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Neuroscience coaching

Book or Report Section

Accepted Version

Riddell, P. ORCID: https://orcid.org/0000-0002-4916-2057 (2021) Neuroscience coaching. In: Passmore, J. ORCID: https://orcid.org/0000-0003-0832-7510 (ed.) The Coaches' Handbook: The Complete Practitioner Guide for Professional Coaches. Routledge, London, pp. 243-256. ISBN 9780367546199 Available at https://centaur.reading.ac.uk/98185/

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Publisher: Routledge

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Chapter 23: Neuroscience coaching

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Introduction

Sometimes we are surprised by our own behaviour. We find ourselves acting in ways that appear illogical, irrational or even way beyond our own expectations. Better understanding of what drives our behaviour is therefore likely to be able to put us at more choice in how we behave. Since the brain and the nervous system are responsible for every thought, emotion and behaviour that we produce, understanding the ways in which these work is likely to give us insight into how our behaviour emerges and therefore provide us with greater choice in what we choose to do. This is the basis of neuroscience coaching. In this chapter I will outline what differentiates a neuroscience coaching approach from other, more traditional methods. I will then describe some of the techniques that are more unique to neuroscience coaching.

The neuroscience coaching approach explained

In essence, coaching is a process that is used to help individuals to create and fulfil goals. We might, therefore be able to improve this process by viewing it through the lens of neuroscience both to determine how coaching works and, potentially, to add to the effectiveness of the process. For instance, the GROW model of coaching (Whitmore, 2009) has proved useful for helping clients to set goals, but it has not always been the most effective strategy to ensure that these goals are met (Aarts, et al., 2007). Deconstructing the GROW model from a neuroscience perspective can help us to improve the goal-setting process. In addition, research in health behaviour change has uncovered ways to improve the likelihood of behaviour change (Michie, et al., 2011; Schwarzer, 2008). By considering these models through a neuroscience lens, we can make important additions to the GROW model in order to increase its effectiveness.

Beyond the coaching process, however, neuroscience coaching is also able to introduce individuals to some of the more surprising ways that our brains can work against us. For instance, one of the most important ways that neuroscience has contributed is by providing solid evidence that we are able to change our behaviour at any age. Research in both epigenetics and neuroplasticity has demonstrated clearly that we have tended to under-estimate this ability (Kempermann and Gage, 1999; Van Praag, et al., 2000). Not only are we able to change aspects of our brain throughout the lifespan, but this is fundamental to the way that our brains work. Knowing that the processes that create change in the brain are lifelong can change beliefs and therefore dispels excuses – we can teach old dogs new tricks.

Neuroscience coaching can also draw on research into how we regulate our emotions (Begley and Davidson, 2013; Feldman Barratt, 2017). One of the common challenges brought to coaching is how to deal with difficult people to whom we have negative emotional responses. Being able to control or change our own emotional response can be a stepping stone to creating behaviours that improve the situation. By understanding both how our emotional response is generated and how it is controlled, we can provide tools and techniques to help change unwanted emotional reactions.

Making substantial changes in our lives can sometimes seem daunting. We can become attached to ways of being that are difficult to give up. Neuroscience research has considered what happens in the brain when we are required to make change (Cohen, et al., 2007). By understanding this, we can provide insight into what needs to happen for change to become easier, and be better prepared to direct clients through the change process. This involves understanding both the benefits of the current situation and the benefits of change so that clients can create potential solutions that combine both.

Neuroscience research has also given us some surprising insights into our inner critic and why we can sometimes lack self-compassion (Young, et al., 2010). By understanding both the mechanisms for empathising with others and how these relate to our ability to empathise with ourselves, we can help clients to address their inner critic in ways that increase self-empathy. There has been significant neuroscience research into this relationship, which has provided important insights into how we can become kinder and more compassionate with ourselves (Englander, et al., 2009).

These are only a small selection of the tools that neuroscience coaching can offer (Bossons, et al., 2015). As more coaches become familiar with neuroscience research and the insights that this can bring to the, sometimes unintuitive, ways in which the brain works, the number and range of neuroscience coaching tools will expand. This is a discipline that is certainly in its infancy, and has a long road to travel before it becomes fully integrated into the range of coaching methodologies.

