

According to Kelly McGonigal's book, The Willpower Instinct, our brain's prefrontal cortex is designed to prevent us from being lazy. Kelly writes, "When it's easier to yes to dessert, your prefrontal cortex remembers the reasons for ordering tea instead," (p. 13). The prefrontal cortex has three regions which splits up the work of I will, I won't and I want (p. 14). The upper left side is the "I will" power; it helps you stick through mundane or difficult tasks. The right side is the "I won't" power; this power gives you resistance against temptations that harm your progress. The third region is the middle of the prefrontal cortex and the "I want" power. This is where we think and imagine our goals as possibilities. For our purpose, we will use three statements based on weight loss:

- I will put on my running shoes everyday
- I won't eat fast food
- I want to fit into my skinny jeans from last year.

According to Kelly's book and many of our experiences, it's not easy to lose weight. She mentions evolution, "Our brains didn't so much change as they grew," and this is why we have the prefrontal cortex (modern society) and the primitive brain (p. 16). The primitive brain deals with survival. Primitive instincts tell us that we must eat to survive. In fact, it was difficult to find food at one point, so humans ate anything they could salvage. With modern fast food chains and microwaves, we can no longer afford to think this way. It is important to learn a balance between our instincts. Although, there are advantages to fear, which is part of our primitive brain function, we must put our work into the prefrontal cortex, where our willpower functions live.

McGonigal recommends doing a five-minute meditation to train the brain and increase willpower, "It reduces stress and teaches the mind how to handle both inner distractions (cravings, worries, desires) and outer temptations (sounds, sights, and smells)," (p. 25).

The I will, I won't and I want parts of her book are standard; the hard parts are making them personalized to yourself and knowing what is getting in the way of your success. For example, if it is difficult to put on your running shoes everyday, you have to ask yourself, why? Are they not in the correct place by the door, do I not give myself any personal time, or do I need to buy running shoes? If you want to not eat fast food, then make sure you take a moment to pack a lunch the night before work, or ask your significant other to bring you lunch from home. In order to successfully complete these I will and I won't actions, you need to take preventive measures to make sure there is nothing in your way. Discover the obstacles to each statement and avoid them!

According to The Willpower Instinct, psychologist Suzanne Segerstorm, has found that "Like stress, self-control has a biological signature," (p.36). When our bodies go into the willpower state of mind, she calls it our pause-and-plan response. In retrospect, it is the complete opposite of the fight-or-flight response. Kelly explains the pause-and-plan state as calm, "not to paralyze you in the face of internal conflict, but to give you freedom," (p.37). This state of mind is not always easy to reach, in fact, it has a lot to do with the biology of stress and self-control.

"The single best physiological measurement of the pause-and-plan response is something called heart rate variability [HRV]," and this is where SweetBeat comes in (p.38).

Willpower can be measured by HRV. First, take a moment to realize that you can put a number on your willpower strength. Segerstrom first discovered that willpower gave off a biological signature during a study where she had students fast for a study, and then gave them cookies, chocolate candy and carrots, but asked them to eat only the carrots. She claimed the cookies and chocolate candies were for the next experiment. The students who resisted the cookies and candy, had a noticeably higher HRV, while the students who were given the cookies and candy showed no change in HRV.

To better understand how willpower can be measured by HRV, we need to understand the two branches of the nervous system. When the body is in the sympathetic nervous system and we are stressed, our heart rates go up, variability goes down, our lungs work harder and we have no time (according to our bodies) to think through our decisions. As our bodies slow down and go into the parasympathetic nervous system, we think more clearly, our stress levels go down and we can focus on our “I want” statements from before. The higher the HRV the more of these willpower items you can take on. For example, if you are feeling stressed out, maybe you should avoid going out to eat at a restaurant where you know you might choose a hamburger rather than a salad. But the opposite also applies, if you are feeling well-rested and SweetBeat can help you realize your HRV and willpower potential, then you can take on all three statements and maybe add another: I will bike to work, today. “These findings have led psychologists to call heart rate variability the body’s ‘reserve’ of willpower – a psychological measure of your capacity for self-control,” (p.39).

As for improving HRV and willpower, there are many factors which can hurt or help you. It is important to eat healthy, unprocessed foods, exercise and control stress factors in your life, while staying in a clean air environment. Chronic pain and illness are factors that can negatively influence heart rate variability and should be taken very seriously. Breathing is an important part of weight-loss and stress control (p. 40). Did you know that not breathing right can be a contributor to weight-gain? Here is a short list of ways to start monitoring your willpower and weight-loss:

- Create your “I will, I won’t and I want” statements
- Under each statement, write obstacles that can prevent your success and avoid those situations
- Read Kelly McGonigal’s book, [The Willpower Instinct](#) and complete the exercises she includes at the end of each chapter (i.e. meditation, breathing, etc.)
- Measure your HRV with SweetBeat to be aware of your willpower reserve each day. This will prevent overload.
- Create a food and exercise diary
- Don’t beat yourself up, everyone makes mistakes and guilt only leads to giving up.

The algorithm that we use to get your willpower number uses a set of math equations using the heart rate variability number.

Willpower is calculated as follows:

Input:

- HRV_average: The average HRV of the session
- HRV_minimum: The minimum recorded average HRV across all sessions. On app install, the default is 50.
- HRV_maximum: The maximum recorded average HRV across all sessions. On app install, the default is 70.

Output:

- $\text{willpower} = (\text{HRV_average} - \text{HRV_minimum}) / (\text{HRV_maximum} - \text{HRV_minimum}) * 100$