

Coaching the brain: Neuro-science or neuro-nonsense?

Anthony M. Grant

This paper discusses some myths and misconceptions that have emerged in relation to neuroscience and coaching, and explores the notion that neuroscience provides a foundational evidence-base for coaching, and that neurocoaching is a unique or original coaching methodology. It is found that much of the insights into coaching purported to be delivered by neuroscience are long-established within the behavioural sciences. Furthermore, the empirical and conceptual links between neuroscientific findings and actual coaching practice are tenuous at best. Although at present there is no convincing empirical support for a neuroscientific foundation to coaching, there are important ways in which coaching and neuroscience can interact. There is good evidence that solution-focused cognitive-behavioural (SF-CB) coaching can reliably induce specific behavioural and cognitive changes. SF-CB coaching could thus be used as a methodology to experimentally induce specific changes including greater self-insight and better relations with others. Subsequent changes in brain structure or brain activity could then be observed. This has potential to be of great value to the neuroscience enterprise by providing more hard evidence for concepts such as neuroplasticity and brain-region function-specificity. It may well be that coaching can be of greater use to the field of neuroscience than the field of neuroscience can be to coaching. In this way we can address many neuromyths and misconceptions about brain-based coaching, and begin to author a more accurate and productive narrative about the relationship between coaching and neuroscience.

Keywords: neuroscience; coaching; neuromyths; brain-based coaching.

Introduction

THERE HAS BEEN a significant growth over the past 10 years in articles, products and services in the coaching industry that purport to draw on neuroscientific research. There is an immediacy and attractiveness in neuroscience that appeals to many people. For some, neuroscience offers the ultimate explanatory framework from which to understand coaching. For others neuroscience-based coaching is a classic example of pop-science bandwagoning with coaches, workplace trainers and business consultants using neuroscientific jargon and brain images as pseudo-explanatory frameworks for atheoretical proprietary coaching systems (for discussion see Grant & Cavanagh, 2007).

The target paper in this issue provides an opportunity to reflect on some aspects of neuroscience-based coaching. I should state

that I am no expert in neuroscience. My expertise (if any) lies in solution-focused cognitive-behavioural approaches to coaching, conducting coaching research, practicing evidence-based coaching with organisations and coaching clients, and teaching and training others in evidence-based coaching. In addition, my undergraduate and postgraduate training in psychology taught me some skills in critical thinking, reasoning and research. It is from this perspective that I write.

This paper, in response to the target paper, discusses the narrative that has emerged in relation to the use of neuroscience in coaching, some neuromyths and misconceptions and explores the notions that neuroscience provides an evidence-base for coaching and that neurocoaching is a unique or original coaching methodology.

I then argue that, by providing a well-validated methodology for creating human change, coaching *per se* may well be of greater use to the field of neuroscience as an experimental methodology than neuroscience *per se* can be to coaching.

Neuromyths and misconceptions

Neuromyths are misconceptions about the brain that propagate when cultural or social conditions (e.g. lack of critical thinking or expert knowledge, unconscious biases, etc.) inhibit rigorous scrutiny (Crockard, 1996), and can be viewed as surface markers of an underlying social narrative.

Neuromyths arise, in part, because the mind-brain-behaviour relationship cannot be reduced to, or acutely represented in a colourful computer-generated image of the brain – however impressive such images might be. Oversimplification of these complex relationships creates misunderstandings (Howard-Jones, 2014), and such misunderstandings are frequently propagated by the popular press and those who wish to use neuroscientific language to sell their goods or services (Beck, 2010). As Beck (2010) notes, it is very easy to manipulate the general public's perception of neuroscientific findings. Indeed, there is good research suggesting that people find statements made with reference to brain images and neuroscience language more convincing than the same statements that make no reference to the brain (McCabe & Castel, 2008; Rhodes, Rodriguez & Shah, 2014; Weisberg et al., 2008). In short, it is difficult for those not appropriately trained in neuroscience to fully grasp the true relevance or veracity of research in this area.

To add further confusion, there are significant controversies about the real meaning of functional magnetic resonance imaging (fMRI) – a primary tool in the neuroscientific research. The way that fMRI data itself is statistically analysed and reported has come under considerable criticism (Vul et al., 2009), and the lack of statistical power and the use of incorrect statistical analyses has cast doubt on the validity of

many fMRI research studies (Button et al., 2013), and this situation has fuelled a passionate debate amongst noted experts in the field (e.g. Diener, 2010).