Neuroscience coaching theory and research

When we consider the evidence base for a particular branch of coaching, it is important to differentiate between evidence-based and evidence-supported practices (Stober, et al., 2006). The best research into the practice of coaching is evidence-based. This uses research methods including the gold standard double-blind randomised, control trial to determine whether a particular tool or technique is more effective than, for instance, paying more attention to an individual.

Unfortunately, very little research of this nature is available for coaching in general and neuroscience coaching in particular. Techniques used in neuroscience coaching are therefore mostly evidence-supported, or based on our understanding of how the brain

works. In this approach, research that provides credible evidence for how our brains work is used to create techniques that help us to work better with our brains. This is particularly useful for areas in which the brain works in surprising ways where we have to develop coaching techniques that work with, not against, the way that our brains work. While some people find ways to do this simply through experience, providing clients with a better understanding of how their brain works can help them, consciously, to create solutions that work better for them.

With respect to evidence-based neuroscience coaching, Panchal and Riddell (2020) have investigated the benefit of extending the GROW model with models of behaviour change from health psychology and neuroscience. Their GROWS model was designed to help clients consider not just whether they were motivated to act, but also to consciously consider what actions they might take, the potential obstacles they might face and what they would do in order to get back on track if they failed. Research has demonstrated that imagining actions make it more likely that these will be taken in the future (Neroni, et al., 2014).

Additional questions in the GROWS model were framed in relation to self-efficacy – beliefs about the ability to cope. Research has related self-efficacy with parts of the basal ganglia (putamen and globus pallidus) which are associated both with movement and reward (Nakagawa et al., 2017). This suggests that we are rewarded by imagining the successful completion of an action.

In the GROWS model, self-efficacy is divided into three stages. The first, action or task self-efficacy, is the ability to anticipate and imagine the outcomes of successful change. Individuals low in action self-efficacy are more likely to imagine failure, obstacles to success or to have doubt in their own abilities. High action self-efficacy predicts intention to act.

Maintenance or coping self-efficacy is a belief that obstacles that stand in the way of maintaining change will be overcome. This requires that a long-term goal (e.g. having a healthy old age by drinking in moderation, eating healthily and staying active) is maintained even when competing goals with higher short-term rewards are present (alcohol, high calorie foods and sedentary activities). High self-efficacy has been found to be predicted by the size of the lateral prefrontal cortex which is important in working memory and ability to execute planned actions (Duckworth and Gross, 2014). Thus, when our brains have been wired by experience to imagine successfully completing future actions, we have greater self-efficacy.

Recovery self-efficacy is the ability to recover after a lapse and not to assume that a particular behaviour change is impossible. High recovery self-efficacy requires the ability to attribute the lapse to an external situation and to find ways to limit the damage and to get back on track. This has been defined by Duckworth and Gross (2014) as grit. The volume of the nucleus accumbens (part of the dopamine reward system) has been found to predict grit (Nemmi, et al., 2016). This suggests that focussing on the end reward regardless of delay or obstacles can maintain motivation when pursuing long-term goals.

In their small-scale study, Panchal and Riddell (2020) compared the GROW and the GROWS model with 4 coaching clients. Results demonstrated that clients found benefit in the additional GROWS questions as these led to the proactive development of strategies to overcome potential obstacles and to recover from setbacks. This led to more successful initiation and completion of goals (Panchal and Riddell, 2020).

Neuroscience coaching practice

A neuroscience coaching session is similar in structure to other coaching sessions. The purpose is to provide a space and structure for the client to address a challenge of their choosing within a given time-frame. The structure of the GROW model is suitable for neuroscience coaching since the different stages are underpinned by neuroscience.

Goals

The session starts by defining an overall goal, and a goal achievable within the session. When we plan goals, the dorsolateral prefrontal cortex (dlPFC) is active (MacDonald, et al., 2000). More specifically, different parts of the dlPFC are active when we are pursuing goals that we believe will bring reward (approach goals: Left dlPFC) versus goals which we believe will prevent punishment (avoid goals: Right dlPFC) (Spielberger, et al., 2011).

