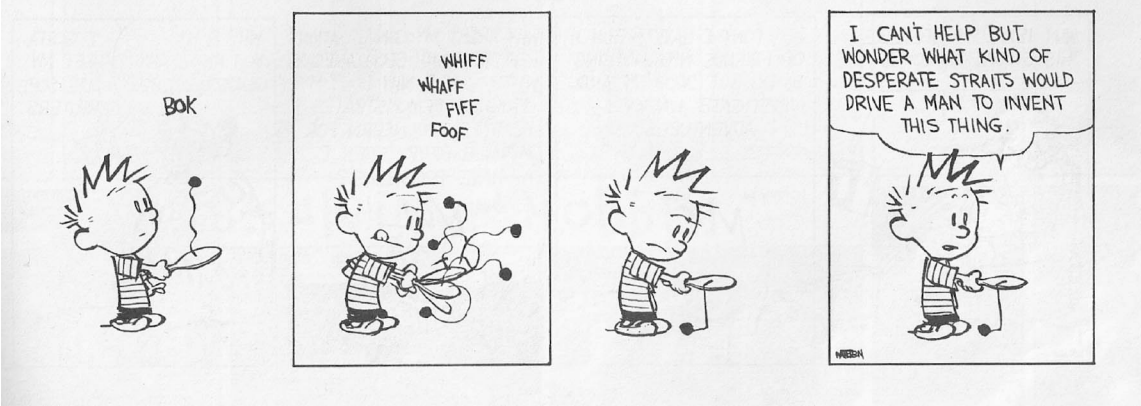
Culture and Identity

Lubart (1999) explains that our cultures and lifestyles act as a sort of guiding trench for the flow of our creativity. Topics that are deeply ingrained in our cultures, or other identifiers of self, are also less likely to be dealt with creatively. In a major way, this is one of the places where content and processes interact. Inventing a new silly way to make toast may be an interesting, compelling and imaginative process yielding a high variety of results, but inventing a new silly way to celebrate the Fourth of July is far less fruitful territory in terms of creativity levels. It seems as though the more central to how we identify ourselves something is, the more hindered creative processes are when dealing with it. At least part of this hindrance stems from the emotional reaction to either the subject or the implication of the topic. After all, don't we easily rattle on about the weather, sports or distant news without too much concern for the

impact on each other? Don't we often shy away from topics such as religion, politics, and other highly personal categories? Chapter five will discuss and explore further the connections among emotions, creativity, critical thinking and morality. For now, let's explore the counterpart to creative thinking - critical thinking.

CHAPTER 3

CRITICAL THINKING



Introduction to Critical Thinking

If creative thinking is the expansive, divergent, broadening of ideas then critical thinking can be considered its narrowing, convergent, categorizing counterpart. Like creative thinking, critical thinking has no single comprehensive definition, but there are many common themes or factors that emerge from the many attempts to describe it. Critical thinking employs tools such as inference, comparison, recognition of assumptions, deduction, interpretation, evaluation of arguments, analysis, organization, transferability and inclusive consideration of all known factors. These tools can be used to examine topics from a wide variety of different perspectives such as a mechanistic perspective, in which the goal is to understand how something works, or a diagnostic perspective, in which the goal is to determine what went wrong and how to fix it. Much of the literature intertwines critical thinking with intelligence. For example, Feuerstein (2006) discusses his concept of intelligence as having key components such as understanding cause-effect, hypothetical thinking, orientation in space, family relationships, and categorization. Another common theme in the critical thinking literature is the idea of tiers or high-order

thinking. For example, in order to take a diagnostic approach, it is necessary to understand the parts, how they work and interact, making the mechanistic approach a prerequisite. In this way, many of the tools and perspectives of critical thinking form a conceptual structure or tiered hierarchy in which some parts form the foundation or precursor to subsequent parts. Hassan and Madhum (2007) wrote that, "Nearly all cited definitions of critical thinking emphasize in-depth consideration and examination of gathered information using different modes of thinking, in light of present evidence, in order to create beliefs, make decisions or take actions." (p.362) For our purposes here, critical thinking can be broadly seen as convergent thinking that utilizes various combinations of the above tools and principles.

In my own experience, I have come to see critical thinking as the yang to the creative thinking yin. I see the two ways of thinking as forming a biphasic cycle. Creative thinking is the first phase in which ideas are expanded, multiplied and varied. Critical thinking is the second phase in which that broad field of ideas is narrowed through a process of selection that utilizes varying constellations of the tools and principles mentioned above. In this way, our ideas can undergo a refining process analogous to evolution. Creative thinking increases the variation of ideas, and then critical thinking selects the best or most appropriate ideas for further consideration. Then with that selection of ideas, the process can be repeated as needed. It is a crude model but it exemplifies the way I've come to view creative and critical thinking. We need to know the difference between a good idea and a bad one, to weigh ideas against each other, in order to select one to take action on. A healthy cognitive environment should have this convergent capability, so as to not become lost in, or paralyzed by, the expansive field of ideas and options on offer.

A Misconception about Critical Thinking

There is one particular misconception about critical thinking that I think is very important to put to rest. The word 'critical' is often used and perceived as a negative or derogatory term. My guess is that this misconception stems from critics who often use derogatory and exaggerated language in their critiques. Art critics, food critics, movie critics and so on, have the tendency to add a certain sharpness to their critical reviews, while their main job is to describe where something scores across various categorical scales. For my purposes, I would like to focus on critical thinking as being the convergent form of thinking described above, without the negative or derogatory inflection.

