A Brain-Based Approach to Coaching

David Rock, based on an interview with Jeffrey M. Schwartz, M.D.

This article introduces a theoretical foundation to coaching based on brain function. It highlights some of the current findings about the neuroscience of attention, insight, reflection and action, through interviews with a leading neuroscientist.

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Introduction

Coaching has emerged from a synthesis of many fields including training, adult learning, consulting, change management, the human potential movement, psychology and systems science. Each of these fields has their own models and approaches to coaching. The various schools of thought agree on little, except that "coaching works," and that more of it should be done. There is no widely accepted theoretical framework that explains why we need it, how it actually works and how to do it better.

This can be a problem when various constituencies are trying to roll out system-wide approaches to coaching. Senior executives, being academically trained and analytical, will want a theory base, evidence and research to support the introduction of any new way of thinking into their organization. A brain-based approach to coaching may provide an answer to this challenge, for a number of reasons.

First, every event that occurs in coaching is tied to activities in someone's head. (Some people may argue that coaching is more "heart based." Whatever your perspective is on this, consider that emotions have correlates in the brain too.) This means that a brain-based approach should underpin and explain every good coaching model and provide the field with an underpinning science. A brain-based approach is going to be inclusive and bring the disparate field to greater cohesion.

Second, a brain-based approach to coaching looks attractive when you think about the other contenders for a foundational discipline, the obvious one being psychology. From an organizational perspective, psychology suffers from a mixed history and a perception of being unscientific. While psychologists are the first people called on if someone is in crisis, most senior leaders would not consider them for improving performance because of the bias they assume psychologists have for therapeutic languages and models. A brain-based approach on the other hand is something tangible and physical. We live in a materialistic world where organizations respect things that can be measured. To bring about the wide- scale use of coaching as a learning or transformation tool, we need to speak to organizations in a language they understand.

The main reason it may be time to build a brain-based approach to coaching is simply how profoundly useful this approach is. It is interesting to be able to explain in scientific terms

why the brain needs coaches, but it is even more useful to know how coaching helps the brain improve its functioning. This points us to ways we can better measure, manage and deliver coaching initiatives, whether one to one, training internal coaches, or in teaching coaching skills to thousands of leaders.

My Own Coaching Journey

I began coaching formally in 1996. At the time I was not aware of any coach training programs, so I developed my own approach, drawing on ten years of designing and delivering training and experience in business. I quickly had too many clients, some of whom wanted to do what I was doing. In 1997 I started to informally train others to coach, through a process of mapping out how good coaching occurred, moment to moment.

One of the biggest epiphanies in my life happened in 1998 during a workshop I was leading. I had designed an exercise during which several new coaches would try to help the same person--someone with a real challenge they faced. After watching this exercise dozens of times, I had this sudden and quite frightening realization that human beings on the whole were very poor at helping others, and were largely unaware that this was the case. Working out how to improve our ability to help others improve - to coach - became a central mission in life, something I am still passionate about today.

Over hundreds of days of workshops, I watched the paths that coaching conversations followed when they worked and when they didn't work. In time I developed a series of models as signposts to help coaches build new habits in how they approached any dialogue, whatever the content. After five years of working on this, I had a solid framework with a proven track record. However, I didn't know how or why this was working.

In 2003, together with a colleague, Elizabeth Guilday, I began helping New York University build a series of certificate programs in coaching. As educators, we both had explored all the underpinning theories of coaching, running classes that covered change theory, systems theory, learning theory, positive psychology, philosophy and other fields. Every time we explored the scientific foundations of coaching, recent findings in neuroscience kept jumping out like a flashing red light to me and to many of my students. Neuroscience was helping me make sense of coaching and opening up great possibilities for research. This inspired me to rethink my whole approach to coaching and explore the neuroscience of the field, the beginnings of which are in my new book, *Quiet Leadership.*

One of the scientists I connected with while researching my book was Jeffrey Schwartz, a world expert on obsessive-compulsive disorder. Jeff had developed a way of treating patients without drugs or behavioral approaches, and had shown through brain imaging that his techniques were literally changing their brains. His book, *The Mind and the Brain*, became a cornerstone of my thinking and teaching, and we have since collaborated in various ways.

Jeff's work is important in that he has explained how, moment to moment, our choices change the functioning of our brain, which then impacts the way we see the world and interact with it.

