

THE BRAINS BEHIND MEDIATION: REFLECTIONS ON NEUROSCIENCE, CONFLICT RESOLUTION AND DECISION MAKING

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INTRODUCTION

On September 13, 1848, an explosives charge sent a three-foot tamping iron about an inch in diameter through the head of Phineas Gage.¹ Although Gage survived, the tamping iron, which entered just under the left eye and exited through the frontal portion of his head, destroyed his prefrontal cortex.² Prior to the accident, Gage was a popular foreman of a railroad construction crew.³ After the accident, he was a tactless, profane, and impulsive man with a dramatically altered personality.⁴

It is through extreme examples of severe deficits in the brain that scientists were able to develop our earliest descriptions of how the brain affects behavior. Today, advances in neuroscience have given us unprecedented insights into the workings of the human brain.⁵ A great deal has been discovered in disciplines ranging from cognitive-behavioral psychology and neuropsychology to molecular biology. To what extent these discoveries impact other fields, including the dispute resolution profession, is now a hotly-pursued topic. While a quick survey of recent studies of the brain produces a flood of connections to the practice of mediation, even neuroscientists caution against the certainty of their findings.⁶ There is still more research to be done and many of these studies provide evidence of correlation but not necessarily causation. Perhaps we should resist the temptation to champion a long sought-after scientific basis for all that we do as mediators. However, there is no denying the fascination with what we are learning about the human brain, how it guides our behaviors, and how it impacts the way we make decisions. At a minimum, it is cause for great reflection.

I. OUR NEGATIVE VIEW OF CONFLICT

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¹ See *The Phineas Gage Information Page Maintained By Malcolm Macmillan*, www.deakin.edu.au/hbs/GAGEPAGE (last visited Feb. 14, 2010).

² *Id.*

³ *Id.*

⁴ *Id.*

⁵ For a great explanation of functional magnetic resonance imaging (fMRI), see MARCO IACOBONI, *MIRRORING PEOPLE, THE SCIENCE OF EMPATHY AND HOW WE CONNECT WITH OTHERS* 59 (2009). For a description of transcranial magnetic stimulation (TMS), see *id.* at 90.

⁶ See Edward Gandolf, *Cautions About Applying Neuroscience to Batter Intervention* 3 (citing NEUROSCIENCE AND THE LAW: BRAIN, MIND, AND THE SCALES OF JUSTICE (Brent Garland & Mark Frankel, eds. 2004)), available at <http://www.nationalcenterdvtraumamh.org/lib/File/Neuroscience%20and%20batterer%20programs-FINAL.pdf> (last visited Mar. 6, 2011); see also Nigel Eastman & Colin Campbell, *Neuroscience and Legal Determination of Criminal Responsibility*, 7 NATURE REV. NEUROSCIENCE 311 (Apr. 2006), available at <http://www.nature.com/nrn/journal/v7/n4/full/nrn1887.html>.

Mediation training programs often begin with a conflict word association exercise to explore the nature of conflict. Trainees typically produce a list of similarly negative words including argue, fight and disagreement. This list propels a lively discussion of why we tend to view conflict as something that is always negative. We point to television, our past experiences and even our parents. After encouraging reflection, sometimes through small group exercises, mediation trainers ask whether anything positive ever comes from conflict. Trainees list a number of positives including clarity, recognition, understanding, and improved relationships. The trainer then hopes the group will come to appreciate that conflict is not inherently good or bad but that the nature of conflict often depends on how it is handled.

Recent discoveries in the field of neuroscience shed even greater light on our predominantly negative view of conflict. In *Nurture Shock*, Po Bronson and Ashley Merryman discuss the work of Dr. E. Mark Cummings at the University of Notre Dame.⁷ Cummings studied the impact that everyday parental conflict may have on children. Cummings found that the typical married couple had about eight disputes each day and that spouses were roughly three times more likely to express anger to each other as they were to show affection.⁸ Children are witnesses to these conflicts forty-five percent of the time.⁹ Cummings staged experiments to see what impact this type of conflict had on children. Ultimately, what he found was that witnessing the conflict itself did not result in any negative change in the child's behavior, provided the child was allowed to see the resolution of the argument.¹⁰ It was only when the argument was stopped in the middle before resolution that it had a negative effect on the child's behavior.¹¹ Cummings has even shown that being exposed to marital conflict can be good for children provided it is constructive and resolved with affection.¹²

Think for a moment about our own childhood experiences with conflict. Did our parents fight? If so, was it constructive conflict? And as to a more subtle point, as Bronson and Merryman highlight, did our parents ironically make matters worse by taking the fight upstairs or into the other room, thus sparing us the exposure? If so, did they remember to tell us that they worked it all out?