There are two ways in which this information is used in neuroscience coaching: When we focus our coaching clients away from problems and onto solutions, we are effectively increasing activation in the left dlPFC and decreasing activity in the right dlPFC. Additionally, not every client will benefit from creating approach goals. Asking questions like: “What would happen if you fail to take action?”, “What is the worst possible outcome for you?” or “What do you most not want to happen?” will be effective questions for clients who form avoid goals.

Reality

The reality phase of the GROW model encourages clients to use all the available evidence. A client that has more of an approach focus when creating goals (left dlPFC) will be more optimistic and will to take risks. It is likely that this client will predominantly look for reasons to believe their plan will work.

In comparison, a client that is more avoid focussed when creating goals (right dlPFC) is more aware of reasons that their actions will not be successful. Avoid focus naturally occurs in people who are more pessimistic and averse to risks.

It is important to help the client assess the full reality of their plan in a non-judgemental manner. If your client has an approach focus, check that they have thought about potential obstacles and how these might be overcome. If your client is avoid focussed, encourage them to attend to positive evidence of success when assessing risk.

Options

We use divergent thinking to generate novel solutions for problems that do not have a right or wrong answer. There are three processes involved in divergent thinking. We need to:

1. Make associations across different domains of knowledge or concepts which result in the generation of possibilities. This is known as "conceptual expansion".

2. Conceive of an object in a manner different from its customary or habitual use (functional fixedness); therefore, we need to inhibit habitual responses.

3. Explore possibilities and interpret these to determine if they are appropriate. Only those that meet the requirements are selected for consideration. Testing out possible ideas requires creative imagery.

Since there are a number of different processes involved in divergent thinking, it is unsurprising that this involves a complex network of brain areas. There are three major networks in the brain that are active during divergent thinking (Beaty, et al., 2015). These are:

The Salience Network (anterior cingulate cortex, insula): This identifies important aspects of the environment and directs attention to these. This network also is important in switching between the other two networks.

The Cognitive Control Network (dorsolateral prefrontal cortex, medial temporal gyrus): This network controls our thinking processes including access to long-term memory, working memory, inhibition and self-regulation. It helps us plan actions to complete our goals.

The Default Mode Network (posterior cingulate cortex, inferior parietal lobe, temporo-parietal junction): This network controls our ability to think imaginatively partly by turning attention inwards rather than outwards. This helps in the production of creative solutions.

To encourage creativity in others it is necessary to help them to eliminate typical learned responses in order to encourage new thinking. One way that coaches can do this is to insist that clients list a large number of options. The first options are likely to be typical while later options will be more creative.

Will

The next stage is to create an action plan that the client is motivated to follow. To move from an abstract goal to action, we have to be able to imagine the action, which requires both the hippocampus (address book for memory) and the ventromedial prefrontal cortex where our personal goals are represented (Medea, et al., 2016). When individuals are given time to consider their goals, they think about what this would mean for them, especially when their mind is allowed to wander. Thus, the process of day dreaming allows time to consider how the plan might turn out. Thus, in coaching, the effect of giving a client space to imagine a future plan can help increase the likelihood that the plan will be implemented.

It is clear from this short description of the neuroscience behind the GROW model that this creates a useful structure to develop the intention to change. But experienced coaches

know that it is not always sufficient to ensure action. The Health Action Process Approach (HAPA) model of behavioural change considers both motivational (intention) and volitional (action) components of change (Schwarzer, 2008).

The volitional phase requires action. Intention is more likely to be converted into action if the behaviour change is imagined. This activates the medial prefrontal which primes new behaviours to occur faster and more automatically (Rosenberg-Katz et al, 2012). See Figure 1.