His work is based on hard scientific knowledge including some important findings from physics.

What I have realized after a year of working with Jeff is that all coaching can be explained from neuroscience, and it's time that it was. Let's now explore some of the key findings, including why brains need coaches, how coaching works in the brain and what happens when we have an insight. I have weaved my own findings as well as some interviews with Jeffrey Schwartz in with the ideas.

Why Brains Need Coaches

Getting people to change is becoming increasingly important in our rapidly changing work environment. The dominant view of organizational leaders is that getting people to change just requires information and the right motivation: we need to know what has to be changed, and then use incentives to inspire people to behave differently. This is a reductionist perspective, which works well in any linear system: if a machine breaks down, we work out logically where the source of the problem is, then simply replace the part. However, if the "thing broken" is someone's communication style, finding this out and trying to "replace the part" is not realistic. In fact, the more information we have about a human problem, the deeper the problem may become, as we will shortly see.

In the last few years, neuroscientists have been confirming what many of us know all too well: change is much harder than we think. You can take this statement literally: change requires more than just scant thought; it requires ongoing attention and a significant effort of the will. There are several reasons why change is so hard, and they point to the need to provide additional resources to an individual who wants to successfully change in any way. Hence, brains need coaching. Let's explore these issues now in an interview with Jeffrey Schwartz.

The Interview:
Why Change is Hard

David Rock: Jeff, tell us why change is so hard.

Jeffrey Schwartz: At the level of individual neurons, brains are built to detect changes in the environment and send out strong signals to alert us to anything unusual. Error detection signals are generated by a part of the brain called the orbital cortex (it's located right over the eyeballs, or orbits), which is very closely connected to the brain's fear circuitry in a structure called the amygdala. These two areas compete with and direct brain resources away from the prefrontal region, which is known to promote and support higher intellectual functions. This pushes us to act more emotionally and more impulsively: our animal instincts start to take over. When our error detection machinery goes into overdrive, we end up with a problem known as obsessive-compulsive disorder (OCD). In this case our brain sends a constant, incorrect message that something is wrong, so we keep trying to fix it.

Even in people without OCD, just trying to change a routine behavior sends out strong messages in our brain that something's not right. These messages are designed to distract our

attention, and they can readily overpower rational thoughts. It takes a strong will to push past such mental activity.

***David Rock*:** That explains why change brings on so much fear and uncertainty. What else do we know about change and the brain?

Jeffrey Schwartz: It comes down to basic brain physiology. A key part of our conscious mind, called our 'working memory,' requires more energy to operate than a set of deeper structures located in the basal ganglia near the brain's core. The basal ganglia operate like the brain's automatic transmission: it can function exceedingly well without conscious thought, as long as what we are doing is a habitual routine activity.

On the other hand, our working memory, based in the prefrontal cortex and used for learning new activities, has quite limited resources. This area fatigues much more easily than the basal ganglia, and is able to hold only a limited number of ideas "in mind" at one time. Since our working memory can get easily overwhelmed, any activity we do repetitively (to the point of becoming a routine habit) gets pushed down into the automatic pilot parts of the brain, to free up cognitive resources. After just a few months of learning to drive a car, we begin to do it "without thinking." Try driving on the other side of the road and you suddenly need to pay far more attention to what you're doing. Many people swapping continents prefer to never have to undergo this experience.

From the perspective of the brain, when we've learned to drive we have developed new circuits controlled deep within the brain along which information can automatically be transmitted in certain situations. Forging new circuits is like cutting through dense new forest rather than following a well-worn trail. We have to go much slower, and put in a lot more effort and attention for every foot we travel. Now consider that much of what we do in the workplace, whether it's how we sell, how we run meetings, how we manage others, even just how we communicate, is well and truly hardwired. Trying to change any of this takes a lot more energy, (in the form of attention, it turns out), than many people are willing to put in. So we do what we can to avoid change.

David Rock: It also reminds me of a study I saw recently of 800 human resources people. It was found that 44% of HR professionals prefer not to follow new directives from the boss, and 15% of them are absolutely intent on keeping things the way they are when it comes to organizational change. Coaching can help here by keeping people focused on the change they are trying to make.

