

# — Neuroscience, Law and the Brain

Transcription of the interview with David Eagleman<sup>1</sup> - Ch. 1

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## 1. The **frontal-lobe workout**: how does it work?

The general thing to understand about the way the brain works is that it's what I call a team of rivals, which means you have many different networks in the brain that are all trying to drive towards their own thing.

You can argue with yourself. You can cuss at yourself, you can contract with yourself, and so on. This is the way that all decisions actually get made, and this is something that neuroscience has been able to make clear over the last 20 years, is that you have these different competing networks in the brain.

The interesting thing when you meet with a drug addict and talk with them, is that part of their brain really wants the drug, part of their brain doesn't want it. They know all the reasons that they shouldn't do the drug, economically, socially, in terms of employment opportunities, other opportunities in their life. They are very aware of all the costs that that this has had to them.

The idea with the prefrontal workout is the following. This part called the prefrontal lobe, which is the part behind your forehead, that's the part of the brain that's very good at simulating the future and saying, «Okay, here are the reasons that I shouldn't do the drugs» You have other parts of your brain that want the drug right now.

The idea that we started working on is taking people who are addicted to drugs, putting them in the scanner. We image the networks in their brain that are involved in both of those. We show them pictures of cocaine, for example, and we say, «All right, go ahead and crave the cocaine». That lights up particular networks in the brain. Then we say, «Okay, think about all the

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reasons why you don't want to do the cocaine, all the costs that this has had to you». We encourage people to think of it that way, and that lights up these networks in the brain.

Then what we do, now that we have the networks for that individual's brain, is we show them pictures of cocaine, and we ask them to figure out how to control their craving. We put on the screen a speedometer that goes from crave to suppress. What they're doing, is they try to figure out what they need to do in order to move that needle. In other words, the needle, we're measuring the activity in these networks, and that's what determines where the needle is, and they're trying to figure out how to move that needle.

What we get is immediate feedback about what's happening in their brain, which is very new and unique. I mean to be able to measure what's going on inside the brain and give someone visual feedback about that decision-making

**"we're teaching people to resist temptation... because they'll always have it"**

We're changing anything fundamentally about the person, we're simply allowing them to figure out how to make better long-term decision-making. You know, 60 years ago, there was a movement to have prefrontal lobotomies, as it's called, where a surgeon would go in and essentially scramble up the prefrontal lobes. This was actually a treatment that was done on some people in prison. The idea is that it would make them less aggressive, and so on.

That has, I think, real problems from a libertarian point of view about whether we should ever give the government permission to mess with somebody's brain. The nice part about what we're talking about now with the prefrontal workout, is that it only works if somebody wants to change themselves.

As I said, with all drug addicts, if you talk to them, they have both of these voices telling them what they should do. When they're in a moment of reflection about their lives, they really don't want to do the drugs. It's just that when somebody offers them the drug, they, «God, I just can't resist». It's right there.

All we're doing is giving people the tools they need to learn what they need to do to be able to resist.

The idea with moving the needle, is that you're surfing through your mental space and you're figuring out what it takes to allow the long-term to win, whether, or not you're even consciously aware of how you're doing it. The interesting part is that people can learn.

**"We are reshaping people's brains"**

The interesting part is that they are the ones reshaping their brains. They are figuring out, only if it's meaningful to them, how to do that.

«Here are the tools that you need if you want to learn how to do this. If you want to learn how to do this exercise». From a libertarian point of view, I think this is a very important distinction that we're simply giving them the tools to decide their own direction, their own fate.

I think the ethical issues are minimal with something like this.

As long as the system offers that in a way that is even and says, «Look, instead of going to jail, here's this other opportunity», then the nice part is, it's cheaper for the government. I mean it's less expensive. Functional magnetic resonance imaging is about \$ 500 an hour, which is expensive, but that's nothing compared to jail. I mean jail is really expensive.

## **Is there a future for this technique?**

I think there's definitely a future. The current brain imaging technologies that we use, it's called functional magnetic resonance imaging, and it's the best thing that we have right now in 2018, but it won't be the best thing in five years or 10 years.

This will become a pretty standard thing to be able to help people, obviously not just in the criminal system with drugs, but even things like obesity or whatever.

It's always this battle between the long and short-term decision-making.

**"it's not the government changing you, it's you changing yourself"**

*[to be continued]*