

## How to Focus A Wandering Mind by Wendy Hasenkamp

New research reveals what happens in a wandering mind—and sheds light on the cognitive and emotional benefits of increased focus.

We've all been there. You're slouched in a meeting or a classroom, supposedly paying attention, but your mind has long since wandered off, churning out lists of all the things you need to do—or that you could be doing if only you weren't stuck here...

Suddenly you realize everyone is looking your way expectantly, waiting for an answer. But you're staring blankly, grasping at straws to make a semi-coherent response. The curse of the wandering mind!

But don't worry—you're not alone. In fact, a recent study by Matthew Killingsworth and Daniel Gilbert sampled over 2,000 adults during their day-to-day activities and found that 47 percent of the time, their minds were not focused on what they were currently doing. Even more striking, when people's minds were wandering, they reported being less happy.

This suggests it might be good to find ways to reduce these mental distractions and improve our ability to focus. Ironically, mind-wandering itself can help strengthen our ability to focus, if leveraged properly. This can be achieved using an age-old skill: meditation. Indeed, a new wave of research reveals what happens in our brains when our minds wander—and sheds light on the host of cognitive and emotional benefits that come with increased focus.

What happens in the wandering mind?

For something that happens so often, what do we really know about this process of mind-wandering?

For thousands of years, contemplative practices such as meditation have provided a means to look inward and investigate our mental processes. It may seem surprising, but mind-wandering is actually a central element of focused attention (FA) meditation. In this foundational style of meditation, the practitioner is instructed to keep her attention on a single object, often the physical sensations of breathing.

Sounds simple enough, but it's much easier said than done. Try it for a few minutes and see what happens.

If you're like most people, before long your attention will wander away into rumination,

fantasy, analyzing, planning. At some point, you might realize that your mind is no longer focused on the breath. With this awareness, you proceed to disengage from the thought that had drawn your mind away, and steer your attention back to your breath. A few moments later, the cycle will likely repeat.

At first it might seem like the tendency toward mind-wandering would be a problem for the practice of FA meditation, continually derailing your attention from the “goal” of keeping your mind on the breath.

However, the practice is really meant to highlight this natural trajectory of the mind, and in doing so, it trains your attention systems to become more aware of the mental landscape at any given moment, and more adept at navigating it. With repeated practice, it doesn't take so long to notice that you've slipped into some kind of rumination or daydream. It also becomes easier to drop your current train of thought and return your focus to the breath. Those who practice say that thoughts start to seem less “sticky”—they don't have such a hold on you.

As a neuroscientist and meditator, I'd long been fascinated with what might be happening in my brain when I meditate. Being familiar with both subjective, first-person meditative practice and objective, third-person scientific research, I wondered what would happen if I put these two modes of investigation together. Could I get a more fine-grained picture of how this process works in the brain by leveraging the experience of these cognitive shifts during meditation?

I started by considering the default mode network, a set of brain areas that tend to increase in activity when we're not actively engaged in anything else—in other words, when our minds tend to wander. Maybe it was this default mode network that kept barging in during my meditation, interfering with my ability to keep my attention focused. And maybe this network was what I was learning to “tune down” by practicing over and over. I wondered if I could test this scientifically.

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Supported by funding from the Mind & Life Institute, and with the help of colleagues at Emory University, I started to test which brain areas were related to meditation. We asked meditators to focus on their breath while we scanned their brains: whenever they realized their minds had been wandering, they'd press a button. Then they would return their focus to the breath as usual, and the practice would continue. As they did so, we collected MRI data showing which brain regions were active before, during, or after the button press that corresponded to various mental states.

The study, published in the journal *NeuroImage*, found that, indeed, during periods of mind-wandering, regions of the brain's default mode network were activated. Then when participants became aware of this mind-wandering, brain regions related to the detection of salient or relevant events came online. After that, areas of the executive brain network took over, re-directing and maintaining attention on the chosen object. And all of this occurred within 12 seconds around those button presses.

Looking at activity in these brain networks this way suggests that when you catch your mind wandering, you are going through a process of recognizing, and shifting out of, default mode processing by engaging numerous attention networks. Understanding the way the brain alternates between focused and distracted states has implications for a wide variety of everyday tasks. For example, when your mind wandered off in that meeting, it might help to know you're slipping into default mode—and you can deliberately bring yourself back to the moment. That's an ability that can improve with training.

### The benefits of building focus

What are other practical implications of this knowledge? Recent behavioral research shows that practicing meditation trains various aspects of attention. Studies show that meditation training not only improves working memory and fluid intelligence, but even standardized test scores.

It's not surprising—this kind of repeated mental exercise is like going to the gym, only you're building your brain instead of your muscles. And mind-wandering is like the weight you add to the barbell—you need some "resistance" to the capacity you're trying to build. Without mind-wandering to derail your attempts to remain focused, how could you train the skills of watching your mind and controlling your attention?

In our study, we also wanted to look at the effects of lifetime meditation experience on brain activity. In agreement with a growing number of studies, we found that experience mattered—those who were more experienced meditators had different levels of brain activity in the relevant networks. This suggests that their brains may have changed due to repeated practice, a process called neuroplasticity.

One brain area stood out in this analysis: the medial prefrontal cortex, a part of the default mode network that is particularly related to self-focused thoughts, which make up a good portion of mind-wandering content. It turns out that experienced meditators deactivated this region more quickly after identifying mind-wandering than people who

hadn't meditated as much—suggesting they might be better at releasing distracting thoughts, like a re-hash of a personal To Do list or some slight they suffered at work yesterday.

In a follow-up study, we found that these same participants had greater coherence between activity in the medial prefrontal cortex and brain areas that allow you to disengage attention. This means that the brain regions for attentional disengagement have greater access to the brain regions underlying the distraction, possibly making it easier to disengage. Other findings support this idea—more experienced meditators have increased connectivity between default mode and attention brain regions, and less default mode activity while meditating.

This might explain how it feels easier to “drop” thoughts as you become more experienced in meditation—and thus better able to focus. Thoughts become less sticky because your brain gets re-wired to be better at recognizing and disengaging from mind-wandering. And if you've ever struggled with rumination—re-living a negative experience over and over, or stressing (unproductively) about an upcoming event—you can appreciate how being able to let go of your thoughts could be a huge benefit.

Indeed, the Killingsworth and Gilbert study I mentioned earlier found that when people's minds were wandering, they tended to be less happy, presumably because our thoughts often tend towards negative rumination or stress. That's why mindfulness meditation has become an increasingly important treatment of mental health difficulties like depression, anxiety, post-traumatic stress disorder, and even sexual dysfunction.

Reading all this might make you think that we'd be better off if we could live our lives in a constant state of laser-like, present moment focus. But a wandering mind isn't all bad. Not only can we leverage it to build focus using FA meditation, but the capacity to project our mental stream out of the present and imagine scenarios that aren't actually happening is hugely evolutionarily valuable, which may explain why it's so prominent in our mental lives. These processes allow for creativity, planning, imagination, memory—capacities that are central not only to our survival, but also to the very essence of being human.

The key, I believe, is learning to become aware of these mental tendencies and to use them purposefully, rather than letting them take over. Meditation can help with that.

So don't beat yourself up the next time you find yourself far away from where your mind was supposed to be. It's the nature of the mind to wander. Use it as an opportunity to become more aware of your own mental experience. But you may still want to return to the present moment—so you can come up with an answer to that question everyone is waiting for.