Metacognition

Like creativity to humor, critical thinking has a close sidekick called metacognition. The most direct and simple definition of metacognition is – thinking about one's own thinking. If you've ever explicitly asked yourself about your own mental condition or process, then that's the essence of metacognition. "Am I going about this problem the right way?", "How did I end up at that conclusion?" and "What caused me to act that way?" are all good examples of metacognitive questions. To examine, ponder, and question one's own mental process is at the very heart of metacognition. As you might expect, thinking about your own thinking is not the sort of thing usually done inadvertently, especially when it is needed most. Metacognition is effortful, active and conscious. I have found metacognition to be a uniquely powerful tool for monitoring and managing my own thinking process. That is, of course, when I remind myself to engage in it.

I have also found metacognition to be enhanced by, and somewhat akin to, transcendental meditation (TM). In the opening or beginning procedures of TM, the practitioner is to focus on

their breathing and to gently but constantly remind himself to think about nothing other than his own breathing. He can acknowledge the sensations and sounds around and within himself, but does not dwell on them, constantly reminding himself to focus only on his breathing. That monitoring seems to be very metacognitive in practice and principle. Not only is it easier to keep track of my own thoughts while the mind is less busy and noisy, but the practice makes it easier to engage in metacognition when one is not meditating.

Teaching and Promoting Critical Thinking

There is a new wave of efforts to teach critical thinking, or high-order thinking, in schools. While critical thinking is widely seen as something beneficial for students, there are many different teaching approaches being considered and employed. Janssen et al. (2008) developed a list of twelve thinking tools designed to enhance the critical thinking of biology students. Each tool is basically a question to ask from a given perspective. The twelve perspectives that they deemed necessary or helpful to biology students were:

- The comparative perspective, accessed through questions like, "How can it be classified?"
- The causative perspective, accessed through questions like, "What causes it?"
- The functional perspective, accessed through questions like, "What is it used for?"
- The mechanistic perspective, accessed through questions like, "How does it work?"
- The ecological perspective, accessed through questions like, "What does it need from the environment?"
- The developmental perspective, accessed though questions like, "How did it develop?"
- The evolutionary perspective, accessed through questions like, "How did it evolve?"
- The caring perspective, accessed through questions like, "How can you take care of it?
- The diagnostic perspective, accessed through questions like, "What can go wrong and how can it be treated?"
- The technological perspective, accessed through questions like, "How can you put it to use?"
- The ethical perspective, accessed through questions like, "What are you allowed to do with it?"

- The personal perspective, accessed through questions like, “How does this affect you personally?”

(Janssen et al. 2008, P.2-3)

Most of these perspectives can be applied to other fields as well. Lists designed for endeavors such as mathematics or running a business would certainly share many of these perspectives, like functional, mechanistic, and diagnostic, but may not include the evolutionary perspective. It’s also important to note that some of thee tools rely on others. Remember, in order to take on a diagnostic perspective, one must already have mechanistic answers.

Janssen et al. (2008) also go on to describe four teaching types and their impact on critical thinking acquisition. The first type of teaching is basically just like painting by numbers. The teacher presents the material or assigns a reading and then quizzes the student’s comprehension. This is a very direct approach commonly found among high schools and undergraduate college. While it is cheap and easy to conduct this type of teaching, it also yields the lowest return on critical thinking. The second type of teaching involves asking questions that lead to the answers. Rather than telling a student a fact, the teacher can ask a question that is answered in their text or notes. This second teaching type requires as few resources as the first one, but grants the student additional practice and in finding relevant information on their own. The third type of teaching is basically like the second, except that the answers may not be in the textbook. Students are then required to go find the answers from a wider field of resources, like the library or internet. The third teaching type requires more resources in terms of needing a sufficient library, internet access and additional time to sift through the information. However, the tools gained would be more easily carried into other endeavors. The fourth teaching type allows students to ask their own questions to find answers to. This fourth type of teaching grants the student maximum autonomy and a full set of tools that will help in the future. As you can

see, the first type of thinking takes on the essence of warehousing information. With the fourth teaching type, students are able to follow their own curiosities, which will help maintain a healthy learning practice, invoking critical thinking, long after the class is over. Janssen and de Hullu (2008) also make it clear that the reward systems should be based less on right answers and more on right process. Higher order thinking should be the goal.

Caccavo (2009) continued elaborating on the idea of granting students more autonomy. He proposed a required class for undergraduates on the basic principles of how science works. Many students don't fully understand, or even have dire misconceptions about, how science works; having them role-play and go through the process of science may help resolve many misconceptions. He argues for allowing students to both choose their own topics of inquiry and set some of their own goals and standards. By choosing their own topics, students are inclined to both make the subject more personal and to investigate a specific topic or subject of genuine interest, as opposed to something imposed on them. This helps kick-start the learning process and helps students see science as a way of learning interesting things, rather than a huge body of facts in a textbook. Having students take some control over their own grading process further helps the autonomy of learning. While certain minimum standards need to be maintained and imposed by the teacher, there is still some room to let students have some say over their own grading process through dialogue and negotiation. This way, their research is self-guided and presents them with the tools and resources needed to continue the process on their own. During the semester the students may work on their projects and then, as Caccavo did, hold a symposium or presentation day at the end of the semester, granting an opportunity to experience and practice the peer-review part of the scientific process.

McMahon (1999) echoed this rhetoric when his assessment of authoritarian structures in education revealed effects on both teachers and students. The traditional teaching model has teachers provide the framework and criteria for assessment. That traditional system motivates students to fulfill the requirements imposed upon them for the goal of attaining a grade. When a teacher allows the student to generate his own assessment criteria (through negotiation and still meeting a minimum standard) the motivation to learn and understand the content is more focused on. It is a little like the difference between following the letter of the law and following the intent of the law. Traditionally, the letter of the educational law has been to receive good grades. However, the intent of education is to give our students the knowledge, tools and skills to explore, discover, adapt and think effectively in a variety of situations and environments. By giving our students the opportunity to practice and explore the skills of identifying and pondering questions and problems and then seeking solutions and answers they gain that autonomy intended for them. Autonomy allows students to practice their critical thinking on their own, away from the structure and guidance of formal educators.