This also reminds me of the principle of homeostasis, the way any complex system automatically pushes back against a force trying to change it. Perhaps coaches should remember that the more we try to make people change, the harder they push back. I have seen this a lot in my practice: you have to first allow someone to arrive at the conclusion that they want to change. Then their work can begin.

How Coaching Impacts the Brain

As well as helping us understand why coaching can help the brain, there are now a large number of neuroscientific findings that can explain how coaching works at a brain level. We can now understand from a physiological perspective why an individual needs to come to their own answers and why a solutions-focus is more powerful than dwelling on problems. We can understand why learning new skills takes time, how positive feedback affects the brain, aspects of how we make decisions, what happens when we set goals and many other things. Jeffrey Schwartz's work does not stand alone. Many scientists are doing important research. In his groundbreaking book *On Intelligence*, Jeffrey Hawkins explains the mechanics of how our brains are prediction machines. Joseph Ledoux has done impressive work on the emotional brain, providing the underpinning science to Goleman's book, *Emotional Intelligence*. Gerald Edelman, a Nobel laureate, developed the theory of neural Darwinism which provides a physical explanation for how our mental maps compete for resources. And a team of scientists you will read about later in this article have discovered some exciting findings about insights.

While there are many interesting and useful findings across neuroscience, there are four main areas of scientific research that combine to form a central explanation of how coaching impacts the brain. These are the study of Attention, Reflection, Insight and Action, or 'ARIA' for short. Scientists studying these domains often don't connect with one another, as neuroscience is such a vast field. Jeffrey Schwartz has done major work on the science of attention and how it changes the brain, which provides strong evidence for how a self-directed, solutions-focused approach to coaching works.

A Focus on Attention

David Rock: Jeff, can you please explain the nature of attention in the brain to the layperson. How does attention change the brain itself?

Jeffrey Schwartz: Neurons communicate with each other through a type of electrochemical signalling. This signalling requires the actions of individual ions -sodium, potassium, and calcium - travelling along channels that are, at their narrowest point, only a little more than a single ion wide. If you have a basic understanding of Newtonian versus quantum physics you will know that this means the brain itself is a quantum environment.

Being a quantum environment, the brain is subject to all the laws of quantum mechanics. In quantum mechanics, the question you ask of nature influences the outcome you see. This is quite true of the brain. The questions you ask of your brain significantly affect the quality of the connections it makes, and profoundly alters the patterns and timings of the connections the brain generates in each fraction of a second. Now, substitute the concept of 'attention' for the phrase "the question you ask," and you get the statement "Where you focus your attention, you make connections." Focus your attention on something new, and you make new connections. This has shown to be true through studies of neuro-plasticity, where focused attention plays a critical role in creating physical changes in the brain.

Over the last 20 years a very large amount of scientific data has thoroughly validated the fact that changes in an environment cause systematic structural and functional changes in the

brain. More stimulating environments, especially when coupled with structured activity, lead to more nervous system connections being formed and generally higher levels of function. This work has been markedly extended over the past few years by what has been termed self-directed neuroplasticity, or the ability of an individual to alter his or her own brain activity through the active practice of focusing attention in constructive ways. Perhaps the classic demonstration of this was in people suffering from OCD, who with just a few weeks training, and a lot of effort, were able to systematically alter the brain circuitry underlying the intrusive 'something is wrong' thoughts and urges with which the brain bombards people suffering from OCD. The key to brain change was systematic training in a self-observational skill called mindful awareness, which empowers people to respond rationally to emotionally stressful stimuli.

David Rock: Do we know how this actually works? Is there any more science to draw from here?

Jeffrey Schwartz: An important and well-verified law in quantum mechanics called the Quantum Zeno Effect turns out to be the key to understanding how focused attention can systematically re-wire the brain. Quantum Zeno Effect was first described nearly 30 years ago and has been extensively studied many times since then. One classic example of it is the fact that rapidly repeated observation of a molecule will hold the molecule in a stable state. It does this by markedly slowing the rate of fluctuation the molecule demonstrates when not observed in a repetitive fashion. This is a basic principle of quantum physics -- the rate of observation has marked measurable effects on the phenomenon being observed. The Quantum Zeno Effect for neuroscience application states that the mental act of focusing attention holds in place brain circuits associated with what is being focused on. If you pay enough attention to a certain set of brain connections, it keeps this relevant circuitry stable, open and dynamically alive, enabling it to eventually becoming a part of the brain's hard wiring.

