

The Science behind Executive Coaching: Social Cognitive Neuroscience

White Paper by Dr Ruby Campbell, September 2012

"I am always ready to learn, but I do not always like being taught."
Sir Winston Churchill

"A good leader talks little but when the work is done, the aim fulfilled, all others will say, 'We did this ourselves.'"
Lao-Tse

There is a new science dedicated to researching the neuroscience of human interactions, called Social Cognitive Neuroscience (SCN). Whereas most neuroscience up till now has focused on the individual functioning of a solo brain, SCN is focusing on the way brains interact with other brains. Social neuroscience is also the first domain in neuroscience to consider the human experience at multiple levels, from the molecular to the functional, to the psychological, to the observable, to the social world and wider society. The basic premise behind social cognitive neuroscience is to infuse social psychology with brain science methodology in the hope of deciphering how the brain controls such cognitive processes as memory and attention, which then influence social behaviours such as stereotyping, emotions, attitudes and self-control.

Given that a lot of coaching focuses on improving a person's ability to interact with and influence others, it makes sense that coaching can benefit from the findings of an area studying the mechanics of how we interact with each other.

The field is very new, with the first two academic journals focused on social neuroscience launched in March and June 2006. The first academic piece published on the field was by the *Journal of Personality and Social Psychology* in October 2003.

This new area of study is enabled with the advent of functional magnetic resonance imaging (fMRI) which now makes it possible to quantify individual differences in neural reactivity much more directly than we have been previously able. Using a social cognitive neuroscience approach Ochsner and Lieberman (2001) look at the ways in which individual differences in the anterior cingulate cortex (ACC) reactivity shape social cognition and how social factors, in turn, can shape ACC reactivity.

The ideas we will explore here include:

- Our social brain
- Status
- Threat and cognition
- Reappraisal
- Connectivity

1. OUR SOCIAL BRAIN

In *“Friday’s Footprint”*, author Leslie Brothers first broke the idea that the brain was a social interaction machine. Brothers also saw the amygdala as our social centre, not emotional center; the idea being that social issues are what we feel strongest about.

According to Matt Lieberman from UCLA, one of the key players in SCN, “Three out of four activities whirring in the background when the brain is at rest involve mulling over our relationships with others.” Our brain has been formed over time by its environment, and our environment is predominantly a social one. So the environment that we live in is more social than physical.

In recent years, the phrase ‘theory of mind’ has more commonly been used to refer to a specific cognitive capacity: the ability to understand that others have beliefs, desires and intentions that are different from one’s own. ‘Theory of mind’ is a term to describe how we understand other people’s intentions. We literally need to know someone else has a mind that may be different to ours, in order to understand other people.

This ‘theory of mind’ covers two separate concepts:

1. Gaining the understanding that others also have minds, with different and separate beliefs, desires, mental states, and intentions; and
2. Being able to form operational hypotheses (theories), or mental models, with a degree of accuracy, as to what those beliefs, desires, mental states, and intentions are.

A theory of mind appears to be a usually innate potential ability in humans (and, some argue, in certain other species), but one requiring social and other experience over many years to bring successfully to adult fruition. It is probably a continuum, in the sense that different people may develop more, or less, effective theories of mind, varying from very complete and accurate ones, through to minimally functional. It is often implied or assumed (but not stated explicitly) that this does not merely signify conceptual understanding that “other people have minds and think”, but also some kind of understanding and working model that these thoughts and states and emotions are real and genuine for these people and not just ungrounded names for parroted concepts. Empathy is a related concept, meaning experientially recognizing and understanding the states of mind, including beliefs, desires and particularly emotions of others without injecting your own, often characterized as the ability to “put oneself into another’s shoes”.

Studies of young children show that they develop a theory of mind between the ages of 4 and 6 years old. Before they have this, children have difficulty playing hide and seek effectively: they don’t realize that others can’t see them when their own eyes are closed but they are in full view.