One major theme that permeates all the literature about critical thinking is that it should draw from what is known, and be both analytical and transferable. Like the twelve perspectives and related questions for biology students, critical thinking provides us with a set of tools that can be applied to a much wider variety of fields than the subjects through which the skills were originally presented. We can teach our children how to compare by using fruit as the subject and basis for comparison. However, once the ability to compare has been mastered, the student may transfer that ability to any domain they like, beyond fruit. In other words, once we provide critical thinking tools to our students, they will have and be able to utilize those tools as they negotiate the terrains of their futures.

Measurement and Assessment of Critical Thinking

Hassan and Madhum (2007) conducted a review and validity test for an instrument designed to measure critical thinking called the Watson Glaser Critical Thinking Appraisal (WGCTA). The key subsets of critical thinking identified by the WGCTA are inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments. The WGCTA has been used for years in both the US and UK and when Hassan and Madhum used it to test 273 students in Lebanon, the validity of the instrument was further supported.

There are almost as many ways to measure critical thinking as there are nuanced definitions of it. The business college at the University of West Florida took on the task of developing a learning measurement for their program (Peach et al., 2007). After extensive meetings and dialogues they arrived at a definition extremely similar to the one proposed by Hassan and Madhum (2007). Once they had developed a critical thinking assessment, they implemented it in their program's capstone course. It provided adequate feedback to make adjustments to both the measure and how some courses were taught. Over subsequent years, both the teaching standards and the assessment method evolved and matured together. Many schools and colleges use these tests internally, but inter-school comparisons are generally blocked by the politics of educational administrations (Benjamin, 2008). In his article, Benjamin made the case that promoting and conducting critical thinking examinations across many schools would both help discover the effectiveness of various teaching methods in promoting critical thinking, as well as provide prospective student additional relevant information to base their school selection process on.

As critical thinking gains more and more fame within academia, it should also become more and more of a selling point for academic institutions. If an institution can demonstrate itself

to be particularly good at encouraging and promoting critical thinking, then it should also be eager to promote that fact to prospective students. Critical thinking would not only help students be more autonomous and effective in their future careers, but would also give them the tools to help themselves develop healthy and balanced cognitive environments. Together, creative and critical thinking form a powerful engine of ideas, but now we need to explore a compass for that engine, moral thinking.

CHAPTER 4

MORAL THINKING

Introduction to Moral Thinking

I've come to see moral thinking as a guiding force that directs the biphasic cycle of creative and critical thinking. The cycle of divergent and convergent thinking expressed in the last two chapters forms a powerful engine for ideas. That engine is like a meta-tool, comprised of smaller tools to help enhance the specific parts, like using humor to enhance creativity. However, the biphasic engine of creative and critical thinking does not inherently have direction. It could potentially be used for great and noble purposes or horrible destructive purposes, as well as everything in between. As the fictional character, Spiderman's uncle Ben, is wisely fond of repeating, "With great power comes great responsibility." We often use the metaphor of tools to describe the practices for enhancing the machinery of creative and critical thinking. Tools are extensions of ourselves and we are responsible for making sure they are used in moral ways. Just as every shop class stresses a 'safety first' mentality as students learn to use band saws and drills,

I propose that stressing an understanding of morality and moral development is an essential aspect of encouraging and maintaining a healthy cognitive environment.

Most of my memorable life has been tinted by the struggle to understand right from wrong. Socrates described his moral intuition as an inner voice or Damon, which would speak up and let him know when he made disingenuous or knowingly improper arguments (Plato, 399 B.C.). Our moral intuitions are also commonly depicted as the cartoonish devil and angel on each shoulder whispering into our ears. This is undoubtedly an echo of, or reference to, the deeply subscribed to notion of a cosmic duality and clash between good and evil, which we find ourselves caught in the middle of. I've always found descriptions of this sort inadequate and unconvincing because they do nothing to describe where our moral intuitions come from or how they work. My hope for this chapter is to lay down some groundwork for dispelling some of the misconceptions about our moral intuitions, as well as exploring some more contemporary research on how our morals develop and function.

Misconceptions about Moral Thinking

The main misconception about the origins and mechanisms of our moral intuition is that they stem from religion. Like so many of our attempts to understand the world, religion was the first venue of understanding. Two major inadequacies stem from the religious view of moral origins: the inability to accurately describe and predict moral behavior and views, and the assertion that morality is objective. For clarity's sake, I'll limit my critique to the three major Abrahamic religions (Christianity, Judaism, and Islam).

To illustrate why our moral intuitions must stem from an inherent condition within ourselves, rather than religious dogma, I present the Bible itself. Every Jewish and Christian

person hoping to be a part of a functional modern society is forced to be selective about which verses to adhere to. For example, even the most strident followers tend not to follow such verses as Deuteronomy 21:18-21 which commands followers to stone stubborn and rebellious children to death, or Titus 2:9-12 and Exodus 21:20-21 which not only expect followers to keep slaves, but give guidance as to how harshly slaves may be beaten. To me, the fact that followers can read and dismiss these passages indicates that their moral intuitions cannot derive from the passages themselves. It is a good thing that modern people cherry-pick from their holy books and the very fact that they do so means that their source of moral judgment comes from their own inner sense of morality. Otherwise, I would expect to find corpses everywhere children of the pious rebel. The same argument can be made for the Hadith and the Qu'ran, the main holy books of Muslims.