The point here is that there is much ambiguity and controversy in neuroscience about research methodologies and the reliability of findings – even amongst experts. This ambiguity should act as an important caution for the coaching industry and the purchasers of coaching services, the vast majority of who do not have the appropriate specialised postgraduate training in neuroscience needed to thoroughly and critically understand and utilise the data from neuroscientific findings. This is not a simple area to understand and it is very easy to over-generalise the findings from neuroscience research to real-life coaching practice.

Pseudo-insights from neuroscience

Indeed, the neurocoaching field is awash with broad motherhood statements that are purported to be 'insights' derived from neuroscience. Some often-cited examples (e.g. Rock & Schwartz, 2006; Williams, 2010) include:

- The connections in our brains form 'mental maps' of reality.
 - Focusing our attention on solutions or new thinking is a better strategy for reaching goals than focusing on analysing problems from the past.
 - If leaders want to become more effective coaches themselves they need to learn to stop giving unsolicited advice to people, or if it is given, to be unattached to their ideas and present them as options to people.
 - Change is hard and people resist change.
- However, all of these supposed neuro-insights have been common knowledge within the behavioural sciences for many years. The notion that we hold mental models or maps of the world in our minds dates back though the cognitive traditions of Beck (1987) to Korzybski (1948) and to the ancient Greek philosophers. The idea that change is better attained through focusing on solutions and desired outcomes or goals

than analysing problems from the past has a long history in psychology, and encompasses the work of Latham and Locke (1991) and Fishbein (1979) amongst many others. The notion that leaders should genuinely consult and engage in dialogue with their employees rather than merely ordering or giving advice has a longstanding history well before the emergence of neuroscience (e.g. Blanchard, 1994; Locke, Schweiger & Latham, 1986); and the idea that people find it hard to enact change has been extensively explored in the behavioural sciences for over 90 years (e.g. Bandura, 1977; DiClemente & Prochaska, 1998; Schwarz, 1933).

Thus we need to ask, what new or unique insights about coaching does neuroscience give us that are not already evidenced through behavioural science. One has to conclude, that as yet, not many.

The negative impact of neuromyths in education and management

There has also been concern that the propagation of neuromyths and the inappropriate use of neuroscientific findings have had a negative impact on a number of areas of practice. For example, Howard-Jones (2014) discusses the negative impact on neuromyths in education, ranging from the erroneous belief that we mostly only use 10 per cent of our brain to the (similarly erroneous) belief that individuals learn better when they receive information in their preferred learning style (e.g. visual, auditory or kinaesthetic). Howard-Jones (2014) argues that such neuromyths have had negative effect on education by propagating less effective teaching methods and inhibiting evidence-based approaches to teaching.

Lindebaum and Jordan (2014) similarly mount an extensive critique on neuroscientific methodologies in organisational behaviour and management studies (which includes neuroscience-based workplace coaching and neuroscience-based leadership coaching). They point out that there are very few substantive critiques of organisational neuroscience – suggesting a degree of

groupthink, a result of an organisational neuroscience bandwagon. They also argue that the basic science behind organisational neuroscience is far less rigorous than currently advocated (due to the low statistical power of some studies coupled with an inability to locate mental phenomena accurately in the brain), concluding that the practical implications of organisational neuroscience research are currently overstated. If organisational neuroscience is to develop, they argue, it is vital that researchers move away from broad, general statements and become more far specific about the phenomena under investigation. Clearly, caution is required in extrapolating from general and basic neuroscientific research to applied coaching methodologies (Frankfurt, 2005).

Four common coaching neuromyths and misconceptions

There are four common neuromyths and misconceptions that sit at the core of the neurocoaching narrative. Interestingly, although these are often-cited arguments in support of neurocoaching, one does not need an in-depth understanding of neuroscience to refute them – just logic, critical thinking and an understanding of coaching as discipline.

1. The myth that neuroscience gives us scientific proof that coaching ‘works’

This myth is erroneous because there are large amounts of data in the behavioural sciences from the 1990s onwards indicating that coaching can help facilitate behavioural change and enhance goal attainment and well-being in a wide range of domains including life coaching, leadership coaching and in response to stress (e.g. Grant, 2003; MacKie, 2014; Peterson, 1993; Wissbrun, 1984). Such work is peer-reviewed, conforms to accepted scientific procedures and does not utilise any aspect of neuroscience. In short, there is already longstanding scientific proof that coaching works irrespective of what neuroscience proponents may say.