Bronson and Merryman also point to a body of research on the nature of conflict among siblings.¹³ Dr. Hildy Ross of the University of Waterloo found only about one in every eight conflicts between siblings ends in compromise or reconciliation.¹⁴ In the other seven conflicts, the siblings withdraw usually after the older child bullied or intimidated the younger child.¹⁵ Scottish researcher Dr. Samantha Punch concluded "Sibship is a relationship in which the boundaries of social interaction can be pushed to the limit. Rage and irritation need not be suppressed, whilst politeness and toleration can be neglected."¹⁶ Children made seven times as

⁷ PO BRONSON & ASHLEY MERRYMAN, *NURTURE SHOCK* 184 (2009).

⁸ *Id.*

⁹ *Id.*

¹⁰ *Id.*

¹¹ *Id.*

¹² *Id.*

¹³ BRONSON & MERRYMAN, *supra* note 7, at 120.

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ *Id.* at 121.

many more negative and controlling statements to their siblings as they did to their friends, according to Dr. Ganie DeHart of SUNY Geneseo in New York.¹⁷

Bronson and Merryman wonder what siblings learn from the thousands and thousands of interactions that they have with each other when, no matter how the conflict is handled, they will still be together the next day. They suggest perhaps that children learn poor social skills from those interactions, just as often as they learn good ones. They learn of conflict, but not necessarily constructive conflict.¹⁸

Bronson and Merryman also provide support for those who claim that we get our negative view of conflict, and perhaps our poor conflict resolution skills, from children's television. Citing studies involving comparisons of educational television with more violent children's shows, we now know that while children may be less violently aggressive after watching educational television, they are far more relationally aggressive.¹⁹ Bronson and Merryman explain that while physical aggression can include pushing or hitting, and verbal aggression often involves name calling, relational aggression involves ignoring or telling lies about another child. The more children watched educational television, the more controlling, manipulative and bossier they became. Bronson and Merryman point out that one possible explanation for this phenomenon may be that educational television spends most of its time establishing conflict between characters and very little time resolving it. Preschoolers, for example, are said to be less able to connect the information from the end of the show to what happened earlier. They tend to learn from the individual behaviors shown rather than the overall lesson.²⁰

Bronson and Merryman not only provide us with insights into our views on conflict, but they also provide us with food for thought on why we behave the way we do in conflict.²¹ For example, significant research has been done on the importance of sleep, which supports the position that we consolidate learning and store memory during sleep.²² Bronson and Merryman report that according to these studies, negative memories are stored in the amygdala (an area of the brain associated with strong emotions such as fear) while neutral and positive memories are stored in the hippocampus (an area of the brain associated with storage of memory and conversion of short term to long term memory).²³ Furthermore, lack of sleep is harder on the hippocampus than it is on the amygdala, so we may remember negative feelings and events more so than neutral or positive ones. Could this explain why we so often seem to judge people in conflict by their most negative potential? Other studies have shown that stress can cause a similar effect on the hippocampus.²⁴ During situations of stress, hormones called glucocorticoids are released in the brain.²⁵ Glucocorticoids are known to cause damage to the hippocampus. In fact, under extreme conditions, glucocorticoids can kill brain cells in the hippocampus.²⁶ This suggests that stress, and the brain chemistry connected with it, is not only related to our negative

¹⁷ *Id.* at 120-21.

¹⁸ *Id.* at 119.

¹⁹ BRONSON & MERRYMAN, *supra* note 7, at 180.

²⁰ *Id.*

²¹ *Id.* at 35.

²² *Id.* at 33-35.

²³ *Id.* at 35.

²⁴ JOHN MEDINA, BRAIN RULES 178 (2009).

²⁵ *Id.* at 179.

²⁶ *Id.* See also NORMAN DOIDGE, THE BRAIN THAT CHANGES ITSELF 248 (2007).

view of conflict but perhaps our negative view of those with whom we have conflict and how we interact with them.

What can we learn from the field of neuroscience and these studies of the brain, conflict and even educational television? The above research suggests that our predominantly negative view of conflict is shaped by our experience dating back to early childhood. This further suggests that our negative view of conflict is perhaps a conditioned response. Did any of us have positive role models for dealing constructively with conflict when we were children? And even if we did, were those lessons as frequent or as powerful as the negative ones?²⁷ Did our parents let us watch educational television thinking we were learning something good about conflict resolution? The jury may still be out on exactly what it was we were learning, but it appears evident in the way in which so many of us behave in conflict situations that we developed more destructive than constructive skills. Furthermore, our negative view of conflict undoubtedly impacts how we approach it and increases the likelihood that we will adopt a competitive style when a collaborative style would be optimal. The perception that conflict is inherently negative quite possibly precludes many disputing parties from even trying mediation when it would otherwise be helpful to them. However, if our negative view of conflict is indeed largely a conditioned response, perhaps we can change it. If our destructive behavior in conflict is further influenced by the unconscious effects of stress or lack of sleep, perhaps we can mitigate these effects by simply becoming aware that they exist. Therefore, the integration of mediation and neuroscience not only provides help with resolving the conflict at hand, it provides an opportunity to develop constructive conflict resolution approaches and skills that can be used well into the future.

