WHY WE LOVE ZONING OUT

You're sitting in class, looking roughly in the direction of the board. On the outside, you're there. On the inside, you're somewhere else completely. Maybe you're replaying an argument, or imagining a scene that hasn't happened yet, or building a whole alternate life in your head. Then someone says your name and you snap back. For a split second, the classroom feels less real than whatever you were just inside.

Nothing actually happened. You didn't move. Nobody else saw what you saw. But that little private movie still managed to change how you felt and what your body was doing.

That's the part that keeps bothering me in a good way. We know a daydream or a story is "just in our head", but our brain doesn't always behave like it's fake. We flinch at jump scares in movies. We feel heavy after imaginary conversations. We get genuinely attached to characters who don't exist. If the brain is supposed to keep track of what's real and what isn't, why does zoning out feel so real, and honestly, so rewarding?

At some point that question stopped being a shower thought and turned into a "okay but what does the brain actually do?" problem. And because I'm me, that didn't mean journaling about feelings, it meant opening someone else's fMRI data on my laptop at 1 a.m.

I ended up with the **Alice fMRI** dataset: people lying in an MRI scanner, listening to an audio story (a version of *Alice in Wonderland*), while the scanner quietly tracks how their brain activity changes over time. No tasks, no decisions, just a story unfolding in their ears. It's basically the closest legal thing we have to peeking inside someone's head while they're somewhere else mentally.

To connect this dataset to my question, I first marked the story itself. I went through the audio and labelled different moments as:

- **Calm** - background description, low stakes, nothing intense.
- **Neutral** - the plot is moving, new information appears, but it doesn't hit emotionally.
- **Shocking** - the "wait, what?" moments: sudden twists, threats, or emotional punches.

For this study, I didn't want to wrestle with thousands of tiny brain voxels. Instead, I used a standard 7-network brain map (the Yeo-7 parcellation) and divided the cortex into seven big networks, so it's easier to see who's doing what.

