

# MAKING THE BRAIN A FRIEND NOT A FOE: WHAT INTERVENTIONISTS SHOULD KNOW ABOUT NEUROSCIENCE

Emily Fusting

*“The chief function of the body is to carry the brain around.”*  
— Thomas A. Edison

## INTRODUCTION

In recent years, in the context of helping addicts change their addictive behavior, the practice of using interventions that include a professional facilitator (“interventions”) together with the addict and his key friends and family members has become increasingly popular.<sup>1</sup> For instance, the popular television show “Intervention” is now in its 11<sup>th</sup> season and is an Emmy award winner and a five-time PRISM award winner.<sup>2</sup> This increased popularity has led to numerous programs and professionals developing themselves as intervention specialists, often directly facilitating interventions and preparing families for the process.<sup>3</sup>

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<sup>1</sup> As of March 9, 2012, a search of Amazon.com yields over 1,000 books on the topic of intervention and addiction. See also, *infra*, FN 3.

<sup>2</sup> A&E TV, *Intervention: About the Show*, <http://www.aetv.com/intervention/index.jsp>.

<sup>3</sup> National Council on Alcoholism and Drug Dependence, Inc., *Intervention Tips and Guideline*, <http://www.ncadd.org/index.php/for-friends-and-family/intervention> (“NCADD and our Affiliates know that most successful interventions are professionally directed. The interventionist will work [to] help you to determine who should be invited to participate in the intervention- parents, spouses, siblings, friends, co-workers etc.”); Partnership for a Drug-Free America, *Intervention E-book*, [www.drugfree.org/intervene](http://www.drugfree.org/intervene) (“You may want to hire a trained professional such as an interventionist or qualified counselor, to conduct and mediate this type of [formal] intervention.”); Mayo Clinic, *Intervention: Help a loved one overcome addiction*,

Thus interventions are in many ways multi-party mediations or facilitations where a neutral third party facilitates a conversation and helps the parties gain understanding and often a plan for moving forward.<sup>4</sup>

Mediation, also, involves a professional intervener charged with enhancing understanding and helping the parties develop a plan for addressing issues that are raised.<sup>5</sup> Given the overlap in goals of the two processes, this paper looks at research on mediations in order to develop more effective strategies for

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<http://www.mayoclinic.com/health/intervention/MH00127>  
("Consulting an intervention professional (interventionist), an addiction specialist, psychologist or mental health counselor can help you organize an effective intervention. It may be a good idea to have the intervention professional attend the actual intervention to help keep things on track.").

<sup>4</sup> In interventions without a neutral facilitator, the intervention is more easily comparable to a negotiation. However most of the principals this paper focuses on will apply to either facilitated or un-facilitated interventions. In un-facilitated interventions the family members and friends can employ the same strategies that this paper suggests that intervention specialists use in an intervention.

<sup>5</sup> CARRIE MENKEL-MEADOW ET AL., *MEDIATION: PRACTICE, POLICY, AND ETHICS* 91 (Aspen 2006) ("Mediation is a process in which an impartial third party acts as a catalyst to help others constructively address and perhaps resolve a dispute, plan a transaction, or define the contours of a relationship. A mediator facilitates negotiation between the parties to enable better communication, encourage problem solving, and develop an agreement or resolution by consensus among the parties."); Lela Love and Joseph Stulberg, *Understanding Dispute Resolution Processes*, Michigan Supreme Court Mediator Skill-building Manual (revised 1997), available at *Id.* at 14 (Mediation is "a private, voluntary dispute resolution process in which a third party neutral, invited by all parties, assists the disputants in: identifying issues of mutual concern, developing options for resolving those issues, and finding resolutions acceptable to all parties.").

successful interventions. Research on negotiation<sup>6</sup> will also be examined to show what neuroscience tells us about parties who are entering into a process where they will be challenged to understand a new perspective and develop creative options for change.

In the early 1990s the study of neuroscience was revolutionized with the invention of the functional magnetic resonance imager<sup>7</sup> or fMRI.<sup>8</sup> The fMRI has allowed researchers to study the intensity, location, and duration of brain activity with vivid, near-moving pictures.<sup>9</sup> Researchers have now been able to simulate different scenarios and strategy games and see how the brain reacts under these conditions.<sup>10</sup> As a result, mediation practitioners and scholars have been able to take this newfound knowledge of how the brain reacts to different situations and develop strategies for more effective mediations.<sup>11</sup> This research is

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<sup>6</sup> The Merriam-Webster dictionary defines “negotiate” as “to confer with another so as to arrive at the settlement of some matter.” See also WILLIAM URY, GETTING PAST NO: NEGOTIATING IN DIFFICULT SITUATIONS 4 (“Broadly defined, negotiation is the process of back-and-forth communication aimed at reaching agreement with others when some of your interests are shared and some are opposed.”).

<sup>7</sup> Richard Birke, *Neuroscience and Negotiation: What the New Science of Mind May Offer the Practicing Attorney*, 17 NO. 4 DISP. RESOL. MAG. 4, 5 (2011).

<sup>8</sup> The fMRI is able to study the blood flow and oxygen in the brain, thereby allowing researchers to see what regions of the brain are most active under different conditions. Columbia University, *Program for Imaging and Cognitive Sciences (PICS)*, <http://www.fmri.org/fmri.htm>. Conversely, the MRI simply depicts the unmoving anatomy of the brain and is useful in locating problems such as tumors. WebMD, *Magnetic Resonance Imaging*, <http://www.webmd.com/a-to-z-guides/magnetic-resonance-imaging-mri>.

<sup>9</sup> Richard Birke, *Neuroscience and Settlement: An Examination of Scientific Innovations and Practical Applications*, 25 OHIO ST. J. ON DISP. RESOL. 477, 480 (2010).

<sup>10</sup> *Id.*

<sup>11</sup> David A. Hoffman, *Mediation, Multiple Minds, and Managing the Negotiation Within*, 16 HARV. NEGOT. L. REV. 297, 300-301

particularly important with respect to interventions since most experts now agree that addiction is a disease that affects the brain.<sup>12</sup> Therefore strategies that may be beneficial in a standard mediation may have a completely different effect in an intervention.

This paper will take the current research on neuroscience and mediation and discuss how the strategies developed to date need to be adjusted in interventions because of the differences in the addicted brain. Part I will provide a background of the current research on neuroscience and mediation and the specific strategies for mediators that has grown out of this research. Part II will examine the main differences between an addicted brain and a healthy brain. Part III will address how the mediation strategies noted in Part I need to be adjusted in an intervention to account for the brain differences examined in Part II. The paper concludes by emphasizing the importance of neuroscience for both traditional mediators and interventionists in specialized areas such as the confrontation of addicts.

## I. WHAT NEUROSCIENCE TELLS US ABOUT MEDIATIONS

Modern day scientists first began studying the brain after witnessing a miraculous accident in 1848.<sup>13</sup> Phineas Gage had a

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(2011) (In a mediation “each of the parties is engaged in an internal negotiation. Mediators can facilitate the parties' negotiations with each other more effectively if we can help the parties manage their internal negotiations”).