II. NEUROPLASTICITY AND REASON FOR HOPE

During much of the twentieth century, the prevailing theory was that our brains, at least for the most part, were almost completely formed and unchanging after childhood.²⁸ However, recent discoveries have provided evidence of neuroplasticity, which challenges the assumption that our brains are done developing once we reach adulthood.²⁹ For example, studies have shown that exercise can improve cognitive function and even brain physiology.³⁰ Exercise also appears to stimulate a protein known as Brain Derived Neurotrophic Factor ("BDNF"), which aids in the development of healthy tissue.³¹ In *Brain Rules*, molecular biologist John Medina refers to BDNF as having a powerful fertilizer-like growth effect on certain neurons in the brain.³² According to Medina, BDNF not only keeps neurons young and healthy, rendering them much more willing to connect with one another, but it also encourages the formation of new cells in the brain.³³

Another revolutionary scientific discovery is the neural insulator known as myelin. In *The Talent Code*, Daniel Coyle describes how myelin wraps itself around the nerve fibers in our

²⁷ For an interesting discussion of the psychological phenomenon of "negativity bias," which means that the human mind is wired to magnify the negative, see JONAH LEHRER, *HOW WE DECIDE* 81 (2009).

²⁸ DOIDGE, *supra* note 26, at i.

²⁹ DOIDGE, *supra* note 26, at xix.

³⁰ See MEDINA, *supra* note 24, at 7–27. See also DOIDGE, *supra* note 26.

³¹ See MEDINA, *supra* note 24, at 22.

³² *Id.*

³³ *Id.*

brain that serve as the basis of skill, making them stronger and faster.³⁴ The thicker it gets, the better it insulates and the faster and more accurate our movements and thoughts become. Coyle tell us that we continue to grow myelin well into our fifties and beyond, after which we still make myelin even though we start to lose more than we make.³⁵

These are amazing discoveries. No matter how prior experience may have shaped our perception of conflict, if we can always acquire new skills and improve our brain function, it is not a far stretch to believe we can improve the way in which we perceive and deal with conflict. As Coyle puts it, maybe you *can* teach an old dog new tricks; it just takes “deep practice.”³⁶

III. MEDIATOR SKILLS AND DECISION MAKING

In my journey through numerous books and studies dealing with neuroscience, a number of associations with conflict resolution and mediation emerged. Studies of the brain have produced major insights into how we make decisions. When viewing these insights from the perspective of a conflict resolution professional, it does not take much to connect aspects of mediation and mediator skills to neuroscience and what we have been learning about the brain.

Fundamental mediator skills include the delivery of an opening statement, framing negotiable issues, and generating movement between parties who are stuck in their positions.³⁷ The utility of these skills can be connected to a number of findings including the psychological phenomenon of “priming,” “the framing effect,” the role of mirror neurons, and the functions of the left and right hemispheres of the brain as they impact cooperation, empathy, and problem solving.³⁸ Additional studies in behavioral economics and cognitive-behavioral psychology provide explanations for how our adult views of conflict are shaped, discussed *supra*, and reasons why mediator skills and reflective practice are so helpful to people in conflict.

Malcolm Gladwell wrote in *Outliers* that, “[p]lane crashes are much more likely to be the result of an accumulation of minor difficulties and seemingly trivial malfunctions.”³⁹ The same is true for any discussion of the impact of specific mediator skills. Focus on the use of any one skill or nuance of process will not by itself typically change the nature of the dialogue between the parties in mediation. The true difference between whether or not the parties’ conflict lands safely or crashes to the ground is the accumulation of skills and nuances of process that may seem trivial when viewed in isolation.

IV. THE PSYCHOLOGICAL PHENOMENON OF PRIMING AND MEDIATOR OPENING STATEMENTS

³⁴ See generally DANIEL COYLE, *THE TALENT CODE* (2009).

³⁵ *Id.* at 6.

³⁶ *Id.* at 47–53. “Deep practice” as used by Coyle is comparable to the term “deliberate practice” used by psychologist Anders Ericsson, who described deliberate practice as “working on technique, seeking constant critical feedback, and focusing ruthlessly on shoring up weaknesses.” *Id.* at 51. Ericsson is known in part for his groundbreaking work, which included the central tenet that “every expert in every field is the result of around ten thousand hours of committed practice.” *Id.* See also MALCOLM GLADWELL, *OUTLIERS* 40 (2008).

³⁷ See *Mediation Training Curriculum Guidelines*, New York State Unified Court System, http://www.nycourts.gov/ip/adr/Part146_Curriculum.pdf (last visited Mar. 6, 2011) [hereinafter *Mediation Training Guidelines*].