Many of Shakespeare’s plays involved characters misunderstanding others’ intentions. In a play like *“King Lear”* we need to hold in our own mind as the audience the various intentions of the players, and the tragedy that unfolds emanates from the misreading of these intentions. In everyday life, big brains are needed to find our way through the complex social world. With each person we meet we need to know if they are a friend or foe, threat or resource, trustworthy or not. It is believed that much of the high level capacity of our brains, like working memory, evolved to manage the complexities of our social lives. In the animal kingdom, it is being found that the bigger the brain, the bigger the social group. Based on brain size, humans should live in groups of about 150, which is the size of a typical English village, or a hunter-gatherer group, and thus how we have lived throughout history.

The brain has strong memory circuits for relationships between people. We remember people more easily than things, and things more easily than concepts. Think of the number of people you could summon to mind if you had to for an hour, and how well you could describe your relationship to them and to others. Our memories of our interconnections are vast. For example, the way that memory experts remember several decks of playing cards in random order is by creating a story of how characters relate to each other.

For coaching, this theory builds on earlier chapters where an individual's beliefs, values and culture create the filters through which they see the world. Social neuroscience takes this further to say that this concept is also true for how we read, empathise and socialise with others. Therefore it is useful for clients to not only increase their self-awareness of their own beliefs and values, but also how they interpret this for others in their environment. This concept overlaps with Daniel Goleman's work in the area of social intelligence. In coaching, a client's mental map will determine how they navigate their social landscape, whether that be in an organisational or personal context.

2. STATUS

Why do we feel good when we see a famous person in a coffee shop? Why do we queue for hours to shake hands with someone we have seen on TV? The answer is it increases our status. Status is of great importance to the brain.

Status and survival are closely linked. Right now, a monkey in the wild just died because its status was reduced. In the human world our status determines our salary, our health, even perhaps our length of life. Research on workers in Sweden showed that high status individuals who smoked, drank and didn't exercise, were healthier and lived longer than low status healthy fit workers.

The brain thinks about status using similar circuits to how we think about numbers. An experiment showed how in both cases we were more quickly able to determine differences in status when the difference was large than small, as we do with numbers.

One of the things the brain is constantly doing is checking on our status: who we are in relation to the people around us. Reduced status, to the brain, feels like it could come with terrible consequences. The response to reduced status, or fear of it, is highly visceral, a flood of cortisol that inhibits clear processing. This may partly explain the lengths people go to, to avoid others being 'wrong' in an argument. To be wrong, means we reduce our status and the other person increases theirs.

An increase in status makes us feel great. We get a burst of positive chemistry. Negatively impacting a person's status can activate the same part of the brain activated when we experience physical pain. It also influences the presence of neurotransmitters like adrenaline and dopamine, and increases the stress hormone cortisol to a level that can have measurable impact on performance, and even increase the risk of ill health.

The brain responds to a threat of lower status with the same circuits as a threat to life. A study by Matthew Lieberman showed how experiencing social rejection shows up in the same part of the brain as we feel physical pain (Lieberman et al, 2003).

Referring back to Richard Boyatzis work in Systems Theory on the three types of stress (too much to do; being seen by others/being observed and dealing with ambiguity) we see how social rejection

contributes to stress. Research on what creates stress involves testing people's cortisol levels. The research is showing that situations with a social component, where our status may be reduced, are significantly more stressful than without. When stress has a social component, for example being evaluated by others, cortisol levels stays high 50% longer, taking an hour or more to return to normal.

In studies of workers at various levels, just speaking to a higher status person at works makes your blood pressure go up.

Consider what happens when someone offers us feedback. It's very common to perceive this as a threat to our status: that we may not look good in the eyes of someone important. To some people this literally could be a life-threatening situation, as they fear it might involve losing a job and going hungry, yet to some degree we all act as if it is. The limbic system goes into overdrive, the brain pumps out cortisol, resulting in reduced functioning of the prefrontal cortex. The amygdala starts to make connections between things it would not normally connect.

In coaching we will often provide feedback to clients in various ways. It is important that the coach handles feedback appropriately to ensure that the feedback is received constructively. The coach's relationship, empathy and intuition with the client are all important. This is also why "priming" a client for what you are about to say, asking permission to go down a certain path and using appropriate language are important techniques.

The concept of status can also be used in coaching to bring an unconscious process of assigning status or categorisation to the conscious level with clients. As coaching conversations often deal with the client's relationships, it may be useful for the client to understand the status or "role" that they have assigned to those individuals. The status that they assign to others will impact the way they deal with individuals – whether consciously or not. Bringing this into the conscious gives the client the ability reappraise (if relevant) and/or to act more purposefully.