David Rock: You often talk about how our mental maps influence our perception, which can explain the impact of expectations, of goals, of intent. Can you explain this further?

Jeffrey Schwartz: The connections we have, our own mental maps, can strongly influence the reality we see, often more than the inputs themselves. The science of the placebo effect is a classic example of this. When people are told that they have just been administered a pain reducing agent they experience marked and systematic reductions in pain despite the fact that in reality they have received a completely inert substance, a mere sugar pill. Extensive studies by Dr. Donald Price of the University of Florida have shown that it is the mental expectation of pain relief that accounts for the change in pain perception and that the brain's deepest level pain centers show systematic changes consistent with these changes in experienced pain. In sum, mental expectation itself is markedly altering how the brain responds to pain. Dr. Price and I are currently working to demonstrate that it is Quantum Zeno effect that explains these findings. It is because the mental expectation of pain relief causes the person to repeatedly focus attention on the experience of pain relief that the brain's pain relief circuits are activated, causing a decrease in pain sensation itself. Or in plain language: what we expect is what we experience.

David Rock: One of the most useful and exciting ideas you have shared with me is the concept of "attention density," which helps us remember that change requires paying enough attention to a new idea. This is a core function of coaching: to remind our clients of things they can easily forget about, like how well they are doing or what they are learning. Can you explain attention density for us?

Jeffrey Schwartz: Attention density is the description of how much attention we pay or the number of observations we make over a specific time. Simply put, the more focused we are, the closer we look, the higher the Attention Density. It is a term to describe our mental focus and concentration. The reason it is so important, in quantum physics terms, is that it is Attention Density that brings Quantum Zeno Effect into play and causes the proper brain circuitry to be held in place in a stable dynamic way. With enough attention density, individual thoughts and acts of the mind can become a part of who we are, a part of how our brain works, and so play a role in how we perceive the world. In other words, the power is in the focus. Where we choose to put our attention changes our brain and changes how we see and interact with the world.

David Rock: This idea really hammered home for me the importance of following up with people we coach to see what they learned out of an activity they set for themselves. When people have an insight during the week between our coaching sessions (for example, they might see that they are really tough on themselves) if we can give this insight more attention, we increase its chances of making a long term difference to our clients. That explains why getting people to write down their insights and talking about them with others helps so much.

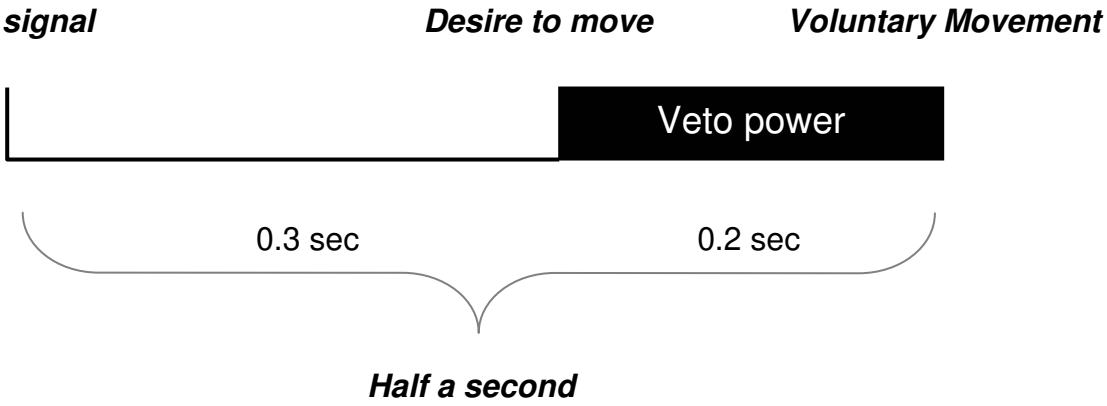
Jeffrey Schwartz: Exactly. Where we put our attention, we create connections, and it happens much faster than is commonly believed. After just two weeks of training with OCD patients we could see significant changes in the way their brains functioned. Through PET (Positron Emission Tomography), we could see actual changes to the neural structure of the brains. What these people needed to do, though, was leave the problem where it was and focus on creating new connections, new circuitry to replace the old.

