Practical Brain Science

Transcript of:
The Neurobiology of Willpower
(It's Not What You Expect)
with
Ruth Buczynski, PhD
and Kelly McGonigal, PhD

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The Neurobiology of Willpower (It's Not What You Expect)

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The Neurobiology of Willpower (It's Not What You Expect)

with Ruth Buczynski, PhD
and Kelly McGonigal, PhD

Dr. Buczynski: Hello everyone and welcome. I'm Dr. Ruth Buczynski, a licensed psychologist in the State of Connecticut and the president of the National Institute for the Clinical Application of Behavioral Medicine.

Tonight we're going to talk about w*illpower.* We're going to talk about what willpower is in the brain, what's going on in the brain when we lose our willpower, and what you can do to help your patients with their issues of willpower.

This is so important in so many ways – whether we're in the mental health side or in the medical field.

My guest tonight is Dr. Kelly McGonigal. Kelly received her PhD in Psychology from Stanford University. She's an award winning psychology instructor at Stanford.

Her courses include the *Science of Willpower* and *Living Well with Stress*.

The *Science of Willpower* is a very, very popular course, and you'll see why as we get into the tonight. She's a leading expert in this field and she's the author of two books: *Yoga for Pain Relief* as well as *The Willpower Instinct*.

Tonight we're going to focus pretty much on *Willpower*. So Kelly, welcome and thanks for being part of this.

Dr. McGonigal: Thank you for having me.

Training the Brain for Willpower

Dr. Buczynski: Let's start with training the brain for willpower. You say in your book that people often see willpower as a virtue, but that this view can actually sabotage our willpower. Can you shed some light on that?

Dr. McGonigal: Sure. There're a couple of reasons for that. One is when you think of something as a virtue, you tend to see it as something you either have or you don't have, which is totally inconsistent with the science of willpower.

Research now shows that willpower is best thought of as a quality of strength that you can train or even a mode of the brain that you can shift into at will.

When you think about willpower as a virtue or some sort of moral trait, it turns out that most of us are not that intrinsically motivated to be martyrs or to be saints.

"Research now shows that willpower is best thought of as a quality of strength that you can train...."

So when we start to think about willpower in terms of being a really good person, or a really moral person, we tend to forget that willpower is about doing the things that matter most to us, even when they're difficult.

"Willpower helps us find the motivation to do things that are difficult."

It's really important to recognize both those aspects: willpower is a strength that you can train, and willpower reflects doing things that matter to you.

It's not about trying to impress somebody else or to be the right kind of person. Willpower helps us find the motivation to do things that are difficult.

Dr. Buczynski: Let's at least have a working definition of willpower. What do you use as a working definition?

Dr. McGonigal: Overall, I talk about willpower as being the ability to do what matters most even when it's difficult.

But it's helpful to break that down into three different types of powers or the three different kinds of skill sets we need in order to do these difficult things. I call these: *I Will Power, I Won't Power,* and *I Want Power.*

"*I Won't Power* is really the classic kind of willpower that most people think of: the ability to resist temptation."

I Won't Power is really the classic kind of willpower that most people think of: the ability to resist temptation. Maybe you see that extra dessert and you feel like you really want to have it until you're about to reach for it, and you have to say: "No, I've got to remember that what I really care about is my health, so no, I'm not going to indulge."

Or it might be resisting that craving to smoke a cigarette. That's the classic *I Won't Power*.

How do you recognize when you're about to do something that's inconsistent with your goals?

How do you have the strength to stop yourself – to restrain that impulse? This is a more neglected aspect of willpower, which I call *I Will Power*, and that is the ability to find the energy and the motivation to do what is overwhelming.

"*I Will Power* is the ability to find the energy and the motivation to do what is overwhelming."

That might be what we find boring; it could be what we find uncomfortable, it could be what makes us anxious, whether it's being willing to comply with a medical treatment that's uncomfortable and painful, or whether it's the ability to get out of bed early in the morning to exercise.

Where are you going to find that motivation and that reserve? So I call that *I Will Power*. It's really saying *yes* when some part of you is stressed out or tired, and you'd really just rather not.

The last aspect of willpower, the part that I call *I Want Power*, is the part that most people never think about at all. That's the willpower to consider the possibility of knowing what you really want, what your goals are, what your values are, the relationships that matter to you – to have that big picture vision of your life. We want to recognize that as a strength.

That gives us the ability to say *no* when we want to give into temptation. It's also what gives us the ability to find our strength and our courage when we're feeling stressed out or anxious or overwhelmed.

So those are three different types of strengths that we can train and when you put them all together, then we have *Willpower.*

Dr. Buczynski: Where in the brain do these skills take place?

Dr. McGonigal: I just happen to have a spare brain…with me! I always carry it with me. We're going to imagine looking into the brain from this point of view.

It turns out that where willpower lives in the brain is basically a constellation of areas in and just behind the prefrontal cortex.

"Where willpower lives in the brain is basically a constellation of areas in and just behind the prefrontal cortex."

Here, the prefrontal cortex is divided up into a couple of different regions, and that ability to remember what you want is in the ventral medial prefrontal cortex, behind my eyebrows and my eyes.

In that ventral medial prefrontal cortex, the brain is keeping track of what your goals are – what you want – and that area communicates with the two sides of the prefrontal cortex.

The right side of the prefrontal cortex has that *I Won't P*ower, which tends to control your attention and helps you control your behaviors. It's very good at regulating impulses that are coming up from the mid-brain. That part of the brain is going to help you regulate stress and regulate cravings.

The *I Will Power* lives more in the left side of the prefrontal cortex and that's the part of the brain that gives you the *approach* motivation. It gives you the willingness to move toward something even if you're also experiencing stress or temptations that would be pulling you way.

Willpower lives in the prefrontal cortex and it communicates with an area of the brain right behind the prefrontal cortex, the interior cingulate cortex. You can think of the interior cingulated cortex as a monitor of what's going on inside.

"The interior cingulated cortex is keeping track of what's going on in your body, where your attention is, and how to recognize if you're moving away from your goals."

The interior cingulated cortex is keeping track of what's going on in your body, where your attention is, and how to recognize if you're moving away from your goals. This turns out to be a really important aspect of willpower, too.

Is your brain paying attention to what's happening right now? Are you even aware that you're feeling a little bit tired and that's going to push you to want to maybe drink more caffeine than you should or have a sugary snack?

Are you even aware that stress is arising or that you're starting to move away from your goals and getting distracted?