<sup>12</sup> In 2011, the American Society of Addiction Medicine (ASAM) released a new definition classifying addiction as a brain disorder after a four-year study involving over 80 experts. MSNBC, *Addiction now defined as brain disorder, not behavior issue* (Aug 15, 2011) available at: <http://www.msnbc.msn.com/id/44147493/ns/health-addictions/t/addiction-now-defined-brain-disorder-not-behavior-issue/#.TyhHUphNND5>.

<sup>13</sup> Richard Birke, *Neuroscience and Negotiation: What the New Science of Mind May Offer the Practicing Attorney*, 17 NO. 4 DISP. RESOL. MAG. 4, 4 (2011) (hereinafter “Birke Negotiation”); Daniel

metal rod jammed through his skull and brain during a work accident but managed to survive.<sup>14</sup> However post-accident Gage was described as a different person – rude, vulgar, and socially inappropriate.<sup>15</sup> Scientists discovered that the area of his brain that was damaged correlated to his unusual behavior.<sup>16</sup> Since that day neuroscience has come a long way, especially in recent years with the development of the fMRI. Neuroscience has attracted fans and theorists from vastly divergent areas of life and far beyond the scientific community.<sup>17</sup> Over the past ten years, experts in the field of alternative dispute resolution (“ADR”) have begun developing strategies for applying these brain studies to the practice of ADR.<sup>18</sup>

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Weitz, *The Brains Behind Mediation: Reflections on Neuroscience, Conflict Resolution and Decision-Making*, 12 CARDOZO J. CONFLICT RESOL. 471, 471 (2011) (hereinafter “Weitz Reflections”); Richard Birke, *Neuroscience and Settlement: An Examination of Scientific Innovations and Practical Applications*, 25 OHIO ST. J. ON DISP. RESOL. 477, 498 (2010) (hereinafter “Birke Settlement”).

<sup>14</sup> See FN 13, *supra*.

<sup>15</sup> See FN 13, *supra*.

<sup>16</sup> See FN 13, *supra*.

<sup>17</sup> Birke Negotiation, *supra* note 13 at 4.

<sup>18</sup> Elizabeth E. Bader, *The Psychology of Mediation: Issues of Self and Identity and the IDR Cycle*, 10 PEPP. DISP. RESOL. L.J. 183 (2010); Richard Birke, *Neuroscience and Settlement: An Examination of Scientific Innovations and Practical Applications*, 25 OHIO ST. J. ON DISP. RESOL. 477 (2010); Richard Birke, *Neuroscience and Negotiation: What the New Science of Mind May Offer the Practicing Attorney*, 17 NO. 4 DISP. RESOL. MAG. 4 (2011); Terrence Chorvat and Kevin McCabe, *Neuroeconomics and Rationality*, 80 CHI.-KENT L. REV. 1235 (2005); Clark Freshman, *Identity, Beliefs, Emotion, and Negotiation Success*, The Handbook of Dispute Resolution Ch. 7 (2005); Clark Freshman et al., *The Lawyer-Negotiator as Mood Scientist: What we Know and Don’t Know About How Mood Relates to Successful Negotiation*, 2002 J. DISP. RESOL. 1 (2002); David A. Hoffman, *Mediation, Multiple Minds, and Managing the Negotiation Within*, 16 HARV. NEGOT. L. REV. 297 (2011); David A. Hoffman, *The Future of ADR: Professionalism, Spirituality, and the Internet*, 14 NO. 4

a. *Framing*

For instance, a widely held belief in the field of mediation is the importance of framing. Nobel Laureate Daniel Kahneman and his partner Amos Tversky published a paper in 1979 finding that people are more sensitive to losses than to gains.<sup>19</sup> Their theory of “loss aversion” demonstrated that whether something is a gain or a loss could be manipulated, or “framed” to more likely achieve the desired result, a theory that has been popularly applied in mediations.<sup>20</sup> However a recent study allows us to better understand the reasoning behind this “loss aversion” theory by understanding the relationship between loss aversion and the brain.<sup>21</sup> The study found that when something was framed as a gain it triggered pleasure in the brain and when something was framed as a loss, the brain’s fear center was not activated but rather its pleasure center was suppressed.<sup>22</sup> Essentially, “expected losses did not create fear--they suppressed the brain's ability to imagine pleasure.”<sup>23</sup> This new information is important for mediators to know because “if loss aversion suppresses the ability to imagine reward, it may have additional effects on one's ability to think

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DISP. RESOL. MAG. 6 (2008); Jeremy Lack and Francois Bogacz, *The Neurophysiology of ADR an Process Design: A New Approach to Conflict Prevention and Resolution?*, ABA 14<sup>th</sup> Annual Section of Dispute Resolution Spring Conference (2012); Daniel Weitz, *This is Your Brain on Mediation: What Neuroscience Can Add to the Practice of Mediation*, 4 NYSBA New York Dispute Resolution Lawyer 36 (2011); Daniel Weitz, *The Brains Behind Mediation: Reflections on Neuroscience, Conflict Resolution and Decision-Making*, 12 CARDOZO J. CONFLICT RESOL. 471 (2011).

<sup>19</sup> Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 *ECONOMETRICA* 263 (1979). See also Birke Negotiation, *supra* note 13, at 7.

<sup>20</sup> See FN 11, *supra*.

<sup>21</sup> Sabrina M. Tom et al., *The Neural Basis of Loss Aversion in Decision-Making Under Risk*, 315 *SCI.* 515, 515 (2007). See also Birke Negotiation, *supra* note 13, at 6; Birke Settlement, *supra* note 13, at 520-21.

<sup>22</sup> See FN 21, *supra*.

<sup>23</sup> Birke Negotiation, *supra* note 13, at 6.

creatively about how to meet their desire for reward.<sup>24</sup> The brain's pleasure center is suppressed when it imagines a loss, which obviously makes agreeing to a loss less likely but since the brain's reward system affects motivation it may also have the effect of negatively affecting the parties motivation to work towards a creative collaborative solution.<sup>25</sup>

*b. Emotions and Decision-Making*

Two other tools sometimes used by mediators relate to emotions – giving the parties an opportunity to vent<sup>26</sup> and looping<sup>27</sup>, or acknowledging the emotions underlying a party's concerns. Neuroscience tells us that when someone is angry with us, it triggers a biological fight or flight response that makes rational choice difficult.<sup>28</sup> However neuroscience also tells us that even our simplest decisions are informed by our emotions.<sup>29</sup> For instance, when doctors were treating a patient whose brain tumor prevented him from experiencing emotions, they found he had difficulty making even the simplest decisions like whether to use a

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<sup>24</sup> Birke Settlement, *supra* note 13, at 521.

<sup>25</sup> *Id.*

<sup>26</sup> Lawrence M. Watson, Jr., *Effective Advocacy in Mediation: A Planning Guide to Prepare for a Civil Trial Mediation*, at 19 available at

[http://www.summitsolutions.us/resources/Watson\\_Effective\\_Adv.pdf](http://www.summitsolutions.us/resources/Watson_Effective_Adv.pdf) (“First, the client must feel his or her story has been told. Any anger, frustration, and discontent stemming from the events leading to the dispute must be relieved before focused attention can be given to reconciliation considerations. To one extent or another, therefore, the client must be given the chance to vent.”).

<sup>27</sup> Looping entails the mediator trying to understand each party, expressing that understanding to the party, and seeking and receiving confirmation from the party that he feels understood. Carrie Menkel-Meadow et al, FN 5, *supra*, at 225-26 (“The essence of looping is a genuine commitment of the mediator to understanding each party and demonstrating that understanding.”).