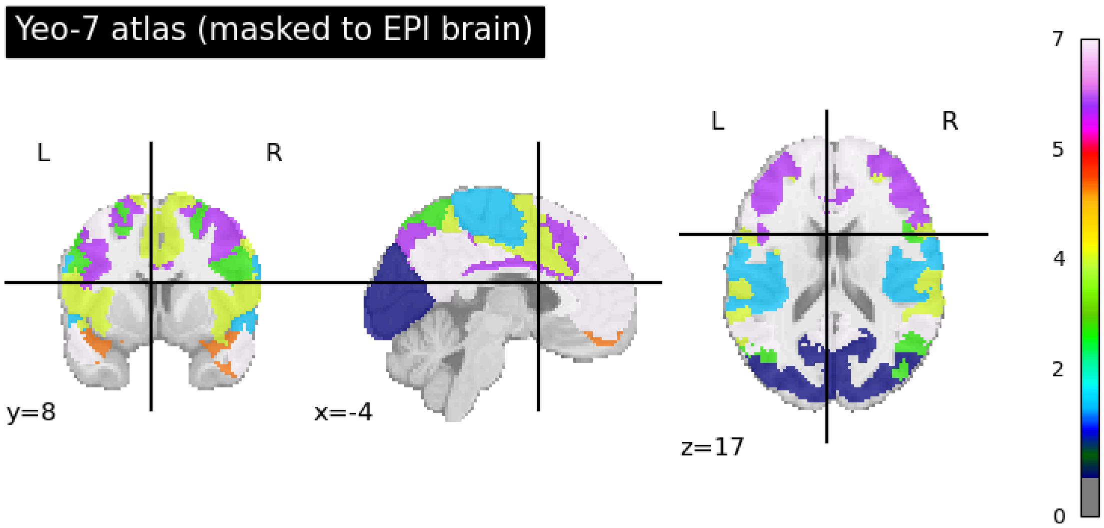

Figure 1 - The seven Yeo brain networks

- **Net 1 (Visual):** processes visual information and supports visual perception and imagery.
- **Net 2 (Somatomotor):** links body sensations and movements, from touch to actions.
- **Net 3 (Dorsal attention):** supports goal-directed attention and focusing on selected things.
- **Net 4 (Ventral attention/salience):** detects unexpected or important events and helps reorient attention.
- **Net 5 (Limbic):** involved in emotion, motivation and assigning value (good, bad, rewarding, threatening).
- **Net 6 (Frontoparietal control):** supports flexible thinking, planning and top-down control.
- **Net 7 (Default mode network):** supports internally directed thought, memory, self-related thinking and mind-wandering.

For each participant and each timepoint, I averaged the fMRI signal within these seven Yeo networks, giving seven timecourses per person that track how these systems changed over time.

Now I had two things in my hands: a story that was sliced into calm, neutral and shocking moments, and a brain that was reduced to seven big networks. The next step was almost too tempting, just line them up and see what happens.

How the brain’s seven networks react to different events

For every calm, neutral and shocking point in the story, I cut out a tiny window of brain activity around it-just before, during and after - and stacked those windows across all events and listeners. Each line in Figure 2 is what that network usually does as the story moves through that type of moment.

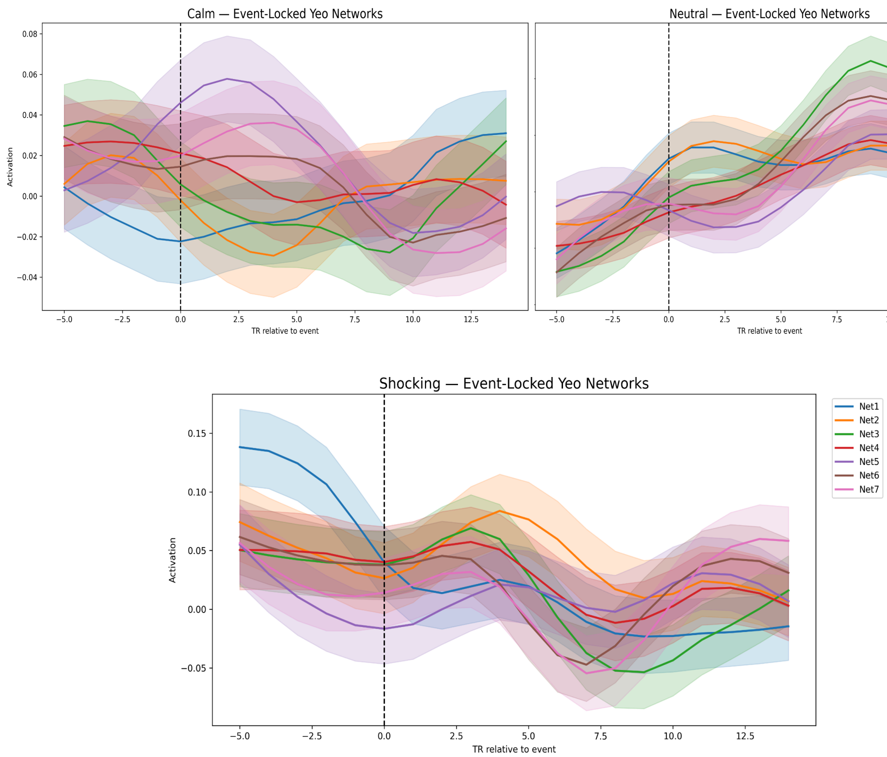

Figure 2 - Event-locked brain responses.
Each line shows how a network’s activity changes from 5 TRs before to 15 TRs after calm, neutral, and shocking events.