When those systems of the brain work together, you both remember what you want and what your goals are. You are aware of what's happening in the present moment that might be taking you away from those goals, and you have that extra willpower to put into action whatever needs to happen.

How Our System of Self-Control Has Evolved

Dr. Buczynski: As humans, how did our system of self-control evolve?

Dr. McGonigal: This is always a bit of a "just so story" when we talk about evolution. I can't say for sure, but it does seem like we have willpower because of how incredibly complex our social structure is as a human species.

We definitely aren't the only species to show signs of willpower, but these areas of the brain, the prefrontal cortex in particular, are much more evolved and better adapted in humans than in other species.

When we live in complicated social structures and systems, we need to be able to restrain the basic survival impulses that would help us if we were more on our own, or it was less important to build strong relationships.

But as a human species, we need the ability to share and cooperate. We need the ability to regulate the emotions that might cause us to pick a fight or hoard all the food for ourselves.

"When you look at the systems in the brain that are important for willpower and you look at willpower in the body itself, they look very similar to the systems of social engagement."

This makes it seem as if willpower is very much a social strength, which we might come back to later and talk about how important social support is for willpower.

When you look at the systems in the brain that are important for willpower and you look at willpower in the body itself, which I think we'll talk a little bit about, they look very similar to the systems of social engagement.

The same systems of the brain and in the body allow us to cooperate with others. When we are well-connected to our social tribe, we also end up having more willpower.

Dr. Buczynski: Interesting. Let's just do a little more foundational work. You also talk about the idea of *one brain two minds*. Can we get into that a little bit?

Dr. McGonigal: Sure. This is one of the key ideas to come out of neuroscience in the last decade or so. This is the idea that we have one physical structure of the brain, but it tends to shift back and forth between two modes of operation.

One mode of operation is the version of willpower that we've been talking about – you could call it your ideal self, or your wise self, or some people refer to it as the rational self.

When this system is dominant, then we make really smart choices. We're thinking about our long term goals. We're very good at predicting the consequences of our behaviors. We tend to think about ourselves in relationship to other people and within a bigger context – the roles that we care about. This version of willpower tends to be dominated by the prefrontal cortex.

"...the brain tends to shift back and forth between two modes of operation."

But then, there's another mode of operation that we tend to slip into and that is dominated by structures of the brain that are more interior – in the middle of the brain.

"When we're operating from... the amygdala and stress response, we tend to be focused on the very short term - the small picture."

Here we find structures like the amygdala that is responsible for very quick emotional responding and also the stress response, areas of the brain that produce the promise of reward and the overall reward system of the brain.

When we're operating from this mode, the amygdala and stress response, we tend to be focused on the very short term – the small picture. We're driven by immediate gratification. We are desperate to avoid pain and conflict in the short term.

This system of the brain will drive us to make choices that might seem like a good idea right now, because we'll get pleasure or we'll avoid pain, but it tends to lead us to avoid doing the things that are actually in our best interest in the long term.

We'll put off something that makes us anxious or we'll indulge in something that calms us down at the moment even though we'll regret it later on.

In the idea of one brain but two minds, a big part of making good choices for ourselves is finding ways to make the ideal self dominant, as opposed to living in the system of the brain that drives us toward short term thinking and choices.

"In the idea of one brain but two minds, a big part of making good choices is finding ways to make the ideal self dominant..."

Dr. Buczynski: Some of us are raised with such a super ego…and that kind of control can block us out from any spontaneity.

Dr. McGonigal: That's a really interesting observation. One of the things that I've been most fascinated to learn in reading about the neuroscience of guilt and shame, is that some of what we think of as being motivating – what we might think of as being our inner conscience – is also like an inner critic or like an inner parent who's very disappointed in our behavior.

That actually is part of the system of the brain that drives us to make these short term choices – often more irresponsible choices – they're often a version of stress and put us right back into the position of not being able to be our ideal self.

What's really important as we start to think about behavior change – motivating people to get through very difficult experiences – is that anything with the flavor of shaming or judging or criticism tends to push us back into that system of the brain which is very self-protective, even though we have this intuition that it's motivating and might motivate us toward our higher self.

"...some of what we think of as being motivating... is also like an inner critic...who's very disappointed in our behavior."

Dr. Buczynski: Even though, the intention is motivating…That's like what we used to call in the 70's, the top dog/underdog. Fritz Perls talked about the top dog and underdog (dichotomy)…

Dr. McGonigal: What we really need is a mentor.

Dr. Buczynski: Yes that's a nice reframe for a different way of thinking about it.

Training for Willpower: The Role of Meditation

Let's switch into a mode of teaching people how they could use these ideas with their patients. I especially want to get into your ideas about which power is trainable. Can you give us one?

I know you have a five minute brain training meditation and we don't really have time to go through it, but can you tell us about it?

Dr. McGonigal: Yes. If you're thinking about training willpower, there are two ways to train the brain for willpower or to train the entire system for willpower.

One is to think about willpower as a biological response in the brain in the body. You can do things to train this biological response that are completely independent from the content of willpower.

These trainings, totally independent of that content, will make you better able to control your temper and your emotions, better able to make good choices about your health, and better able to take on the overwhelming and frightening.

"You can create willpower workouts that strengthen you for specific willpower challenges."

You can also create willpower workouts that strengthen you for specific willpower challenges. If you're thinking about quitting smoking or getting through a very long term process that is going to be difficult, there are ways to create willpower training regimes that are specific to the content that help you build up that kind of willpower reserve.

First, let's think about willpower as a biological response. From that point of view, willpower happens in the brain and it shifts the brain and the body into a specific state. Anything you do that shifts the brain in the body into that state will enhance your willpower reserve in general.

One of the best ways to do that turns out to be *focus meditation*, which is a five minute willpower workout that you were talking about.

With this meditation, you're choosing to focus your attention on the breath just by sitting still, noticing that you're breathing, and noticing that when your mind wanders, which of course it will, it's not a problem at all. You're noticing that your mind wanders and comes back to the breath.

"Focus meditation basically engages every system of the brain that we talked about for willpower..."

Focus meditation basically engages every system of the brain that we talked about for willpower: having a goal, paying attention to what is happening in your mind and body and what's moving away from that goal, and then coming back to it.

"When we choose the focus on the breath, it tends to shift us toward a very balanced state of sympathetic and parasympathetic activation."

You're training the brain for a very basic process of willpower. But it also has the side benefit of changing what's happening in the peripheral physiology in your autonomic nervous system.