<sup>28</sup> David A. Hoffman, *Mediation, Multiple Minds, and Managing the Negotiation Within*, 16 HARV. NEGOT. L. REV. 297, 303 (2011) (hereafter “Hoffman Mediation”).

<sup>29</sup> *Id.*

blue or black pen despite his intellectual functioning remaining fully intact.<sup>30</sup> Emotions are filters for our perception, the brain's amygdala<sup>31</sup> interprets our emotions to switch our decision making process between reptilian instinctual thinking and cortical thinking.<sup>32</sup> The implication for mediators is that mediators should not try to separate emotions from the decision making process but rather acknowledge the emotions and direct them toward the task at hand, thus switching the parties from instinctual thinking to cortical thinking.<sup>33</sup>

While emotions are clearly important for decision-making, the process of venting can in some circumstances make decisions more difficult when they bring up memories of fear. The neural networks and pathways associated with fear are among the most durable of all neural networks.<sup>34</sup> It is thought that when a person retells in detail an event that was painful or traumatic, his neurons physically relive the experience.<sup>35</sup> Thus while it may be important for both the mediator and the parties for each party to have an uninterrupted time to retell events in detail, it is equally important for the mediator to take a substantial break before asking the

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<sup>30</sup> Jonah Lehrer, *How We Decide* 15 (2009). *See also* Hoffman Mediation, *supra* note 28, at 303-04.

<sup>31</sup> The amygdala is two almond shaped set of neurons in the brain that is part of the brain's limbic system and plays a role in processing emotions and responses based on fear, safety and pleasure, along with other emotions. Science Daily, *Amygdala*, <http://www.sciencedaily.com/articles/a/amygdala.htm>; Jeremy Lack and Francois Bogacz, *The Neurophysiology of ADR an Process Design: A New Approach to Conflict Prevention and Resolution?*, ABA 14<sup>th</sup> Annual Section of Dispute Resolution Spring Conference, 4 (2012).

<sup>32</sup> Jeremy Lack, presentation, Oxford (March 10, 2010) *Understanding the Mind in Peace Negotiations* at 29; Francois Bogacz et al., training presentation, ICC (Feb 9, 2011) *Neurobiology Applied to Mediation* at 6.

<sup>33</sup> Hoffman Mediation, *supra* note 28, at 304.

<sup>34</sup> Birke Negotiation, *supra* note 13, at 6.; Birke Settlement, *supra* note 13, at 508.

<sup>35</sup> Birke Settlement, *supra* note 13, at 510.

parties to make any decisions in situations where there has been a painful experience on either side.<sup>36</sup>

c. *Trust*

Neuroscientists have discovered that there are specific chemicals in the brain which foster trust, the most important of such being oxytocin.<sup>37</sup> Oxytocin is a neuropeptide that is responsible for maternal care and pair-bonding, and neuroscientists have recently associated the chemical with increased trust between humans.<sup>38</sup> For instance fMRI experiments have shown that when individuals were given oxytocin before participating in games, they were “more trusting in games involving risky investments and more generous in games that involved sharing a fixed amount of money.<sup>39</sup>” Research also indicates that there are some activities that naturally increase the production of oxytocin – physical touching, eating together, or working together for instance.<sup>40</sup> This may explain the importance of physical touching like handshakes in some cultures as “trust enhancing activities.<sup>41</sup>” This research suggests that mediators may want to provide food or suggest that the parties eat meals together during breaks as a way to foster trust<sup>42</sup> between the parties.<sup>43</sup>

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<sup>36</sup> Birke Negotiation, *supra* note 13, at 6.

<sup>37</sup> Hoffman Mediation, *supra* note 28, at 308-09. *See also* David A. Hoffman, *The Future of ADR: Professionalism, Spirituality, and the Internet*, 14 No. 4 DISP. RESOL. MAG. 6, 8 (2008) (hereafter “Hoffman ADR”).

<sup>38</sup> Ernst Fehr et al., *Neuroeconomic Foundations of Trust and Social Preferences: Initial Evidence*, 95 AMERICAN ECON. R. 346, 349-50 (2005).

<sup>39</sup> Hoffman Mediation, *supra* note 28, at 308-09.

<sup>40</sup> Hoffman ADR, *supra* note 37, at 8.

<sup>41</sup> *Id.*

<sup>42</sup> However “the increase in trust due to oxytocin only appears to occur intra-group, however, and not as between groups, where others may be perceived as being different.” Jeremy Lack and Francois Bogacz, *The Neurophysiology of ADR and Process Design: A New Approach to Conflict Prevention and Resolution?*, ABA 14<sup>th</sup> Annual Section of Dispute Resolution Spring Conference 9 (2012).

#### d. *Mirror Neurons and Face-to-Face Contact*

A series of experiments have led to the conclusions that humans have “a neuron-based capacity to mirror the facial expressions of others and thereby to understand their intent.”<sup>44</sup> This theory was initially developed when experiments with monkeys showed that monkeys who observed another person or monkey doing an act had the same brain activity as those who actually did the act.<sup>45</sup> For instance, a monkey who watched another monkey eat a banana had a similar brain signature to a monkey actually eating a banana.<sup>46</sup> This phenomenon was soon after discovered in humans.<sup>47</sup> For instance, when we see someone reaching for a glass of water, our brain registers the scene in the same way it would as if we were actually reaching for a glass of water our self.<sup>48</sup> While the result in this example does not mean that the observer felt actual thirst or thirst quenching, the observer recognized the process of drinking on a neural level. Thus when the phenomenon of mirror neurons is applied to emotions, individuals are able to recognize the emotions of others without even consciously being aware of what those emotions are.

Subsequent experiments have shown that when human subjects had their faces anesthetized they had a harder time recognizing the facial expressions of others.<sup>49</sup> These experiments have led scientists to conclude that humans use mirror neurons for empathy, language, and to recognize emotions in others.<sup>50</sup> This

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<sup>43</sup> *Id.*

<sup>44</sup> Birke Negotiation, *supra* note 13, at 6-7. *See also* Birke Settlement, *supra* note 13, at 505; Weitz Reflections, *supra* note 13, at 483-84; Elizabeth E. Bader, *The Psychology of Mediation: Issues of Self and Identity and the IDR Cycle*, 10 PEPP. DISP. RESOL. L.J. 183, 197 (2010); Lack, *supra* note 32, at 30-32.

<sup>45</sup> Birke Negotiation, *supra* note 13, at 6-7; Weitz Reflections, *supra* note 13, at 483-84; Birke Settlement, *supra* note 13, at 503.

<sup>46</sup> Birke Negotiation, *supra* note 13, at 6-7.

<sup>47</sup> Weitz Reflections, *supra* note 13, at 483-84.

<sup>48</sup> Bader, *supra* note 44 at 197.

