

**DIALED**

# THE NEUROSCIENCE OF IMAGINATION

UNDERSTANDING HOW IMAGINATION WORKS COULD BE THE KEY TO DAYDREAMING YOURSELF INTO A SHARPER, MORE CREATIVE PERSON.

BY JANE PORTER

**"Use your imagination." You've probably heard this phrase since before you can remember.**

It was your imagination you were using to create your first finger painting; your imagination that let you visualize what it might be like to make out with your high school crush; your imagination that helped you dream up the idea for your business or book or the house you'll one day build.

**But when you use your imagination, what exactly is at work?**

Try this: Close your eyes and imagine a bowl of fruit. This is pretty simple. You might see some apples and oranges, bananas, maybe a bunch of grapes. Probably, you've seen enough bowls of fruit in your life to call a stored-up image to mind with little effort.

**"THE BRAIN IS  
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Now close your eyes and imagine these pieces of fruit could talk. What would they say to each other? Not so easy, right?

Talking fruit isn't something we encounter much in life. That means you'll need to use

your perception--what you know about the way different fruits look and taste--and fill in the parts you don't know. That's where imagination comes in.

"Perception and imagination are linked because the brain uses the same neural circuits for both functions," says Gregory Berns, a professor of neuroeconomics and director of the Center for Neuropolicy at Emory University. "Imagination is like running

perception in reverse."

**When you call to mind something you've never actually seen, it's a lot easier to think creatively than if you try imagining something that's familiar to you.** That's because the brain can't rely on connections that have been shaped by past experience.

But experience something enough times and your brain becomes more adept at processing this information. As the connections between neurons become more efficient, your brain doesn't have to work as hard. "The brain is fundamentally a lazy piece of meat," writes Berns. "It doesn't want to waste energy."

**"THE SUREST WAY TO PROVOKE THE IMAGINATION IS TO SEEK OUT ENVIRONMENTS YOU HAVE NO EXPERIENCE WITH."**

### **WHAT DOES THIS MEAN FOR CREATIVE THINKING?**

First thing's first: Forget the whole ideas of left brain/right brain thinking. Creative thinking happens across various regions of the brain, depending on what stage of the creative process you're in, according to cognitive psychologist [Scott Barry Kaufman](#).

In other words, when your imagination is at work, networks in the brain interact with one another. If you lit up those network regions in a brain scan, they might look something like a spotted cowhide.

Three large-scale brain networks in particular can help understand brain activity involved in creative thinking, according to Kaufman:

#### **1. THE EXECUTIVE ATTENTION NETWORK**

If you need laser-focused attention on something--be it a complex presentation or a problem that requires your working memory, you're recruiting the executive attention network in your brain.

#### **2. THE DEFAULT NETWORK**

When you're remembering, thinking about the future or imagining alternative scenarios, you're activating the default network; what Kaufman calls the "imagination network." This is also at work during social interactions when, say, you're trying to imagine what someone else is thinking.

#### **3. THE SALIENCE NETWORK**

This network monitors both external events and your internal

stream of consciousness, moving quickly between the two depending on which is most relevant in the moment. It gathers all of the information coming at you and prioritizes it, sending signals to the brain about what it ought to process first.

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Researchers are studying that second network in particular, what Kaufman calls the "imagination network" as a way to understand daydreaming and creative thinking. What, they want to know, is happening in that default network when you're focused on another task?

"The motor part of the brain is active, if you're driving for example," says John Kubie, Associate Professor in the department of cell

biology at SUNY Downstate Medical Center. **"But the other part of your brain isn't just twiddling its thumbs. It's doing something."**

Perhaps it's that other part of your brain that accounts for those "ah-ha" moments when solutions to problems come to you from what feels like out of nowhere. That's why great ideas frequently hit us when we're driving or walking or taking a shower. The default network in the brain is active, making connections and imagining different scenarios until--"ah-ha!"--the right one comes to you.

So how to get your imagination firing in order to give your creative thinking a boost? "Creativity is enhanced when you begin to recognize that many of your fantasies may have relevance to some of the kinds of things that you are interested in doing," according to Jerome Singer, whose work in daydreaming is seminal in the field of psychology.

And according to Berns: "The surest way to provoke the imagination ... is to seek out environments you have no experience with. ... Novel experiences are so effective at unleashing the imagination because they force the perceptual system out of categorization, the tendency of the brain to take shortcuts."

Go to a museum. Take a walk. Read a book set in an unfamiliar place. Let your mind wander and you might be surprised what it turns up.