The other major misconception about morality is that it is concretely objective. As we will see in the research, morality is almost entirely subjective. While there are objective ways of studying our subjective experiences that does not automatically entail that those experiences are inherently objective. For example, I could ask you to rate your sensation of happiness from 0-10, take measurements of dopamine and other neurotransmitters associated with happiness, muscle tension, and so on and so forth. That would give me an objective measure of happiness, but that would not make happiness itself objective.

Moral Development – Procedural Perspective

One of the most subscribed to theories about moral development comes to us from Lawrence Kohlberg (1969, 1976). Kohlberg's theory of moral development is among the most popular, studied, and cited theories on moral development. It is basically outlined in two parts.

The first part describes the general nature of moral development. Like many parts of our thinking, moral development is a process that involves the interplay between, and combination of, inherent physiological (more specifically in this case neurological) patterns and growth and environmental inputs. In other words, morals will not simply develop on their own without interactions and feedback from sources like parents, friends, teachers, and other society. Likewise, the best moral training and development program, or environment, is of no use to someone with the key parts of the brain disabled by disease, genetics, or other sources of damage. Both nature and nurture need to work together in order to properly develop our moral faculties.

Another aspect of Kohlberg's theory involving the general nature of moral development is that the interplay between nature and nurture forms a cognitive framework. This framework is basically comprised of the heuristics, connections, associations, and patterns that develop as a result of the above-mentioned interplay between genetically determined biological development and social interactions. This moral framework, or hierarchical structure, is extremely reminiscent of and similar to the high-order thinking described in chapter three. In fact, these two structures utilize many of the same foundational components. As an illustration of this, Kohlberg notes that the highest levels of moral development are only attainable with a sufficiently developed understanding of logic because logic is a prerequisite to the high-order moral thinking defined by those moral stages. Jumping to the highest stage of moral development without the underlying structures is a bit like attempting astrophysics without understanding the basics of math like addition and multiplication.

Table 4.1

Kohlberg's Stages of Moral Development

Phase 1: Pre-conventional	Stage 1: Punishment and Obedience	Right and wrong is determined by the perceived reward or punishment resulting from the action
	Stage 2: Fairness and Reciprocity	Understanding of fairness develops along with the concept of "you scratch my back and I'll scratch yours."
Phase 2: Conventional	Stage 3: Interpersonal Concordance	Morality dependant upon the approval of parents, siblings and close friends or mentors
	Stage 4: Law and Order	Concern for approval extends to the wider population, subsequently including the law
Phase 3: Post-conventional	Stage 5: Social Contract	Law is still the primary source of moral guidance, though individual interests and conflicts are understood and considered
	Stage 6: Universal Ethical Principles orientation	Self-selected principles that are universally applied and are consistent and comprehensive

The second major component of Kohlberg's theory of moral development explicitly outlines the progression of moral stages (See Table 4.1). While keeping the first section in mind, it's also important to point out that these stages are apparently both linear and neatly segmented, but they actually develop in a smoothly transitioning fashion, like all biological systems. We draw lines in the sand to differentiate seedling, from sapling, from tree, but it's easy to see how the progression from one to the next is fluid and continual. There are six stages split evenly among three phases. In the first phase, called pre-conventional, we start with the first stage of

punishment and obedience. The reason not to do something is because it results in punishment. Likewise, the reason to do something is because of the subsequent reward. The second stage in the pre-conventional phase is fairness and reciprocity. Here an understanding begins to develop of the principles of 'You scratch my back and I'll scratch yours.' There also begins to be some recognition of when a deal is basically fair or if someone involved is being either short-changed or over paid. The second over-all phase is the conventional phase, which starts with the third stage called interpersonal concordance. The basis for measuring the morality of an action or intent in this third stage is the approval of local entities like immediate family and neighbors. I don't care too much about what strangers think, but my family and friends hold the opinions that matter. The fourth stage expands upon the previous to include a wider population and an understanding that the law reflects the desires and moral intuition of the masses at large. The law now becomes the yardstick of morality in the fourth stage. The third and final phase is predictably called the post-conventional phase. The first stage of the post-conventional phase (fifth over-all stage) is the social contract. Now the standards and procedures of the law and other moral frameworks are more critically examined and evaluated. While the law is still the primary focus and source of moral insight, it becomes understood that scenarios are relative and individuals may hold differing views, occasionally causing a disagreement with the law. The sixth and final stage of moral development, according to Kohlberg, is the universal-ethical-principles orientation. Here, people have critically examined and considered all of the reasonable and available standards and subsequently constructed a set of principles that are self-determined, universal, consistent and takes the previous stages into consideration. There is no guarantee that this final stage will be reached by any individual. If either damage to certain sections of the brain

or lack of the proper environmental stimuli and interactions interfere with the process, then development would be hindered.

In the nearly half-century since Kohlberg's theory hit the public spotlight, it has become the premier theory to poke, prod, examine, test and study. Dawson (2002, 2003) conducted a wide-net analysis of the tools and insights gained by Kohlberg's theory over the years. The findings are quite supportive, though not entirely. Qualitatively distinct reasoning can be used to help define the stages, and an additional stage between Kohlberg's third and fourth stages may be needed. Furthermore, there is strong evidence that development of these stages is linear, one-way, and hierarchical. However, Dawson adds that it is extremely likely that this hierarchy may metamorphose or restructure itself during the progression of stages. Experience and practice with moral dilemmas helps aid subsequent handling of moral issues. During childhood, age is the strongest predictor of moral stage, but as we reach adulthood, education appears to play a larger role (Commons et al. 2006). However, Dawson also pointed out that the measures used over the years have primarily focused on the development of procedural tools or faculties, which seem to have a heightened vulnerability to cultural biases.