<sup>49</sup> *Id.*

<sup>50</sup> Birke Settlement, *supra* note 13, at 503-04.

taken together with the well developed ideas of universal expression<sup>51</sup> mean that particular communicative expressions are readily understood by all people and that the neurons in our brains are actually wired to understand and emphasize with these expressions.<sup>52</sup>

Mirror neurons send signals to the limbic system and allow the observer to recognize on a neural level the emotions associated with the observed expression.<sup>53</sup> This combined with this idea of universal expression mean that mirror neurons helps us understand the genuineness and intentions of other people.<sup>54</sup> For mediators this suggests the importance of joint sessions where all parties are present over caucuses<sup>55</sup> in order to establish trust.<sup>56</sup> When the parties cannot see each other face-to-face they will have a harder time determining the intentions of the other party and therefore will most likely be more hesitant to trust their offers and information.<sup>57</sup> Put another way, caucuses might encourage the attribution of bad intent to a counterpart. Face-to-face contact will give the parties a greater opportunity to demonstrate their own

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<sup>51</sup> In the 1950's scientist Paul Ekman traveled the world showing photographs of faces from many cultures to people of other cultures. *Id.* He found that facial expressions were universal and even primitive cultures unexposed to western life could correctly recognize and identify the emotions expressed in the faces in the pictures. *Id.* See also Paul Ekman, *Emotions Revealed: Recognizing Faces And Feelings To Improve Communication and Emotional Life* 1 (2003).

<sup>52</sup> Birke Settlement, *supra* note 13, at 503-05.

<sup>53</sup> Weitz Reflections, *supra* note 13, at 484.

<sup>54</sup> *Id.*

<sup>55</sup> "A joint session is where all the participants meet together with the mediator. A caucus is where the mediator meets individually with one side or some subset of the entire participant group (for example, one side only, lawyers only, clients only, kids without parents). In a caucus, parties are invited to speak openly with the assurance that the mediator will not share information conveyed unless given permission to do so." Carrie Menkel-Meadow et al, FN 5, *supra*, at 245.

<sup>56</sup> Birke Settlement, *supra* note 13, at 505-06.

<sup>57</sup> *Id.*

sincerity and to trust the statements and offers from the other side.<sup>58</sup>

e. *Left Brain v. Right Brain*

One of the most explored areas of neuroscience is the differences between the right and left sides of the brain. The left side of the brain is the logical side of the brain; its functions include processing facts, details, comprehension, strategies, and patterns.<sup>59</sup> The right side of the brain is the more emotional and creative side of the brain; its functions include processing feelings, goals, risks, imagination and the big picture.<sup>60</sup> Using both sides of our brain at the same time is not something that we can do easily.<sup>61</sup>

Scientists have studied the brains of humans when playing versions of the Prisoner's Dilemma game<sup>62</sup>, a classic game of

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<sup>58</sup> *Id.*

<sup>59</sup> Lack, *supra* note 32, at 14.

<sup>60</sup> *Id.*

<sup>61</sup> *Id.* at 12. For instance when shown a list of color words written in another color ink (i.e. the word purple written in orange ink) a person will have a difficult time reading only the ink colors and ignoring the word written. *Id.* The right brain wants to say the color while the left brain wants to say the word. *Id.* It is difficult for the brain to process them both simultaneously and we have to focus only on one view at a time. *Id.*

<sup>62</sup> This theory was initially described by researchers Merrill Flood and Melvin Dresher at the RAND Corporation in discussing global nuclear strategy. David Hoffman and Dawn Ash, *Building Bridges to Resolve Conflict and Overcome the "Prisoner's Dilemma": The Vital Role of Professional Relationships in the Collaborative Law Process*, 2010 J. DISP. RESOL. 271, 273-75 (2010). However it was later and is more commonly discussed in terms of police interrogation. *Id.* The "game" is often described in the follow situation: Police interrogate two accomplices separately. They are each given the opportunity to confess. If neither confesses they will each receive a sentence of one-year. If one confesses and the other doesn't the confessor goes free and the other gets sentenced to ten years. If they both confess then they are each sentenced to three years. While it is optimal for both individuals to remain

cooperation and defection.<sup>63</sup> When the subjects were playing with other humans, the majority of brain regions showing cooperation were right-sided.<sup>64</sup> While when the subjects played against a computer the left-sides of their brains were more active.<sup>65</sup> For mediators this means that in order to maximize empathy and cooperation, the mediator should find ways to activate the right brain in mediations.<sup>66</sup>

One strategy the mediator can use to activate different parts of the brain is to control how information is presented.<sup>67</sup> For example when female students were presented with a negative bias, or “stereotype threat,” such as reminding them that women perform worse at math tests, they in fact performed worse at a math test.<sup>68</sup> However they only performed worse when the problems were presented horizontally not when the problems were presented vertically.<sup>69</sup> Horizontal problems are processed in the left prefrontal cortex, the area associated with anxiety whereas vertical problems are processed in the right prefrontal cortex an area of the brain that is not distracted by anxieties.<sup>70</sup> The presentation of information can affect which side of the brain is used to process the information so mediators can actually use the presentation of information to activate the cooperative side of the brain.

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silent, they have no way to communicate and they will often both defect to avoid the maximum sentence while the other goes free.

*Id.*

<sup>63</sup> Weitz Reflections, *supra* note 13, at 485-86.

<sup>64</sup> *Id.*

<sup>65</sup> *Id.*

<sup>66</sup> *Id.*

<sup>67</sup> *Id.* at 480-81. See also Daniel Weitz, *This is Your Brain on Mediation: What Neuroscience Can Add to the Practice of Mediation*, 4 NYSBA New York Dispute Resolution Lawyer 36, 38 (2011) (hereafter “Weitz NYSBA”).

<sup>68</sup> Weitz Reflections, *supra* note 13, at 480-81; Weitz NYSBA, *supra* note 67, at 38.

<sup>69</sup> Weitz Reflections, *supra* note 13, at 480-81; Weitz NYSBA, *supra* note 67, at 38.

<sup>70</sup> Weitz Reflections, *supra* note 13, at 480-81; Weitz NYSBA, *supra* note 67, at 38.

Horizontal v. Vertical Math Problems<sup>71</sup>

Horizontal Math Problem	Vertical Math Problem
$75 - 50 = 25$	$\begin{array}{r} 75 \\ - 50 \\ \hline 25 \end{array}$
The brain processes this as verbal information, activating the left brain.	The brain processes this as spatial information, activating the right brain.

f. *Priming*

Another way that our brain can subconsciously influence our behavior and actions is through the use of priming. For example, in one experiment students were asked to make sentences out of a series of words.<sup>72</sup> Some students were given “polite” words mixed into their list and others were given “rude” words.<sup>73</sup> The students were then asked to take their completed list down the hall to the professor’s office.<sup>74</sup> When they arrived another student was in the office talking to the professor.<sup>75</sup> The study found that those students with the polite list were much less likely to interrupt the professor.<sup>76</sup>

For mediators the implication is clear, the use of positive language by the mediator, especially in the opening statement, can prime the parties for more positive and polite behaviors.<sup>77</sup> Since

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<sup>71</sup> See Jonah Lehrer, *The Frontal Cortex* (Apr. 13, 2010), [http://www.scienceblogs.com/cortex/2010/04/dont\\_choke.php](http://www.scienceblogs.com/cortex/2010/04/dont_choke.php).

<sup>72</sup> Weitz NYSBA, *supra* note 67, at 37; Weitz Reflections, *supra* note 13, at 478-79.

<sup>73</sup> Weitz NYSBA, *supra* note 67, at 37; Weitz Reflections, *supra* note 13, at 478-79.