3. THREAT AND COGNITION

The amygdala is an almond shaped part found in an older part of the brain that we share with most animals. Although the amygdala is commonly thought of as the 'emotional center' of the brain, when stimulated it does not generate happy emotions, only anxiety and fear.

The amygdala scans everyone we come into contact with to identify if they are a potential threat. Perhaps after having spent millions of years in small groups of people we know, now that we live in large groups we have the response we would have anytime we met a stranger: don't trust them. In a world of scant resources where people lived to an average of 20, this was a good strategy for genetic survival. Now this function may be unnecessary and in some ways a burden, especially in an organization trying to create a common culture and sense of shared vision.

When we eye up a potential threat, the amygdala becomes aroused. In its aroused state, the amygdala does several things that are important to understand:

- *It generalizes more.* It make links where perhaps there may not be.
- *It reduces the metabolism of the prefrontal cortex.* It takes resources away and uses the energy that would be needed for thinking, making decisions.
- *It errs on the side of pessimism.* A study in 2005 showed that ambiguity on its own was lighting up the amygdala.

- *It does not distinguish between psychological and physical threats.* We have a similar biological response to someone threatening to insult us in public as someone threatening to hit us with a cane. As shown in a study by Matt Lieberman, the same part of the brain lights up for perceived insults as for actual physical pain (Lieberman et al, 2003)

Once the amygdala starts to take over, it gets harder to think 'rationally'. Think of having a mild argument with someone then going back to your desk. Is it easy to get back to projects, or do you somehow keep mulling over the argument, like an echo reverberating in your mind?

The cortisol released when we perceive a threat has a significant impact on many of our systems, including reducing our ability to fight infection, increasing stress levels and increasing the fright response.

Another interesting piece of research is how easily the brain is activated by anxiety versus pleasurable emotions. Research by the positive psychology field, including Martin Seligman and Barbara Fredrickson, into the speed and depth of negative affect versus positive affect is showing that negative affect comes on faster, is more intense, lasts longer, and is triggered more easily.

Research has shown that long-term stress inhibits cognitive functioning. It also inhibits learning. Increased levels of cortisol have also been shown to drive long-term damage to the hippocampus, the part of the brain central to memory and learning. This can be seen for example with people with Post Traumatic Stress Disorder.

Fear, concern about status, and anxiety can impair the functioning of working memory, reducing our capacity to store and process ideas. Stress or anxiety creates an alert signal that keeps demanding our attention, making it hard to hold other ideas in mind for a long time. The average time people can hold an idea in mind in good conditions is around ten seconds. This goes also for holding an idea not in mind, eg trying to not think about something.

Matthew Lieberman and Kevin Ochsner found that when we name an emotion, we activate the prefrontal cortex, which has the effect of dampening down the amygdala. This explains the experience of how talking about how you feel seems to help 'clear the mind.' (Ochsner and Lieberman, 2001)

Tell your troubles to a Guatemalan worry doll, place it beneath your pillow and, according to legend, those worries will be gone by morning. That's just one example of the culture-spanning idea that putting problems into words can blunt the emotional impact of those problems. Centuries of thinkers – from Spinoza to William James to every psychologist who practices talk therapy – have recognized this peculiar power of language, according to UCLA psychologist Matthew Lieberman, PhD.

In a study published in *Science* in 2003, Lieberman and his colleagues used functional magnetic resonance imaging (fMRI) to scan the brains of participants as they played a computer game called "cyberball." In cyberball, participants think that they're playing an onscreen version of catch with two other people who are using computers linked to their own. For a while the two other people throw the ball regularly to the participant's onscreen character, but after a while they stop and begin to throw the ball only to each other.

In reality, the other people don't exist and the "game" is simply an automatic computer program, but the participant doesn't know this and feels the sting of social rejection. Using fMRI, the

researchers found that this social rejection activated an area of the brain that also lights up in response to physical pain – the anterior cingulate cortex.

