LC AP London Centre for Applied Psychology

Neuroscience: The Basics

Section 2: Clinical Applications

What you'll learn in this section

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Clinical applications

Brain plasticity
Key themes – from impact of environment, childhood trauma – to Zoom fatigue
Specific difficulties and the brain – depression, anxiety, OCD
Habit formation and CBT

Recap

1. The brain works by making guesses/predictions based on past experience. We often get those predictions wrong.

2. The brain can be changed, through developing and cultivating neuronal pathways.

Brain plasticity

Two types:

1. **Structural**

Moving functions from a damaged area of the brain to undamaged areas

2. **Functional**

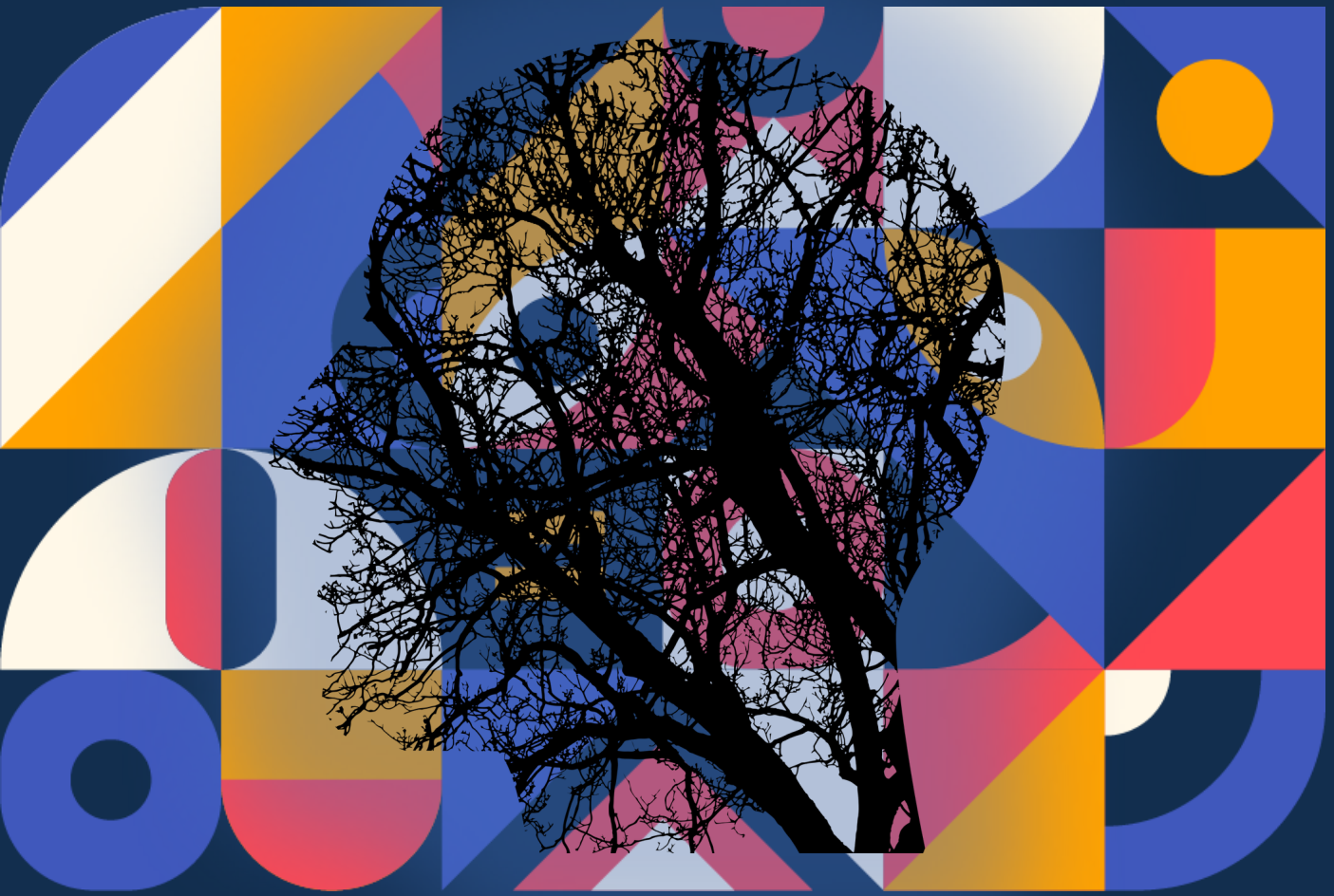
Changing the physical structure as a result of learning

Babies' brains

At birth, every neuron in the cerebral cortex has 2,500 synapses; by age 3, this has grown to 15,000. The average adult, however, has about half that number.

Windows of heightened plasticity exist in the development of sensory pathways (vision, hearing), language, and higher cognitive function, as well as many other brain functions.

