

Can You See the Real Me? Recognizing Hemispheric Specialization through Art

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Introduction

If you were to ask an AP Psychology student on the first day of school what they expected this course to cover, you would probably hear something about the meaning of dreams or what makes serial killers. One of my favorite things about teaching this course is how surprised students are to discover just how comprehensive a subject psychology really is. Everything they do, from breathing to completing complex mathematical equations, involves psychology.

So, the task of the AP Psychology instructor is to take all these seemingly disparate areas of human activity and show their students that they are interrelated simply because they are *all* areas of human activity. This can be a daunting endeavor for both the teacher and student, weaving all these complex tapestries together to form the amazingly rich human animal. Add to this the pressures to cover the requisite curriculum to adequately prepare students for the AP exam and the expectations that our students, administrators, and often that we teachers have about what the classroom experience should be like and big gaps begin to appear in student understanding.

The fundamental goal in my unit is to give students greater insight into a part of themselves that all too often is neglected by educators and society as a whole. I want students to get to know themselves in different way and as a byproduct, learn to see the world from the perspective of this new self that has been inside them, silently influencing their lives from the very beginning. Indeed, this was their original self.

What I'm speaking about, of course, is hemispheric specialization. My goal in this unit is increase my students' understanding of the differences in these hemispheres and the implications this has on our lives. The main thrust of this unit will be presented during the first unit, which covers neuroscience, but there will be tertiary lessons throughout the year and will culminate in a field trip to the Bechtler Museum of Modern Art.

This unit is admittedly, a luxury item when compared to its curricular utility in preparing students for the AP exam. It does cover a variety of sub-goals as laid out by the North Carolina Standard Course of Study, but it does so in an untraditional or nonspecific way. What I mean is that typically, the material is covered a compartmentalized fashion. For example, development usually starts with the womb and ends at the tomb with an analysis of the motor, cognitive, and social developmental hallmarks that occur in between the two.

I begin the year with the study of the brain so this unit will be presented along with these lessons, but it doesn't need to be. If I chose to open the year with a different topic, say cognition, I would still incorporate this lesson into it. As you will see, this lesson is tricky to pin down, which is the goal. The most important thing for me is that I teach this lesson as early in the school year as I can, before the familiar drumbeat of another school year traps us all into falling into the familiar routine of units, chapters, and sections.

The cortical hemispheres and the corpus callosum are just a few in a long list of brain structures that students are expected to understand. A teacher could very easily have a brief class discussion or lecture along with a comprehensive exercise of all the brain structures and move on to the next unit in a neat and orderly fashion. I know that's what I typically do and with good reason.

I have had growing reservations about this approach however. The course is so compartmentalized, with each sub-set like development, learning, perception and motivation each living in its own vacuum completely isolated from one another.

Now, we know that's not true and I think our students understand that they are interconnected at least on a theoretical level. Is it enough to supply our students with a compartmentalized though comprehensive inspection of the mind and human behavior with a vague notion that they are so interwoven as to make them inseparable? Why don't we try, in our limited time, to give them a deep appreciation for the complexity of human cognition and behavior first and sprinkle in the gory details (essential vocabulary) as we go along? For those of you who just said yes, you just accessed your right brain. Welcome.

Background

I teach at a magnet school for the performing and visual arts. Students from the entire county may attend provided they pass an audition process centered on their specific artistic major, though there are some academic qualifications that must be met. The result is that the student body is made up of people who are choosing to be here, in many cases making considerable sacrifices to make it to school. While it may be true that the central reason for each student's enrollment is for their arts classes and not their academic

ones like mine, they bring an enthusiasm to campus that manages to seep into every classroom no matter what the subject.

The campus itself is situated in a very low-income, urban setting and many of the students do come from this neighborhood to avoid attending their local school. Consequently, the school has an ethnic and socio-economic mix that fairly matches that of the city and county as a whole with an approximate 60/40 ratio of black to white and economically disadvantaged to non-economically disadvantaged student population. The questions and challenges discussed during this unit will be suitable and I would add necessary, but all the more so at a school for the arts.