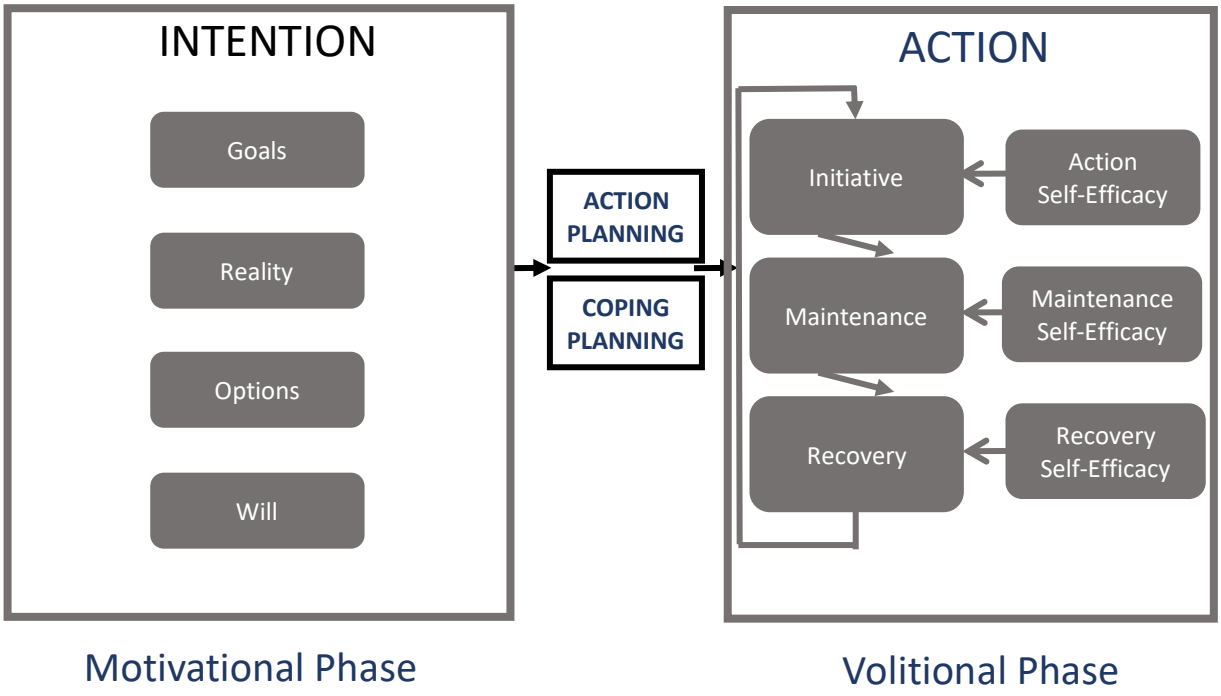

Figure 1: *Model of behavioural change incorporating both the GROW model and aspects of the Health Action Process Approach (HAPA) model of behavioural change (adapted from Schwarzer, 2008).*

One thing that is not explicit in the GROW model is the reference to our beliefs about our ability to act – or self-efficacy. In the HAPA model, self-efficacy has three components. Action self-efficacy is the ability to visualise and anticipate the outcomes of successful change. High action self-efficacy predicts intention to act. Individuals who are low in self-efficacy are more likely to imagine failure, obstacles to success or to have doubt in their own abilities.

Maintenance or coping self-efficacy is the belief that obstacles will be overcome. This requires that the long-term goal is maintained even when competing goals with higher short-term rewards are present. High-self-efficacy has been associated with conscientiousness (Duckworth and Gross, 2014) or the ability to constrain impulses.

Recovery self-efficacy is the ability to recover after a lapse. High recovery self-efficacy or grit (Duckworth and Gross, 2014) requires the ability to attribute the lapse to an external situation and to find ways to limit the damage and get back on track. Grit has been found to

be associated with the volume of the dopamine reward system (Nemmi, et al., 2016). Thus, seeking reward regardless of delay or obstacles can help us to keep motivated when pursuing long-term goals.

Self-efficacy

What is self-efficacy, and how does it improve the chances of behaviour change? Michie, et al. (2011) suggest that, in order to reduce the friction that obstructs behaviour change, we should examine three factors:

1. Capability or individual psychological and physical capacity to engage in the behaviour including necessary knowledge and skills;
2. Opportunity to perform the behaviour, including all the factors that lie outside the individual that prompt the behaviour, and make it possible, including the physical properties of the environment and the social culture;
3. Motivation to change including all the brain processes that energise and direct behaviour, including habitual or automatic processes, emotional responding and reflective or analytic decision-making.