³⁸ See *infra* Part IV.

³⁹ GLADWELL, *OUTLIERS*, *supra* note 36, at 183.

Most mediators begin the initial meeting with an opening statement. This is particularly true of mediators who deal with interpersonal conflict including divorce, community, or workplace mediation.⁴⁰ The goals of an opening statement include educating the parties about the process, developing rapport and trust, and setting the tone for a collaborative negotiation. Despite the apparent benefits of providing an opening statement, some mediators question its utility.⁴¹ Critics of a mediator opening statement say it takes too long and much of it is a waste of time as the parties are too distracted to absorb the content. However, the research of John Bargh on the “priming effect” may provide new insights.

John Bargh, a psychology professor at Yale University, has published many books and papers on the “priming effect,” in which prior presentation of a word or concept can influence behavior.⁴² One of the most well known priming studies involves two groups of undergraduate students at New York University who were asked to read a long list of words.⁴³ Everyone was given a list of five-word sets and asked to make a grammatically correct four-word sentence out of each set. These are called scrambled sentence tests. For example, students are presented with the following: “feels weather the hot patience.” This five-word set could be unscrambled to read “the weather feels hot.” However, students in this experiment were actually given one of two different lists containing words meant to “prime” them to behave in a specific way. Mixed into one list were words associated with being polite; mixed into the other list were words associated with being rude. When the students were soon placed in an experimental situation to measure the degree to which they would act polite or rude, their behavior correlated with the words with which they were primed.

After completing twenty variations of the scrambled sentences, the students were instructed to take the completed lists down the hall to the professor’s office where they were to be collected and scored. When the students arrived at the professor’s office, there was another student standing in the doorway asking the professor a series of questions. The real test was to see how quickly the students would interrupt or how long the students would wait before interrupting to hand in the completed test. The students who were primed with polite words waited longer on average than the students who were primed to be rude. In fact, the overwhelming majority of the students primed to be polite never interrupted at all.⁴⁴ Simply priming them with words associated with being polite made them wait longer than those students who were primed with words associated with being rude.

There is an enormous body of research demonstrating the ability to prime subjects with subtle words to act in an almost limitless variety of ways.⁴⁵ Research has even shown that priming can make us slow or fast, or even good or bad at math. But before we explore math, I will conclude the discussion of opening statements.

Think about the words mediators emphasize in their opening statements. Most give meaningful emphasis to words such as “listen,” “understand,” “comfortable,” “confidential,” “freely,” and “informal.” Mediation trainers and teachers often discuss the benefits of a good opening statement in order to set the tone for mediation because we want to establish an

⁴⁰ See Mediation Training Guidelines, *supra* note 37.

⁴¹ This is based on my own experience working with mediators.

⁴² See MALCOLM GLADWELL, *BLINK* 53 (2007).

⁴³ See *id.* at 55 (describing a study conducted by John Bargh, Mark Chen and Lara Burrows at New York University).

⁴⁴ *Id.*

⁴⁵ See IAIN MCGILCHRIST, *THE MASTER AND HIS EMISSARY* 167 (2009).

atmosphere of cooperation and open dialogue and in doing so, distinguish mediation from its adversarial alternatives. While most mediators have always appreciated the power of a good opening statement, we now have reason to believe there is a scientific explanation for its effectiveness as well. According to the “priming effect,” “the way we think and act...are a lot more susceptible to outside influences than we realize.”⁴⁶

When we deliver opening statements, we have the potential to prime the parties to act in a manner consistent with the words we use. Furthermore, given our tendency to associate conflict with that which is negative, parties are likely primed to behave poorly in conflict. At a minimum, they are primed to adopt a competitive and adversarial approach to conflict. Therefore, a mediator’s opening statement is not only an important aspect of establishing a collaborative atmosphere, but perhaps also plays a role in neutralizing the way in which parties are negatively primed as they enter the process.⁴⁷

V. THE FRAMING EFFECT AND THE UTILITY OF FRAMING NEGOTIABLE ISSUES

The research showing that we can be made to perform better or worse on mathematical problems ties the “priming effect” with another psychological phenomenon known as the “framing effect.”⁴⁸ In a study conducted by Sian L. Beilock from the University of Chicago, a group of female undergraduates were given a series of relatively simple math problems known as “modular arithmetic.”⁴⁹ Students were given horizontal math problems, represented by a left to right linear equation as well as vertical math problems represented by numbers above and below one another forming the equation. Then, half of the female students were reminded of a negative stereotype, for example that women do not do as well as men on math.⁵⁰ This form of priming is called the “stereotype threat” condition in which simply reminding people of a stereotype can create anxiety, which in turn decreases performance.⁵¹ This allowed Beilock and her colleagues to explore how a high-stress situation creates worries that compete for the working memory normally available for performance. After all, if we are stressed out and anxious, there is going to be less working memory available to deal with solving the math problems.