David Rock: This concept also explains the power of having a solution focus over a problem focus. I have noticed for years that we have a choice when faced with an issue to either drill down to the problem or focus on the solution. A brain-based approach explains how focusing on the solutions actually creates solutions, while focusing on the problems can deepen those problems in our thinking.

Jeffrey Schwartz: Yes, and further support for the concept of "focusing away from our problems" can be found in the studies of voluntary movement. Our brains are constantly processing (a process called "ambient neural activity") whether awake or asleep. We have little control over the many connections occurring each second, including the thousands of thoughts every day that our brain suddenly throw into conscious awareness. A study in 1983 by Libet and associates discovered some fascinating ideas about how "free will" really works. In studying the concept of voluntary movement they were able to determine that the brain sends us a desire or urge to act, about five tenths of a second before acting, a long time in

neuroscience terms. When we decide to get up out of our chair to talk to someone at a party, our brain already initiated that process three tenths of a second before our conscious mind became aware of it. What Libet found was that the control we had over "voluntary" behavior was only in the last two tenths of a second before we moved. Following his lead, I call this "veto power." While we don't seem to have the ability to control our thoughts, we do have a say over which thoughts we act on. It seems we may not have much "free will," but we do have "free won't" - the ability to not follow our urges.

Veto power



David Rock: Leaders have known about this concept for years; it's sometimes called "self control" or "self awareness." It is good to understand why we should leave the source of our thoughts alone, and focus on building our awareness of choice. We can summarize all this with the statement that changing behavior requires deepening our ability to choose what to focus on among the menu of ideas popping into our consciousness. Again, we're back to your statement earlier**, "**the power is in the focus."

Jeffrey Schwartz: I think you'll find this statement can be used widely in the coaching field. I am not an expert on coaching but from what I know it sounds like the role of the coach is to help leaders focus their attention on the right activities.

David Rock: This reminds me of the big insights that leaders need to have when I lead programs to help them be more effective coaches. They need to learn to not give advice, or if they give it, they need to be very unattached to their ideas and present them as options instead of dictates. Secondly, they need to learn to focus more on solutions. When I teach leaders these ideas, it's clear that their old patterns are hard wired - it's really hard for them to change. So it's been useful to discuss this idea of "free won't" - the concept of noticing something they are about to do, and catching themselves before they do it. In time they do the old habit less and less. It's inspiring to hear that these activities change the actual functioning of their brains. Executive coaches are paid to improve what people do for a living, which in

the case of senior leaders, is mostly to think. It seems that when we improve thinking, we're improving brain functioning itself.

ARIA Model Distinctions: The Anatomy of an "Aha"

The science of attention is a cornerstone of coaching. The other elements of the ARIA model are reflection, insight and action. I'd like to share some of my own findings about these elements that draw from a range of research being done. These findings are further explored in my book *Quiet Leadership*.

In early 2005 I secured a small grant to run a functional Magnetic Resonance Imaging (fMRI) study of what happened in the brain during a coaching session. I gathered a team of volunteers to help. The team was led by Marisa Galisteo, a research scientist from the NYU medical center who had crossed over from cancer research to executive coaching. We soon realized that a central feature of effective coaching was the appearance of some kind of "insight" by the client.