These factors will be different for any behaviour that we choose to change, and so coaching a client to change behaviour should start by specifically defining the behaviours that are to change – both those that are to be reduced or eliminated and those to be increased or developed. Only then is it possible to determine whether the client has sufficient self-efficacy to make these changes and how this can be supported despite potential obstacles.

When does neuroscience coaching work best

Typically providing clients with new knowledge is not considered part of the role of a coach. In some situations, however, it can be appropriate for coaches to bring expert knowledge to a coaching situation when the knowledge of the coach is greater than that of the client and the knowledge base is relevant to the client's goals (Stober and Grant, 2006). This might therefore include knowledge about how the brain works (see, for example, the special issue of The Coaching Psychologist: Enhancing the dialogue between the fields of neuroscience and coaching, volume 11, June 2015).

If neuroscience has something to offer in a particular coaching context, it is important to consider *how much* neuroscience should be shared. There is a cost to consider here, since coaching is designed to be a process that the coach holds so that the client can explore their own thoughts, beliefs and goals. In order to share neuroscience knowledge, it is necessary to break the coaching process by introducing an element of mentoring or consulting. This can require a break in rapport and so should be used circumspectly. Not all clients want to know how their brains work; they are happy to be guided by the coaching process. In this case asking questions that direct their thinking in new ways can be sufficient. For others, however, the neuroscience can add scientific credibility to processes or techniques that

might otherwise seem unsubstantiated. For these clients, adding a bite-sized chunk of neuroscience can often work wonders.

Asking permission to share a neuroscience fact and providing a rationale for doing this is a necessary step to ensure that rapport can be, first, broken ("I would like to share a fact about your brain that you might find useful. Would that be helpful to you?") and then recovered ("What might you do with this new information?").

Tools and techniques

There are many ways in which neuroscience can be used in coaching. In this section, five examples are provided (see Bossons, et al., 2015 for further examples).

Neuroplasticity and growth mindset

Change is not only possible – it is inevitable. The human brain has evolved to adapt to changes in our world. Neuroplasticity refers to the structures in the brain (neuro-) that can change (-plasticity) to adapt to changes in our environment. The brain changes by creating new neurones (the active, information-processing cells in our brains) to store new information in the parts of the brain that process memory. For example, the hippocampus (an area of the brain vital to memory) is larger in London taxi drivers who have learned "The Knowledge" – a map of the streets of London and what times of day, for instance, these are busy (Maguire, et al., 1997). New connections between neurones (synapses) can also be created in any area of the brain that is required to process new information. Indeed, we create and lose as many as 10% of the synapses in our brains on a daily basis whether we do anything different or not (Purves, et al., 1987; Umeda and Okabe, 2001). By constantly renewing synapses, the structures in the brain are able to adapt immediately to any changes in the environment. Indeed, if we do the same today as we did yesterday, the energy required to make these changes goes to waste. Coaches can help their clients to understand the potential of the brain to learn (at any age).

Since our brains are adapted for change, this cannot be the reason that we sometimes find learning or change difficult. Rather, this can be the result of our beliefs. If we believe that our intelligence, personality or skills are aspects of our self that we are born with and therefore cannot be changed – then this can become a self-fulfilling prophesy or fixed mindset (Dweck, 2006). There is no point in trying new ways if things cannot be changed. We will be more willing to change if we understand that our brains are designed for change and, therefore, with perseverance and the right strategy – or a growth mindset, we can become better at new skills or learn new concepts. Providing clients with information that changes their beliefs about their ability to learn and change can help to increase willingness to try new strategies.

Calibrating emotions

Our emotions evolved on the savannah when we might have needed to respond to life-threatening challenges (sabre-tooth tigers, lack of food or water, etc.). See Figure 2.

