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The PFC Limbic Seesaw

by Reena Dayal with Pete Sawyer



For the past few years, I have been researching the benefits of neuroscience for menopause, for two reasons. Firstly, I am experiencing the various phases of menopause myself, and I'm keen to learn how best to navigate it. Secondly, through my work, I often coach corporate leaders who are menopausal, usually in their 40s and 50s. In both situations I am amazed by the sheer elegance and effectiveness of neuroscience

tools. Spurred on by what I have experienced and witnessed, here I am with a three-part series.

In this first part, I will give you a glimpse of why menopausal women should develop a healthy curiosity around applied neuroscience and why we have 'no control' over how we feel during menopause. Over the next two issues of *Menopause Matters* I will build on this, offering insights on how you can gain control and expand your cognitive capacity and leadership skills. →



What is Neuroscience?

Here is a great definition cobbled together by ChatGPT (they got it right!):

Neuroscience is the scientific study of the nervous system, which includes the brain, spinal cord, and peripheral nerves.

It is a multidisciplinary field that combines knowledge and methods from biology, psychology, physics, and other disciplines to understand the structure and function of the nervous system, as well as its impact on behaviour, cognition, and overall health.

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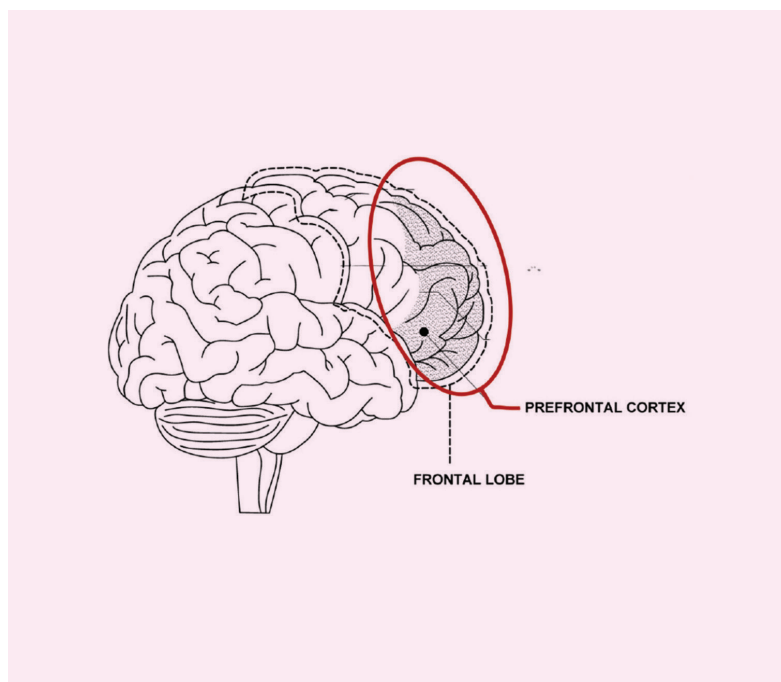
Why apply neuroscience to menopause?

Think of a broken-down car. If a person knows how a car engine works, they know what parts to change or modify, so that the car can attain peak performance. Or imagine a laptop that seems to be running slow. If a person knows how the operating system works, they can tweak it, so it operates at optimum speed.

Knowing how to overcome stress, anxiety, frustration, despondency, sadness, or mood swings is similar. Understanding the operating principles of how your brain works allows you to recognise the source of the problem and know what to modify to change your experience of life and all it brings to you.

Whilst there is no exact science, medical practitioners say around one quarter of menopausal women do not experience the disruption during the various phases of menopause. The rest, however, are hit hard. For them, this information can be especially beneficial, empowering and satisfying. After years of managing multiple responsibilities on the personal and work front, perimenopause or post menopause can feel like the rug is pulled from under your feet. But once you understand the mechanisms of the brain, you can regulate your life experience during this transformational phase.