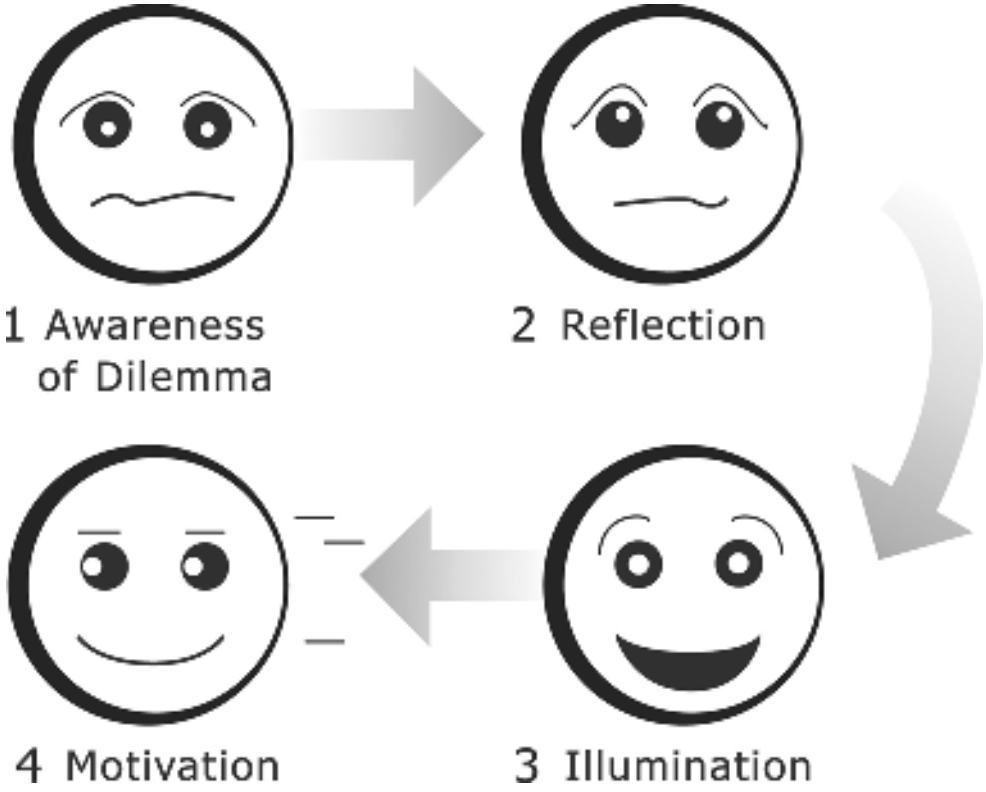
Over several months of meetings and conversations, and having read the key literature on what was known about insights, we developed a good body of knowledge on the field. We also discovered that a lot of research had already been done in very similar territory, such as an fMRI study of insight by Marc Jung-Beeman, John Kounios, and others, published in April 2004. These studies were all fascinating, and breaking new ground, but there was nothing that tied all the findings together in a relevant, accessible way. My most compelling personal realization came when I pictured how people's faces changed considerably when they had an insight. I felt strongly that if coaches could see which "face" people had on at any time, it might make them more effective at creating change. So I created a simple model that defined what happened in the few seconds before, during and after someone had an insight. This model is called the Four Faces of Insight©. (See the graphics on the following page.)

This model provides visual and audible clues to watch for when a coach is trying to help other people arrive at their own insights. I have recently filmed a series of short coaching sessions and observed exactly where someone seems to be in their inner process during any moment of coaching based on this model. This model is very useful for reminding us as coaches to focus on the other person and on how their thinking is going, rather than doing too much thinking ourselves. Let's look at each face in more detail.

Awareness of a Dilemma

The first step to having an insight is the identification of some kind of problem to be solved. When we first become aware of a dilemma, our face looks a little unhappy, perplexed. Our eyes might be squinting slightly, we recognize we have a problem and we feel stuck. We haven't yet thought hard enough about the problem, but we definitely know there is an issue to resolve here.

Four Faces of Insight©



In the workplace, the majority of development conversations between leaders and their employees involve ideas that someone has not yet been able to reconcile. Some examples of workplace dilemmas include:
"I want to know how to inspire my sales people but they don't seem to care."
"I'd really like to get all my projects finished but am overloaded with emails."
"I don't want to let my boss down but need some down time."

People express their dilemmas in more complex terms than this at first, but it's been my experience that at the core of any complex conversation is a two-part dilemma waiting to be clarified. The conversations leaders have with their employees that will make the most substantial difference to their performance involve resolving their dilemmas. The most effective way to resolve their dilemma is to help the other person have an insight for themselves. We start this journey by identifying the dilemma itself.

From a neuroscientific perspective, a dilemma means having various mental maps in conflict. They have competing values or make competing demands for resources, and the brain has not yet worked out how to resolve this conflict by creating a new metamap or by reconfiguring the existing maps. For example, we might want to be more successful, but think this means we need to work longer hours—yet we also want to focus on our health and fitness. Our brain can't yet see how to reconcile the needs of these different desires.

Reflection

You can clearly tell when someone is reflecting on an issue: his or her face changes. Most people look up or slightly up and across and get a dazed look on their face. Their mouth might tense up as they think more deeply. Nearly everyone goes silent for a moment. Jung-Beeman and associates reported that people's brains were giving off alpha-band waves just before they came up with an insight. Alpha waves correlate with people shutting down inputs from their external senses and focusing on internal stimuli. It's been shown that top athletes' brains give off alpha waves just before a peak performance.