<sup>74</sup> Weitz NYSBA, *supra* note 67, at 37; Weitz Reflections, *supra* note 13, at 478-79.

<sup>75</sup> Weitz NYSBA, *supra* note 67, at 37; Weitz Reflections, *supra* note 13, at 478-79.

<sup>76</sup> Weitz NYSBA, *supra* note 67, at 37; Weitz Reflections, *supra* note 13, at 478-79.

<sup>77</sup> Weitz NYSBA, *supra* note 67, at 37.

conflicts tend to be inherently negative, this priming can at the very least neutralize an already negative view of the situation.<sup>78</sup>

g. *Mood*

Along the same lines as priming, mood can also have affects on negotiation situations. Studies have consistently shown that positive moods are associated with better negotiation results.<sup>79</sup> For instance when negotiators were shown a funny video or given a small gift just prior to the negotiation they got better results.<sup>80</sup> While the reasoning behind how mood is associated with better negotiation results is still unclear the research clearly indicates the correlation. Clark Freshman has theorized “three ways mood may affect negotiation: (1) the setting of goals in negotiation; (2) the nature of the relationship between the negotiators; and (3) the strategies the negotiators use.<sup>81</sup>”

Regardless of the reason behind the correlation, this research indicates that mediators should try to employ strategies to generate positive mood, such as providing food or playing positive music in a waiting room. Further, parties themselves should do their best to approach a mediation or negotiation with a positive mood because it will most likely result in more joint gains.<sup>82</sup>

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<sup>78</sup> *Id.*

<sup>79</sup> Clark Freshman et al., *The Lawyer-Negotiator as Mood Scientist: What we Know and Don't Know About How Mood Relates to Successful Negotiation*, 2002 J. Disp. Resol. 1, 7 (2002) (hereafter “Freshman Mood Scientist”). See also Clark Freshman, *Identity, Beliefs, Emotion, and Negotiation Success*, The Handbook of Dispute Resolution Ch. 7 (2005) (hereafter “Freshman Identity”).

<sup>80</sup> Freshman Mood Scientist, *supra* note 79, at 15.

<sup>81</sup> *Id.* at 19.

<sup>82</sup> Positive mood promotes more productive negotiations only up to a point and at some point become counterproductive. Freshman Mood Scientist, *supra* note 79, at 28. When participants are in too good of a mood they may make too many concessions, use simplistic strategies, and think that they are doing better than they are. *Id.* at 25. Thus the best negotiators usually have a balance of positive and negative emotions. *Id.* at 28.

Another way that mood plays a role in mediation is the affect that anger has on cooperation. As stated earlier emotions can play a role in decision-making, however anger specifically affects not only decision-making but also cooperation. Research has shown that when people are angry they are more likely to blame those that they see as different.<sup>83</sup> Since perceived similarities help encourage cooperation, anger in the same way discourages cooperation.<sup>84</sup> Thus mediators should work to help the parties to understand their similarities and shared interest so that anger won't have such a powerful negative effect on cooperation. This is represented in the common mediator strategy of identifying common interests early in a mediation and using these common interests as a foundation to build upon throughout the mediation.<sup>85</sup>

## II. A PICTURE OF THE ADDICTED BRAIN

In 2011 after a four-year study was conducted with over eighty experts, the American Society of Addiction Medicine (ASAM) released a new definition of addiction classifying it as a brain disorder.<sup>86</sup> Dr. Raju Hajela, former president of the Canadian Society of Addiction Medicine and chair of the ASAM committee said, “addiction is not a choice. Addictive behaviors are a manifestation of the disease.”<sup>87</sup> Dr. Nora Volkow, Director of National Institute on Drug Abuse, stated, “the behavioral problem

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<sup>83</sup> Freshman Identity, *supra* note 79, at 110.

<sup>84</sup> Bogacz, *supra* note 32, at 23 (“Thinking consciously about another person as similar engages a region of the PFC that is used for self- perception, whereas thinking about another person as dissimilar engages a different sub-region of the brain”).

<sup>85</sup> Lela P. Love, *Training Mediators to Listen: Deconstructing Dialogue and Constructing Understanding, Agendas, and Agreements*, 38 FAM. & CONCIL. CTS. REV. 27, 30-31 (2000).

<sup>86</sup> MSNBC, *Addiction now defined as brain disorder, not behavior issue* (Aug 15, 2011), available at:

<http://www.msnbc.msn.com/id/44147493/ns/health-addictions/t/addiction-now-defined-brain-disorder-not-behavior-issue/#.TyhHUpHNNd5>.

<sup>87</sup> *Id.*

is a result of brain dysfunction.<sup>88</sup> Today most experts agree that prolonged drug use causes changes in the brain which alter behaviors and continue beyond when an individual stops taking the drugs.<sup>89</sup> In fact, addiction is even classified as a disability under the ADA.<sup>90</sup>

The most well studied and catalogued effect of drug use on the brain is its effect on the dopamine reward system. Virtually all drugs alter the dopamine reward system although through different methods.<sup>91</sup> Dopamine is triggered through normal rewards like food and sex.<sup>92</sup> However drug use can release two to ten times the amount of dopamine that natural rewards do.<sup>93</sup> Drug use causes the brain's reward center to be flooded with dopamine and with continued drug use the brain adjusts to the extra dopamine by reducing the overall amount of dopamine in the brain.<sup>94</sup> Since the

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<sup>88</sup> Lauren Neergaard, *Addiction a brain disorder, not just bad behavior*, Associated Press (Aug 16, 2011), available at: <http://news.yahoo.com/addiction-brain-disorder-not-just-bad-behavior-215621166.html>.

<sup>89</sup> Richard J. Bonnie, *Addiction and Responsibility*, 68 SOCIAL RESEARCH 813, 814 (2001). See also Francis J. White, *A Behavioral/Systems Approach to the Neuroscience of Drug Addiction*, 22 J. of Neuroscience 3303, 3303 (2002) (“Drug addiction is presently viewed as a complex neuroadaptive process through which drugs of abuse alter cellular and molecular aspects of neural function in such a way as to render the brain circuits mediating various behavioral effects of these drugs more, or less, responsive to those effects”).

<sup>90</sup> *Id.* at 828.