The plasticity "peaks" of plasticity are staggered throughout development.

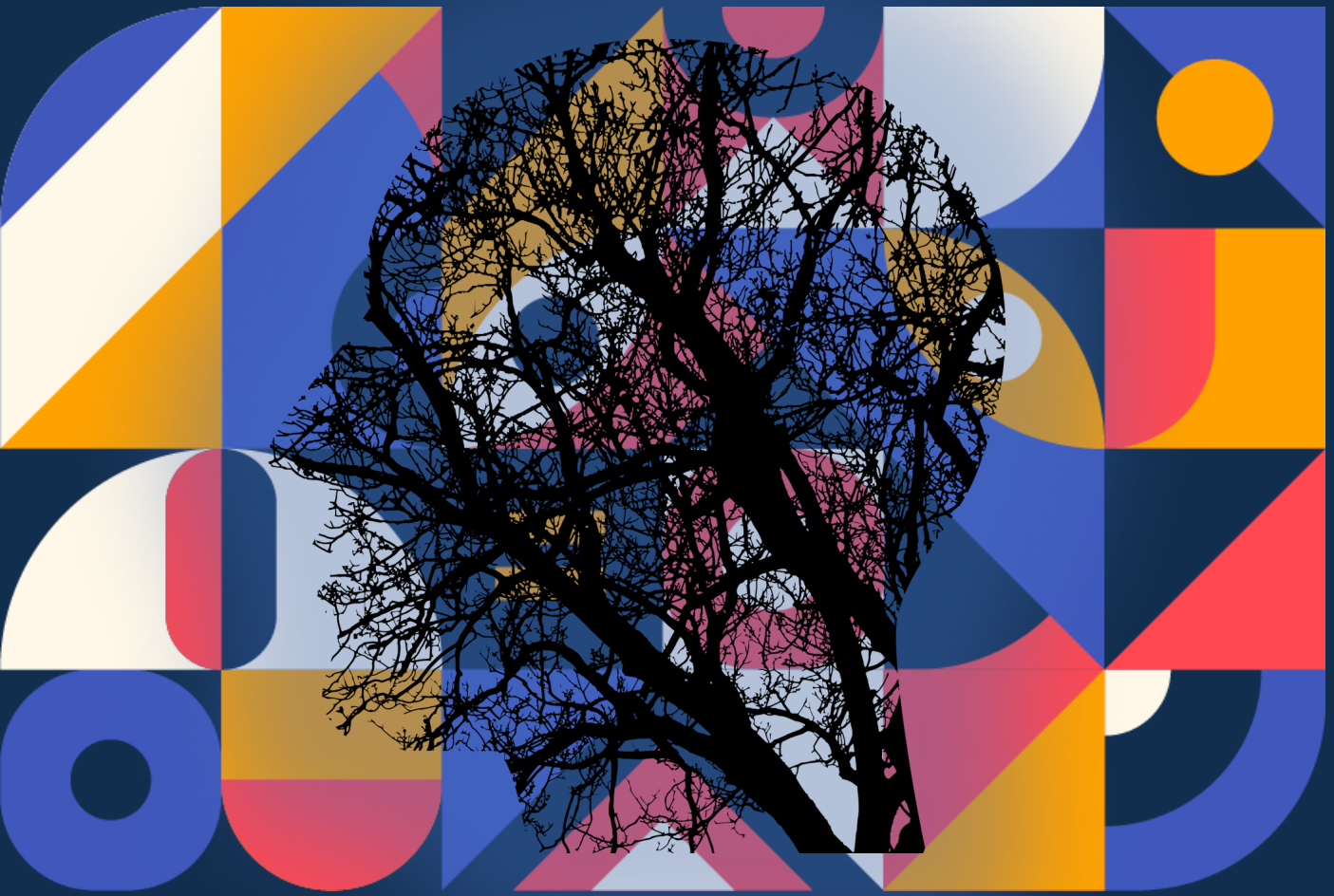


OCD and the brain

We detect mistakes with our orbital frontal cortex,, just behind our eyes.

The orbital frontal cortex fires a “mistake feeling” signal to the cingulate gyrus. The cingulate triggers the dreadful anxiety that something bad is going to happen unless we correct the mistake and sends signals to both the gut and the heart.

The “automatic gearshift,” the caudate nucleus, sits deep in the center of the brain and allows our thoughts to flow from one to the next unless, as happens in OCD, the caudate becomes “sticky.”



OCD and the brain

Relabel - It's a faulty circuit.

The refocus on a positive activity .

"The more you do it, the more you want to do it; the less you do it, the less you want to do it."

The struggle is not to make the feeling go away; the struggle is not to give in to the feeling.

Creating a new neural pathway!