Moral Development – Content Perspective

One of the most compelling criticisms of Kohlberg's moral development model comes from Puka (2002). Where Kohlberg mainly focused on the promotion and stimulation of processes through stages, Puka focused on removing hindrances and roadblocks to moral development, as well as cognitive content rather than process. In Puka's view, what we believe and relate things to is more important than how those things are dealt with. The foundation of this view is based on schemata. A schema is basically all the things we think of when a given

example or stimulus is presented (Reisberg, 2006). So if you were to think of a coffee shop, you'd likely also think of comfortable chairs, small tables, cups of coffee and people engaging in polite conversation but not a walrus. If you were to think of an amusement park, you might think of cotton candy, children, rides, games and open spaces, but not likely a chemistry set. We associate groups of things together and form typical generic versions of settings, things, events, and other items to be remembered. We have schemata for every category including sports, politics, and in this case, morality. Before discussing schemata and their implications for morality specifically, I think it's important to establish a little more about what they are and how they work.

As with most things in nature, the schema has both advantages and disadvantages. The major advantages seem to be that utilizing schemata helps people form satisfactorily complete pictures of situations, events, places, etc, with incredible ease and efficiency (Puka, 2002, Reisberg 2006). We like to have complete pictures to work from and so we refer to, or consult, previously experienced or typical, similar pictures to help fill in the gaps. So if someone were to enter a library, look around for a moment and then leave what do you think they would recall having been inside? Many things may be remembered specifically, like that interesting lamp or table, but many (possibly most) other things would be supplemented by the library schema; like knowing that libraries are quiet and filled with many shelves of books.

The qualities of using schemata that make them so quick and efficient also makes them less reliable. If someone has a schema already set and new contradictory or poorly fitting information is being presented, then two main tactics typically result. If the new information is far too condemning or disproving of the existing schema, then the person may likely dismiss the new information, even if the reasoning or evidence are difficult to refute. Puka (2002) told a

story about a revelation a student had in his class. It was apparently a very enlightened and well thought-out idea which Puka spent some time applauding. Then he politely pointed out that this brilliant revelation the student had posed contradicted the beliefs and ideology exemplified by the student all semester long. The student was compelled to withdraw the revelation rather than reconsider the conflicting pre-established ideology. If an uncomfortable thorn of information is to be accepted, people will often alter or twist the new information to conform better to the existing model. If the basis or foundation of a developing schema is incorrect and never challenged by the dissenting information over the years, then all the dissenting information would be twisted and contorted upon encoding, forming straw-men arguments and positions upon retrieval. This means that information that runs counter to someone's schema runs the risk of either omission, or being subjected to false interpretation at least twice (once upon encoding and then again during retrieval). Puka relates this phenomenon to ideology and how people hold ideological schemata. We have schemata for our families, our politics, our faiths and beliefs, and most pertinent to this topic, our morality. Schemata and ideologies are very akin to one another, and strongly influence one another.

What we believe weighs in strongly on how we remember, interpret and recall things. This particularly matters when we consider how far removed from reality some of our schemata may be. Beliefs about witnessed events and what a criminal is have been demonstrated to greatly contort eyewitness testimony in court (Reisberg 2006, Puka 2002). If grumpy old Mrs. Johnson down the street views little Timmy as a constant troublemaker, then she'll likely lay blame on him when she discovers that her garden has been destroyed. She may even fabricate a false memory of witnessing Timmy in her garden and firmly believe that this is an accurate recollection, even if it is not.

According to Puka, ideological morality relies on sets of patterns and heuristics to follow, almost regardless of content or subject. Ideology-based morals promote general rules that are less flexible than content-based morals. For example, the Catholic ideology dogmatically asserts that the Pope is the source of moral doctrine. So when the Pope takes a stance against condom use, that stance must be unquestioningly upheld, even in Africa where the spreading of AIDS could be massively hampered by education about and use of condoms.

Luckily, we are capable of identifying and overcoming many of the errors resulting from moral ideology schemata. Puka (2002) was able to utilize the Defining Issues Test (DIT) to help students explore, articulate and alter their own belief references; to see their own schematic and ideological functions and filters and to notice their underlying basis and results. We are capable of finding these normally hidden components and reconsidering the aspirations, values and lost opportunities of an ideology.

Comparing the Views of Moral Development

It's important to notice that Kohlberg's moral development theory and Puka's ideological schema theory are not mutually exclusive. While they may focus on different components, the idea that we develop a procedural hierarchy is quite compatible with the idea that our associations and schemata play a role in our morality. It may yet be too soon to pin down a comprehensive model or explanation of morality and moral development, but it is not too soon to expose and separate some beneficial factors from some detrimental ones. In both cases, our experiences and previous examples play a role in forming our moral outlook. In both cases it is important to expose our developing young to moral dilemmas in a mediated safe environment. In both cases, it is advantageous for us to develop our creative and critical thinking faculties. In

both cases, repression of inquiry and exposure to moral dilemmas inhibits moral development. In both cases, a safe, nurturing and stimulating environment provides developmental benefit.