Calm moments are almost *background noise* for the brain: the lines barely move, and the main story networks just keep things ticking without tagging those instants as important. Neutral moments are more like a gentle update-attention and the DMN rises a little to paste in new facts, but the emotion and “alarm” systems mostly stay quiet, as if saying, *“Noted, but no need to react.”*

Shocking moments are where the brain flips into full “this actually matters” mode:

- **Somatomotor (Net 2)** jumps from about +0.04 to +0.10, as if the body itself were tensing or jolting.
- **Dorsal attention (Net 3)** spikes to around +0.08 then drops below baseline, a classic “snap focus here → release” pattern.
- **Limbic (Net 5)** shows emotional build-up before the shock and a dip to roughly −0.06 after it, the same ramp-and-reset seen for real rewards and punishments.
- **DMN (Net 7)** briefly dips, then climbs to about +0.08–0.09, as the brain rewrites the story and imagines what this twist now means.

Salience and control are in the mix too - briefly tagging the moment as important and helping the brain reinterpret what just happened - but what really stands out is how *familiar* this pattern is. The same combo shows up in studies of real pain, real rewards, real social stress. Here, the trigger is “only” a story, yet the brain recruits the full sensory-body-emotion-narrative package anyway. It isn’t doing a cheap, low-effort simulation; it’s running the same circuitry it would use for actual events, which is exactly why those moments in fiction can hit almost as hard as things that really happened.

The emotion system is already awake *before* the shock

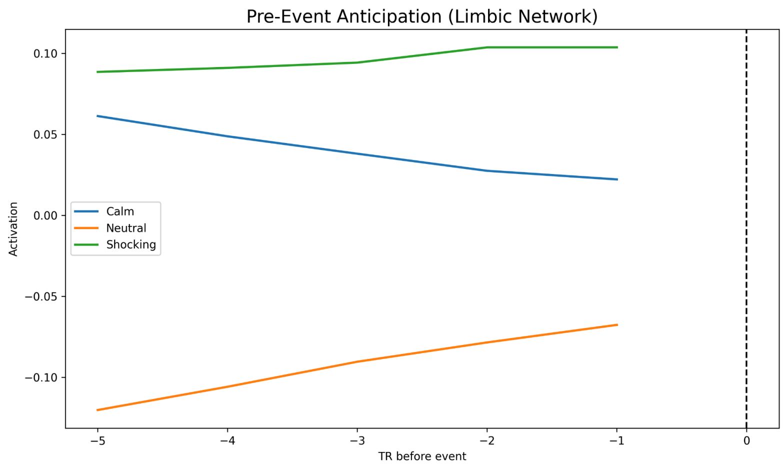

Figure 3 – Limbic (emotion) network activity in the 5 TRs before calm, neutral and shocking events.

This plot is basically a zoom-in on how awake the limbic (emotion) system is in the 5 TRs before each type of event.

- **Shocking events:** limbic is already switched on and slightly ramping up before the shock → the brain is anticipating emotional impact.
- **Calm events:** it starts around 0.06 and drifts down toward ~0.025 → the system is settling, not gearing up.
- **Neutral events:** it sits below baseline (about −0.12 → −0.07) → the brain is treating these as low emotional value.

That ramp-for-shocks vs flat/low-for-calm-and-neutral is the same pattern limbic regions show for real rewards, pain and scary outcomes. Here it appears for fictional shocks in an audio story, which means the brain isn’t just reacting after the twist—it’s preparing for it almost the way it would for a real emotional event.

Zooming out: who reacts more, how “in sync” we are, and can a tiny model read it?

By this point I already knew that around shocking moments, a bunch of networks move in a very “this actually matters” way. But I still wanted three simple checks:

1. Who, on average, cares more about shocks than calm?
2. Are people’s brains actually doing this together, or is everyone in their own world?
3. Is there enough signal here that a small model can look at the seven networks and guess what kind of moment it is?

So I zoomed out.