Jonah Lehrer, a frequent writer in the field of neuroscience, described the results of Beilock’s study in his blog, *The Frontal Cortex*.⁵² As it turned out, the activation of the stereotype led to decreased performance, but only on the horizontal problems.⁵³ The reason for these results has to do with the local processing differences of the brain.⁵⁴ The horizontal problems depended more on the same area of the brain (the left prefrontal cortex) associated with anxiety, which would likely be preoccupied worrying about our math performance. In contrast,

⁴⁶ GLADWELL, BLINK, *supra* note 42, at 58.

⁴⁷ For a related discussion on the power of “anchoring,” a commonly used negotiation technique, see LEHRER, *supra* note 27, at 156–58.

⁴⁸ See *id.* at 106.

⁴⁹ See Sian Beilock, *Math Performance in Stressful Situations*, 17 CURRENT DIRECTIONS IN PSYCHOL. SCI. 3395 (2008).

⁵⁰ *Id.* at 339.

⁵¹ *Id.*

⁵² Jonah Lehrer, *The Frontal Cortex* (Apr. 13, 2010), http://scienceblogs.com/cortex/2010/04/dont_choke.php.

⁵³ *Id.*

⁵⁴ *Id.*

performance on vertical problems was unaffected.⁵⁵ The vertical math problems are perceived primarily as visual spatial problems, which are associated with a different area of the brain (the right prefrontal cortex), which is not distracted by our anxieties or threatened by stereotypes.⁵⁶ In other words, according to Lehrer, “merely changing the presentation of the problem can dramatically alter how the brain processes the information.”⁵⁷

Beilock’s study should also remind mediators of a classic skill we call “framing negotiable issues.”⁵⁸ Mediators are trained to frame issues in neutral language to invite interest-based discussion rather than adversarial positional bargaining. This is done in order to avoid adopting the position of either party and to create an inviting agenda that encourages meaningful dialogue. We frame issues neutrally to take the sting out of the topic. Thanks to Sian Beilock, we now know that neutral framing also changes the way in which the brain actually processes the information and may even mitigate the anxiety produced by conflict.

VI. PRISONERS OF OUR PRECONCEPTIONS⁵⁹

“Tell me what you know. . . Then tell me what you don’t know, and only then can you tell me what you think. Always keep those three separated.”

Colin Powell⁶⁰

Robert Burton’s fascinating work, *On Being Certain, Believing You Are Right Even When You’re Not*, discusses an impressive line of studies, which show that emotional habits and patterns and expectations of rewards are difficult to break.⁶¹ Burton also makes a compelling case for how this same argument applies to thoughts: “Once firmly established, a neural network that links a thought to a feeling of correctness is not easily undone. An idea known to be wrong continues to feel correct.”⁶²

In *How We Decide*, Jonah Lehrer points to studies that show people with strong affiliations, for example, partisan voters, when confronted with inconsistent information, recruit the prefrontal cortex to filter the information to fit what it already believes and to ignore inconsistencies.⁶³ Once this is done, they get a positive emotional response (through the release of dopamine) and are rewarded—to Lehrer, this is the definition of rationalizing.⁶⁴

Marco Iacoboni and colleagues conducted research that revealed how political sophisticates, in answering political questions, rely on memory and a “default state network” or

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ See Lela P. Love, *Deconstructing Dialogue and Constructing Understanding, Agendas, and Agreements*, 38 FAM. & CONCILIATION CTS. REV. 27, 30 (2000).

⁵⁹ This phrase is borrowed from University of California at Berkley psychologist Philip Tetlock referring to political pundits who, according to Tetlock, are particularly prone to dismissing dissonant or contradictory possibilities. Or as Jonah Lehrer puts it, they “[p]erform elaborate mental gymnastics to avoid admitting error.” See LEHRER, *supra* note 27, at 209.

⁶⁰ *Id.* at 248.

⁶¹ See generally ROBERT A. BURTON, *ON BEING CERTAIN, BELIEVING YOU ARE RIGHT EVEN WHEN YOU’RE NOT* (2008).

⁶² *Id.* at 97–98.

⁶³ LEHRER, *supra* note 27, at 205. For another example of cognitive dissonance, see BURTON, *supra* note 61, at 13.

⁶⁴ LEHRER, *supra* note 27, at 205.

the region that is most active when we are resting.⁶⁵ In order to better understand the default state network, Iacoboni refers to the state you are in when you are daydreaming.⁶⁶ You were certainly conscious but not necessarily engaged in any form of conscious deliberation. Sophisticates think about politics all the time so they do not need to employ conscious deliberation to the political statements—they just rely on memory. Political novices show activity in the regions of the prefrontal cortex associated with cognitive attention and in doing so shut down the default state network.⁶⁷

Think about parties in conflict who have invested a lot of time, energy and thought to their positions. How much of their behavior in conflict is driven by their default state network and retrieval of memory? The research on political sophisticates suggests that perhaps a great deal of conflict is driven by processes other than conscious deliberation.⁶⁸ Colin Powell's approach to thinking, for instance, is a possible way to avoid becoming prisoners of our preconceptions.

