

A CBT look at how memories activate neural circuitry in stress and anxiety disorders.



Advances in neuroscience are changing the world of psychology and how we understand and manage stress.

THINKING: CBT is an evidence based psycho-educational therapy that teaches us to examine and reframe *how we explain the world to ourselves*. I like to think of it as a 'rational thinking skills' model. And we know that every definition of stress

and anxiety and depression tells us that these disorders change how a person thinks and feels and behaves – and if that's true (and it is), then it makes sense to unconditionally accept the fact that we're not thinking straight when we have a stress disorder, and that we can literally learn to think straighter. One of the founding fathers of CBT, Albert Ellis, called it 'crooked thinking', and said we humans have an endless capacity to upset ourselves with irrational thinking habits, but that we can un-upset our selves by apply rational reframing, and dismantling those default thinking habits.

MEMORY – where do we get the data for how we explain the world to ourselves and how we make our choices? We establish our thinking habits and evaluations from our memories and experiences of course, from babyhood to adulthood – always mapping and expanding our neural pathways through our experiences and outcomes. The human species survived because we have 'fear learning' and 'threat learning' – "Is that good or bad? Is that safe or dangerous?" ... If we view something as bad or dangerous, the amygdala neural fear circuitry (threat response) of our brain pumps us up physically with stress hormones to deal with the threat – and we of course store a memory of it as data to protect us in the future.

DISCOMFORT - Stress hormones do not feel good – it is 'discomfort', whether low moderate or high, depending on the threat level - and human beings will do anything to avoid discomfort. That's why most of us stay in the city we were born in, stay in the first job or industry we start our career in, marry the first person we date seriously, avoid public speaking, and avoid challenges and excitement in an effort to avoid discomfort. We are generally risk averse with avoidant behaviour because of our 'feelings'/discomfort.

Note: A better understanding of the learning and memory processes of the brain is leading to new approaches for therapy. Imaging studies of brain

structure and fear circuitry function with children exposed to chronic stress and adversity show increased 'threat related amygdala reactivity' in the brain of that child into adulthood - and we now know that prolonged exposure to stress at any age can deregulate our nervous systems so that our amygdala is automatically and unhelpfully pumping us up for threats when there are no threats. Our bodies can be on 'high physical alert' too often. We 'feel bad' so we think it is bad. Our memories and association and interconnectedness of ideas and reasoning are distorted by stress disorders. Who is going to undistort them? You are. You can literally rewire your brain.

CONDITIONING – we now know that 'fear learning' and 'threat learning' creates fear response conditioning along the way in life, so that we don't have to evaluate every situation consciously and deliberately every time with our *rational pre-frontal cortex* part of the brain, but rather that we build associations that trigger immediate "It's that situation again, pump up for trouble!" responses with our *amygdala*, the amazing but not so rational primitive part of the brain. The amygdala and the threat response is where neuro-psychology focusses new 'self management' for anxiety. Feelings are not facts, they are the neurobiology of how your brain is processing the world. Do you have high physical discomfort in response to situations that are not terrible dangers? Like public speaking? Or challenging work meetings? Or certain social situations? It's visceral isn't it? It's physical. And often, the threat response becomes the threat. Meta. Which of your memories might have created a conditioning that activates the threat response mechanism unhelpfully? Identify, examine, and reframe...

AWARENESS: Can you trust your memory banks and data completely? Can you trust that your memories activate helpful neural circuitry in all circumstances? Quite simply, no. As the neuro psychologist and author Gary Marcus says, our brains were cobbled together through evolution, and they are certainly not a 'rational thinking device that defaults to rational conclusions'. Our memories are notoriously unreliable – we are not computers, and our memories are not binary data that is stored and retrieved efficiently – as the UofA Emeritus Professor of Psychology and author Michael Corballis explains:

"Our brains simply don't work like cameras or tape recorders... Memories of emotional events are probably remembered better than those of mundane happenings. This is perhaps not surprising from an evolutionary viewpoint, since emotion generally signals happenings that bear, either positively or negatively, on future survival, and remembering emotional events may help us cope differently next time... capturing the point that memory evolved not so much to provide a faithful record of the past as to help one deal with the future...."

SUMMARY CONCLUSION OF STRESS HORMONES AND 'FEELINGS': While it's true that our crooked thinking can cause feelings and behaviours, and that straightening our thinking can change feelings and behaviours for the good, that is not the whole story. We also have to move with science and understand that in stress disorders distorted memories create conditioning whereby **we activate the neural circuitry of the threat response (fight or flight) in response to neutral non threatening situations**, and that this physical discomfort further distorts the memories and causes irrational thinking and self limiting behaviours. Trapping you in a vicious circle of emotional reasoning ("I feel bad, so it is bad!"). Modern CBT should include management techniques to know when your body is spiking with adrenaline, and that it's okay, it's natural (though unhelpful), and that you can breathe it down, and expose yourself to the event, and collect new data and evidence that the threat response is not required.

We now know that **the brain is not a 'bag of chemicals'**, and also that **the mind is not some outside entity independent of the brain**, and that our 'feelings' are not merely emotions that are always caused by situations and events, but rather that **the base of the stress disorder of anxiety is physical** – namely our *threat response physiology*.

In fact, **our mind is our brain** – and our brain is a tricky little device that needs to be understood to be managed effectively, (that sounds coldly scientific, let me rephrase – we need to understand our beautiful brains to literally learn to be happier).

We would be better served to move away from mainly describing and identifying feelings as emotions all the time. Stress feelings are PHYSICAL, and this becomes that tail that wags the dog, and it causes us great discomfort and messes up our data for how we explain the world to ourselves, and influences the irrational meaning and significance we place on events and situations. So explain your physiology and feelings differently to yourself, and it will be a great foundation to lead on to shifting the lens that you see the world through to a healthier and happier frame.

If you had diabetes you would take insulin to manage your body – in the case of anxiety you are having adrenaline spikes inappropriately, you're not mad, they're real, and they interfere with cool moderate rational thinking – but they can be managed (or better still decommissioned!) through 'learning and doing'.

Begin your journey by wandering through my free guided self help blog iVeronica.wordpress.com. And remember to enjoy the journey – science is fascinating, and your amazing brain is fascinating, it just needs a little executive management. Good luck!

THE EXPERTS: listen to these short podcast links to get you started in understanding the brain:

December 10, 2015: **Neuropsychopharmacology Reviews:** Impact of Stress on the Brain: Pathology, Treatment and Prevention | [Listen](#)

This podcast that explains the latest advances in the neuroscience of 'fear learning' and anxiety disorders and memory.

"Impact of Stress on the Brain: Pathology, Treatment and Prevention," the 2016 issue of *Neuropsychopharmacology Reviews*, focuses on advances in our understanding of the impact of stress on the brain: From pathology to circuits, treatment to prevention.

http://www.nature.com/multimedia/podcast/npp/npp_12102015.mp3

This podcast from **NeuroPod**, the neuroscience podcast from Nature Magazine, features my latest girlcrush, the **philosopher Patricia Churchland**:

Philosopher Patricia Churchland is convinced that to understand the mind, you need to understand the brain. In her latest book, Touching a Nerve, she explains how neuroscience is helping to unravel questions about the mind, and why she's happy with the idea that she is 'just' her brain.

<http://www.nature.com/neurosci/neuropod/index-2013-11-30.html>