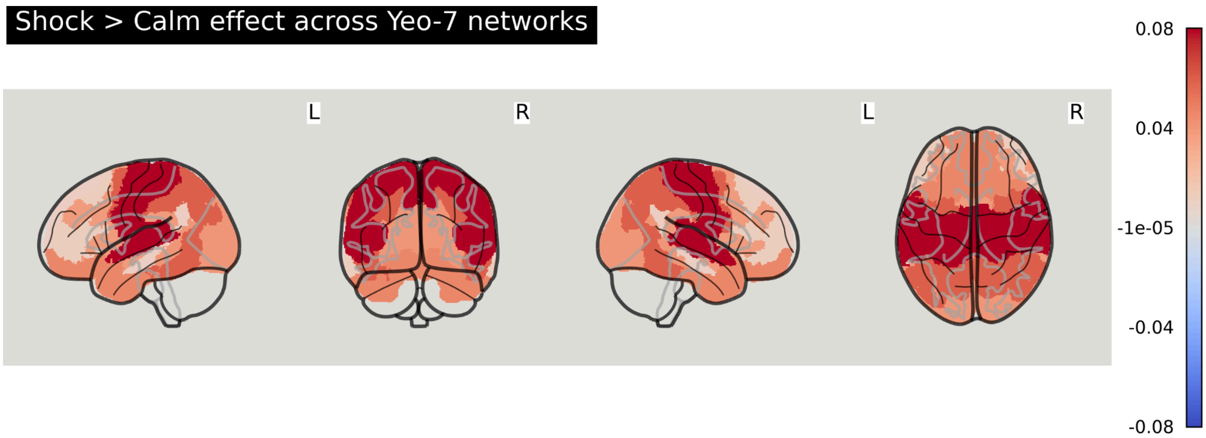

Figure 4 – Shock–Calm difference per Yeo network

Who actually cares more about shocks than calm?

In the Shock–Calm graph, I averaged each network’s activity during shocking moments and subtracted its activity during calm moments. This tells us which systems “care” more about shocks than background. Visual, somatomotor and both attention networks all come out clearly positive (roughly +0.04 to +0.08), which means that when the story hits a shock, the brain puts extra effort into processing the scene, simulating the body and pulling attention in, compared to calm stretches. The control network is slightly higher for shocks too, suggesting a bit of extra “okay, what does this mean now?” processing. Limbic and DMN look slightly negative in this simple contrast, which actually fits our earlier plots: limbic had already ramped up *before* the shock and then settles, and DMN briefly dips and then ramps up later to rebuild the story. Overall, the pattern is exactly the kind of sensory–body–attention boost people report for real sudden events, which is strong evidence that the brain is not treating shocking story moments as harmless background.