VII. MIRROR NEURONS

Conflict escalation is a universal experience. We have all been involved in conflicts and we have all experienced firsthand how conflict has a tendency to escalate. One person speaks and the receiver raises an eyebrow. The speaker continues and suddenly an insult is hurled. Mediators allow venting as a means to let off steam. Mediators also frequently and repeatedly summarize the concerns raised by the parties as way to de-escalate conflict and encourage discussion of interests instead of positions.⁶⁹ But what really is at the core of the escalation? Is it just poor word choice or tone? What did that raised eyebrow really mean and were there other expressions communicated that we perhaps failed to consciously appreciate?

According to Marco Iacoboni, Italian scientists were among the first to discover mirror neurons while researching the macaque monkey in a laboratory in Parma, Italy.⁷⁰ Macaque monkeys were given grasping tasks, for example, picking up a raisin or a peanut.⁷¹ Meanwhile, the researchers tracked the firing of neurons in the motor areas of the monkey's brain through implanted electrodes.⁷² One day, researcher Leo Fogassi casually picked up a peanut and discovered that the monkey's brain reacted as if the monkey had grasped the peanut himself.⁷³ The area of the brain that reacted was the same area that reacts when the monkey performs the grasping action.⁷⁴ Only this time it happened based solely on observing Fogassi as he performed the task.⁷⁵ Soon enough, researchers discovered these same mirror neurons in human beings.⁷⁶

⁶⁵ See IACOBONI, *supra* note 5, at 252–53.

⁶⁶ *Id.* at 253.

⁶⁷ *Id.* at 252.

⁶⁸ For a related discussion on the phenomenon of “confabulation,” in which the mind “makes up” information to resolve ambiguities, see MCGILCHRIST *supra* note 45, at 81.

⁶⁹ Love, *supra* note 58, at 28.

⁷⁰ See IACOBONI, *supra* note 5, at 10 (According to Iacoboni, there are several recorded observations of mirror neurons claiming to be the first but none are confirmed as such. However, through many subsequent controlled experiments over a period of twenty years, the existence of mirror neurons was indeed confirmed).

⁷¹ *Id.*

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ *Id.*

Anyone who has ever spent time with a baby knows how easily they can imitate and how this simple action can easily bring a smile to your face. But what researchers are beginning to conclude is that babies do not only learn to imitate, they imitate to learn.⁷⁷ In one study, a baby imitated facial expressions as early as forty-one minutes after birth.⁷⁸

According to Iacoboni, this ability to imitate is the result of special neurons known as mirror neurons. These mirror neurons are not just about copying, but are also a means of understanding another's intentions.⁷⁹ In fact, the mirroring of other people's speech is necessary for us to perceive it.⁸⁰ Mirror neurons send signals to the limbic system, which allows us to feel the emotions associated with the observed facial expressions. Only after we feel these emotions internally are we able to explicitly recognize them.⁸¹ Mirror neurons also learn to predict the actions of other people and to code them for intention, which suggests that mirror neurons are shaped by our experience.⁸² Mirror neurons help us reenact in our brains the intentions of other people, giving us a profound understanding of their mental states.⁸³

The discovery of mirror neurons has had widespread implications for many disciplines. For example, Iacoboni and others have begun to connect deficits in mirror neuron function to conditions such as autism.⁸⁴ Is there a connection between our unconscious imitation or mirroring of others and the way in which conflicts escalate? How much of our anger or frustration, or dismissive tone is derived from the other as opposed to our own free will or autonomy?

Iacoboni also discusses the interdependence of self and other when he says, "the more we learn about mirror neurons, the more we realize that we are not rational, free acting agents... Mirror neurons in our brains produce automatic imitative influences of which we are often unaware and that limit our autonomy by means of powerful social influences."⁸⁵ He even points out that "imitation and 'liking' tend to go together as well."⁸⁶ Is that why we hate it when people make faces at us or roll their eyes when we speak? Are we unconsciously looking for mirroring and instead receiving explicit rejection? How much of our response to conflict begins as an unconscious mirroring of the other? And if mirroring plays a role in the escalation of conflict, can it play a similar role in the de-escalation of conflict? According to Iacoboni, "mirroring is a pervasive form of communication and social interaction among humans."⁸⁷

We now know that parties in conflict have to deal with brains that may be wired to amplify the negative in conflict and are subject to the unyielding power of our preconceptions and the escalating potential of mirror neurons. At the same time, mediators can use opening statements and summarizing skills to encourage the parties toward a more collaborative conflict approach, de-escalate conflict, and perhaps discuss their interests instead of just their positions.