When we choose to focus on the breath, it tends to shift us toward a very balanced state of sympathetic and parasympathetic activation. That's exactly what willpower looks like in the body.

"The Five Minute Willpower Training...has the side benefit of helping reduce stress."

There's a very specific signature of willpower in the body that includes heightened vagal tone, but also, at the same time, keeps us alert and present. One of the only ways to shift into that state intentionally is to turn your focus to the breadth.

So that's the Five Minute Willpower Training that I tend to start people with – it trains the brain in the body and has the side benefit of helping reduce stress.

Dr. Buczynski: I'm very aware, and so are the practitioners listening tonight, of a vast range of benefits to meditation.

But the concept of meditation being helpful for willpower I think is a fairly new idea and you have an interesting way of putting that together. You've also said in your book, and people that have studied meditation know this, that it doesn't matter if you're good at it.

Dr. McGonigal: Yes, in fact it's better if you're bad at meditation!

In the way that I just described the purpose of meditation for brain training, you need your mind to wander for it to work.

You have to have the mind be distracted by thinking about the past or the future. You have to find yourself fidgeting around and wanting to stop, because otherwise you don't get to train the *I Will* and the *I Won't* side of willpower.

You have to notice that you're finding yourself getting sleepy or fidgeting and then find a way to stay still to inhibit those impulses from getting up and wandering off.

You have to notice what your mind is doing and come back to the task at hand.

Research suggests that this can change the brain very quickly and I'm always looking for the study that's going to find the smallest dose! It's easy to find studies showing that if you meditate for thousands of hours it changes the structure of the brain.

We have a lot of studies like that, but some of the newer studies coming out are suggesting that we're talking about 10 hours of meditation practice over a couple of weeks.

"A lot of studies... coming out are suggesting that we're talking about 10 hours of meditation practice over a couple of weeks."

These short increments have a benefit that is actually changing the structure of the brain, increasing white matter density and gray matter density, specifically in the areas of the brain that pay attention to what you're doing – helping to control attention and behavior.

In fact, one of the studies that I find most encouraging was using this type of breath focus meditation with people who are in addiction recovery. It was found that doing very small practices, five to ten minutes a day, helps people who are in recovery avoid relapse.

Also, it was helping people sleep better at night, which is another way to think about training the brain and body for willpower. It's very much underappreciated that we need our brains to be in top form.

Willpower is difficult, whether we're going through a medical treatment or we're going through a divorce or we're dealing with addiction or chronic pain. So many things that we're struggling with in life actually sabotage willpower when we need it the most.

"Getting more sleep literally makes your brain better able to remember its goals and control stress."

Getting more sleep literally makes your brain better able to remember its goals and control stress.

That was one of my favorite studies in meditation because it showed how a small dose has an unexpected effect – in this case, not just on what we know it will have an effect on, but also on improving sleep and reducing relapse – these were some very good trickle down effects.

Dr. Buczynski: Do you remember who the lead author was on that study?

Dr. McGonigal: Yes, that was I think Wilby Britton (Brown University).

Dr. Buczynski: I was thinking, as you were talking, that it was going to be Sarah Lazar up until you started talking about addictions.

Dr. McGonigal: She's done some of the studies looking at the structure of the brain.

Dr. Buczynski: Right and the effect of meditation on the structure of the brain.

The Pause and Plan Response

Speaking of the people that are contributing to these ideas, let's talk a little bit about Suzanne Segerstrom… who's another psychologist at the University of Kentucky.

Dr. McGonigal: She coined the p*ause and plan response*, which really describes what is happening in the brain when we exert willpower.

She coined that term to make a nice contrast to the fight or flight response, which most people are familiar with. This is a response to a perceived threat in your environment that helps you mobilize your energy to protect yourself.

"The pause and plan response is what the brain and body do when you recognize an internal threat."

The pause and plan response is actually what the brain and body do when you recognize an internal threat. As opposed to some kind of danger in your environment that should motivate you to have a stress response, you recognize that maybe you're having a craving, or maybe you're having a distraction, and you recognize that there's something happening inside of you that is likely to create an outcome you don't want.

When the brain is able to recognize that, using some of the systems that we've talked about already, it shifts you into a mode that is very different from the fight or flight response.

"*Pause and plan* is right between the classic relaxation response and the classic flight or fight response."

Your heart starts to slow down rather than speedup. Your heart rate variability increases as a way of helping to balance the autonomic nervous system between these two sides: trying to pause and slow down (so you don't do something stupid), and at the same time, preparing for action.

Pause and plan is right between the classic relaxation response and the classic flight or fight response. We're going to be very balanced in the middle.

Also, the pause and plan response helps you send energy to the prefrontal cortex as opposed to the flight or fight response which tends to shutdown the prefrontal cortex and mobilize energy to your muscles to help you flee or fight.

It's a very specific kind of biological response, and you can see it unfolding in people when they're making a choice that requires willpower.

Studies have shown that you can see this unfold in the heart rate and in the brain, whether people are resisting temptation or whether they're persisting through difficult tasks.

How Willpower Studies Are Conducted

Dr. Buczynski: Tell us, how are these studies done? What do they have the subjects do?

Dr. McGonigal: One of the original studies that Suzanne did actually brought people into the laboratory for a taste test.

If you can imagine this, they're told not to eat. They come into the laboratory and they're alone in a room. They see this amazing spread of brownies and cookies and chocolate. They're like, *Yes, I'm ready for this!*

There also happens to be a little tray of carrot sticks and celery sticks.

The researcher comes in and says, "Okay, the delicious stuff like the brownies and cookies – those are for the next participant. Your job is to taste test the vegetables – the carrot and celery sticks. You can eat as many of those as you want, but please don't touch the desserts."

Then, the researcher leaves the room and keeps track of whether they resist the temptation or not.

You can see that when people resist the temptation, eat what they really want to eat, their heart rate slows down while their heart rate variability and their autonomic balance increases.

Dr. Buczynski: Their balance increases. Does the variability increase?

Dr. McGonigal: The heart rate variability increases.

Dr. Buczynski: What do we mean by heart rate variability?

Dr. McGonigal: Sure. Heart rate variability is very different from heart rate which we're more used to measuring.

"When people resist temptation...their heart rate slows down while their heart rate variability and their autonomic balance increases."

If you were just to notice right now your own breath and notice when you breathe in and when you breathe out, if your autonomic nervous system is in a balanced state right now, your heart rate will increase when you breathe in, and your heart rate will decrease when you breathe out.

"People who have higher baseline heart rate variability...have more willpower and more resilience to stress."