Neurological Findings

While I do not wish to over-complicate our exploration into morality, a brief discussion on some of the neurological findings may help shed some additional light on the subject. People have been interested in discovering the neurological basis for our moral intuitions for decades, and a lot of progress has been made. In particular, there is a constellation of neurons responsible for our ability to feel empathy called mirror neurons (Goolkasian, 2009, Iacoboni, 2008, Lepage & Theoret, 2007, Miller, 2008, Rosenweig et al, 2002, & Santrock, 2001). As humor is to creativity and metacognition is to critical thinking, empathy is to morality. These neurons have been observed to fire, not only when we experience an emotion or event, but also when we witness someone experiencing an emotion or event. When we see someone laughing, our brains at least partially mimic the sensation of that laughter. Anger, sadness and other emotions follow the same pattern. Not only do we have the ability to recognize and 'mirror' the emotional state of others, but we do it automatically and subconsciously. By studying the activation (and occasional damage) of these various parts of the brain, scientists have been able to isolate the parts and constellations involved with emotions, reasoning, intention, loyalty, and even sections that act as a referee between contending impulses. Now that we have some understanding of the parts and principles of creative, critical and moral thinking, let's explore a little further, in chapter 5, how they work together.

CHAPTER 5

PUTTING IT ALL TOGETHER

Overview

The way I've come to see creative, critical and moral thinking is as a guided biphasic cycle. The expansion and diversification of ideas through creative thinking together with the articulation and selection of critical thinking forms a powerful engine of ideas. That engine can be guided and monitored by moral thinking, as a sort of compass that points the way toward what is beneficial and healthy. All three parts appear to be crucially important for developing a healthy cognitive environment capable of generating views and innovations that benefit our lives. Without creative thinking the variety of ideas would be far scarcer, reducing the likelihood of generating the great idea in the first place. Without critical thinking, it would be far more difficult to select that great idea out of the expanse of less preferable ideas. Without moral thinking, the whole system could potentially generate powerful ideas with horrifying side effects. By facilitating and nurturing all three, we can help encourage a balanced, stable and fruitful mentality.

The benefits of having balanced strengths in creative, critical and moral thinking extend beyond the individual. In my final semester in the CCT program I was fortunate enough to participate in a class called Collaboration and Organizational Change. That class taught me that the ability to think critically, and especially creatively, has extremely beneficial effects on group dynamics for the sake of collaboration and change. Creativity helps groups shift from the 'yeah, but' frame of mind to the 'yes, and' mode of thinking. Once that shift starts to happen, the participants begin to open up and express their ideas, concerns and opinions more freely and

openly. That opening of ideas both enhances group cohesion and the sense of investment, or added value, in the process. During our class discussions, we realized that invested collaboration results in something more than the sum of the parts. In other words, three people collaborating well can be more effective and efficient than the sum of three individuals working on their own. The group, or organization, as a whole benefits as well. By giving all of the members a voice and a sense of investment in the collaboration process, the ability of the whole to be flexible and change is also enhanced. Furthermore, the direction of that change becomes more in tune with the will of the members, rather than just a decisive few. In these ways, creative, critical and moral thinking benefit, not just individuals who invest in promoting them, but whole groups and organizations as well.

Common Themes

There are some interesting commonalities and overlaps between creative, critical and moral thinking that I think are very important to cover. The most obvious is that they are all ways of thinking and are therefore dependant upon that which thinks, the brain. Physical damage to the brain can result in partial or complete loss of one or all three of these modes of thinking. Furthermore, all three styles of thinking benefit from environments such as safe and nurturing homes and practices such as transcendental meditation and playing interactive games. There also appear to be windows of opportunity during development that need to be filled with guidance and nurturance to properly develop certain basic faculties needed for all three. Creative, critical and moral thinking also appear to be somewhat overlapped and interdependent. It does not seem possible for a person to achieve the highest tiers of any one, without also having certain levels of abilities in the other two. This paper has, up until now, treated these three thinking modes as

essentially separate, but the lines between them are far hazier. They certainly do not appear to be either clearly defined or altogether different from one another.

I suspect the reason creative, critical and moral thinking share so much interdependence and overlap is because they also share many of the same foundational components. Kohlberg's analysis of moral development noted that logic is a building block for both moral reasoning and critical thinking. Open mindedness also seems to be a common foundational building block for creative critical and moral thinking. Creativity benefits from the disposition of open mindedness because the very core essence of creativity (as per the definition used in this paper) is to be open, expansive and inclusive of ideas. Critical thinking also benefits from open mindedness because it helps to break biases and one-track thinking that can hinder critical thinking. Moral thinking benefits from open mindedness through both the enhancements of creative and critical thinking and the heightened sensitivity it grants to the opinions, views and perspectives of others. It is easy to see how empathy is good for moral thinking, but creative thinking also benefits from the addition of another's perspective, increasing the perspectives at one's disposal. Critical thinking also uses empathy while performing tasks like identifying the origins of ideas. A cognitive ability that I find particularly helpful in all three modes of thinking is the visual sketchpad. The visual sketchpad is basically our ability to see things in our 'mind's eye', or to internally visualize things that are not physically present for the eyes to perceive. It is easy to see how this inherent ability is invaluable to envisioning yet-uncreated possibilities, aiding the creative processes, but also to organizing and comparing, aiding our critical processes. The visual sketchpad is also good for our moral thinking because it aids in the process of predicting outcomes. There are most likely innumerably many of these foundational elements that are shared by two or all three of these thinking styles, certainly more than I could possibly cover in

this paper individually. Furthermore, these elements take many forms such as dispositions, like open mindedness and temperament, and observable neurological functions like empathy. What I want to do, is relay the general sense of the landscape upon which our creative, critical and moral thinking styles are built. To help further illustrate this cognitive landscape, see Figure 5.1.