My use of the arts fits my circumstances more than most I would imagine and I will briefly explain ways to convert this unit to suit your preferences. First though, a brief explanation about why I believe an examination of hemispheric specialization and the arts is of particular importance at my school.

A lot has been written about hemispheric specialization and its role in cognition. The general perception is that analytical or more traditional academic thought is dominant in the left brain and creative thinking is centered in the right. The vast majority of people are right handed and most right handed people are left brain dominant, which helps explain why traditional schools have been structured the way they have.

There are however, a sizeable portion of the population that struggle with these conventions not because they are intellectually limited, but because they “think differently” than the average person. These people are society’s creative types, people who feel stifled by the order and structure of the traditional classroom environment. It is for these students that my school was designed to instruct, to help tap their inner creativity and find an outlet of expression not available to them at a neighborhood school.

Of course, that’s the role the arts classes are supposed to play, academic classes are expected to be the anchor to provide arts students not just the required content, but a reminder of the real world they will entering with all of it’s reason and rules. Many an administrator has used this to justify the dreaded word *differentiation* when reviewing an observation. A common refrain at my school is “Our kids are just so different than students at other schools. They think differently, you know, you’re the psychology teacher, they’re right brained.” To this I say “Ugh. Unless there’s something I don’t know about, all of my students have both a left and right brain.”

In just a few paragraphs I will examine some the problems with the common perception of the left and right brain phenomena. Much of the research has been used to make wildly extravagant claims to sell books and make fun online surveys to pass around in email chains. It is these misperceptions that need to be dispelled not so we can go

back and make every school a typical neighborhood school, but so we can make every school an arts school.

Rationale

This unit will explore the competing and complementary influences of our left and right hemispheres. We will start with a rudimentary examination of the structures and build from that to examine their various attributes and how we use them in different ways. The final area where we will examine this distinction is art. How much of the artistic experience is the domain of the left hemisphere and how much is from the right?

The left and right hemispheres and the way they are treated by academics have gone through a number of vacillations. Currently, the study of hemispheric specialization has become almost taboo amongst serious academicians because it has become the play thing of pop-psychology. This controversy is not simply a byproduct of academic snobbery and deserves some more discussion before we proceed.

Let's start with the basics. The left hemisphere of the cerebral cortex controls the right side of the body and visual field. The right hemisphere controls the left side of the body and visual field. There is a very easy and illustrative method to introduce this phenomenon to students, which will be discussed later on in classroom activities. For now, let's just recognize that for all intents and purposes we have two brains each with their own physical domain.

The idea of hemispheric specialization of cognitive abilities dates back to the 1960's (at least from a neurological perspective, philosophers have theorized about the duality of the psyche for much longer) with Dr. Roger Sperry and Dr. Michael Gazzaniga. They conducted groundbreaking experiments on the cognitive abilities of people who had had hemispherectomies. This is a procedure to sever the corpus callosum, a thick band of neurons that conveys messages between the two cerebral hemispheres, to relieve epileptic seizures¹.

With no corpus callosum, the patients at first seemed to have no noticeable impairments in initial experiments. Further research involving objects in their visual fields however, would expose deep divisions between what each hemisphere did in terms of understanding and interpreting the environment. When an object was presented in a patient's right visual field they could verbally report seeing the object, but when it was flashed in the left visual field, they reported seeing nothing at all. Then things got interesting, when the patient was asked to draw with their left hand, anything they might have seen they were able to do so accurately.

The research was groundbreaking and Sperry won the Nobel Prize for it. The implications of the study were tremendous, the left brain housed language and interpreted

the world in a coldly logical and analytical way while the silent right brain contained our creativity and could easily manipulate objects spatially. This spawned a whole new series of self-help books and new business management seminars aimed at tapping these various skills.