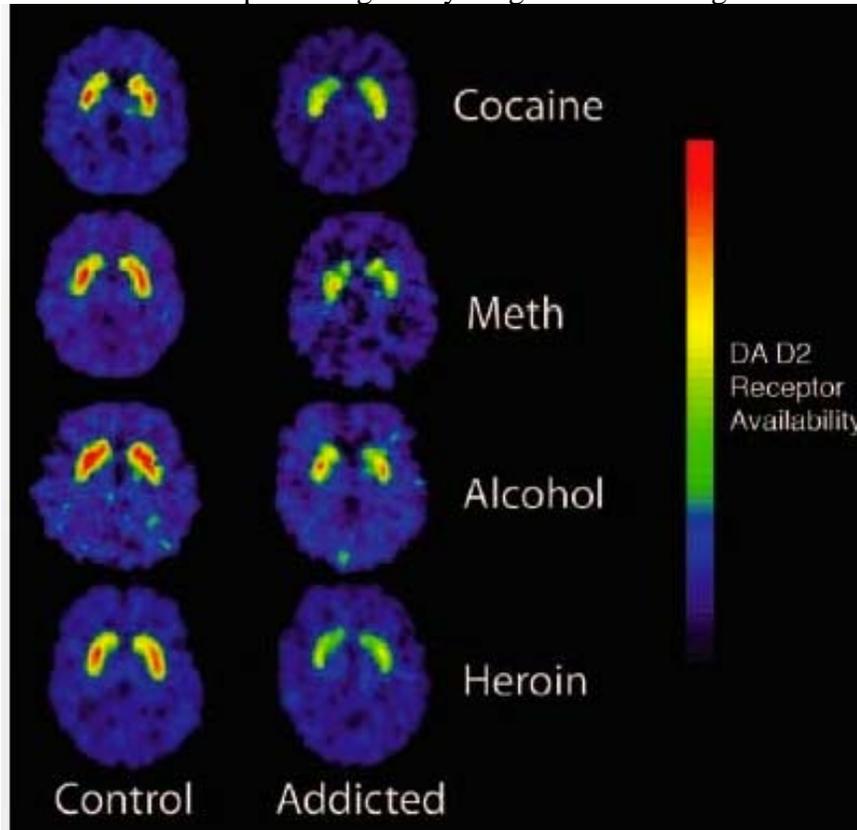
<sup>91</sup> *Id.* at 814.

<sup>92</sup> George Ainslie, *A Research-Based Theory of Addictive Motivation*, 19 LAW AND PHILOSOPHY 77, 85 (2000).

<sup>93</sup> National Institute of Drug Abuse (NIDA), *Drugs, Brains, and Behavior: The Science of Addiction*, NIH Pub. No. 10-5605 (2010).

<sup>94</sup> *Id.* at 17-19; Society of Neuroscience, *Brain Briefings* (April 2011) available at: [http://www.sfn.org/siteobjects/published/0000BDF20016F63800FD712C30FA42DD/8EAF0B9FFA114C772C8C12F682243250/file/April%202011%20BB\\_Addiction\\_Brain\\_Circuits.pdf](http://www.sfn.org/siteobjects/published/0000BDF20016F63800FD712C30FA42DD/8EAF0B9FFA114C772C8C12F682243250/file/April%202011%20BB_Addiction_Brain_Circuits.pdf); Eric J.

brain's reward system has been suppressed, drug users are left depressed without the presence of the drug and are unable to take pleasure in activities that would previously have been enjoyable.<sup>95</sup> This is one of the main reasons why most drug users suffer from a lack of motivation pertaining to anything other than drug use.<sup>96</sup>



Drug abusers have significant reductions in dopamine D2 receptors. Source: National Institute on Drug Abuse (NIDA), NIDA Note, *NIDA's Division of Clinical Neuroscience and Behavioral Research*, October 2007, available at: <http://m.drugabuse.gov/news-events/nida-notes/2007/10/nidas-newest-division-mines-clinical-applications-basic-research>.

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Nestler and Robert C. Malenka, *The Addicted Brain*, *Scientific American* 78, 80-82 (March 2004).

<sup>95</sup> Nestler, *supra* note 94, at 82-83. See also Ainslie, *supra* note 92, at 85 (An addict “may even have deadened her brain to other kinds of reward through the addiction itself.”).

<sup>96</sup> Nestler, *supra* note 94, at 85.

Drug abstinence and withdrawal also causes increased activity in a stress-related neurotransmitter called “corticotropin-release factor” in the amygdala.<sup>97</sup> The amygdala plays a major role in regulating emotions, including fear, anxiety and depression.<sup>98</sup> Since drug abstinence causes an increase in stress-related activity in this region, an addict who abstains from drug use is much more likely to experience these negative emotions.<sup>99</sup>

The positive reinforcing affect of taking the drug combined with the negative depressed state associated with drug abstinence provides a powerful motivation for compulsive drug taking.<sup>100</sup> These powerful reinforcing properties are clearly shown in laboratory tests by the lengths that experimental animals will go to get access to drugs.<sup>101</sup> For instance, rodents that were provided access to drugs by pressing a lever continued to press the lever hundreds of times even after the lever no longer provided the desired drugs.<sup>102</sup> While the alterations in the dopamine system can be reversed, dopamine levels do not return to normal until many months of abstinence.<sup>103</sup>

Repeated drug exposure not only affects the brain’s reward system but also affects an individual’s cognitive function. Glutamate, one of the neurotransmitters that influences the reward circuit, also affects the ability to learn.<sup>104</sup> The concentration of glutamate is altered by drug use and can cause impairment in cognitive function.<sup>105</sup> Further, drug use disrupts brain circuits involved in impulse control in the prefrontal cortex.<sup>106</sup> The

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<sup>97</sup> Brain Briefing, *supra* note 94.

<sup>98</sup> *Id.*

<sup>99</sup> *Id.*

<sup>100</sup> George F. Koob et. al, *Neuroscience of Addiction*, 21 NEURON 467, 469 (1998).

<sup>101</sup> *Id.* at 467. *See also* Nestler, *supra* note 94, at 80.

<sup>102</sup> Nestler, *supra* note 94, at 80.

<sup>103</sup> Brain Briefing, *supra* note 94.

<sup>104</sup> NIDA, *supra* note 93, at 19.

<sup>105</sup> *Id.*

<sup>106</sup> Brain Briefing, *supra* note 94. Additionally, the prefrontal cortex is not fully developed until the mid-twenties, helping to

prefrontal cortex controls reasoning abilities and cognitive control.<sup>107</sup> Thus addicts are less able “to guide thought and action in association with abstract goals or intentions.”<sup>108</sup>

Repeated and continued drug use also affects has an effect on memory. Drugs alter connections in the brain circuits regulating memory.<sup>109</sup> Drug use causes unusually strong associations between the pleasurable feelings of drug use and the circumstances under which drugs are taken.<sup>110</sup> For instance, as described earlier laboratory rodents continued to press a lever that they had associated with drug use even after they lever ceased releasing drugs.<sup>111</sup> These rodents also came to prefer environments associated with the drug use.<sup>112</sup> One study on humans found that cocaine addicts who were shown pictures of drugs for only thirty-three milliseconds, a period too brief for the images to even enter the addict’s conscious mind, had their cravings return.<sup>113</sup> This “conditioning” where environmental cues trigger intense cravings can emerge even after years of abstinence.<sup>114</sup>

The repeated and prolonged use of any type of drug affects the brain’s reward system, cognitive function, and memory. These effects have been investigated and reinforced by many studies. However the field of neuroscience is new and developing and there may be many other effects of addiction on the brain, which have not yet been discovered or explored. However these differences provide a starting point from which to tailor a professional interventionist’s strategies in interventions.

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explain why adolescents are more susceptible to addiction. *Id.* See also Neergaard, *supra* note 88.

<sup>107</sup> Johnathan D. Cohen, The Vulcanization of the Human Brain: A Neural Perspective on Interactions Between Cognition and Emotion, 19(4) J. ECON. PERSPECTIVES 3, 10 (2005).

<sup>108</sup> *Id.*

<sup>109</sup> Brain Briefing, *supra* note 94.

<sup>110</sup> *Id.*

<sup>111</sup> Nestler, *supra* note 94, at 80.

<sup>112</sup> *Id.*

<sup>113</sup> Brain Briefing, *supra* note 94.

<sup>114</sup> NIDA, *supra* note 93, at 20.