That's an index of the balance between sympathetic and parasympathetic activation… People who have higher baseline heart rate variability, first of all, have more willpower and more resilience to stress.

They also have better cardiovascular health and it's actually a great predictor of all-cause mortality and cardiovascular well-being.

Dr. Buczynski: The discrepancy is between their rates at breath in versus breath out.

Dr. McGonigal: It's the synchronization between your heart rate and your breath. There's nothing magical about that; it's just a measure of the balance of your autonomic nervous system.

It means that you aren't stuck in a stress state, which of course many people are. When we talk about high heart rate variability, what we're really talking about is the state of the nervous system, but heart rate variability is the way that we measure it.

Dr. Buczynski: And heart rate variability is correlated…with willpower.

Dr. McGonigal: Yes it is. If you bring people into the laboratory and you measure their baseline heart rate variability, you can predict what they'll do when you give them various willpower challenges.

Dr. Buczynski: If you send them into the room and say "Don't eat anything but the carrots, you can predict…"

Dr. McGonigal: You can predict both from their baseline and also whether they have an increase in heart rate variability when they're given the willpower challenge.

"Some of us are walking around in the world in a state that is ready for willpower challenges, and that tends to be a state that is based on being well rested..."

There are two ways to think about this. Some of us are walking around in the world in a state that is ready for willpower challenges, and that tends to be a state that is based on being well rested – not being sleep deprived and not being in a state of a real stress.

"...you can increase your heart rate variability by choosing to focus on your breath and slowing down the breath..."

Now that's not everyone. You could be walking around in a state of total stress and sleep deprivation, but you can also choose to shift into this state of balance when you're tempted or distracted or threatened. You can also predict people's responses by whether they're able to get into this state even if they weren't in it originally.

The best way to do that is the same breathing technique we've already talked about – you can increase your heart rate variability by choosing to focus on your breath and slowing down the breath

just a little bit, not in any really controlled, difficult struggle kind of way, but just slowing down the breath a little bit.

You want to slow your breath down to about six breaths a minute, which would be like seven, eight second inhales and seven, eight second exhales. It's actually not that hard.

When I have people try it out, most people are able to do it the very first time just by thinking about the breath.

More Studies on Willpower

Dr. Buczynski: You have so many fascinating studies that you share in the book, and I think they're really interesting. These are studies that some of our people can talk to their patients about.

This takes willpower out of the moral domain and into a scientific domain, and that, perhaps, is what can motivate people. So I want to just go into a few more.

"These studies take willpower out of the moral domain and into a scientific domain..."

You have the *Willpower Miracle*, which is a new treatment for enhancing self-control with Megan Oaten (Macquarie University in Sydney, Australia). Can you tell us about that?

Dr. McGonigal: This was a great study. I'm kind of joking when I call it the *Miracle Willpower Cure*.

This was a study that took people who do not exercise at all and gave them free gym memberships, asked them to use the memberships, and had them keep track of other aspects of willpower: what they were eating, how much they were procrastinating, how much they were spending – whether or not they were doing impulse purchases, how much they smoked, how much caffeine they consumed…any of these kinds of basic willpower challenges.

They were even asked how well they were able to control their temper.

The research found that in the beginning, of course, it took awhile to get them to use their gym membership.

They were exercising once a week at first and then building up to a couple of times a week.

"By the end of the study, people who were able to exercise a little bit more were also making these amazing changes in every other willpower domain...

By the end of the study, a couple of months in, people who were able to exercise a little bit more were also making these amazing changes in every other willpower domain, even though the researchers had not asked them to.

They were eating less junk food; they were smoking less and using less caffeine; they were reporting that they procrastinated less and were better able to control their tempers and…everything you can imagine.

So, I called this a *Miracle Willpower Cure* because they changed one thing and it had this kind of overall effect on making good choices that were consistent with their well-being and consistent with their goals.

"This is just one study that demonstrates how helpful physical exercise is for willpower."

This is just one study that demonstrates how helpful physical exercise is for willpower.

That's kind of funny because a lot of people will tell me that it takes willpower to exercise. That's what they want the willpower for: to exercise,

Of anything that you could do to change your brain – to train your brain and to reduce stress – and be better able to have willpower – exercise is the activity.

Exercise is definitely it for those two reasons: it specifically changes the brain. We're not entirely sure why, but there's something about the metabolic demands: particular cardiovascular exercise seems to improve the cardiovascular health of the brain and increase the brain health of the prefrontal cortex specifically.

You can even see it as a training effect. You can take people who are sedentary, have them exercise with moderate cardiovascular exercise, and you can see them improve in neuropsychological tests of executive function and prefrontal cortex function. Then you make them stop exercising, and they deteriorate again.

It's something that happens in a very fast training response. It doesn't take years of training to exercise. That's our Willpower Miracle.

Dr. Buczynski: Do we think it's related to the oxygen that goes to the brain when people are exercising?

Dr. McGonigal: It's not entirely clear. One of the more recent hypotheses about why exercise is so good for the prefrontal cortex is that the brain experiences exercise as a very specific kind of stress.

The theory is that the brain will adapt to this particular metabolic stress of exercise by increasing chemicals – brain-derived neurotrophic factor (BDNF), which helps the brain learn from experience and increases connections between brain cells.

BDNF tends to improve the metabolism of the brain and how the brain uses energy in the same way that cardiovascular exercise improves the way cells in the rest of your body use energy.

"BDNF tends to improve how the brain uses energy in the same way that cardiovascular exercise improves how the cells in the body use energy."

There are all sorts of mechanisms going on, but it seems to have something to do with the fact that you're asking the body to do something that is hard, a real demand, and the brain responds in the same way that the tissues of the body and the cardiovascular and respiratory systems respond.

"...the prefrontal cortex is the area of the brain that is most responsible for regulating stress, and exercise is a good stress..."

We don't fully understand why the prefrontal cortex is most affected by exercise, but it probably has something to do with the fact that the prefrontal cortex is the area of the brain that is most responsible for regulating stress, and exercise is a good stress and that's how the brain and body experience it – as a stressor.

Dr. Buczynski: Now the one experiment you talked about seemed correlational. They had people use their gym membership and the ones that used it more seemed to have more willpower in other areas.

That's a correlational study. Has anybody done a randomized control design where half the people were given exercises to do…?

Dr. McGonigal: That's what that study was. It was a RCT. The control group showed no change in anything at all. This exercise group, as a group, was able to get to the gym a couple of times a week.