Listen closely to your brain as she reveals the secret of how you can change your quality-of-life experiences. She is adherent to the brain's primary operating survival principle – 'away from threat and towards reward'. Within this, 'away from threat' will always be given priority.



The Prefrontal Cortex: Your Executive Functions

So, if your brain could talk, this is what she would say:

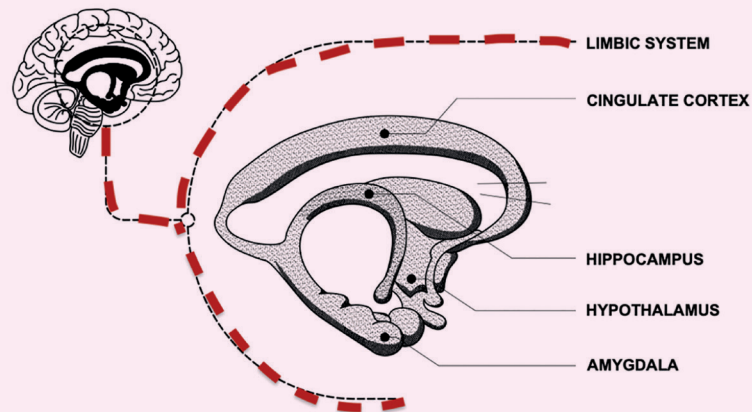
“ You may know me as the PFC, or the executive decision-making part of the brain. I sit right behind your forehead. In fact, some people literally massage this area of the forehead when they get into a ‘thinking-solving’ mode. It is an unconscious body reaction to signal we are using that part of the brain. But no matter whether you do so or not, I am there for you when you need to solve problems, analyse different choices, or make decisions. The beauty of the way that I function is that I can access many different parts of the brain and body to bring you intelligence and information, so you can decide. I can access your values, strengths, past experiences, instincts, expertise, and wisdom. Not only that, to solve a problem you are facing I can also be collaborative and innovative. To encourage you to take actions along these lines I am an important focal point of your motivation and reward pathways.

“I am the part of you who can make the impossible possible. I can access those core beliefs that reside in you which will help you interpret any situation, in a manner so that you can crack the toughest challenges and be appreciated by those who are interacting with you – your family, your colleagues, your line manager, your customers – without compromising what reward you want to get out of it.

“The work I do connecting with billions of other connections requires energy, and so I create for you neurological pathways so that the next time we have to make a similar decision or solve a similar problem, we can get there faster. I work on the principle of efficiency.

“I am always there for you unless the Limbic system activates. Then I have no control and cannot offer you any of the above. In other words, I shut down. ”





The Limbic System: Your Emotional Reservoir

“ Hello! Let me introduce myself to you. If you were to make a fist with your hand tucking the thumb beneath your fingers you are creating the shape of how I look like. I sit at the top end of your spinal cord and am located centrally, surrounded by the cortex, part of which you met in the previous section called the PFC. My primary role is to keep you safe and the method I use is emotions. Every experience which had a high positive or negative impact on you I attach an emotion to. I store this within me or close to me, so I can respond to similar situations in milliseconds (1,000th of a second) when they occur. This is the principle of efficiency.

“I am made up of different parts and we coordinate like a symphony orchestra that has been tuned up to work in unison to ensure we are working in top condition. Within this system we have for our ready-access various parts, such as the cingulate cortex (processes emotions and pain), the hippocampus (learning, memory, and emotional processing), the hypothalamus (regulating temperature, sleep, hydration, appetite, and hormone production) and last but not the least, the amygdala (continuous monitoring of emotions and

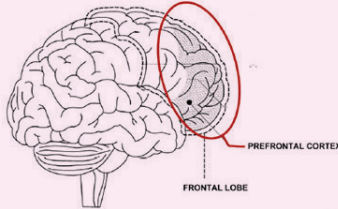
controlling all physiological responses including fight-flight-freeze).