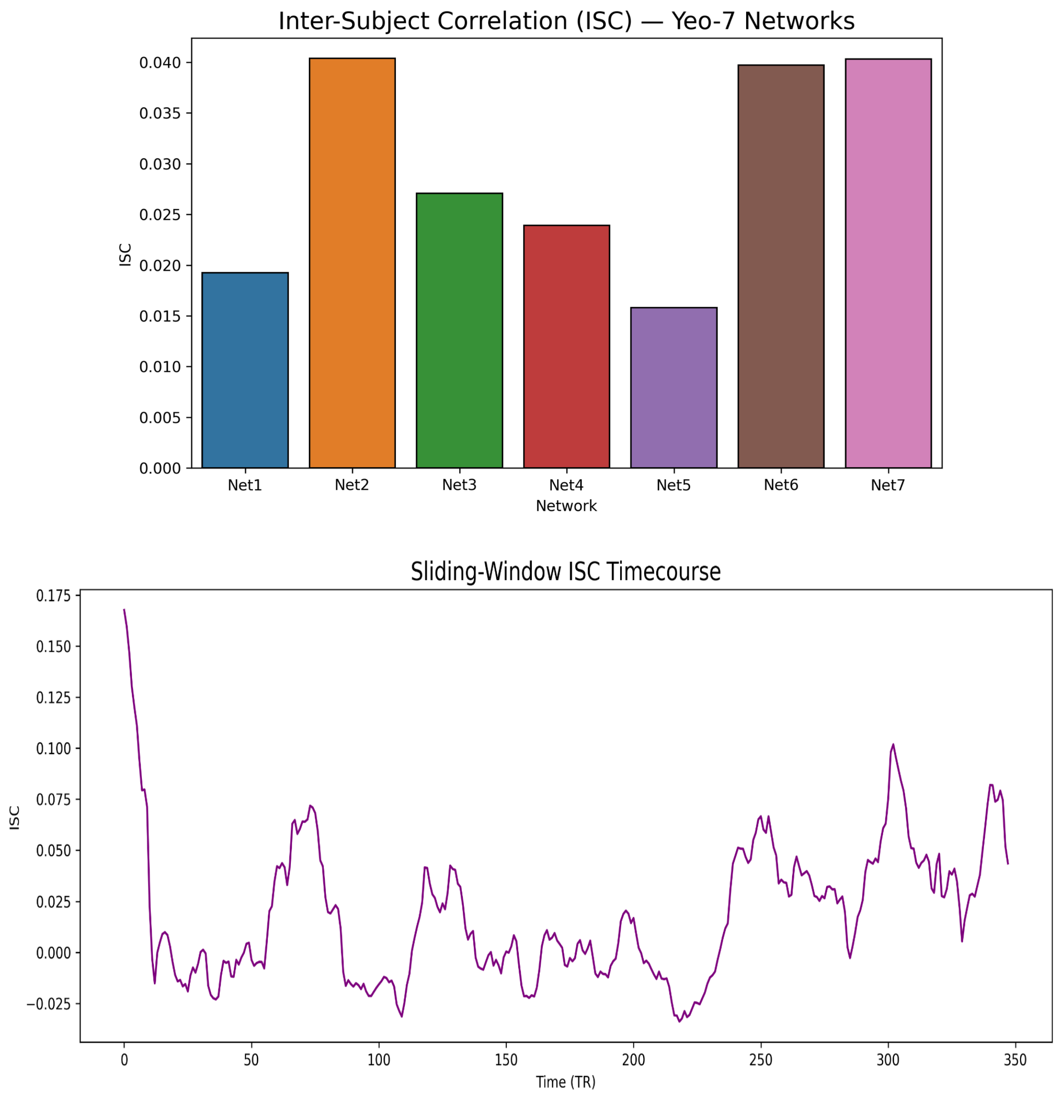

Figure 5 – Inter-subject correlation across the seven networks
Top, average ISC per network; Bottom, sliding-window ISC over time, with synchrony peaking around key moments in the story.

Many brains, one internal storyline

In the ISC graph, I looked at how similar different people's brain signals are while they listen to the same story. All seven networks show positive inter-subject correlation, which means people's brains are not just doing random things on their own timetable – they are responding in broadly similar ways. The synchrony is strongest in the somatomotor, control and default mode networks, the same systems that simulate actions, support thinking and build the internal story. When you look at ISC over time, it rises around key narrative moments and drops in more filler sections. So when the story really "grabs" people, their brains literally become more aligned. Different listeners, same internal pattern. That fits the idea of a shared "fictional reality" that many brains are running in parallel.