Actually, most of the studies…all of the studies I've seen are intervention studies. Otherwise, it's too much of a confounding variable because we associate exercise with willpower…people who exercise already have willpower.

Dr. Buczynski: Exactly.

Dr. McGonigal: Also, a lot of the experiments are with animal models. I know that the ethics of that are kind of tricky, but a lot of the research that makes me confident about the benefits of exercise for the brain and the brain aspects of willpower come from rodent studies.

Sugar and Willpower

Dr. Buczynski: Let's talk about sugar and willpower. Glucose is tricky when it comes to willpower because you're saying we need it and I'm thinking *yes* but when we're dieting, we're trying to avoid it.

Tell us why we need glucose. What's going on there, and how do you know? What kinds of studies have been done?

Dr. McGonigal: Sure. We know that the brain runs on glucose.

It turns out that the system that gives us willpower uses a little bit more energy than other systems of the brain. This is what some studies have shown, and these studies are a bit controversial.

This is the area of willpower science that right now, when you go to the conferences, people are fighting over. So I'll give you the full scope.

"Early studies coming out a few years ago suggested that when we exert willpower, it uses so much more energy in the brain than our typical tasks."

Some of the early studies coming out a few years ago suggested that when we exert willpower, it uses so much more energy in the brain than our typical tasks and you can see a drop in circulating blood glucose levels.

These were studies done by Roy Baummeister (social psychologist at Florida State University in Tallahassee, Florida) He and his colleagues were looking at asking people to resist temptation by keeping their arm in a bucket of ice water – using their *I Will Power* to resist pulling out their hand.

When people do things that require willpower, you see a drop in blood glucose levels, which suggest that the brain is using a real source of energy – your brain is using up energy in order to resist temptation or to focus your attention.

"Willpower is depletable."

Dr. Buczynski: But this would also suggest that you have only so much energy and you're depleting it.

Dr. McGonigal: Yes, exactly, and that's one of the ideas that came out of some of this research: willpower is depletable.

It's so easily depletable that you get a temporary drop in your willpower reserve each time you use your willpower.

Now, some of the studies that have come out more recently are suggesting that the relationship between blood sugar and willpower is a little bit more complicated than just thinking, *Well, I'm going to mainline sugar to make sure I've got lots of energy so that my brain won't get tired*, which is how some of this got interpreted initially.

"The brain monitors fluctuations in blood glucose, and what your brain likes is a steady state of blood glucose."

It seems that the brain monitors fluctuations in blood glucose, and what your brain likes is a steady state of blood glucose.

If the brain feels comfortable that you have a steady state of energy, it is comfortable using the energy required to control impulses or focus your attention.

The brain doesn't like big spikes and drops in blood sugar. There's some interesting research suggesting that your brain gets kind of stingy when it doesn't trust a stable energy supply, so it will be reluctant to use systems of the brain that require more energy.

"With this more evolved way of thinking about the relationship between sugar and willpower, it is important to eat a diet that gives you a steady supply of blood sugar.."

With this more evolved way of thinking about the relationship between sugar and willpower, the best thing you can do is eat a diet that gives you a steady supply of blood sugar.

My students, when they heard the original studies, were thinking, *Great, I'll just eat candy before I need willpower*, which of course is not going to make your brain feel very good about its stable blood sugar supply.

It seems to be pretty important to eat on a regular basis and eat the kind of diet that's going to give us a steady state of energy levels that help us be our best selves with the best kind of willpower reserve.

Dr. Buczynski: That could be why people who try to exercise first thing in the morning before they've had breakfast – when they haven't had a thing to eat – may have a harder time getting themselves going.

Dr. McGonigal: Right, and there are a lot of practical things to think about with this. We know that when our energy levels are low, our brain is going to very seriously try to motivate us to consume energy.

Some people have a real rebound effect with that, too. If they try to exercise without energy, their body will notice that they've now depleted what little energy they had, and then they'll become ravenously hungry and undo the benefits of exercise.

Of all the big picture takeaways from this research, thinking about energy management is one of the most important things that we can do when we take good care of ourselves.

This includes sleep, remembering to eat breakfast instead of skipping breakfast, and choosing foods that give us that long term energy. When we take care of our energy in this way, we're actually changing our personality. We're allowing ourselves to be more of this ideal self rather than the self who runs on survival instinct, fear, and stress.

"When we take care of our energy...we're allowing ourselves to be more of this ideal self rather than the self who runs on survival instinct, fear, and stress."

"There are a lot of reasons to think of self-care as being the foundation for being able to be productive and effective..."

This is particularly important…a lot of the people I work with, including healthcare professionals and therapists, are so used to putting other people first, thinking about their own self-care as being self-indulgent.

But there are a lot of reasons to think of self-care as being the foundation for being able to be productive and effective, or getting through difficult situations where it might seem as if: *How can this be a priority right now?* But self-care *is* a priority.

Dr. Buczynski: Matthew – I'm not going to pronounce it right – Gailliot was, I think, a student of Roy Baumeister, and it sounds like he did some interesting studies looking at willpower.

Dr. McGonigal: Gailliot (Florida State University) did the original research looking at how willpower choices might deplete blood sugar. He's also done some interesting studies looking at what happens when our blood sugar is low.

He would characterize decisions as being either higher self or lower self, and he's found that when we're running low on blood sugar, we're more likely to make decisions that are like our lower self than our higher self.

"When we're running low on blood sugar, we're more likely to make decisions that are like our lower self than our higher self."

We're more likely to be prejudiced and rely on stereotypes; we're less likely to help someone who needs assistance; we're more likely to flirt with someone we shouldn't be flirting with; we're less likely to persist on tasks.

"Willpower in the brain and willpower in the body are the systems of social and prosocial engagement."

His research has really been the foundational work suggesting that thinking about maintaining our own energy levels is a way of maintaining our own willpower.

Dr. Buczynski: I thought it was fascinating that his research got into prosocial behavior – not just willpower in terms of procrastinating or avoiding the cookies…but when helping people or not being prejudiced or not gossiping… Low glucose makes us more likely to do those things.

"The training to recover from *compassion fatigue* or *empathy fatigue* is the same as the training for willpower."

Dr. McGonigal: This comes back to what we first talked about. That willpower in the brain and willpower in the body are the systems of social and prosocial engagement.

A lot of the work that I do right now is on *compassion fatigue.* We end up talking about the same thing as we talk about with willpower: people feel like they don't have the energy to help anymore – they're exhausted by being around other people's pain and suffering.