To scientists however there were some deep concerns with these claims. First off, the study of the brain has left researchers to conclude that there are no absolutes when discussing functions and regions of the brain. The system is far too complex in every other facet to have such a distinct division of labor involving such important attributes such as language and spatial reasoning. Second, with the very rare exception of split-brain patients, humans have a functioning corpus callosum so even if the division exists it ultimately matters very little in understanding human cognition.

Then in the 1990's further research involving hemispheric specialization using PET scan imaging seemed to shatter the findings of Sperry and Gazzaniga. This research showed that some language processing occurred in the right hemisphere while there was spatial awareness in the left hemisphere². This seemed to close the matter for most of the research into cerebral hemispheres and leave it as an issue for pop-psychologists and you might be thinking that I should have maybe mentioned this earlier and saved you some time.

Not so fast, for while those studies showed that both hemispheres had the same abilities, they appear to use them in strikingly different ways. Take for instance, the most common claim that language is the domain of the left brain. This is true regarding the literal use of language, but when using language for poetry or humor, to convey some underlying meaning or emotion, that language is the domain of the right. Spatially as well, the left brain navigates in space in a goal-oriented specific fashion. It is trying to make order of the environment to complete a desired task. Meanwhile the right-brain is taking in the environment in a much broader or general way with no definitive target or goal in mind. Then, when the right brain is struck by something, it accesses the left brain to provide meaning³. It is this relationship that will make up the culmination of the unit as it explores the cerebral cortices.

I've chosen to use the analysis of modern art as the culminating activity for the unit because high art does a very subtle and delicate dance between the two. All artistic movements have had some set of organizing principles that they use as a starting point to build off of (more on this later with Kuhn), yet within the confines of these structures there is some significant emotive expression. To experience art then is to learn and understand these established structures and use them to have a personal experience with the piece.

Teaching Strategies

The inspiration for this unit came from a woman who suffered a stroke in her left cerebral cortex and over the course of a couple of hours, slowly took away that region's ability to function. All she was left with was a right hemisphere. The woman's name is Dr. Jill Bolte Taylor and she just so happens to be a neuroscientist. She was able to analyze what happens to the brain during a stroke from a personal perspective. During this episode, Dr. Taylor describes how she was settled in the present moment and was unable to distinguish the cognitive boundaries that defined where her own physical sense energy ended and another began. She claims to have experienced Nirvana while she lost herself in a sea of sense energy⁴.

Dr. Taylor's talk is such a wonderful combination of scientific curiosity and heart wrenching awe at the humanity she finds at the end of her search that students (and teachers) can't help but feel somehow changed by it. Taylor artfully bridges the gap between spirituality and science. She is now an advocate for an increased attention of the need for compassion in medical schools as a result of her experience.

The left hemisphere processes information serially, this gives meaning to incoming information and allows the brain to operate on the information with a sense of purpose for the future. It is this region that organizes and defines sensory information. When this area was shut down in Dr. Taylor, she no longer had a sense of what it means to be her. If her hand went to rest on a table, she couldn't determine where her hand stopped and the table started. She glories in the memory of being able to shed decades of emotional baggage.

The right hemisphere experiences the world using what Taylor calls a "parallel processor" meaning the sensory experiences go undefined and without any sense of time or purpose. The world, to this mind, is pure with raw emotion. This begs the question of what is consciousness awareness. Do your experiences have to be firmly planted in the present or defined against some past event or expectation to be valid? Some of the art students will be introduced to will make some similar challenges.

