

Article

Emotion Coaching in relation to: Triune brain, polyvagal theory & handheld brain model

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Practitioners' engaging with research: Understanding why scientific explanations can change over time

It seems that effectively explaining who we are and our behaviour in relation to bodies and brain function remains an elusive goal for academics. Humans as sense-making beings, have created many academic disciplines to study the human condition. There is much, specialized, but easily accessible, knowledge that offers insights into human function, from the cellular level to global trends. However, understanding just what is credible and then translating this to effectively inform educational practice is fraught with problems.

Emotion Coaching UK (ECUK) accepts that 'language is the only means we have to consider what we see and to communicate our understanding of social phenomena' to others (Milliken and Schreiber, 2012:687). To accurately share understanding, clarity in meanings of words and phrases is needed. Meaningfulness is only experienced when we 'can talk with and make sense to each other', however, these very words 'will also shape how we think and what we accept as truth and knowledge' (Arendt, 1998:4). Although we create meaning we are also born into a world of meaning, so how we view and engage in the world is a social construct; because the world has already been interpreted those who have gone before us, and knowledge has been judged as meaningful in relation to what is already known. Indeed, factual data only has relevance when interpreted and communicated through personal, cultural and historical lenses (Geertz, 1973; Willig, 2013).

For example, looking back to some historical research, truth and reality was strictly governed by empiricism. Today, however, the contribution of human agency, language and interpretation to knowledge and understanding – and hence reality - is recognised

(Milliken and Schreiber, 2012; Stryker, 2008). This means that our reality will and does change over time because, 'at different times and in different places there have been, and are, very divergent interpretations of the same phenomena' (Crotty, 1998:64).

With globalization and technological advances, truth and relevance are more broadly challenged and ever modified. New scientific explanations emerge to test, confirm or refute existing ways of knowing, resulting in the creation of ever more reasonable or alternative scientific explanations. This in turn can lead to challenges in acceptance of the dominant explanations and changes to our scientific understanding overtime. In the light of this process, we want to clarify our view on the following: The triune brain theory (Maclean, 1990); the polyvagal theory (Porges, 2011) and the handheld model of the brain (Siegel, 2012).

1. The triune brain theory

The triune brain theory was first proposed by Paul Maclean in the 1960's and became well-accepted in explaining how brains might evolve and function. His anatomical studies of the brains of various animals, led to a belief into the particular and special structures of the human brain. Maclean recognised commonality between species of specialised areas in brain functions such as sight, speech and motor actions, and proposed they shared a linear evolutionary pathway from simple to complex animals. Humans had the most complex brains, reflecting three distinct evolutionary layers which emerged in temporal succession. Each of the layers had *specific, differing and independent* functions. He proposed that the human brain developed through *an additive process* with newer, more complex functioning layers emerging over the older layers. His theory suggested that the evolutionary "older brain" controlled the primal emotional responses whilst the "new brain" controlled the cognitively sophisticated processes. This explanation was simple and accepted as a credible interpretation at the time.

However, 'no fact is safe from the next generation of scientists with the next generation of tools' (Feldman Barrett, 2017, pg 293). Maclean's triune brain theory is now questioned; although species may have common ancestry, current science suggests evolution is neither shared nor linear. It is believed that adaption by separate species

to their distinct environments has given rise to multiple evolutionary pathways. The idea that human brain structure is unique, reflecting the 'layering' of ever more complex functioning structures, over the more primitive, is now disputed. This is because other vertebrates have been found to have similar structures and forebrain regions as humans, challenging the suggestion that the human brain has three evolutionary separate areas each with exclusive function. It is now evident that the forebrain, in its activities and functioning, is extensively interconnected with other areas of the brain (Cesario, Johnson and Eisthen, 2020; LeDoux, 2012; McKay [nd]). As a result of traditionally distinct disciplines collaborating, and the use of new technologies, more explanations, offering more representative explanations of human brain function are emerging.