“Given my role is to ensure your survival, I have unquestionable dominance over every other part of the brain. If there is any stress signal I detect, I will activate a physiological response before you become consciously aware of it. Think about times when you have taken an ‘impulsive’ decision like withdrawing your hand from a flame or, feeling a flush of anger when disrespected. In fact, I am sure you can think of countless times during the menopause phase when I am in control. All the times you felt emotions associated with anger, sadness, anxiety, or any other mood swings that got you teary-eyed or despondent or fearful, I was at play. Please don’t get me wrong. I am not here to make life difficult for you. My reactions are meant to keep you safe and over millennia the human species evolution has shown that the primary choices of fight-flight-freeze takes me out of the immediate danger. When I am activated, I do not access your PFC because that requires milliseconds more to process information and I don’t have that kind of time at hand. Once you feel you are out of danger, I will switch off and you can access the PFC. “

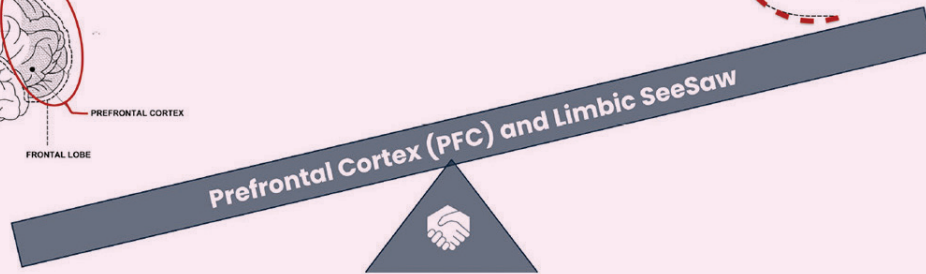
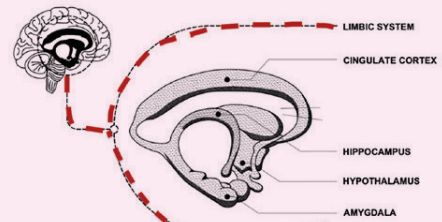




PFC : Problem solving, decision making, multiple choices



Limbic : Survival reflex. Limited choices - fight/flight/freeze



The PFC - Limbic Seesaw

So, let's recap, the brain's operating principle to survive is 'away from threat - towards reward', in which 'away from threat' is given priority. To deliver this outcome it has, over millions of years, crafted the limbic system. When the limbic system is operating it switches off the PFC so it can channel all energy to fuel the fight-flight-freeze response. Hence the terminology 'see-saw'.

As a woman's body adjusts to hormonal changes during menopause, the brain senses a shift in body functions as a possible future 'threat' and may then move into a 'limbic' state. Disruptive physical symptoms, health complications, lack of sleep, body weight and hot flushes put us into a higher limbic state. At the same time, the woman may find herself experiencing other stressful environmental situations, such as gendered ageism, unsupportive work environment, parental or carer duties, or other family duties. The limbic system is now on red alert. We are now in a continuous fight-flight-freeze state which leads us to disengage at work, compromise, fade into the background, and 'struggle'. Mood swings, emotional outbursts, self-doubt, insecurity, anxiety, and stress become our way of coping with the limbic system in action. The loss of not having access to our PFC, which shuts down when the limbic system is working, and which would give us more choices to use our inherent experience and wisdom, is noticeable.

Join me next time as we begin to unravel how we can bring balance to the Limbic-PFC see-saw, and gain control over how you feel and over unhelpful internal narratives.



Reena Dayal is an applied neuroscience and leadership development specialist with over three decades corporate, HR and entrepreneurship experience. In 2022 she launched The Butterfly Movement, an initiative aimed to change the narrative on menopausal

support and empower women to transform their mid-career journey. She is the host and producer of the four part The Wise Woman Series aimed at mid-career women experiencing menopause. Recordings are available till end of the year on free registration. Please scan the QR code below.

Pete Sawyer is an author, journalist, photographer, and psychotherapist in training. His work focuses on human rights, international relations, sociology, and the psychology of the individual. He has over 30 years experience.