James Elkins's *The Object Stares Back* in which Elkins claims that an individual cannot "just look" at an object, but is compelled to bring with them their own past experiences and expectations. This is a patently left-brained attribute which interprets sensory information with a contextual awareness as well as an expectation for the future. Creativity is a trait most often expressed by the right hemisphere, but the left hemisphere anchors creative expression by giving it definition and purpose. The notion of 'losing yourself' in an amazing work of art sounds wonderfully romantic and idyllic, but if you are in fact 'lost in the moment' can there be a real appreciation for the experience? The hope is to stay rooted in the right brain while using the left to give an experience meaning. The question then becomes, what is the ideal relationship between the two spheres?

The idea of alternate processors is extended in another lecture by Iain McGilchrist, a British psychiatrist who is exploring not ‘what’ the hemispheres do differently, but ‘how’ they do them differently⁵. Where Taylor relished the ability to shut down her left brain, McGilchrist sees it as a tool to enable the right to interact with the world. In this way, he serves as a kind of mediator between Taylor and Elkins. The concern to McGilchrist however, is that the tool, with its ability to use language and the desire to define and “pin down” experience is slowly taking over our collective minds. When this happens we shut out the natural experience and try to achieve a defined perfection, which is not a natural state and therefore devoid of any real meaning⁶.

To an educator this cuts to the very core of what we are trying to do with our students. Let me give an example of what McGilchrist is saying. In addition to teaching AP Psychology, I also teach US History, which up to this year has been subject to a state created assessment. Here are two potential questions that a teacher could pose to a class:

What event caused Southern states to secede from the Union?

Or

What would the United States government have to do to compel you leave the country for good?

The first question uses a left brain processing style, the answer is can be clearly defined and understood. Not just by one person, but by anyone who uses the language. The language is in charge here. This is perfection, right? We know this because if a student knows the meaning of all the essential vocabulary for any given subject they will earn a *perfect* score on that subject’s assessment. Now, what do they really know? Students may associate the election of Abraham Lincoln to other antebellum events and recognize their collective significance to the rising tension between free and slave states, but this is all still confined to the use of specific language.

The second question uses language to reach into the right brain and search within themselves for an answer, their answer. Then connect that to the answer that citizens of South Carolina and we have created empathy, an intuitive emotional connection between our students and a historical event. In relating that experience they may use the essential vocabulary from the curriculum, but the experience is still their own. That’s what many of us are trying to do, but this is becoming harder to do because of restrictions placed on us from within the education system.

So, McGilchrist’s fears that the language of the left will usurp the intuitive powers of the right seem to have to some basis in fact. In fact, this may be part of the human condition. Thomas Kuhn, the noted scientific philosopher, claimed that human beings progressed by creating paradigms which served as defined underlying principles that enabled greater understanding at a faster rate. In other words, definitive order supplies the tools of creation. At some point however, these principles will fail to answer certain

questions, meaning the tools become obsolete. During these periods, people are forced to experiment with different tools to establish a new order and progress is very slow.

This finally brings us to how all of this connects to the arts. Well, art is a creative endeavor by people to express their thoughts and feelings. On the surface, what could be more right brained? Elkin's points out that this is not as clear and simple as it might at first appear. McGilchrist would probably argue that art more than other areas of life is particularly vulnerable to a left brained takeover. So let's take a look. Clement Greenburg an important art critic of the modernist period mirrored the later views of Kuhn and much later McGilchrist in the following passage:

A society, as it becomes less and less able, in the course of its development, to justify the inevitability of its particular forms, breaks up the accepted notions upon which artists and writers must depend in large part for communication with their audiences. It becomes difficult to assume anything. All the verities involved by religion, authority, tradition, style, are thrown into question, and the writer or artist is no longer able to estimate the response of his audience to the symbols and references with which he works...

Thus our present bourgeois social order was shown to be, not an eternal, "natural" condition of life, but simply the latest term in a succession of social orders.⁷

This nicely synthesizes the thoughts of Kuhn and McGilchrist. Artists in the modern period (modern period for the purposes of this unit, but this is applicable to any period) could no longer make any connection using the traditional methods. I particularly love the acknowledgement that a social order is just that, a set of orders. They are left brained definitions that inhibit and eventually replace the natural world.