Alpha waves have also been found to correlate with the release of the neurotransmitter serotonin, a chemical messenger that increases relaxation and eases pain. So when we reflect, we also tend to feel good. However, alpha waves are also decreased by doing math calculations and other exercises that require engaging the conscious, logical mind. I propose that there is a certain type of internal reflection that brings about insights. We don't make these big connections through deductive reasoning or pure calculation.

Studies have shown that during reflection we are not thinking logically or analyzing data; we're engaging a part of our brain used for making links across the whole brain. We are thinking in an unusual way, tapping into more intelligence than the three to five pieces of information we can hold in our working memory. In practical terms, it seems that to help people have insights, we need to encourage them to reflect more, and think less, or at least less logically.

Illumination

The illumination phase is the most thoroughly studied part of the process, and something we're all familiar with. Being in the illumination phase brings on a rush of energy.
Even small illuminations pack an energetic punch. Think for a moment about the buzz you get watching a police thriller or a great movie, when the mystery falls into place at the end. This rush is being driven by nothing more than a new set of connections in our brain. We get this same rush when we solve a dilemma at work for ourselves. It's clear that at the moment of insight various neurotransmitters like adrenaline are released as well as possibly serotonin and dopamine.

According to the Jung-Beeman paper, at the very moment an insight occurs, the brain gives off strong gamma-band waves. Gamma-band waves are the only frequency found in all parts of the brain and are seen when the brain simultaneously processes information across different regions. Gamma-band brain waves signify various parts of the brain forming a new map. As neuroscientist John Ratey says, "The different pieces of the concept are transported back and forth between the regions that house them, until they resonate with each other—sustained at the 40 Hz oscillation."

When we have an illumination experience we are creating a super-map (of other maps) that links many parts of the brain. The creation of this new map gives off substantial energy,

energy that can be tapped as a valuable resource. Imagine 1,000 employees having big insights once a day, instead of once a year. I wonder what that would do to the levels of engagement in any workplace?

Motivation

When people have just had an insight, their eyes are racing ahead, ready to take action. However, the intense motivation we feel passes quickly. An hour after a great idea, we have just about forgotten it. If you can get people to take tangible actions while the insight is close at hand, even just to commit to doing something later, this will be a big help to ensuring new ideas become reality. With so many thousands of thoughts each day, we need to capture the important ones, through the application of attention.

The Four Faces of Insight model is a guide to the moments just before, during and after an insight occurs. One of the important realizations I had from seeing this model was that the energy of insight might be the thing that propels people through the fear of change and their automatic homeostasis response. If we want people to change, they need to come to an idea themselves, to give their brain the best chance of being energized by the creation of a wide scale new map.

Given the many dramatically different ways our brains are connected, the best way to bring about insight is not to think about people's issues for them, but to help people reflect more deeply and support them in their ability to generate connections. I go so far as to say that when a coach thinks they have the perfect answer for their client, that's the time to definitely *not* share it with them.

The energy of coming to an idea ourselves, or at the very least to feel that we are firmly in the driver's seat of our learning process, is an under-studied principle in coaching. To avoid clients setting actions as a way of "humoring" their coach, we need to coach with the brain in mind. This means coaching so that the insights happen in the client's mind, through paying attention to solutions, and providing follow up and practice that increase the attention density on any new insight.

A lot has been debated about whether coaching is purely self-directed or can include advice and suggestions. I think we are asking the wrong question here. The real issue is whether we are coaching with the client's brain in mind. Our ideas and input, delivered the right way to mitigate the homeostasis response, can help with this. A question I ask my clients all time is: "What does your brain need right now to move forward?"

In Summary

Neuroscience is beginning to provide an explanation of how and why coaching works. I have personally found that an understanding of the neuroscience of coaching has significantly improved my coaching and my ability to train other coaches. A brain-based approach explains many of the intuitive hunches that coaches have, like the way our focus creates change. It supports the solutions-focused approach as a fast way to change. A brain-based approach also helps explain many other domains of study, including change theory, adult learning theory, positive psychology and the study of creativity, amongst others. This approach is linking a

hard science to coaching. While there is much more work to be done, at least the journey has begun.

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