The training to recover from *compassion fatigue* or *empathy fatigue* is the same as the training for willpower.

These are the systems of the brain that allow us to be in difficult situations whether we're dealing with our own internal challenges or whether we're helping other people deal with their challenges.

The Anticipation of Reward

Dr. Buczynski: One of the things that you write about in your book is the anticipation of reward – how it can be as pleasant as the actual reward.

Dr. McGonigal: Yes, and that's actually quite complex. One of the biggest things that leads us into willpower disaster is relying on the brain's promise of reward.

"The experience of wanting something and the experience of liking something are completely different experiences in the brain."

It turns out that the experience of wanting something and the experience of liking something are completely different experiences in the brain. They aren't even overlapping structures of the brain.

You have a system of the brain that makes you think something is going to make you happy. That's the classic reward system of the brain and it runs on the chemical, dopamine.

When your brain is activated in this way, it will tell you that chasing something is the most important thing in the world because that's the thing that's going to make you happy. This is the system of the brain that seems to be adapted to make sure we don't starve. It is extremely responsive to food temptations.

"One of the reasons we get into a lot of willpower problems is that we confuse the experience of wanting with actual happiness and satisfaction."

This system in the brain produces consuming and approach behavior, and it makes us just absolutely convinced something's going to make us happy.

The systems of the brain that provide actual pleasure and particular satisfaction – these are different systems.

One of the reasons we get into a lot of willpower problems is that we confuse the experience of wanting something with actual happiness and satisfaction.

We get tricked when our brain is telling us that buying this or that is going to make us happy. We believe it so much that we don't pay any attention to the regret that we feel afterwards.

Our brain is absolutely convinced that the only thing that's going to make our pain go away is to take another drink or smoke that cigarette or watch another episode of reality TV. We believe the experience of wanting so much that we stop paying attention to the disappointment or the regret of the consequences.

"We believe the experience of wanting so much that we stop paying attention to the disappointment or the regret of the consequences."

Dr. Buczynski: What's the takeaway from that? What could practitioners tell their patients?

Dr. McGonigal: First of all, we need to have people pay attention to the difference between wanting and liking.

Some of the most interesting evidence-based interventions that are being developed right now use *mindfulness of wanting* as the primary intervention. It is training people to notice what the experience of wanting to do something is like in their brain and in their body.

It is training them to notice that the experience of wanting, first of all, is not a good predictor of whether giving in is going to provide relief or make them happy.

It's also training them that the experience of wanting is itself producing a kind of stress that makes you even more likely to give in. It's the wanting that is stressful, and it's actually producing the pain and discomfort that we then need to relieve by giving in.

For example, let's say that I have a problem with food and food control and maybe my particular temptation is ice cream.

"...when people are exposed to what is tempting, two sides of craving are going on."

When I see ice cream, the brain is going to start to produce the chemical dopamine that makes me believe that the ice cream is going to make me happy. But it's also going to start to trigger and produce a cascade of stress hormones.

Researchers have found that when people are exposed to things that they find tempting, two sides of craving are going on.

There's the promise of reward and the experience of desire, and also a real physiological stress response. This stress response is a pain response in the brain that makes you feel like you need the temptation even more than if you weren't in this kind of pain.

When you pay attention to that, you start to realize that the ice cream is producing the entire experience itself. It's not the solution to the problem; it's actually producing the pain, the stress, and the anxiety that you think you're going to relieve with the ice cream.

"The process of paying attention starts to shut down the craving response."

I know this paying attention sounds like: how could that possibly help! But the process of paying attention, first of all, starts to shut down the craving response.

The process of paying attention is inconsistent with the normal way that this reward system operates.

That's one thing that neuroscientists have found, whether it's for food or whether it's for cigarettes or some other kind of behavior.

Just paying attention starts to shut down the craving and creates a kind of functional disconnection between the experience of wanting and the way the brain usually motivates behavior to give in.

"That shift in seeing something from being a friend to being a trickster gives people more willpower."

The other thing I've found in working with people is that they no longer like that temptation as much.

It's kind of a sad joke about how we thought something was our friend and actually it really is not our friend – the very thing that is providing relief and reward is making us feel bad in order to get us to give into it.

That shift in seeing something from being a friend to being a trickster gives people more willpower. It's kind of funny how it works.

Dr. Buczynski: Interesting. Who's doing the study on that?

Dr. McGonigal: I would say that probably the most important figure in the area of the mindfulness of cravings or temptations would be Sarah Bowen and the late G Alan Marlatt. He really pioneered the field of mindfulness based relapse prevention.

That work is going on at the University of Washington. Marlatt created the first interventions, and Sarah Bowen has modified them to include everything from serious addictions to simple behavior change. So that would be a good place to start.

Here at Stanford, we're doing work on another aspect of willpower challenges: people who have anxiety. Philippe Goldin is a good resource for that using this idea of paying attention to anxiety in the same way that an addict has to pay attention to a craving.

That process of paying attention to the anxiety transforms it in a way that gives you the willpower to act even in the face of anxiety.

Stress and the Brain

Dr. Buczynski: Let's talk for a minute about stress. You're saying in your book that stress shifts the brain into a reward seeking state.

Dr. McGonigal: Yes. Stress basically transitions the brain into that system we talked about that is more likely to run on any sort of immediate reward or relief. But it does seem to be the case that when we are stressed out, we sensitize the reward system of the brain and we become more likely to be tempted. We become more likely to be distracted, and it also works at a psychological level too.

"...when we are stressed out, we sensitize the reward system of the brain and we become more likely to be tempted.."

Not only is the brain sensitized, but we ourselves begin to feel a real drain in our ability to focus on long term goals. We shift toward a kind of self-defense mode: How can I just feel better now?

Feeling better now starts to eclipse the desire to think about what our long term goals are or making choices based on values and commitments.

Self-Compassion vs. Guilt and Shame

"...self-compassion tends to be the research that surprises people the most."

Dr. Buczynski: You have a hypothesis: if guilt sabotages self-control then the opposite would support...self-compassion

Dr. McGonigal: Yes. Of all the research that I talk about, self-compassion tends to be the research that surprises people the most. Most of us have this intuition that guilt and shame are motivating, but in fact they tend to push us back toward the very thing that we feel guilty or ashamed of because that behavior tends to be our crutch.

Procrastinators who feel worse about procrastinating are the most likely to then procrastinate more because they don't want to think about how bad they feel about themselves when they think about the fact that they procrastinated. Procrastinating is a way to make them feel better by not having to think about it.