Anxiety and the brain

Not just the amygdala and “limbic system”. Subjective experiences of fear are processed by brain circuits involving the prefrontal cortices.

We need to treat the conscious and the unconscious elements of anxiety.

Pharmaceutical treatment in combination with therapy has shown greater rates of improvement, possibly because medications target the subcortical system, and talk therapy affects the cortical system.

Zoom fatigue

Not enough info – we're looking for social cues, but we can only focus on the faces and words.

Too much info - we become overwhelmed by unfamiliar excess stimuli while being focused on searching for non-verbal cues we can't find.

But.....can be better for those with autism who can become overwhelmed by multiple people talking or in-person stimuli.

Brain and body

Stress and trauma have impacts on our brain and bodies.

For example, toxic stress has been linked to the suppression of new neurons in the hippocampus.

We know that abusive caregiving leads to insecure attachment styles, and that Adverse Childhood Experiences are linked to a number of negative life outcomes, including shortened lifespans.

One compelling new strain of research suggests strong links between toxic stress, abuse, trauma and inflammation in the brain and body – and the subsequent impact of that inflammation on mental health.

Habit formation (and CBT)

80% of people are wrong!

Habit memory builds up very slowly over time. The first few times are the hardest but most important.

The ‘C’ bit: Guilt and self-loathing are terrible motivators! Rewards and self-encouragement are much better. **Why** do you want to change?

The ‘B’: The structure of the environment around you matters much more than in-built “willpower”.

Find a gym nearby...

If you go five miles, you're likely only going to the gym once a month. If your gym is three and a half miles away, you're going five times a month.

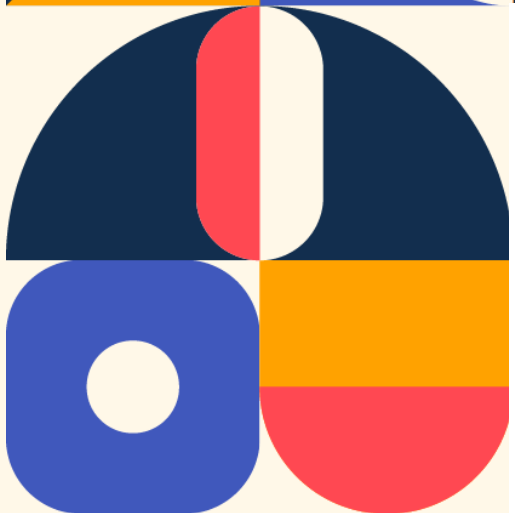
People who go to the gym because they feel guilty if they don't go form habits less successfully than those who go to the gym because they enjoy it.

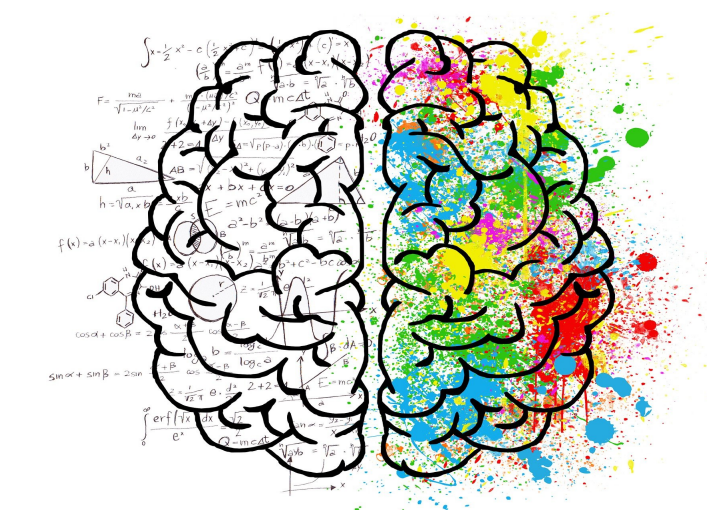
...and an exercise you enjoy.

We’re always learning about the brain

Let’s be honest: we’re at the very beginning of our understanding of the brain.

Take depression: there are many possible causes of depression, including faulty mood regulation by the brain, genetic vulnerability, stressful life events (and inflammation), medications, and medical problems. Are there many “depressions”?





Psychedelics

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Ketamine to treat depression and addiction at UK's first medical psychedelic psychotherapy clinic

The class B drug is to be used by Awakn Life Sciences when its centre opens in Bristol in March, explains its chief medical officer Dr Ben Sessa

Key take-aways

1. We know enough about the brain to understand – broadly – how OCD occurs and how to treat it; how anxiety occurs and how to treat it. With depression, we know much less, but we're at an exciting stage in neuroscience/mental health research.

2. New experiences shape the brain through new neural pathways. This has significant implications for mental health treatment – from CBT treatment for habits; for ERP treatment for OCD; for attachment-based relational therapy for insecure attachment and personality disorders.

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Thank you.