I also think it is noteworthy that an art critic's analysis precedes these two brilliant scientific philosophers by decades. Art is perhaps the ultimate intuitive and intellectual exercise there is. What better arena is there to have a student begin exploring these critical distinctions?

What I want my students to get from this unit is an appreciation that much of what we call the world has been artificially created to allow for easier understanding and manipulation. To understand that much of the world order has been man made, students will be less likely to blindly accept their absoluteness.

Please note however, that I have chosen to center my unit's hemispheric investigation on art, but these concepts are easily transferable to theatre, poetry, engineering,

linguistics, religion, economics, geography and on and on, really anything involving human beings. Show students a satellite image of Earth and then show a typical map of the world from a textbook. They look nothing alike. The one in the textbook will be a jigsaw of very unnatural colors with straight lines all over the place. Those lines and colors are man made, but they have become so ingrained in our minds we have forgotten we put them there for our purposes.

I encourage any efforts to use this to teach across multiple disciplines. The structure of the unit is laid out as follows, introduce the hemispheres and brain structures, discuss the development of our understanding of these structures, the current theories on processing differences, research evidence of this on a larger, societal scale.

Classroom Activities

The typical unit plan will have a very specific set of blueprints for another teacher to follow. I feel that if I were to do that at this point, I would be undermining everything written up to this point. What follows are the activities I use for this unit, but I typically have my students keeping a number of plates spinning, so in the course of a typical ninety minute class we have these activities, book discussions, lecture, test review and so on. In short, this unit is trying to show the interconnectedness of the entire curriculum and my daily lessons follow a similar theme.

To introduce my students to the existence of their two cerebral hemispheres I have them all stand up in class, extend their left arm straight out in front of them, point their index finger and then rotate their wrists counter clockwise. Then I tell them to lift their right foot up and rotate their ankles clockwise while still rotating their wrists. They can all do this very easily and think my demonstration is a colossal failure so I have them put their foot back down and try the left foot instead. Of course, this is asking the right hemisphere to send two totally opposing messages and it is practically impossible to do.

To extend the lesson on hemispheric differences, I show a short video clip of Dr. Michael Gazzaniga's experiments with people who have split brains⁸. To alleviate terrible seizures in some people, doctors perform a hemispherectomy which severs the corpus callosum, a thick band of axonal nerve fibers that allows the hemispheres to communicate with one another. In the experiment, Dr. Gazzaniga has the patient stare at a dot in the center of a computer screen as words or images are flashed on one or both sides. If a word is flashed on the right side the patient can say what he has seen. When a word is shown on the left side the patient reports seeing nothing, but is able to draw a picture of the word with their left hand. It is a remarkable clip that vividly illustrates the existence of two separate brains each with their own experiences inside all of us.

The next step of the lesson introduces the different skill sets that reside in each hemisphere. I have my students take a survey called the Wagner Preference Inventory;

this can easily be found with an internet search. It is a quick, twelve item survey that evaluates hemispheric preferences. Here is a sample item:

Choose the activity you *prefer* even though it does not necessarily mean that you have the *ability* to do it.

- a) Be a comparison shopper
- b) Read about famous men and women
- c) Run a traffic control tower
- d) Mold with clay and putty

For each item, answers a and b indicate a left hemispheric preference and c and d a right preference. A difference of more than three (i.e. 8 left and 4 right) indicates a hemispheric dominance⁹.

Working at an arts magnet school, my classes usually respond with a majority of balanced or right dominant students. Next, I begin a discussion of which hemispheric skill set is most rewarded in schools and what are the subsequent societal ramifications? The two US History questions posed earlier would be an example of a prompt to get the conversation going. If there are negative consequences, how can classrooms incorporate lessons and assessments to evaluate the abilities of both hemispheres?