⁷⁶ IACOBONI, *supra* note 5, at 10.

⁷⁷ *Id.* at 48.

⁷⁸ *Id.*

⁷⁹ *Id.* at 58.

⁸⁰ *Id.* at 105.

⁸¹ *Id.* at 112.

⁸² *Id.* at 162.

⁸³ *Id.*

⁸⁴ IACOBONI, *supra* note 5, at 172.

⁸⁵ *Id.* at 209.

⁸⁶ *Id.* at 114.

⁸⁷ *Id.* at 245.

The reflections on the neuroscience surrounding conflict and decision-making are endless. But for now, I have only one more observation.

VIII. MEDIATING ON THE RIGHT SIDE OF THE BRAIN

In 1979, Betty Edwards published the bestselling book *Drawing on the Right Side of the Brain*, in which she illustrated how suppressing the left side of the brain and enabling the right side of the brain can bring out the true artist in anyone.⁸⁸ She believed that the left hemisphere is too narrowly focused on details to see the big picture. However, by using techniques to suppress the left hemisphere, she allows the right hemisphere to see the whole picture and put the pieces together.⁸⁹

A common theme in the neuroscience literature surveyed for this article involves the differences between the left and right hemispheres of the brain. While the left hemisphere of the brain is critical to decisionmaking, particularly for its ability to engage in sequential logic, it is the right hemisphere upon which we rely for matters of cooperation, empathy, and the types of problem solving associated with a shift toward collaboration.⁹⁰

If we are to accept some of the differences between the left and right hemispheres as accurate, then mediators should find ways to activate the right hemispheres of the parties in mediation. By doing so, we maximize the parties' ability to engage in collaborative dialogue. According to the research reported by Iain McGilchrist and others, there are quite a few commonly accepted differences between the left and right hemispheres of the brain. For example: "the left hemisphere delivers what we know, rather than what we actually experience"⁹¹; or the right hemisphere is concerned with the whole context while the left hemisphere is concerned with the parts and naming.⁹² According to McGilchrist, "we must learn to use a different kind of seeing, to be vigilant not to allow the right hemisphere's options to be too quickly foreclosed by the narrower focusing of the left hemisphere."⁹³

⁸⁸ See generally BETTY EDWARDS, *DRAWING ON THE RIGHT SIDE OF THE BRAIN* (1979).

⁸⁹ *Id.* For an interesting interpretation of the applicability of Edwards' book, see DANIEL H. PINK, *A WHOLE NEW MIND: WHY RIGHT-BRAINERS WILL RULE THE FUTURE* 15 (2006).

⁹⁰ See generally MCGILCHRIST, *supra* note 45. Additional differences between the left and right hemispheres cited by McGilchrist include: "When we put ourselves in others' shoes, we are using the right inferior parietal lobe and the right lateral prefrontal cortex, which is involved in inhibiting the automatic tendency to espouse one's own point of view." *Id.* at 57; "In circumstances of right hemisphere activation, subjects are more favourably disposed towards others and more readily convinced by arguments in favour of positions that they have not previously supported." *Id.*; "The right hemisphere plays an important role in 'theory of the mind,' a capacity to put oneself in another's position and see what is going on in that person's mind." *Id.*; "Ultimately, there is clear evidence that when it comes to recognising emotion...whether it is expressed in language or through facial expression, it is the right hemisphere on which we principally rely." *Id.* at 59; "The one exception to the right hemisphere's superiority for the expression of emotion is anger." *Id.* at 61; the right hemisphere is partial to emotions that deal with bonding and empathy while the left hemisphere is partial to competition, rivalry and self belief. See *id.* at 62-63; an extensive body of research now indicates that insight, whether mathematical or verbal, is associated with activation in the right hemisphere." See *id.* at 65; "Denial is a left hemisphere specialty." See *id.* at 85; "Our sense of justice is underwritten by the right hemisphere, particularly by the right dorsolateral prefrontal cortex." *Id.* at 86.

⁹¹ See *id.* at 164.

⁹² See *id.* at 70.

⁹³ *Id.* at 164.

