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Creativity – the Biology of Learning – walking through the basics

<https://wp.me/p92pWp-3r>

I took myself off for a walk. It was a day that I had booked as research leave and, normally, would have seen me at my desk with books and online journals and a notepad. However, the sun was out. It was one amazing blue sky day and I wouldn't be happy until I was in it!

On the basis of the previous post's conclusion that we are less likely to learn if we don't feel safe and happy, I decided that my research could continue outside in the sunshine! Flippancy aside, I did wonder if I would actually study better when in the environment I love, doing the activity I adore: walking in the hills.

The brain is still generally uncharted territory:

“Mapping the components of the brain is far more complex than mapping the human genome”

Sudhof (1)

The female mind is, if anecdotal wisdom is to be believed, also an area within which even angels fear to tread! However, I thought I would take the risk and accompany my brain on a walk; would the experience help me engage with the facts and figures I needed to learn, more effectively than sitting at my desk?

The theory

I have obviously started with a reference to the three aspects of the brain I commented on in my previous post and the overarching need to be safe and happy. These two areas continued to play a part in my day.

Whilst I was obviously wanting to engage my younger rational brain and study, the older limbic areas were already at work, checking out the nature of the idea.

The actual thought of going for a walk, generated in the frontal cortex (part of the young rational system) is likely to have prompted the hypothalamus (a limbic structure) to release dopamine (2). This hormone is a neurotransmitter and, amongst other functions, mediates pleasure in the brain. It generates movement as it “is released during pleasurable situations and stimulates one to seek out the pleasurable activity or occupation” (3). I have to say that I did look forward to being in the hills.

The act of walking though also ensured a good mood due to the release of two other ‘happy’ hormones alongside dopamine: serotonin and noradrenalin (6). Exercise in general appears to do this; from personal experience I do agree with one contributor to a Cycling magazine (4) who also noted that:

You are just one ride away from a good mood.

However, another limbic area, the hippocampus was also getting in on the act. This sits in the temporal lobe and is involved in the construction of long term events and facts. It also loves to know where it is, as place or location is an essential survival tool. It integrates all the sensory information that the brain picks up from the body, and the environment it is in, into a bigger picture of the episode or event that is occurring. It then sends this information back into the neocortex in a form where it can be recalled and reassembled later (5, p81). Clever eh?

The act of exercise also serves to stimulate the hippocampus with an increase in focus and attention and in its own size (6). Basically, it should speed up my brain's processing ability of everything I experienced on the walk and create more space within itself to process even more data.

Something else was also affecting my hippocampus. A little bit of stress.

I was aware that this was a risk. Just a little one. Would it be an academic day wasted? But physically, and more importantly, would I manage the walk safely? It was a new hill for me to climb from a location I was unfamiliar with. Would there be enough time and suitable weather conditions to walk but also to read and return to the car before dark? This is likely to have prompted the release of a small amount of adrenaline from the primitive brain (7) which improves the work of the hippocampus and increases long term semantic memory - the facts and figures of an event (5, p83).

How was it in practice?

Amazing!

I walked up Mellbreak near Lorton in Cumbria. As I said, it was new ground for me, literally, and I spent the first section of the walk navigating carefully from a map and guide book. Once on the summit it was easy to see the route down. I planned to make more of my rest stops and use the time to eat and read from an ebook I had on a tablet. I had three stops of this kind, lasting about 10-15 minutes each before I got too cold. Between the study stops I reflected on what I had read as I walked. The study stops coincided with the easier navigating. There was only so much I wanted to concentrate on at once!

I noticed one thing that surprised me: that I was very aware of my surroundings. More so than normal. It was as though my senses were on some form of hyper setting. Where I read and how I was feeling at the time are etched in my memory. I can still recall a few days later the feel of the breeze on my neck as I considered the effect of adrenaline on the hippocampus and the stillness of the lake water at my feet when I studied the structure of brain cells or neurons.

An event worth repeating then?

When we want to learn something, we need to create explicit memories. These are constructed of semantic (facts and figures etc) and episodic (the story we reweave around the facts we have assimilated) memories (5, p81). Our hero the hippocampus assimilates these from the experiences we have and sends them out to be stored in different areas of the frontal and temporal cortices – both areas of our younger neocortex. In this case it looks like the facts I studied are mapped together with particular moments of my walk and now sit in my memory. A result!

So, maybe I should do all my studying in the hills then?

Ah well, I wish it was that simple.....

References

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