2. *The myth that neuroscience allows us to ‘coach the brain’*

In order for this claim to be true, proponents of neurocoaching need to show how other approaches to coaching do not involve the coachee’s brain. Stated like this it is obvious that all coaching involves the brain. All coaches, irrespective of theoretical orientation ‘coach the brain’!

3. *The misconception of reductionism*

At its core this misconception involves the notion that we can understand complex human behaviour by examining fMRI images, and that human experience can be understood by reduction to the cellular level. This simplicity is attractive to many; in essence it states that if you can understand fMRI images, you can understand people. Reinforcing this misconception is that fact that fMRI images tend to give an illusion of explanatory depth, with people believing that they have a better understanding of the mechanism underlying a behavioural phenomenon – even when such understandings are incorrect (Rhodes et al., 2014). Thus it is easy to fall into the reductionist trap (Cahill, 2001).

However, we cannot explain human behaviour (or develop coaching methodologies) just by looking at, or extrapolating from, computer-generated images that present idealised images of brain functioning. It must be remembered that fMRI images are only surface markers of underlying complex brain processes that themselves are a response to a broad range of external stimuli and internal psychological and biological processes. To understand the complexities of human behaviour (and coaching) we need a more holistic biopsychosocial approach.

4. *The myth that neuroscience provides the scientific foundation for coaching*

It has been argued that contemporary neuroscience provides the scientific foundation for coaching practice (see, for example, Rock & Page, 2009). The idea that there was

not an already existing scientific foundation for coaching prior to 2009 or the popularising of neuroscientific language in relation to coaching, would have come as a great surprise to the many behavioural scientists (e.g. Grant, 2003; Kilburg, 2001; Miller, 1990; Olivero, Bane & Kopelman, 1997; Peterson, 1993) who had been using theory to generate coaching-specific hypothesis, and then testing those hypotheses through systemic data collection and analysis – facets commonly understood as comprising the ‘scientific method’ (Wilson, 1990), a vital part of a scientific foundation.

A foundation is commonly understood as the base on which all else is built (Hanks, 1986). Thus if neuroscience is to provide a scientific foundation for coaching it will need to be able to generate unique coach-specific theories and methodologies that can then inform the development of unique coaching interventions. Until this point is reached, the best we can say is that neuroscience can inform and augment existing approaches to coaching.

A word of caution: Let’s get real

A word of caution is warranted at this point. It is clear that there is little empirical data that directly links neuroscience research to coaching-specific outcomes, and it is clear that there are large conceptual holes in the arguments and conceptual frameworks underpinning neurocoaching and in the attempted links between neuroscience and coaching. Thus, coaches, trainers and consultants that use neuroscientific jargon as a means of gaining credibility and developing an aura of scientific respectability in order to sell their products and services run the very real risk of having their own professional standing diminished, as well as doing their clients and broader coaching industry a disservice. Good, evidence-based coaching that is solidly grounded in the behavioural sciences does not need pseudo-neuro psychobabble or pseudoscience to find a market. Let’s get real and cut the hyperbole (Frankfurt, 2005).

Final reflections and towards the future

This is not to be dismissive of neuroscience as valid science, or dismissive of the contribution that neuroscience can potentially make to the evidence-based coaching enterprise. The recent and ongoing advances in neuroscience technology and methodologies are exciting. Neuroscience has the potential to offer great insights.

But let's be frank about it, there's a lot of nonsense talked about neuroscience and coaching. There is lots of marketing hype; lots of sweeping statements; lots of erroneous reasoning, and almost quasi-religious fervour in some quarters. This is not good for the coaching industry or its clients, and may well impede to the movement towards a genuine evidence-based coaching paradigm.

The way forward?

Although at present there is no truly convincing support for a neuroscientific foundation to coaching, there are some interesting ways in which coaching and neuroscience can interact.

We now have good evidence that solution-focused cognitive-behavioural (SF-CB) coaching can reliably enhance goal attainment and induce behavioural change as well as positively impacting on a range of psychological variables including capacity for self-regulation, self-insight and solution-focused thinking (Theeboom, Beersma & van Vianen, 2013). Thus it would be valuable to use SF-CB coaching as a methodology to experimentally induce specific changes (e.g. increased self-regulation; greater self-awareness and self-insight; better relations with others) and to observe (any) changes in

brain structure or brain activity. This line of research (which should be hypothesis-driven, rather than speculative), has the potential to be of great value to the neuroscience enterprise by providing more hard evidence for concepts such as neuroplasticity and brain-region function-specificity

In addition it would be extremely fruitful to explore the links between the self-report outcome measures typically used in coaching, actual behaviour change and any changes in brain states as recorded by neuroscientific methodologies such as fMRI. This kind of holistic research has far greater potential to make a meaningful practical contribution to the evidence-based coaching enterprise than much of the somewhat speculative and reductionist links that have been drawn between fMRI images and coaching practice to date.