Most mediators likely recall the Prisoner's Dilemma model in game theory, which has served as a basis for training mediators in the benefits of collaboration over competition.⁹⁴ According to McGilchrist, scientists have studied the brains of humans as they played this Prisoner's Dilemma game.⁹⁵ In Prisoner's Dilemma, subjects that achieve mutual cooperation with another human being show activity in the pleasure centers of the brain, including the dopamine system, striatum, and orbitofrontal cortex.⁹⁶ They do not, however, show activity when cooperation is with a computer.⁹⁷ When playing with a human being, the majority of regions showing cooperation are right-sided whereas when playing with the computer the regions are mainly left-sided.⁹⁸ McGilchrist goes on to say that "[i]t is mutuality, not reciprocity, fellow-feeling, not calculation, which is both the motive and reward for successful co-operation."⁹⁹

The research on the Prisoner's Dilemma scenario provides support for the theory that relationship building and direct communication between the parties is a critical component of establishing a cooperative negotiation environment. This research also has implications for the use of caucus in mediation. Mediators are frequently taught to caucus less if the parties have an ongoing relationship; the parties need to learn to work things out themselves.¹⁰⁰ The research on Prisoner's Dilemma supports the theory that the parties, particularly those with the potential for an ongoing relationship, may do better together in joint session than apart in caucus. At a minimum, caucus should be used sparingly in order to give the parties the greatest opportunity to develop the mutuality and fellow feeling necessary for cooperation.

IX. OLD LADY YOUNG LADY¹⁰¹

⁹⁴ For a detailed description of Prisoner's Dilemma, see MCGILCHRIST, *supra* note 45, at 147.

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ *Id.*

⁹⁹ *Id.*

¹⁰⁰ CARRIE MENKEL MEADOW ET AL., *DISPUTE RESOLUTION: BEYOND THE ADVERSARIAL MODEL* 355 (2nd. ed., 2005).

¹⁰¹ This picture known as "My Wife and My Mother-in-Law" was originally published in 1915 by the cartoonist W.E. Hill.



The above image has been used extensively by mediation trainers. Through elicitive dialogue trainers might ask the trainees to look at the image and describe what they see. Some trainees would say they see an old lady. Others would say they see a young lady. And some would say they see both. The trainer might then ask those who see the young lady to help those who do not and vice versa. Trainees draw attention to the mouth of the old lady and encourage the viewer to see the mouth as a choker on the neck of the young lady. They point out that the young lady is looking off to her right revealing a profile of her left jawbone. The jawbone is also the nose of the old lady. Eventually, everybody will see both images. The lessons learned may include the fact that two people can look at the same thing and see it in dramatically different ways. One might say the image reflects the importance of being open to looking at a situation from another point of view. However, if anyone doubted that the other was telling the truth about what they see, they might only be willing to look at the image from their own point of view. What neuroscience now tells us about this exercise takes these lessons one step further.

McGilchrist argues that the right hemisphere will not prematurely resolve ambiguities such as the “old lady young lady image” because studies of the brain involving images like this one reveal that such ambiguities can be seen in one way or another, but not simultaneously.¹⁰² This means you cannot hold onto your own point of view and simultaneously see the other. You have to suspend your point of view or toggle points of view for a brief moment in order to see the other perspective. This is easier said than done. With images such as the old lady young lady, “[w]e remind ourselves that this is pure biology on display, and move on to other thoughts. But with unstable mental images that are personally meaningful, this is far more difficult.”¹⁰³ The key to this challenge may reside in the abilities of the right hemisphere. “So the left hemisphere needs certainty and needs to be right. The right hemisphere makes it possible to hold several ambiguous possibilities in suspension together without premature closure on one outcome.”¹⁰⁴

¹⁰² See MCGILCHRIST, *supra* note 45, at 82.

¹⁰³ See BURTON, *supra* note 61, at 199.

¹⁰⁴ See MCGILCHRIST, *supra* note 45, at 82.

CONCLUSION

“It is the rule of thumb among cognitive scientists that unconscious thought is 95 percent of all thought—and that may be a serious underestimate. Moreover, the 95 percent below the surface of conscious awareness shapes and structures all conscious thought.”¹⁰⁵

Phineas Gage and his horrible accident provided us with some of our earliest insights into the connection between our brain and the way in which we behave. Advances in technology now enable us to observe the brain in unprecedented ways. This has led to a wide array of discoveries in neuroscience with potentially broad application to the dispute resolution profession. Researchers who have studied the role of conflict in the lives of children have taught us that we learn as many if not more ineffective conflict management skills growing up as effective skills. From glucocorticoids to cognitive dissonance and the discovery of mirror neurons, we have reason to believe our perceptions of conflict and those with whom we have conflict may be influenced as much, if not more, by our unconscious thoughts than our own free will. We have explored how the “priming effect” and the “framing effect” can be correlated with the utility of certain mediator skills, including the delivery of opening statements and the framing of negotiable issues. We have learned there are many differences between the tendencies of the left and right hemispheres of the brain. These differences may provide new clues in how to best use mediation to foster collaborative dialogue. Yet we have only seen the tip of the iceberg when it comes to the application of neuroscience to the world of dispute resolution and mediation. More discoveries are surely on the horizon.

¹⁰⁵ GEORGE LACKOFF & MARK JOHNSON, *PHILOSOPHY IN THE FLESH* 13 (1999).