E.P.I.C PSYCHOLOGY

THE NEUROSCIENCE OF ATTENTION

How Your Brain Filters 11 Million Bits of Information Per Second

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Introduction

Every second, your brain processes approximately **11 million bits of sensory information** – visual, auditory, tactile, olfactory, and proprioceptive data flooding your nervous system.

But your conscious mind can only process about **40–50 bits per second** (Zimmermann, 1989).

That means 99.9996% of the information your brain receives is **filtered out**.

This filtering system is called **attention** – and it's the foundation of all cognitive performance.

The Three Attention Networks

Research by Michael Posner and colleagues (1990) identified three distinct neural networks that control attention:

1. The Alerting Network

Function: Maintains vigilance and readiness to respond

Brain Regions: Right frontal cortex, right parietal cortex, locus coeruleus (noradrenaline system)

What it does:

- Keeps you awake and alert
- Monitors the environment for important stimuli
- Prepares the brain for incoming information

When it's strong: You feel sharp, responsive, and mentally present
When it's weak: You feel foggy, sluggish, and mentally dull

Influenced by: Sleep quality, caffeine, stress hormones, circadian rhythms

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2. The Orienting Network

Function: Directs attention to specific stimuli

Brain Regions: Parietal cortex, frontal eye fields, superior colliculus, pulvinar nucleus

What it does:

- Shifts focus from one stimulus to another
- Filters relevant information from irrelevant noise
- Responds to novelty, threat, and reward

When it's strong: You can quickly shift attention when needed and lock onto relevant information
When it's weak: You get stuck on irrelevant details or miss important cues

Influenced by: Environmental distractions, novelty, emotional salience

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3. The Executive Attention Network

Function: Sustains focus and inhibits distractions

Brain Regions: Prefrontal cortex (dorsolateral and ventrolateral), anterior cingulate cortex

What it does:

- Maintains focus on a task despite distractions
- Inhibits irrelevant stimuli and impulses
- Resolves cognitive conflict (e.g., "Should I check my phone or keep working?")

When it's strong: You can sustain deep focus for extended periods and resist distractions
When it's weak: You're easily pulled off-task, struggle to concentrate, and experience mental fatigue

Influenced by: Cognitive load, mental fatigue, stress, practice

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Why Distraction Happens

Your brain evolved to prioritise **novelty, threat, and reward** over sustained focus.

In ancestral environments, this kept you alive. A rustling bush could be a predator. A bright colour could be food. Ignoring these signals meant death.

Today, this same system makes you check your phone every 5 minutes.

The Distraction Cycle:

1. **Trigger** – A stimulus activates the orienting network (notification, noise, thought)
2. **Shift** – Your attention shifts from the task to the distraction
3. **Engagement** – The executive network tries to re-engage with the task
4. **Cost** – You lose time, momentum, and cognitive resources (switching cost)

Research shows that it takes an average of **23 minutes** to fully re-engage with a task after a distraction (Mark et al., 2008).

The Good News: Attention is Trainable

Just like a muscle, the executive attention network strengthens with practice.

Studies show that attention training can:

☑ Increase focus duration by 30–50% (Tang et al., 2007)
☑ Reduce distractibility and improve task performance (Rueda et al., 2005)
☑ Enhance working memory and cognitive control (Jaeggi et al., 2008)

Over the next four days, you'll train all three attention networks using evidence-based techniques.

The Bottom Line

Attention is not fixed. It's a skill.

And like any skill, it improves with deliberate practice.

Let's get to work.

Kyle Walker, MSc, GMBPsS *PhD Researcher, Behavioural & Evolutionary Psychology*

"The art of being wise is the art of knowing what to overlook." – William James

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