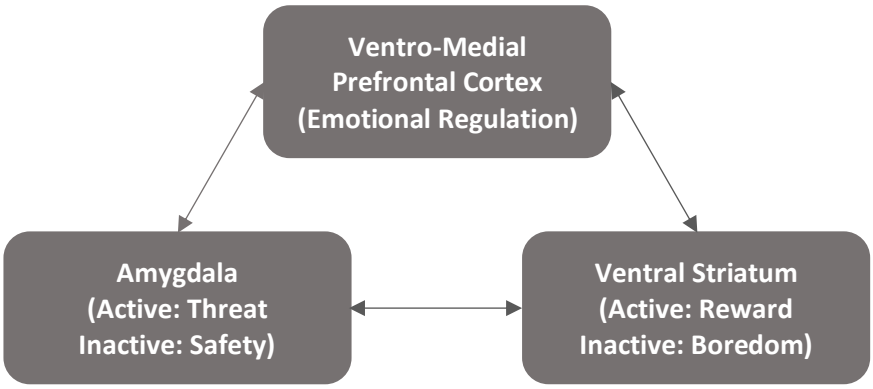

Figure 2: *The triadic brain. This model demonstrates the parts of the brain that interact when we consider what we consider as threats and rewards, and how we regulate our emotional response in the workplace (Adapted from Ernst et al., 2006).*

Our current day-to-day existence is a lot less threatening, and yet we have the same emotional range at our disposal. It is therefore possible that we might express our strongest emotional responses for events that are far from life-threatening. This raises the question – how do we calibrate our emotional range? Do we over-react in some situations? Or have we learnt, through our culture, to suppress emotions in some situations? And, if so, can this be changed?

Emotions can be changed, and the first step is to believe that this is possible. One of the major functions of the brain is to identify situations we should avoid (threat: Amygdala) and those we should approach (reward: Ventral striatum). The combined activity in these two areas of the brain determine both our behaviour and our emotional response – more reward than threat causes approach behaviour and is associated with (mostly) positive emotional responses while more threat than reward will cause avoidance and is associated with negative emotions.

The unconscious, habitual responses of the amygdala and ventral striatum and the emotions that these create, however, can be overcome. Consciously activating the ventro-medial prefrontal cortex (vmPFC) reduces the activity in the amygdala and ventral striatum. Thus, by showing clients how to increase this activity, coaches can help to re-calibrate their emotional response. Techniques for doing this include naming the emotion (Lieberman, et al., 2007), noticing whether an emotion is appropriately calibrated and reframing the event by interpreting it differently (McCrae, et al., 2009).

Empathy for others

Our brains have adapted to be able to understand our own and others' emotional reactions to events. The ability to empathise develops over the lifespan and consists of several interacting components. The first stage of acquiring empathy is to be able define and understand our own emotional signals – both those that signal approach (positive emotions e.g. joy, happiness, fulfilment, compassion; negative emotions e.g. anger) and those that

signal avoidance (negative emotions e.g. disgust, fear, sadness, guilt, embarrassment). This ability develops at, or soon after, birth (Decety and Svetlova, 2012). See Figure 3.

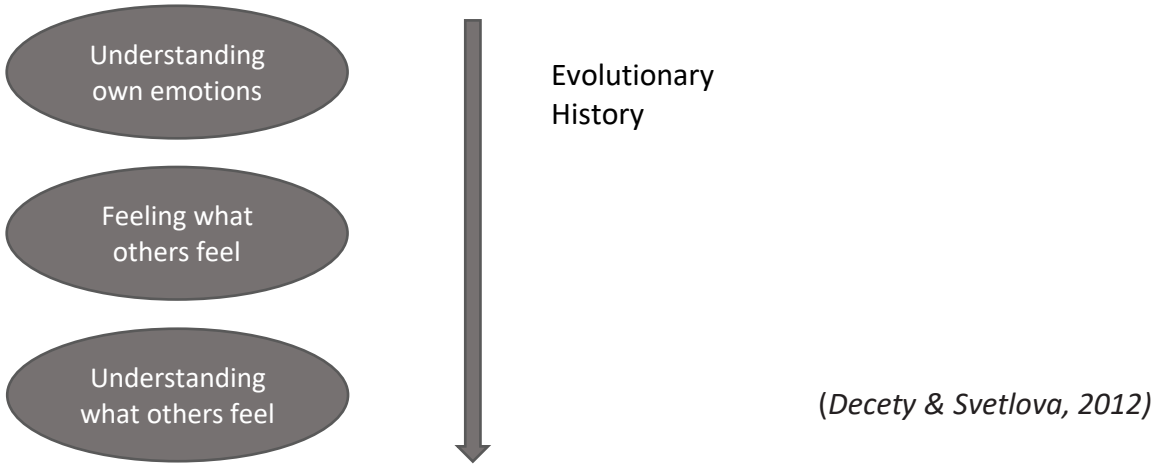

Figure 3: *The evolutionary development of empathy showing the different mechanisms available for empathy (Adapted from Dececty and Svetlova, 2012).*