### III. SUCCESSFUL INTERVENTION STRATEGIES

The first interventions were hosted by Vernon Johnson, an Episcopalian priest and recovering alcoholic, who began holding meetings in his church where family members, friends, and co-workers would come together to talk to an individual about their alcohol addiction.<sup>115</sup> Johnson's book "I'll Quit Tomorrow"<sup>116</sup> is still a widely used book relating to alcohol addiction and interventions and his intervention model is one of the prominent models still used today.<sup>117</sup> The term "intervention" today had generally come to mean "a professionally directed, education process resulting in a face to face meeting of family members, friends and/or employer with the person in trouble with alcohol or drugs."<sup>118</sup>

This paper will focus on formal planned interventions facilitated by an intervention specialist. However, some of this research may also be beneficial to informal participant run interventions. There is some variation in the intervention process; however, most formal interventions consist of similar steps and

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<sup>115</sup> Michael's House, *History of Drug Intervention*, <http://www.michaelshouse.com/intervention/history-drug-intervention/>.

<sup>116</sup> VERNON E. JOHNSON, *I'LL QUIT TOMORROW: A PRACTICAL GUIDE TO ALCOHOLISM TREATMENT* (Revised ed. 1980).

<sup>117</sup> *Id.*

<sup>118</sup> National Council on Alcoholism and Drug Dependence, Inc., *Intervention Tips and Guideline*, <http://www.ncadd.org/index.php/for-friends-and-family/intervention>. See also Mayo Clinic, *Intervention: Help a loved one overcome addiction*, <http://www.mayoclinic.com/health/intervention/MH00127> ("An intervention is a carefully planned process involving family and friends and sometimes colleagues, clergy members or others who care about a person struggling with addiction. During the intervention, these people gather together to confront the person about the consequences of addiction and ask him or her to accept treatment.").

strategies.<sup>119</sup> In preparation for an intervention, the concerned party(s) and the intervention specialist will choose the intervention team, make arrangements for treatment options, research the specific drug at issue and its effects, decide on specific consequences in case the intervenee<sup>120</sup> refuses treatment, and each participant will write some form of letter discussing the addicted behavior and its effect on that participant.<sup>121</sup> When everything is planned and ready, the intervenee is invited to the intervention location (sometimes the intervenee is told the reason for the meeting and sometimes it is a surprise).<sup>122</sup> During the intervention each participant shares the contents of their letter, the intervenee is presented with available treatment options, and the consequences of not agreeing to treatment are communicated.<sup>123</sup>

This section will discuss each of the mediation-neuroscience strategies mentioned above and how they can be applied in an intervention setting, taking into account the specific brain differences in addicts.

*a. Framing*

Research has shown the importance of framing since gains are associated with dopamine releases in the brain's reward system

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<sup>119</sup> This is another reason why many choose to involve an intervention specialist. She can assist the family in tailoring the intervention to the specific situation.

<sup>120</sup> Hereafter I will refer to the addicted party in an intervention as the intervenee.

<sup>121</sup> Mayo Clinic, *Intervention: Help a loved one overcome addiction*,

<http://www.mayoclinic.com/health/intervention/MH00127>. See also Livestrong, *How to Conduct a Family Intervention*,

<http://www.livestrong.com/article/225707-how-to-conduct-a-family-intervention/>; The Partnership for a Drug-Free America, *Intervention Quick Guide*,

[http://a614.g.akamai.net/7/614/2201/v002/aetn.download.akamai.com/2201/aetv/intervention/Intervention\\_Quick\\_Guide.pdf](http://a614.g.akamai.net/7/614/2201/v002/aetn.download.akamai.com/2201/aetv/intervention/Intervention_Quick_Guide.pdf).

<sup>122</sup> See *supra*, FN 121.

<sup>123</sup> See *supra*, FN 121.

while losses suppress the brain's reward system.<sup>124</sup> Thus people are more likely to agree to the same proposal when it is framed in terms of the gain rather than when framed in terms of the loss. However the dopamine system of an addict is severely depressed meaning that addicts are chemically unable to feel reward through natural means.<sup>125</sup> Thus framing an issue or proposal in positive terms will have little effect when dealing with an intervenee. Chemically speaking, even when a point is presented as a gain, the addict will be unable to release the dopamine to feel the "reward" and thus gains and losses are neutral for an addict. In an intervention, parties and the intervention specialist may still, as a matter of good practice and common sense, choose to try to frame things as gains. However this will have little effect on the intervenee in practical terms, and that reality should come as no surprise.

*b. Emotions and Decision-Making*

As noted earlier, emotions are necessary to our decision-making and the amygdala interprets our emotions to tell our brain which decision-making process to use, reptilian instinctual thinking or cortical thinking.<sup>126</sup> Since drug use causes an increase in stress-related neurotransmitters in the amygdala, an addict is more likely to operate in a state of instinctual thinking than cortical thinking.<sup>127</sup> Thus it is especially important in an intervention to acknowledge the intervenee's feelings and emotions in an attempt to cause a shift from this instinctual thinking to cortical thinking.<sup>128</sup> The simple act of acknowledging the emotion can cause an individual to think about experiencing the emotion, in and of itself causing a switch to cortical thinking.<sup>129</sup>

Further, research about emotions tells us that fear is one of the most durable neural networks and people chemically relive fear

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<sup>124</sup> See *supra*, section I(a).

<sup>125</sup> See *supra* FN 95 and accompanying text.

<sup>126</sup> See *supra*, section I(b), particularly FN 32.

<sup>127</sup> See *supra*, FN 97-99 and accompanying text.

<sup>128</sup> See *supra*, FN 32 and accompanying text.

<sup>129</sup> *Id.*

when they retell painful stories in detail.<sup>130</sup> Thus it is important for mediators to give parties a break after retelling painful stories before asking them to make a decision.<sup>131</sup> Similarly the neural networks associated with drug memories are extremely durable.<sup>132</sup> Therefore it may be equally important for an intervention specialist to give the intervenee a significant break after the participants talk about drug use before asking the intervenee to make a decision about treatment. Having a discussion about drug use will most likely cause cravings in the intervenee and asking them to make a decision to enter treatment while they are having drug cravings is not ideal.

c. *Trust*

Many kinds of drug abuse result in paranoia in the drug user.<sup>133</sup> While it is uncertain the reason why drug use causes paranoia it does mean that addicts are less likely to trust others. While mistrust and reactive devaluation<sup>134</sup> are principals at play in typical mediation, the addition of paranoia in an addict causes additional reasons for mistrust in an intervention thus amplifying the importance of fostering trust in an intervention. There is no research to date showing that oxytocin affects an addict's brain any differently than that of a non-addict thus intervention specialists can employ the same strategies mentioned above to foster trust among the participants.<sup>135</sup> Thus it may be helpful during an intervention for the intervention specialist to serve food and for the participants to physically touch the intervenee, such as a hug or a handshake.

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<sup>130</sup> *See supra*, section I(b).

<sup>131</sup> *Id.*

<sup>132</sup> *See supra*, FN 109-110 and accompanying text.

<sup>133</sup> National Institute of Health, U.S. National Library of Medicine, *Drug Abuse*, <http://www.nlm.nih.gov/medlineplus/ency/article/001945.htm>.