Although we accept that evolution has shaped humans as a species, it is now suggested that this has happened not through addition but *through the modification of pre-existing and repurposing of brain structures* (Feldman Barrett, 2017; Porges, 2011). In humans, the evolutionary interactions between the environment, experience and relationships favoured skills to predict to support survival. Past experiences, organized as concepts, guide actions, and give sensations meaning (Feldman Barrett, 2017). Although the ability to make meaning of physical sensations is universal, we see great variation in individual interpretation and subsequent actions. The proposition that brain function is modified through interaction within environments and with others, means we can begin to better understand why some individuals merely exist whilst others thrive. This explanation suggests the important role of the self to manage behaviour and acknowledges the interactional influences of context and others on outcomes. This thinking offers credence to promoting relational practice in general, and specifically Emotion Coaching, in education (Gilbert, 2018; Gus et al., 2015; Rose et al. 2015).

2. The polyvagal theory

The polyvagal theory (Porges, 2011) is a concept of brain-body neuroscience, which links social communication to the regulation of our autonomic nervous system. Central to the theory is the emphasis on sociality as the 'core process underlying mental and physical health' (Porges, 2021:17). However, it is not a static theory but was proposed

as ‘a framework for organizing information and structuring hypotheses’ (Porges, 2021:xxiii). Therefore, our rhetoric reflects ongoing awareness of alternative interpretations (see Grossman and Taylor, 2007 for comments on polyvagal theory). We endeavour to critically engage with literature to ensure Emotion Coaching practice evidences informed understanding.

Although polyvagal theory (2011) references an evolutionary (phylogenic) hierarchy of brain organization, it does not support Maclean’s triune brain theory. Rather, polyvagal theory (2011) suggests that mammals optimized their survival *through modifications of existing brain structures and function*. ‘As a result of evolutionary modification and adaption of existing neural circuits, [humans] were able to down-regulate defences, to reduce psychological and physical distance with conspecifics, and to functionally co-regulate physiological and behavioral state’ (Porges, 2021:9). The theory proposes that it is our *ability to regulate* our stress-response system, that allowed us to engage socially and co-operate, giving personal and collective advantage.

To participate with others and learn effectively, we need to feel safe in our relationships and environments (Gottman, 1989; Porges, 2011; 2021; Siegel, 2011). We then can engage more effectively with others and our environments to practise problem-solving. Due to plasticity of brain structure, particularly in childhood, we have an innate capacity to learn through repetition, trial and error, practise and copying (Shonkoff,2010). We learn through adapting our behaviour to support survival, and when we feel safe our thinking and behaviour is driven by integrated functioning in the brain.

We constantly, and largely unconsciously, assess safety and monitoring threat and this is known as neuroception (Porges, 2011). Our ability to predict outcomes also contributes to the activation or suppression of defence mechanisms. Indeed, it is now proposed that the connectivity and integration of brain structures and function, reflecting maturational, environmental, experiential and genetic components, contributes to the variation seen in emotional responses and regulation (Feldman Barrett, 2017; Siegel, 2011, van Der Kolk, 2014). If behavioural responses reflect a dynamic interdependency between physiological, environmental and psychological factors, an advantage can be inferred in the universal promotion of empathetic and nurturing relationships. Emotion Coaching training is one of the ways to support such

educational practice to optimise learning potential (Gilbert, 2018; Rose et al.,2019; Rose et al., 2015).

3. The hand model of the brain

The hand model of the brain (Siegel, 2011) was created to show simply how we respond to threat and safety. At the time it complemented the Triune brain theory, which in turn conferred credibility.

ECUK uses the hand model of the brain, adapted from Siegel's model (2011), in training as a simple practical tool to help visualise the structure of the brain. As discussed, our brains are constantly assessing environments to predict safety and adapt behaviour for survival. Structures and guiding mechanisms, which activate this automated survival response, are believed to be primarily located in the brainstem and limbic system (Carlson,2007). Neural and hormonal signals systems support individual defence mechanisms and prepare the body for fight, flight or freeze related behaviours. And once the threat is over, they help bodily functions to return to settings that optimise health and allow social engagement to be re-established. The forebrain is involved in assessment, decision making, creativity and problem solving. Therefore, the model is used to identify differing brain regions with specialised functions and to illustrate their connectivity and need for integration of brain function.