The next system to develop is the nurturance system, which allows us to feel how others feel. This evolved for parenting behaviours that support the extended development of the infant brain. Parents respond appropriately to their children's emotions through emotional contagion when the vocal, facial and gestural cues of the child generate a similar state in the parent. The hormone, oxytocin, has been found to both promote care-giving and decrease fear and anxiety in the cared-for person (decrease in activity in the amygdala). However, in a situation where others consistently express negative emotions, feeling how others feel can lead to increased levels of stress, resulting in poor health, burn-out and social withdrawal.

Understanding what others feel depends on the development of self-awareness. This increases the capacity for empathy through adherence to social norms based on feedback from others. Self-awareness activates the medial prefrontal cortex (mPFC) and requires differentiation of self from other (right temporo-parietal junction: rTPJ). This allows us to notice others' thoughts, intentions and emotions, thus increasing our ability to hypothesise about their potential actions. Compassion for others, which requires self-awareness, can induce positive feelings in response to the negative emotional response of others (Engen and Singer, 2015). Responding to negative emotions with compassion drives good health. Coaches can therefore help their clients to respond better in emotionally draining situations by eliciting conscious compassion for others rather than unconscious emotional contagion.

Empathy for self

Another rather strange aspect of our empathic processing is our ability to empathise with ourselves. We are often more critical of our own behaviour than the behaviour of others. There is more than one reason why this might be true.

The first is level of detail: When we do something embarrassing, we judge ourselves not only on that event, but on previous similar events and therefore believe that people will be more critical of our behaviour than they really are. In fact, we are more correct about another's judgement of us when we reflect on how we might view this in ten years' time. This strips away some of the detail, making our interpretation more similar to that of someone who knows less about our past behaviour (Powers and LaBar, 2019).

The second reason that this might be true is that the temporo-parietal junction (TPJ) is highly activated in empathising behaviour. However, the TPJ is not active when we think about our own behaviour –therefore, we do not seem to have the ability to empathise with ourselves (Young, et al., 2010). Since empathy developed in order to help social cohesion it is an important aspect of interacting in groups but not when thinking about your own behaviour.

Coaches can assist their clients in being more empathetic with themselves by pointing out that this requires some effort and then by encouraging them to, for instance, consider what they might say to a good friend in their situation.

Explore and exploit

Some people are impatient when they perceive that there are better ways to do something, and want to try out new ideas. Other people are more likely to be concerned about what they might lose if things change. They like the status quo. Individuals, therefore, can hold very different beliefs about change. Some people can't live with it and some can't live without it.

When a particular situation is going well, we *exploit* it. We *refine* it to our needs, we *choose* how to manage it, we can *select* elements from the role that we enjoy, we can *implement* and *execute* our ideas and we *complete* projects (Cohen, et al., 2007).

By comparison, when a situation is working less well we *explore*. We might feel the need to *search* for alternatives, to *vary* our routine, to *pursue novelty* and *take risks*. We might *play* more, be more *flexible* and *innovate*. We are more likely to explore when we feel that our talents are under-utilised or under-rewarded or when we become bored and want more novelty (Cohen, et al., 2007).

Only exploiting or only exploring is limiting. While, in the short term, exploiting provides certainty and security, only exploiting can fail to create better opportunities through lack of flexibility and willingness to take risk. Only exploring can be exciting but can also lead to undeveloped ideas, inability to develop competence in any area and failure to complete

projects.

Recently, neuroscientists have identified a part of the brain in the cingulate cortex (part of the brain used to calculate risk) that is active when we move from exploiting to exploring (or back again). When one part of this area is active, we exploit and when another part is active, we explore (Cohen, et al., 2007).