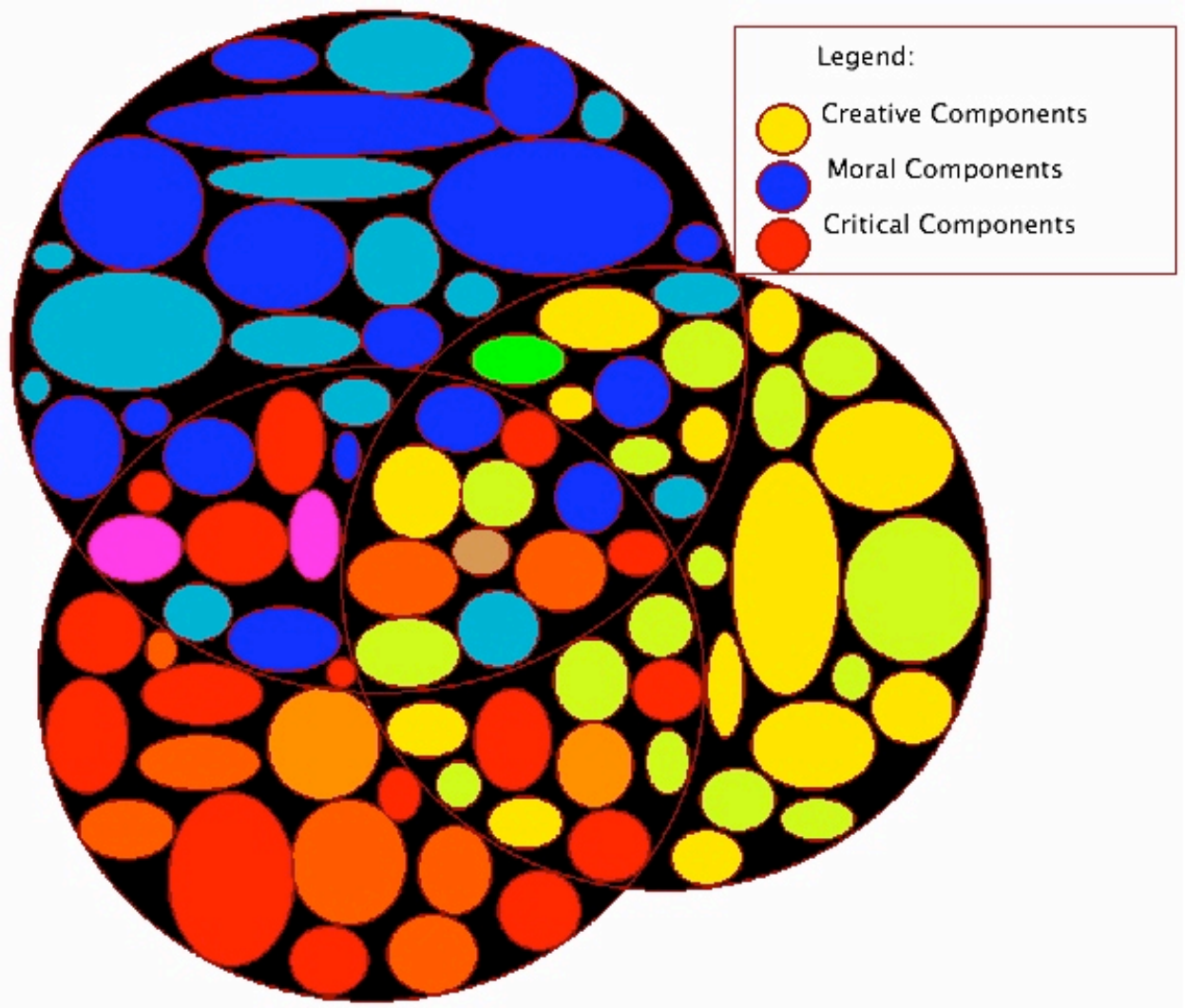


Figure 5.1

Figure 5.1 portrays my conceptual image of the creative, critical and moral thinking styles of thought. It is important to note that the circles and ovals represent a wide range of types

of components, such as dispositions, schema, specific life events, and all of the various elements that comprise our cognitive environment. As you focus your eyes on the creative section, represented by shades of yellow, you'll notice that much of its territory is being shared by critical and moral elements as well. The same effect is seen for the moral and critical sections. In this way, Figure 5.1 demonstrates a sort of shotgun effect. Not only is there overlap and fuzzy borders between these three thinking styles, but the fullest picture of one comprises elements of the other two as well.

The Garden Metaphor

Throughout the history of psychological inquiry people have used technological examples around them to try to describe how our minds and bodies work (Schultz & Schultz 2004). In 17th century Europe, the wealthy entertained themselves with statues that moved via water pressure, called automata. It was believed that our bodies worked very much the same way, with clock-like mechanical components. In the 1800's a mathematician named Charles Babbage invented the first calculating machine. It was a rather large and complicated mechanical machine that could perform mathematical functions, and even play chess and checkers with the turn of a crank. For the first time, a machine could seemingly think. Later, electronic computers were built with memory, data, retrieval, input, output and so on. To this day, much of our psychological terminology reflects the direct comparison of our minds to our latest thinking technology. I'd like to take a different approach and explore the metaphor of a garden as a description of the cultivation and nurturance of our cognitive environment.

Our creative, critical and moral thinking faculties seem to undergo an organic maturation, just as the plants of a garden do. The thinking faculties of an infant are like

seedlings, still very young, undeveloped and pliable to the environment. As the plants mature and grow they are largely following predetermined genetics but must also adjust and conform to their environment. This is a tender and crucial window of time. Just as a sapling will grow around rocks and fences, our cognitive environments seem to conform to the culture and family we find ourselves in. As they develop, our creative, critical and moral faculties need to be nurtured and fed with security, playing and social interactions, just as plants in a garden require sunlight, nutrients and water. There do seem to be people who are genetically prone to having particularly strong abilities in one or more of our three thinking modes, but as in a garden, the weaker components can be nurtured and strengthened. There are also some components that are a benefit to each other, such as a tree giving shade to a fungus, which in turn, provides nutrients to the tree. By practicing activities that nurture our creative, critical and moral faculties, I believe we can help assure that our cognitive environments are strong, balanced and fruitful.