The same thing has been shown with dieters who feel bad about breaking their diet; they're more likely to turn to food as a source of comfort for how bad they feel about what they ate.

It's illogical, but that's how this system of the brain operates. The brain says, "Forget logic. We're just going to try to feel better now."

The study that you're thinking of is a study that was run by Mark Leary looking at whether you could take people who are very weight and health conscious and break that cycle of guilt leading to giving in even more by having them forgive themselves for indulging.

I call this the *Doughnut Study* where they had women eat a doughnut and then have a taste test of candy. Usually when young women eat a doughnut, they start to feel guilty about giving in and often they'll be thinking, "Well, what the heck? What's the point? I already broke my diet. I might as well just enjoy myself because I have no self-control anyway."

What they found was if they had the experimenter come in between the doughnut and the taste test and say, "You know, we found that some women are feeling guilty after eating the doughnut and you might notice that you feel kind of guilty right now. That's totally normal and we just want to remind you that everyone indulges sometimes and don't be too hard on yourself about it."

"'...we just want to remind you that everyone indulges sometimes and don't be too hard on yourself about it.'"

That was the intervention. Most people hear that and they think, "That's terrible. They're going to eat all the candy. You just told them to let themselves off the hook for eating a doughnut." But what the researchers found is that those women ate less than half as much candy as the women who had not gotten that self-forgiveness message.

Dr. Buczynski: Now tell people exactly how this worked. First, they eat the doughnut and then the experimenter comes in. Then there's a bowl of candy. How does the second half work?

Dr. McGonigal: There are three bowls of candy. It's designed so that they'll like at least one kind. Think about all the different varieties of candy. The bowls are weighed so they can measure it later to find out how much candy they ate.

The women are told to eat as much or as little as they would like in order just to rate certain features of the candy. It's like a taste test. I mean all these studies are trying to trick people a little bit.

Afterwards, the experimenters weigh the bowls to find out how much candy they ate, and actually, there was quite a bit of difference. It wasn't just half as much but it was more meaningful than that – handfuls of candy not just little bites of candy.

Dr. Buczynski: On the group that had the experimenter come in and say, "Don't be so hard on yourself versus…"

Dr. McGonigal: Yes, they ate much less, but the other women who had just eaten the doughnut showed this typical – the researchers call it *The What the Hell Effect* and that's the clinical term for it…

It's the clinical and scientific term, and I love it. You can explain it to someone. You can say to a person, "Have you had this experience where you put something off and you feel so bad about it you say *what the hell? What's the point?*"

Dr. Buczynski: At least for today…I can start over again tomorrow…

Dr. McGonigal: It often goes along with self-doubt. Are you even capable of making this change or getting through this difficult experience?

"The self-compassion intervention is like pressing the reset button."

The self-compassion intervention is like pressing the reset button.

The reason this study surprises people, and the reason it's so important is that most people don't trust themselves and most people don't trust other people either. We're profoundly suspicious of whether or not we care about ourselves.

We think that if we give ourselves permission to do what we really want, we fear that what we really want is going to spiral completely out of control and we'll never do anything of value at all.

What the study shows is that the version of us who behaves that way is the version of us who's stressed out and feeling overwhelmed and feeling guilty and ashamed.

Who we really are, when we remove that barrier, can remember our goals and can help us move back in a positive direction. There's something very profound about this study, yet a little bit silly.

Dr. Buczynski: Who was the experimenter?

Dr. McGonical: Mark Leary. He's with a group at the University of North Carolina and Duke University I believe.

The Marshmallow Study

Dr. Buczynski: Let's talk about the old Marshmallow Study. Now there might be some people who aren't familiar with it. Can you just give us a little background? It began in the 60s, I think.

Dr. McGonigal: This was a study led by Walter Mischel that was done a few decades ago at Stanford University.

They took four-year-olds into a room and in this room on a desk were two treats, two marshmallows or two cookies. They found out what the kids liked ahead of time.

The kids were told, "Okay, at any point and at any time, if you want one of these treats all you have to do is ring a bell (ding), and you can eat it right away. But if you can wait until I come back into the room…"

They don't tell the kids how long it's going to be; that's kind of important. "But if you can wait until I come back into the room, you get to have both of them."

The experimenter says, "Which do you want?" The kids are saying, "I want both of them." The experimenter says, "Great…you're going to just wait here. I'm going to leave the room and when I come back, if you haven't rung the bell and eaten one of them, you get both of them."

"When you follow the kids who were able to wait on their own the full 15 minutes, this was a great predictor of all sorts of outcomes."

They had the kids sit and wait. The actual waiting period was 15 minutes, and it turns out, most kids are not very good at this.

Most kids will give in before the 15 minutes is up, they ring the bell and they eat their treat.

But it turned out that kids who were able to wait on their own the full 15 minutes, and you follow them over time, this was a great predictor of all sorts of outcomes.

It predicted how well liked the kids were in school and what their SAT scores were when they applied to college. This study, since it started so many decades ago, has gone on to track people into middle age and later.

Kids who were able to better control and delay gratification when they were four-years-old you can actually see in their prefrontal cortex function when they're in their 40s. This was a really good proxy for people's basic willpower skills or traits.

Dr. Buczynski: Interesting. What's one way that we could train ourselves to delay gratification?

Dr. McGonigal: One of the things that people took from this study is that some people are born with willpower and some people aren't – that's one way to see this study.

But the flipside is to look at how these kids were doing something that turned out to be very important. It's an important question: Can we train ourselves to do that thing the marshmallow test was measuring? Would that training have the same positive consequences? I think that's really where you're going.

Dr. Buczynski: I also have heard lately that kids who come from more chaotic homes, it's very intelligent for them to grab the marshmallow now.

Dr. McGonigal: Yes. Who knows if there's going to be food available in 15 minutes?

Dr. Buczynski: Exactly.

Dr. McGonigal: Is that person going to come back at all?

Dr. Buczynski: Are they going to keep their promise? Are they going to come in and say, "You know, I meant to have this, but it didn't work out."

Willpower and Social Engagement

Dr. McGonigal: It comes back, again, to the idea that willpower is based on social engagement. Training secure attachment is the best way to train willpower in children.

I don't know if we were going to talk about that, but I get asked so often from parents and from the media: How do I train my kid to have more willpower?

They always think I'm going to say something like, "Oh make them do these brain training games, or make them do really hard things." But the absolutely guaranteed best way to train your kid for better willpower is to make sure that they have a secure attachment.