Understanding how and when individuals switch from exploit to explore enables coaches to help their clients to exploit or explore more. If a client wants to exploit more, then help them to create an environment that contains a sufficient level of challenge and choice which prevents boredom and which rewards them for using their talents to the full. Or, if they want to explore more, then notice ways in which the current situation lacks novelty and under-uses abilities in order to feel that it is worth the risk of changing. Identifying increased reward or purpose will also encourage more exploring.

Ten useful questions for neuroscience coaches

The neuroscience techniques described here suggest some questions that might be useful to use with coaching clients. For instance, a coach might ask a client with a fixed mindset:

1. "What do you have to believe about yourself to choose the easy course of action and what would you have to believe to choose a harder course of action?"

This might help the client to uncover the limiting beliefs that are preventing them from accepting a higher level of challenge.

Another question that is useful for a client with a fixed mindset, or who reacts badly to feedback, is:

2. "What would you do differently if your only goal was to learn something from this situation?"

In this case, the coach can help the client to treat feedback as an opportunity to learn and improve rather than as implied criticism.

Clients that have an unwanted emotional response can be helped to consider whether the response is appropriate by asking them to:

3. "Consider your emotional response to this situation: On a scale of 0 (no emotional response) to 10 (the strongest emotional response to the most serious situation) where would you place this response? What level would be an appropriate response for this situation?"

This can help a client to put their emotions in perspective and might allow them to choose a more appropriate response to the situation.

If you have a coaching client that is considering a substantive change, which requires them to explore new opportunities, you might ask them:

4. "What are you currently exploiting that you would not want to lose?"

Sometimes what holds us back from new opportunities is fear of loss. Consciously identifying what it is that is important to retain can help your client to consider ways of creating change without losing this.

Similarly, a client that is a more natural exploiter might be less aware of the benefits that change might bring. In this case, you might choose to ask them:

5. "What would be the benefits of exploring something new? What change is easily accessible and what is beyond the horizon?"

This can help them to imagine new futures, both by exploring the easier next steps and those that might take more planning.

A client that is overly focussed on a negative experience and is having trouble putting this in perspective might be helped by asking:

6. "What would this look like from five or ten years in the future?"

This might help them to reduce the detail in their memory of the event and take a more realistic perspective on how they might be judged by others in the present and themselves in the future.

Similarly, a client that appears to be judging themselves overly critically and therefore failing to show empathy or compassion for themselves might be asked:

7. "What would a good friend advise you in this situation? And what would you tell a good friend who had your challenge?"

By saying aloud what they would advise a friend for whom they have empathy and compassion, it is possible that they will be more aware of the difference in compassion they display to others in comparison to themselves. This might help them to learn greater self-empathy.

For a client that has created a negative interpretation of a potentially ambiguous event, a coach might choose to ask them:

8. "What other story would account for the facts of the situation? And what other story?"

Creating multiple interpretations of the same event can be helpful in demonstrating that we construct our perceptions from sparse data and often over-interpret what we know. Sharing a number of different perspectives helps to make this explicit and can therefore reduce the impact of the initial, negative interpretation of events.

At the end of a GROW session, it can be useful to give the client an opportunity to consider both potential obstacles and how they might overcome these. A good question for this is:

9. "What might prevent you from reaching your goal and what steps could you put in place to circumvent this?"

Explicitly surfacing obstacles during a coaching session can help clients either to address these appropriately if they arise, or to prevent them from interfering with the plan at all.

Similarly, at the end of a GROW session, it can be useful to put in place a Plan B so that clients continue to act even if their first plan is not successful. A good question for this is:

10. "What will you do if you find that you do not follow your plan? What steps can you take to re-assess the situation and refocus on your goal?"

By having a Plan B and even a Plan Z (worst-case scenario), clients can be more proactive in continuing towards their goals in the event of unexpected interruptions.

Conclusion

An understanding of neuroscience has the potential to increase the effectiveness of coaching through a greater understanding of how our brains operate. Already, a number of different techniques have been developed to take advantage of this understanding, and this will no doubt be expanded by the avalanche of research that is emerging from neuroscience laboratories worldwide. It is an exciting time to be a neuroscience coach.

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