Aside on Religion

In the interest of exploring the field of benefits and detriments to creative, critical and moral thinking, I'd like to reflect on and ponder the effects of religion. I was raised in a Lutheran home and was a firm believer. I was involved in the church youth group, volunteered time, went to massive national Lutheran gatherings and studied the New International Version Bible intensely. After high school I went off to study psychology at Frostburg State, where I became increasingly aware of how many religions there were in the world. The realization of the plurality and mutual exclusivity of religions laid the foundational skepticism that led to my current atheism.

Religion easily becomes, for lack of a better term, a rigid ideological structure. Remember Puka (2002) (from chapter 4) and his views on how schemata play a major role in how we associate things? If you say, "dentist office," the list of things I would likely associate with it would be things like: dentist chair, overhead light, tooth diagram poster, waiting room and so on. When I was a fundamentalist Christian aspects of that belief system would permeate and penetrate into a wide variety of other schemata, like life origins, universal origins, the concept of good and evil, the concept of when an individual life begins and so on. I also strongly identified with being a Lutheran. It was a large part of my very identity. What I realize now is that the combination of permeation throughout my schemata of, and the identity felt with, my faith, had some detrimental effects on my creative, critical and moral faculties.

Before I was to be confirmed, I met with my Pastor and was in tears over the overwhelming feeling of unworthiness. He told me that those feelings were actually an affirmation of how worthy I actually was. Something seemed wrong about that. How could doubts be direct evidence of what is being doubted in the first place? I eventually came to realize that critical inquiry was something faith itself rejected. The claims and assertions of the church basically boiled down to arguments on par with, "Because I said so." Children have the, often rude, habit of asking 'Why?' in an attempt to discover the origins of claims. In the church, these regressions always ended at points that were one form or another of, "Because I said so." The message was becoming clear. Religion was just one of those domains where we were discouraged from being too critical.

My faith was also a problem in terms of creative thinking. As mentioned in chapter 2, creative thinking is hindered by defensive emotions like anger and fear. The position religion had, in terms of identity, placed it in an emotionally precarious position. People feel a strong

attachment to their religion, which lowers their threshold or tolerance of alternative or novel approaches or views of it. Humor is a major creative supporter and people don't like to hear their religion joked about. Looking back, the topics that I felt the least amount of openness and humor about were those topics that were inundated by my religious views, like homosexuality and abortion.

It seems to be a sliding scale where the more religiously fundamentalist someone is, the more schemata their religion permeate. Moderates seem to relate far fewer things to their faith than fundamentalists do. The deepest believers see everything around them through the lens of their religion. The problem is that each of the schemata that religion gets a hold of becomes subject to the same lack of, or even aversion to, creative and critical thinking.

Stepping back and looking at the United States as a whole, I can see religion hindering creative and critical thinking on the mass scale as well. In the United States the issue of gay marriage has a habit of emerging every now and again. Since marriage is a legal process and is therefore a function of the state, one would think that the only country in the world to have explicit separation of church and state and valuing of equality would have no problem granting homosexual couples the same rights as heterosexual ones. Yet, the religious factions have contrived to block equal marriage rights for homosexuals on the basis of their own concept of marriage. I still do not understand the argument that allowing gay marriage somehow dilutes or diminishes the value of heterosexual marriages. The medical field has also suffered at the hands of the religious. For over a decade, stem cell research – probably the number one avenue of research for developing therapies for the greatest number of ailments – has been blocked by religious groups based on their indemonstrable belief in a soul entering the zygote at the moment of conception. Possibly worst of all, there have been repeated attempts (and occasional

successes) to push the theory of evolution from science classes to make room for intelligent design. Intelligent design is the baseless veneer of creationism, the biblical story of the creation of the universe and life. According to Richard Dawkins, renowned biologist, nothing in biology makes sense without evolution. Understanding and working with evolutionary theories is the most fundamental concept to understand in any field of biology. Yet, many teachers all over the country are terrified and hesitant to teach evolution in biology classes because of the charged reactions of the students' parents.

I often listen to a weekly science podcast called 'This Week in Science." The two hosts of the program do a wonderful job of talking about the latest and greatest discoveries in the world of science. Through 'This Week in Science' I discovered that we live in a world where Neanderthal and the wooly mammoth may be brought back from extinction, space elevators may be built for safe cheap transportation to orbit, a dinosaur may be reverse-engineered from a chicken, around 350 planets and counting have been discovered around other stars, and so on and so forth. Yet, only 23% of Americans can correctly answer the following three questions:

1) Approximately what ratio of the Earth's surface is water? (2/3)
2) True or false. Humans and dinosaurs coexisted at some time. (False)
3) How long does it take for the Earth to go around the sun? (1 year = 365 days)

I'm not trying to suggest that religion is the sole cause of this failure of basic understanding. I'm suggesting it does not help. Religious practice is not only the practice of suppressing creative and critical thinking, but it also makes assertions that are bitterly and angrily pushed on the basis of, "Because I said so." If we are to benefit from, and take a lead in, scientific progress, we need

to teach our young how to develop creative, critical and moral thinking. To do so, is to give our young the tools and dispositions that are not only at the heart of the scientific spirit, but also inherently push against our first and worst explanations of the world around us, known as religion (Hitchens 2007).

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