The relationship between emotional regulation and behaviour is believed to reflect an ongoing interplay of perception of threat, emotional response, and reaction. Whether innate primary emotions guide our actions (Ekman, 2016; Gross,2015) or emotional responses are constructed and reflect personal interpretation and experience (Feldman Barrett, 2017) is debateable. Currently, it is accepted that connectivity and integration of brain structures and function reflect continuing maturational, environmental, experiential and genetic components. These factors combine and contribute to the patterns and variations seen in human emotional regulation (Siegel, 2011, Porges, 2021; van Der Kolk, 2014).

The hand model of the brain (Siegel, 2011) has proven to be a popular tool for training and for use by practitioners. Although ECUK use the hand model, it is not to advocate

triune brain theory. We accept that the brain has recognisable distinct regions with specialised function, however, we stress that behavioural responses reflect an integration of brain regional activity. Emotional regulation is influenced by both our engagement with, and our accumulated environmental, experiential, and relational experiences (Davis and Wilson, 2009, Cozolino, 2013; Siegel 2012; Immordino-Yang, 2015). The hand model of the brain (Siegel, 2011) demonstrates the connections and integration of brain regions and functions.

However, we are aware that its connection to the triune brain legacy may cause confusion, and so recognise the importance of stating with clarity in training what the model does, and does not, represent. It can be used effectively to illustrate how Emotion Coaching supports the development of nurturing environments and relationships to encourage emotional self-regulation. We believe it remains a powerful tool in understanding brain structure and function in relation to Emotion Coaching practice.

In Conclusion

As practitioners, we each have a responsibility to promote best practice by referencing contemporary evidence-based research. In a world that is awash with a never-ending supply of unverified data, and a plethora of specialists who may choose to denigrate rather than debate their ideas online, maintaining this principle is neither simple nor obvious. The continuous volume of information can lead practitioners and students to feeling overwhelmed and unsure of what is credible and relevant. It can be difficult to critically evaluate particularly online discussions or research presented, out of context, as professional development. Trying to decide if explanations offered are credible, reflect improved understanding, represent a paradigm shift in the dominant discourse or are inter-disciplinary semantic wrangling is a conundrum for practitioners. In part, this is because every academic discipline has a dominant, preferred interpretation (a paradigm), to explain how we interact with the world. It is only when that interpretation is revealed or tested and unable to fully explain observed phenomena or becomes challenged by a more realistic alternative explanation that these paradigms change.

ECUK's work is founded on a belief that natural science alone can neither capture the nuances of the human condition, nor offer a translation to fully explain the complexity of the brain and mind. Therefore, we prefer to promote an interpersonal neurobiology approach to exploring and explaining health and wellbeing (Siegel, 2012). Human development and function are seen, not just as a product of biological action and reaction, but as a reflection of the ongoing interaction between genes, body and mind, relationships, environments, and experiences, which change over a lifespan (Cozolino, 2014; Porges, 2011, 2021; Siegel, 2012, 2014).

We encourage practitioners to consider their role, rights, and responsibilities in regard to the credibility and applicability of research that informs all practice. When sharing knowledge, we should be transparent about our preferred ways of knowing, recognising that ECUK training materials adopt a multi-disciplinary approach to research, knowledge and understanding.

It is also important to be aware of and acknowledge alternative understanding, accepting that no individual's understanding is ever complete, and knowledge is perpetually progressing. As Levi-Strauss, (1962:248) noted scientific explanation and human progress are found 'not in moving from the complex to the simple, but in the replacement of a less intelligible complexity by one which is more so'.

Therefore, translation of scientific ideas into sustainable and practical teaching demands engagement in lifelong learning. In this way practitioners, with shared skills can actively engage and contribute to critiques of existing and new ways of knowing. For more information on interpreting research please see our ECUK blog (<https://www.emotioncoachinguk.com/post/remember-we-are-all-wearing-spectacles>)

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