So it is at this point where I am going to begin inserting lessons on art and identity. I will start with the TED lecture by Dr. Taylor and introduce the idea of losing yourself to something and not needing language to describe it. We'll discuss how in fact, language can serve to take the life or passion out of something by giving it defined order. I do this by explaining to my students very specifically, something that I find amazing. I am many things, but an artist is not one of them so I use something I am passionate about, skateboarding. To me, there is nothing more beautiful than a big old frontside ollie on a twelve foot vert ramp.

I give them written instructions detailing how to drop in on the ramp. Start by pressing down on the board with the front foot and getting into a crouched position with the knees bent while descending the wall of the ramp. Then, when hitting the transition of the ramp to the floor, the knees straighten quickly to pick up speed, relax again during the flat of the ramp, then straighten once more while ascending the transition on the other side. With the necessary speed achieved, push down fast and hard on the rear foot while simultaneously pulling your front foot in towards your chest. As the board separates from the ramp's surface tuck your back foot in towards the chest and begin rotating the body 180 degrees with the back towards the ramp. Line the feet to be perpendicular to the lip of the ramp and land. Ah, that was so beautiful! Then I show them a brief clip of someone performing this trick and ask them how the two presentations differed. Do they think the skateboarder in the clip was articulating what they needed to be doing to pull off the trick in a similar way that I had done? What do they think the skateboarder's

cognitive process might have been? Can they think of something in their life that might compare to that type of cognitive process?

Their homework that night is to find and bring to class, some piece that really moves them and might even take them out of their left brain. This can be a piece of music, and clip of a painting or photograph or a video clip of a ballet. Something that when they see or hear it, they are momentarily removed from the passage of time. Their prompt to start class that day: Write down, as best you can what makes your selection so special. We'll talk about any difficulties they may have had and the potential limitations of language as an expression of our thinking.

Then, when they are absolutely certain that they know what experiencing art is supposed to be, I'm going to have them read Elkins and ruin everything. They all have a corpus callosum so whatever their right brain is experiencing their left brain is picking up too. What does the left brain bring to the table? Is it a benefit or an obstacle? Is there a brain that you most want to use to experience art or is the relationship absolutely necessary? In other words, does the language of the left brain serve as a necessary guide for your right brain intuition or can you still have a valuable experience solely in the right brain? When might we see the left brain as having a corrosive influence on the experience?

Once we have discussed these issues, students will be presented with an organizational chart outlining the necessary vocabulary to effectively appreciate art. The chart I use structures the language of art criticisms along four axes, Describe, Analyze, Interpret, and Evaluate¹⁰. I will list my source in the bibliography, but an art teacher on your campus will probably have something similar that would suffice. You just want to give your students a brief introduction into art criticism so they are able to properly complete the activity at the Bechtler.

Some students might object to a standardized vocabulary for art appreciation as being opposed to earlier lessons. This is a reasonable concern and all the more likely with a class of adolescents who so desperately want to have a personal fable outlining their own uniqueness in the world, so it is important to refer them back to Elkins and remind them that the hemispheres are not enemies, but are designed to work together. Language is an essential tool to navigating the world. Even Jill Bolte Taylor, who described losing her left brain as Nirvana, fought for years to recover its uses.

Equipped with the language for art, students will visit the Bechtler Museum of Modern Art with the object of finding a piece that speaks to them. Once they find a piece, they will have to articulate what it is about the work they enjoy using the correct language. I want the students to describe what it is about that particular piece that drew them in, made them stop and look further. Then they will have to guide others to

discover the work's essence by coming up with three to five discussion questions regarding the piece.

Students will be put in small groups and visit each group member's chosen piece and use the questions to lead a conversation. Students will be instructed to take notes of their group members' responses. When we reconvene as a class, we will discuss some of the responses and try to identify them as left or right brained.