It may well be that coaching can be of greater use to the field of neuroscience than the field of neuroscience can be to coaching. In this way we can begin to address many neuromyths and misconceptions about so-called brain-based coaching, and begin to author a more accurate and productive narrative about the relationship between coaching and neuroscience.

Correspondence

Anthony M. Grant PhD

Coaching Psychology Unit,
School of Psychology,
University of Sydney,
Sydney, NSW 2006,
Australia.

Email: anthony.grant@sydney.edu.au

References

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215.
- Beck, A.T. (1987). Cognitive models of depression. *Journal of Cognitive Psychotherapy*, 1, 5–37.
- Beck, D.M. (2010). The appeal of the brain in the popular press. *Perspectives on Psychological Science*, 5(6), 762–766.
- Blanchard, K. (1994). *Leadership and the one minute manager*. London: HarperCollins.
- Button, K.S., Ioannidis, J.P.A., Mokrysz, C., Nosek, B.A., Flint, J., Robinson, E.S.J. et al. (2013). Power failure: Why small sample size undermines the reliability of neuroscience. *Nat Rev Neurosci*, 14(5), 365–376.
- Cahill, L., McGaugh, J.L. & Weinberger, N.M. (2001). The neurobiology of learning and memory: Some reminders to remember. *Trends in Neurosciences*, 24(10), 578–581.
- Crockard, A. (1996). Confessions of a brain surgeon. *New Scientist*, 2061, 68.
- DiClemente, C.C. & Prochaska, J.O. (1998). Toward a comprehensive, transtheoretical model of change: Stages of change and addictive behaviors. In W.R. Miller (Ed.), *Treating addictive behaviors* (pp.3–24). New York: Plenum Press.
- Diener, E. (2010). Neuroimaging: Voodoo, new phenology, or scientific breakthrough? Introduction to Special Section on fMRI. *Perspectives on Psychological Science*, 5(6), 714–715.
- Fishbein, M. (1979). A theory of reasoned action: Some applications and implications. *Nebraska Symposium on Motivation*, 27, 65–116.
- Frankfurt, H.G. (2005). *On bullshit*. Princeton, NJ: Princeton University Press.
- Grant, A.M. (2003). The impact of life coaching on goal attainment, metacognition and mental health. *Social Behavior and Personality: An International Journal*, 31(3), 253–263.
- Grant, A.M. & Cavanagh, M. (2007). Evidence-based coaching: Flourishing or languishing? *Australian Psychologist*, 42(4), 239–254.
- Hanks, P. (1986). *Collins Dictionary of the English Language*. London: Collins.
- Howard-Jones, P.A. (2014). Neuroscience and education: Myths and messages. *Nat Rev Neurosci*, 15(12), 817–824.
- Kilburg, R.R. (2001). Facilitating intervention adherence in executive coaching: A model and methods. *Consulting Psychology Journal: Practice & Research*, 53(4), 251–267.
- Korzybski, A. (1948). *Selections from science and sanity: An introduction to non-Aristotelian systems and general semantics*. New York: International Non-Aristotelian Library Publishing Company.
- Latham, G.P. & Locke, E.A. (1991). Self-regulation through goal setting. *Organizational Behavior & Human Decision Processes*, 50(2), 212–247.
- Lindebaum, D. & Jordan, P.J. (2014). A critique on neuroscientific methodologies in organisational behavior and management studies. *Journal of Organizational Behavior*, 35(7), 898–908.
- Locke, E.A., Schweiger, D.M. & Latham, G.P. (1986). Participation in decision making: When should it be used? *Organizational Dynamics*, 14(3), 65–79.
- MacKie, D. (2014). The effectiveness of strength-based executive coaching in enhancing full range leadership development: A controlled study. *Consulting Psychology Journal: Practice and Research*, 66(2), 118–137.
- McCabe, D.P. & Castel, A.D. (2008). Seeing is believing: The effect of brain images on judgments of scientific reasoning. *Cognition*, 107(1), 343–352.
- Miller, D.J. (1990). The effect of managerial coaching on transfer of training. *Dissertation Abstracts International*, 50(8-A), 2435.
- Olivero, G., Bane, K. & Kopelman, R.E. (1997). Executive coaching as a transfer of training tool: Effects on productivity in a public agency. *Public Personnel Management*, 26(4), 461–469.
- Peterson, D.B. (1993). Skill learning and behavior change in an individually tailored management coaching and training program. *DAI-B 54/03*, 1707. September, Empirical, PhD, WS.
- Rhodes, R.E., Rodriguez, F. & Shah, P. (2014). Explaining the alluring influence of neuroscience information on scientific reasoning. *J Exp Psychol Learn Mem Cogn*, 40(5), 1432–1440.
- Rock, D. & Page, L.J. (2009). *Coaching with the brain in mind: Foundations for practice*. New York: John Wiley & Sons.
- Rock, D. & Schwartz, J.M. (2006). A brain-based approach to coaching. *International Journal of Coaching in Organizations*, 4(2), 32–44.
- Schwarz, G. (1933). On relapse in the changing of habits. *Psychologische Forschung*, 18, 143–190.
- Theeboom, T., Beersma, B. & van Vianen, A.E.M. (2013). Does coaching work? A meta-analysis on the effects of coaching on individual level outcomes in an organisational context. *The Journal of Positive Psychology*, 9(1), 1–18.
- Vul, E., Harris, C., Winkielman, P. & Pashler, H. (2009). Puzzlingly high correlations in fMRI studies of emotion, personality, and social cognition. *Perspectives on Psychological Science*, 4(3), 274–290.
- Weisberg, D.S., Keil, F.C., Goodstein, J., Rawson, E. & Gray, J.R. (2008). The seductive allure of neuroscience explanations. *Journal of Cognitive Neuroscience*, 20(3), 470–477.