However, they also found that people who had relatively less activity in that area – and who reported feeling relatively less distress – had more activity in the right ventral lateral prefrontal cortex, an area of the brain associated with verbalizing thoughts and language production. So, according to Lieberman, this suggests that putting feelings into words may activate this part of the prefrontal cortex, which may in turn suppress the area of the brain that produces emotional distress.

In another study, published in *Psychological Science*, Lieberman and his colleagues tested their language hypothesis more directly. They asked 30 participants to view pictures of angry, scared or happy-looking faces. Half of the time the participants tried to match the target face to another picture of a face with a similar expression. The other half of the time, they tried to match the face to a word that correctly labelled its emotion. (Lieberman et al, 2007)

Using fMRI, the researchers found that when the participants labelled the faces' emotions using words, they showed less activity in the amygdala – an area of the brain associated with emotional distress. At the same time, they showed more activity in the right ventral lateral prefrontal cortex – the same language-related area that showed up in the cyberball study.

So, again, this suggests that verbalizing an emotion may activate the right ventral lateral prefrontal cortex, which then suppresses the areas of the brain that produce emotional pain.

The links between perceived threat and reduced cognition have a deep relevance in coaching. We often make poor judgements about situations when our senses are impaired by fear, with deep consequences at times. The coaching process brings this often-unconscious process to the conscious mind and by naming and normalising such events, thus enabling client to deal with the situation in a more constructive way. Understanding this process can also give the client the option to seek additional strategies for dealing with stress management.

This is similar to the concept of 'the power of attention' whereby giving your attention to something helps facilitates the change process. There is a further link here to neuroplasticity. In summary, neuroplasticity refers to the brain's ability to grow, and, as the saying goes, "if you don't use it, you lose it." In simple terms the coaching process facilitates learning at a deeper level, which in turn is providing the opportunity for the brain to grow. Having more neurons to use, flexing this muscle more regularly helps change become easier for clients. We will explore this more under the topic of "self directed neuroplasticity."

Another important consideration in this context is the relationship between the coach and the client – particularly in an organisational context where a client might have been directed to the coaching relationship, rather than seeking it themselves. In these instances it is important for the coach to consider the possible perceived impact that the coaching relationship has on their status and whether the client sees the coach as threatening them in some way.

4. REAPPRAISAL

Reappraisal is what we do when we reframe or ‘recontextualize’ an issue. In a common experiment participants look at a photo of a group outside a church and see people crying, and feel sad. Then they notice a detail that shows it’s a wedding, and their emotions shift. In that moment we unconsciously change our emotional response.

We can also do this consciously, as research by Kevin Ochsner has shown. The part of your brain that does this is the right lateral ventromedial prefrontal cortex (RLVMPCF), which is just above the right temple. When we reframe, we activate the RCLVMPCF, and there seems to be an inverse relationship with the amygdala. In other words, as the prefrontal cortex gets active the amygdala gets deactivated.

Ochsner, along with his Stanford colleagues James Gross, PhD, John Gabrieli, PhD, and Sylvia Bunge, PhD, examined what’s going on in the brain when people reappraise the emotional impact of a scene. Years of social psychology research had found that if, when looking at a disturbing or unseemly picture, people can step back and re-evaluate what they’re looking at, they can minimize its emotional impact. The researchers used fMRI to begin deciphering the neural pathways associated with this phenomenon. They showed study participants an unpleasant photo and asked them either to be aware of their feelings or attempt to reappraise what they were seeing – admitting that it was disquieting but thinking about it as a scene from a movie, for example. They found that when people reappraised the scene, areas in the brain’s frontal cortex that are involved in cognitive control became active, but those involved in emotion didn’t. The opposite occurred when people were simply aware of their feelings but didn’t try to change them – emotion-related brain areas were active but those involved in cognitive control weren’t. These findings suggest that reappraisal may lessen the emotional impact of an experience by turning off the brain’s emotion response centers. It also tells researchers that if they want to understand the psychology of reappraisal, it will be important to think about both the cognitive and emotional side of the equation. (Ochsner et al, 2001)

Reappraisal is a central muscle involved in coaching. When we pull apart the difference between an event and our interpretations of it, we are setting the stage for reappraisal. When an issue upsets us and a coach asks us to reflect on the event, we may be bringing on reappraisal. Reappraisal is what allows people who have had serious accidents, like loss of a limb or worse, to return to their previous state of happiness in around a year.