Research shows that kids who grow up in these chaotic environments do not have a secure attachment with a caregiver. If they have it with some adult like a teacher or a counselor or a sports coach, that can make up for the fact that they didn't have a secure attachment with their primary caregiver.

That sense of security in your social world is so important: it is a foundation for willpower. If I were to think about training willpower in kids I would start there. Now, in terms of training adults…

"That sense of security in your social world is so important: it is a foundation for willpower."

Dr. Buczynski: Just one thing about kids…We're bringing up a world of pretty self-indulgent kids who have…parents for best friends and are indulged with the latest Nike or toy.

"Secure attachment is about having a stable base to explore and to fail in."

Kids are not turning out to have willpower. Parents expect you to say that kids should do brain exercises and you're talking about secure attachment. Secure attachment is not the same thing as indulging.

Dr. McGonigal: Yes, secure attachment is about having a stable base to explore and to fail in.

The other advice I tend to give parents is let kids have failure experiences. Distress tolerance is the other trait that really predicts willpower in both children and adults.

How much can you handle discomfort? It's a great predictor of the *I Will and I Won't* side of willpower. Can you deal with your own emotions? Can you deal with discouragement in the face of a very long term goal? How do you recover from setbacks?

A secure attachment improves our ability to handle setbacks in the same way that as an adult self-compassion does. These are very different from self-indulgence or the sense of trying to boost up feeling good about ourselves by giving ourselves things, or taking the easy way out.

We need to look at secure attachment for kids or self-compassion for adults, because sometimes it's too late to fix that relationship with a caregiver.

But we can be that *caring* person to ourselves – we can have some sense of basic safety and that we'll not be turned on for failing to live up to some expectation.

There's some basic level of security and you won't turn on yourself either. That allows you to then do things that are more difficult and take greater risks and have more resilience.

"We can be that *caring* person to ourselves - we can have some sense of basic safety and that we'll not be turned on for failing to live up to some expectation."

The 10 Minute Delay Rule

"One of the reasons we give into immediate temptation or gratification is because rewards hijack the brain."

Dr. Buczynski: We were about to switch to adults when I detoured us for a moment. You have a 10 Minute Delay Rule as a way of strengthening self-control.

Dr. McGonigal: Sure. It turns out that one of the reasons we give into immediate temptation or gratification is because immediate rewards hijack the brain.

If there's something that you can have right now, it tends to shift the brain into that system of wanting a reward. But if you can pre-commit to a rule of a 10 minute delay, you can take the pressure off the part of your brain that is frenzied into saying "Can I have it? Do I get to do it now?"

Instead, you can say, "Oh yeah, you got it. It's totally yours. Don't worry about it." Stress hormones will start to come down. "But it's going to be in 10 minutes."

During that 10 minute break, do something that puts some distance between yourself and the temptation, whether it's physical distance like leaving the room or maybe calling a friend if you need support, or doing something healthy in that intermediate period.

It's just saying: "Well I'll do that, but first I'll do this, and see what happens." The 10 minute rule tends to create the mindset that then decreases the temptation and helps us make better choices.

"The 10 minute rule tends to create the mindset that decreases the temptation and helps us make better choices."

You can flip it for *I Will Power* challenges. I often ask people, "Would you be willing to do this if you only had to do it for 10 minutes?" Whether it's exercise or getting started on a project or doing rehabilitation – it's just 10 minutes. It's not an hour; it's not tomorrow; it's 10 minutes now.

Usually having these thin slices of change that we can approach makes it possible to move toward much bigger versions of that change over time.

This is just enough to help us get started on what we might otherwise just keep putting off.

Dr. Buczynski: That's true for me. When I feel the least like running I get out and get started and everything aches. And I'll say, "Just get to the top of the hill. If you don't feel like it by the time you get to the top of the hill you can turn right around and come back."

"Usually having these thin slices of change that we can approach makes it possible to move toward much bigger versions of that change over time."

By the time I get to the top of the hill, I've already worked out the part of me that's just creaky and I'm into a different mindset by then. But something about the permission makes it easier to get started.

Dr. McGonigal: It's also important to recognize that *feeling like it* tends to come second. That's another big willpower rule that I try to help people understand.

We tend to expect that one day we're going to wake up and want to get out of bed early, or one day we're going to wake up and be totally enthusiastic about something we've been terrified about before.

"Not everything we do we're going to find joy in, but sometimes even pleasure is intrinsic, or at least a sense of self-worth for having done something difficult."

It turns out that action is what changes the feelings. If you allow yourself to take even baby step actions in a certain direction, you'll find that courage will rise to meet whatever fear was initially present or willingness will arise, where before there was total resistance.

Sometimes even joy and enthusiasm will arise for running. Not everything we do we're going to find joy in, but sometimes even pleasure is intrinsic, or at least a sense of self-worth for having done something difficult.

All those feelings we think we need before we get started are just a consequence of getting started. Just recognizing that can help people stop waiting for the day when they have all their feelings set – as if "Now, finally I can do it."

Dr. Buczynski: Kelly this has been wonderful. There's so much that we've covered and it's fascinating and interesting to hear the work and to get into the details on the studies.

Thank you, Kelly, for being here. It's been a real pleasure to take this journey with you and hear all about this work. Thanks so much.

Dr. McGonigal: Thank you I enjoyed the conversation.

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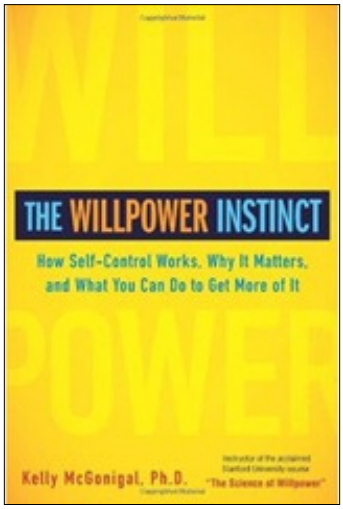


Kelly McGonigal, PhD, is a health psychologist and lecturer at Stanford University, and a leading expert in the new field of "science-help." She is passionate about translating cutting-edge research from psychology, neuroscience, and medicine into practical strategies for health, happiness, and personal success.

Her book, *The Willpower Instinct: How Self-Control Works, Why It Matters, and What You Can Do to Get More of It*, explores the research on motivation, temptation, and procrastination, as well as what it takes to transform habits, persevere at challenges, and make a successful change.

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The Willpower Instinct: How Self-Control Works, Why It Matters, and What You Can Do to Get More of It



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