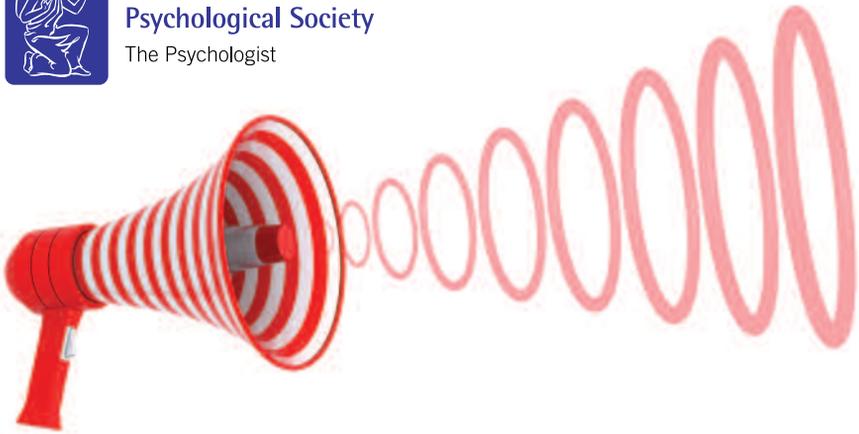
Williams, R. (2010). How brain science can change coaching: Brain science research has significant implications for coaching. *Psychology Today*. Retrieved from: <https://www.psychologytoday.com/blog/wired-success/201002/how-brain-science-can-change-coaching>

Wilson, E.B. (1990). *An introduction to scientific research*. New York: Courier Corporation.

Wissbrun, D.L. (1984). The reduction of managerial stress through skill development in performance counseling and performance coaching. *Dissertation Abstracts International*, 44(12-A), 3571–3572.



The British
Psychological Society
The Psychologist



Calling out for new voices

When someone is making waves in psychology in years to come, we want to be able to say they published their first piece in *The Psychologist*. Our 'new voices' section will give space to new talent and original perspectives.

We are looking for sole-authored pieces by those who have not had a full article published in *The Psychologist* before. The only other criteria will be that the articles should engage and inform our large and diverse audience, be written exclusively for *The Psychologist*, and be no more than 1800 words. The emphasis is on unearthing new writing talent, within and about psychology.

The successful authors will reach an audience of 48,000 psychologists in print, and many more online.

So get writing! Discuss ideas or submit your work to jon.sutton@bps.org.uk. And if you are one of our more senior readers, perhaps you know of someone who would be ideal for 'new voices': do let us know.