Daniel Goleman coined the term ‘high road’ and ‘low road’. Low road functions are those that occur automatically and quickly. Hearing a noise in the night and suddenly feeling your heart jump is a low road function. Realizing it’s the just the cat is a high road function, reappraisal. While the realization that the noise was feline does dampen down the adrenaline and cortisol released by the low road, it takes time to dampen down the emotion and sense of danger we feel. The high road can be the boss, but the low road can be a feisty and difficult to control employee.

Reappraisal, or reframing, is linked to many other modules and is a core concept to coaching. When a client reappraises an event they are more likely to remember it, whereas, when a client represses an event, the negative emotion is what they remember. When you reappraise, you dampen down the amygdala. Every moment involves some kind of reappraisal and/or naming of what has taken place. Revisiting this, and making it conscious can help make a shift. Not all reappraisal is useful to

clients (eg, continued negative self talk). The role of coaching to help make the process useful and move the client forward. The reappraisal process often considers the unconscious, its relevance to how we experience the world through our filters (values, beliefs, culture etc) and helps take it into

the conscious realm of the individual's mental model. Thus, being able to make conscious decisions for the future. In this way we see direct links to ontology, psychology, NLP and systems theory.

5. CONNECTIVITY

The discovery of 'mirror neurons' by Iacomo Rizzolatti and Vittorio Gallasse has opened up a whole new field in neuroscience, and a new understanding of how we learn. Mirror neurons light up in our brain when we see other people experience an emotion or take an action of some sort. (Rizzolatti and Craighero, 2004)

It turns out we grasp others' experience through direct experience ourselves, through feeling not thinking. When someone is feeling sad, we know so because we also feel sad in part.

Emotions are contagious. The strongest emotion in a team can ripple out and drive others in the team to resonate with the same emotion, without anyone consciously knowing this is happening. This has implications to communities and groups of people. In an organisational context, the leader's emotions and mood will have a flow-on effect to others. Coaching can assist a leader's self-awareness of this and enable the leader to make choices about the mood they want to create within the organisation.

The feeling we get when we connect intensely with another human being is the opposite of the stress response when we feel threatened. When we interconnect our emotions, goals and thoughts with others, we can bring about a release of oxytocin, a highly pleasurable chemical. This occurs when two people are dancing together, playing music together, or just in a quality conversation. It's about connecting with others. It seems the brain is built to be rewarded for quality connections, for interconnectivity.

Another term for this is 'rapport'. Usually our unconscious communication and unconscious behaviour are influenced or dictated by our culture. Communication between people of different cultures and subcultures can sometimes cause unexpected outcomes. So, understanding of unconscious communication can be useful. In coaching, this connection is often present between the coach and client. Furthermore, exploring these areas with a client can assist them to consciously create more fulfilling relationships in their own lives.

In psychology we learned about the term coined by Jung, "the collective unconscious," which refers to the part of a person's unconscious that is common to all human beings. It contains archetypes, which are forms or symbols that are manifested by all people in all cultures. They are said to exist prior to experience, and are in this sense instinctual. Through achieving a true insight into how an individual client's unconscious integrates with the collective unconscious, that client can be helped towards achieving a state of individuation, or wholeness of self.

SUMMARY

Core concepts within SCN with close links for coaching include:

- The acknowledgement that coaching often focuses on improving people's ability to interact with and influence others.
- Understanding self, how we empathise and read others beliefs, values and culture and so on. (How a client navigates their social landscape.)

- The links between perceived threat and reduced cognition. There is now a physical explanation of what happens when we get upset and can't think clearly, and research showing how and why naming an emotion seems to help 'clear the mind.'
- Reappraisal or reframing, the ability to pull apart the difference between an event and our interpretations of it, a key concept in raising a client's consciousness (the battle for control between the low and the high road).
- Emotions are contagious. This has implications to the client's environment in the mood that they are either being "subjected to" or are "subjecting others" to.
- The feeling we get when we connect intensely with another human being, also known as rapport can bring about the release of a highly pleasurable chemical.

Understanding these concepts and bringing them to the consciousness of the client can assist them to consciously self manage more effectively and create more fulfilling relationships in their lives.

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