I expect to take five class periods to complete this unit. One class period each for the introduction and Gazzaniga piece, the lecture by Dr. Taylor and the connection to art, and then the presentations and Elkins reading. The field trip to the Bechtler will only take one class period, but it will be a half-day field trip that will take the students out of other classes, then one last class day to share our experiences from the Bechtler and to discuss other possible examples of hemispheric specialization before moving on.

This will close the unit, but I have every expectation that the introduction, however brief, of topics such as; language, cognition, memory, motivation, emotion, intelligence, personality, sensation, perception, and consciousness will stay with them. This will serve dual purposes, the first being to use as a platform to introduce each unit; students will already have a personal connection to the content that we've already shared as a class. Second and most importantly, this unit will reinforce the fact that while the field of psychology can sometimes be sub-divided for academic ease, the reality is that everything is interrelated.

Endnotes

¹ Psyblog, 10/31/2011, <http://www.spring.org.uk/2008/03/two-brains-for-the-price-of-one.php>

² John McCrone, The New Scientist, <http://www.rbiproduction.co.uk> (7/21/2000)

³ Iain McGilchrist, "The Master and His Emissary". Yale University Press, pg. 4

⁴ Jill Bolte Taylor, TED, 3/2008,

http://www.ted.com/talks/lang/eng/jill_bolte_taylor_s_powerful_stroke_of_insight.html

⁵ McGilchrist, pg.3

⁶ Iain McGilchrist, TED, 10/2011,

http://www.ted.com/talks/lang/eng/iain_mcgilchrist_the_divided_brain.html

⁷ Clement Greenberg. Sharecom.ca, 8/24/2010, <http://www.shareroom.ca/greenberg/kitsch.html>

⁸ Michael Gazzaniga, Youtube.com, 4/18/2007, <http://www.youtube.com/watch?v=aCv4K5aStdU>

⁹ R.F. Whagner and K.A. Wells, A refined neurobehavioral inventory of hemispheric preference. *Journal of Clinical Psychology*, 41, 672-673

¹⁰ Davis Publications, "A Critical Method". Poster presented in Northwest School of the Arts visual arts classroom.

Bibliography

Elkins, James. "One." In *The Object Stares Back: On the Nature of Seeing*. New York:

Harcourt, 1996. 22.

"Iain McGilchrist: The divided brain | Video on TED.com." TED: Ideas worth spreading.

http://www.ted.com/talks/lang/en/iain_mcgilchrist_the_divided_brain.html

(accessed December 1, 2011).

"Jill Bolte Taylor's stroke of insight | Video on TED.com." TED: Ideas worth spreading.

[http://www.ted.com/talks/lang/en/jill_bolte_taylor_s_powerful_stroke_of_insight](http://www.ted.com/talks/lang/en/jill_bolte_taylor_s_powerful_stroke_of_insight.html)

.html (accessed December 1, 2011).

McCrone, John. "'Right Brain' or 'Left Brain' - Myth Or Reality?." Jeff Rense Program .

<http://www.rense.com/general2/rb.htm> (accessed December 1, 2011).

McGilchrist, Iain . "Introduction." In *The Master and His Emissary*. New Haven: Yale

University Press, 2010. 3-4.

"Two Brains for the Price of One? " PsyBlog." Psychology studies relevant to

everyday life from PsyBlog. <http://www.spring.org.uk/2008/03/two-brains-for-price-of-one.php>

(accessed December 1, 2011).

Wagner, R.F. , and K.A. Wells. "A refined neurobehavioral inventory of hemispheric

preference.." *Journal of Clinical Psychology* 41 (1985): 672-673.

baynej. " Split brain behavioral experiments - YouTube ." YouTube -

Broadcast Yourself. . <http://www.youtube.com/watch?v=ZMLzP1VCANo>

(accessed December 1, 2011).

"Greenberg: Avant-Gardde and Kitsch." Sharecom Industries Ltd..

<http://www.sharecom.ca/greenberg/kitsch.html> (accessed December 1, 2011).