<sup>134</sup> Reactive devaluation is when a party automatically discounts an offer made by the other side simply because it is an offer made by the other side. Carrie Menkel-Meadow et al, FN 5, *supra*, at 85.

<sup>135</sup> *See supra*, section I(c).

d. *Mirror Neurons and Face-to-Face Contact*

In addition to oxytocin, face-to-face contact is another way for parties to develop trust. Face-to-face contact allows parties to mirror the expressions of others to better understand their intent.<sup>136</sup> Thus face-to-face contact is important in an intervention. This is important to note because many times in interventions letters are read to the intervenee, either by participants at the intervention or by absent parties. This may not be the best strategy for developing trust or for enabling the intervenee to experience the sadness and love of family and friends. While this strategy may be useful for other purposes, such as preparing participants for what to say or keeping the intervention to manageable numbers, it may be possible to achieve those purposes in other ways so that the face-to-face contact can foster trust and allow the intervenee to experience the emotions of family and friends. For instance, prior to the mediation absent parties could be videotaped so that the numbers are still manageable yet the intervenee can still see the facial expressions of those absent parties.

e. *Left Brain v. Right Brain*

Since the right side of the brain is the more emotional and goal associated side of the brain<sup>137</sup> and drug use negatively affects emotions and motivation<sup>138</sup>, it is reasonable to conclude that the right side of the brain is more negatively affected by drug use than the left side of the brain. Since the right brain is associated with cooperation<sup>139</sup>, an addict's brain makes cooperation less natural. Mediators can attempt to present information in a way to activate the right brain and cooperation and this strategy is especially important in an intervention since the intervenee will be predisposed to be uncooperative.

There is a wide variety of research, especially within the education context, of teaching strategies to engage both the left and right brain. Intervention specialists can use this information in an

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<sup>136</sup> See *supra*, section I(d).

<sup>137</sup> See *supra*, FN 60 and accompanying text.

<sup>138</sup> See *supra*, FN 95 and FN 108 and accompanying text.

<sup>139</sup> See *supra*, FN 63-65 and accompanying text.

effort to engage the right brain of the intervenee. For instance the 4MAT<sup>140</sup> teaching model provides strategies for engaging both the left and right brains. This model suggests that the right brain can be engaged by imagining or picturing concepts and is activated by symbols and images<sup>141</sup> so in an intervention it may be useful to have pictures available of different treatment facilities. This example, as well as the vertical and horizontal math problem presented earlier<sup>142</sup>, is just one way to use the presentation of information in ways that attempt to activate the right brain. However there is much more research in this area which may be useful to interventionists.<sup>143</sup>

f. *Priming*

Studies have shown that positive and polite language can subconsciously “prime” an individual to exhibit more positive and

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<sup>140</sup> A model of teaching developed by Bernice McCarthy in 1980 which provides strategies for applying to left and right brain in a series of four learning steps: experiencing, conceptualizing, applying, and creating. D. Antonia Cantu, “*Happy Days Are Here Again*”: A Left and Right Brain 4MAT Approach to Teaching Depression-Era Presidential Elections, 16 OAH MAGAZINE OF HISTORY 46, 47 (2001).

<sup>141</sup> *Id.*

<sup>142</sup> *See supra*, section I(e).

<sup>143</sup> *Id.* See also Christina Hinton et al., *Brain Research, Learning and Emotions: implications for education research, policy and practice*, 43 EUROPEAN J. OF EDUC. 87 (2008); M. H. Sam Jacobson, *Learning Styles and Lawyering: Using Learning Theory to Organize Thinking and Writing*, 2 J. Ass'n Legal Writing Directors 27 (2004); Eric P. Jensen, *A Fresh Look at Brain-Based Education*, 89 PHI DELTA KAPPAN 408 (2008); Peter F. MacNeilage et al, *ORIGINS OF THE Left & Right Brain*, 301 SCIENTIFIC AMERICAN 60 (2009); Graham B. Strong, *The Lawyer's Left Hand: Nonanalytical Thought in the Practice of Law*, 69 U. COLO. L. REV. 759 (1998); Sharyn Hardy Gallagher, *Left-Brained versus Right-Brained: Which is Better for Learning?*, 14 No. 2 NAT. TEACHING AND LEARNING FORUM, available at <http://www.ntlf.com/sample/brain.htm>.

polite behavior and vice versa with negative language.<sup>144</sup> However the reasoning behind this subconscious priming is unclear. Thus we do not know whether the differences in an addict's brain will make them more or less sensitive to priming. However it is unlikely that the use of positive or polite language could adversely affect an intervention so it seems sensible for an intervention specialist and the participants to use this strategy.

In an intervention, not only does the intervention specialist prepare in advance but he helps the participants prepare for the intervention. Thus an intervention specialist can help the participants use positive language in their letters and/or speeches. The letters and speeches often focus on negative behaviors and emotions and as such often contain language that is more likely to prime others for negative behavior. While it is important for participants to confront the intervenee with his or her negative behavior they can also incorporate positive references such as positive behaviors that they miss or hopefulness for the future in an attempt to neutralize or reverse any negative priming that may occur.

g. *Mood*

As explained previously, parties in a positive mood are more likely to achieve better negotiation results.<sup>145</sup> Addicts by their brain chemistry are inclined to be in a depressed negative mood unless they are under the influence of their addictive drug.<sup>146</sup> However participants can attempt to improve their own moods prior to the intervention in an attempt to improve the results of the intervention or balance the negative emotions of the intervenee. Further intervention specialists can attempt to improve the mood of the intervenee by providing food and a comfortable environment. This is unlikely to put the intervenee in a positive mood because of their depressed brain state however it may work to put them in a less negative mood.

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<sup>144</sup> See *supra*, section I(f).

<sup>145</sup> See *supra*, section I(g).

<sup>146</sup> See *supra*, FN 94-99 and accompanying text.

Research on mood also shows us that when individuals are angry they are more likely to blame those that they perceive as different.<sup>147</sup> Again, addicts who are sober are naturally in a depressed and negative state and more susceptible to anger.<sup>148</sup> This is important to consider when choosing participants for an intervention. For instance by including a peer(s) or even possibly a recovering addict in the participant group, the group develops more similar characteristics that can encourage cooperation. Even group members without immediately apparent similarities can attempt to promote cooperation by pointing out parallel experiences or unknown similarities. For example a parent may share that they tried drugs once when they were younger.

## **CONCLUSION**

While the world of neuroscience is still relatively new and developing, it has begun to provide us with insights into the inner workings of the brain. This information has allowed dispute resolution theorists, studying negotiation and mediation, to develop new strategies for successful practice. Their work combines brain studies with their vast knowledge of the practice of consensual dispute resolution. While this work is impressive and still developing it does not provide practical theories in an intervention setting, since the current theories do not take into account the many documented differences presented in the addicted brain.

However by taking the work of these dispute resolution theorists and viewing their findings in light of the brain differences in addicts, this paper suggests strategies for successful interventions. However these are only a few strategies based off of a series of neuroscience studies. As the field of neuroscience continues to grow and the popularity of interventions continues to rise there is much room for continued research on this topic. Today we only really have a glimpse into the workings of the brain and much unexplored and undeveloped research lies ahead.

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<sup>147</sup> *See supra*, FN 83-84 and accompanying text.

<sup>148</sup> *See supra*, FN 94-99 and accompanying text.