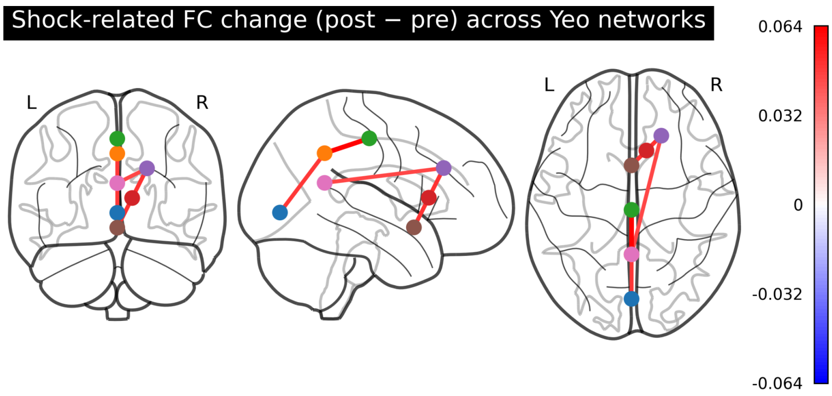

Figure 6 – Change in network–network connectivity before vs after shocks

How shocks temporarily rewire communication between networks.
I also looked at how strongly the networks talk to each other by measuring correlations between their activity before and after shocking events. The connectome plot highlights the connections that get stronger after shocks (up to about 0.06 higher correlation). These links mainly connect attention, somatomotor, control and limbic/DMN nodes. In other words, when something dramatic happens in the story, it's not just that individual networks get more active – the connections between them also tighten for a short time, forming a more integrated "shock mode" where systems for attention, body simulation, emotion and narrative are more tightly coupled.

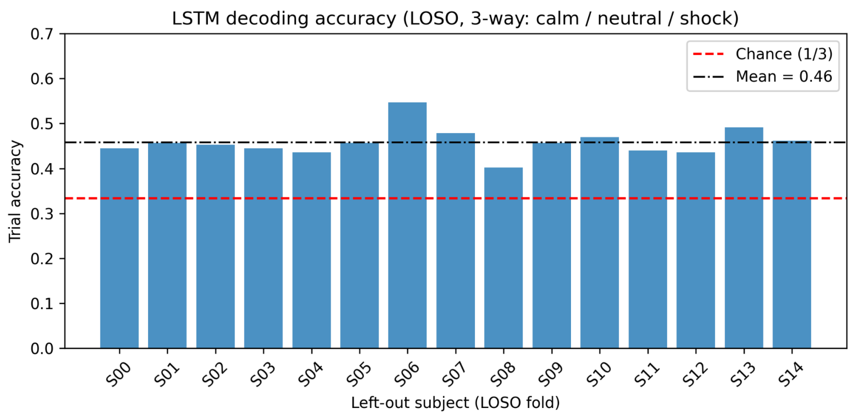

Figure 7 – LSTM decoding accuracy for calm, neutral and shocking windows

Can a tiny model tell "nothing" from "something just happened"?
In the LSTM graph, I trained a small recurrent model on just the seven network timecourses and asked it to guess whether a given window of brain activity came from a calm, neutral or shocking part of the story. I used leave-one-subject-out, so the model was always tested on a person it hadn't seen. Across subjects, trial accuracy sits around 40–55%, with an average of about 46%, while pure guessing for three classes would be 33%. No subject drops to chance – everyone is above it. For such a tiny model and such a coarse representation (only seven networks), this is enough to say that the difference between "nothing much", "normal event" and "something just happened" is literally encoded in these large-scale brain signals in a way that a machine can read. That's another angle on the same point: fictional events don't just feel different subjectively, they are separable patterns in how the brain's big networks behave.

Why this makes zoning out feel so good

If you strip away all the graphs and models, what this whole thing showed me is weirdly simple:
Your brain does not treat your inner world as a low-budget side project.

A fake shock in a story was enough to wake up the same networks that move for real-life events: the body system tensing, attention snapping in, the “this matters” alarm pinging, the emotion system quietly climbing *before* things hit, control and DMN staying back to clean up the meaning afterwards. Different people’s brains even started moving in sync at the same story beats, and a tiny model, staring at only seven squiggly lines, could still tell when “something just happened”.

So that moment in class where you’re staring at the board but actually replaying a fight, planning a confession, or living in a future that doesn’t exist yet? From the brain’s point of view, that’s not a cheap fantasy. It’s running real emotional code on imaginary input.

That, to me, is why zoning out feels so addictive and so real:

> **Your brain doesn’t care whether something happened out there or in your head - if it feels important enough, it upgrades it to reality on the inside.**