

“Wiring” Your Brain

Your actions as a teen directly influence your brain’s efficiency.

Our brains develop from birth through adulthood in a process that starts with our genes but is then shaped by our experiences. So although you don’t have control over the building blocks (genes) of who you are, you do have a say in who you will *become*. In fact, it is during your teen years—yes, right now!—that you have the most say in how efficiently your brain applies new information. In other words, the habits and skills you practice now will take less time and effort in the future.

HOW? Brain cells, called *neurons*, communicate with each other through connections called *synapses*. During childhood, your brain produces more of these synaptic connections than you actually need. This abundance allows you to develop skills as you grow, such as coordinated movements for sports and academic skills for school.

As a person ages, synapses that are used a lot become strong and efficient, while unused synapses die off in a process known as *synaptic pruning*. So the more you do a certain activity—for example, solving a math problem or throwing a ball—the better you become at it.

USE IT

OR

LOSE IT

Think of what is involved in learning to play an instrument. As you practice regularly and study compositions, your brain activates numerous synaptic connections between neurons that control creativity, finger movements, and understanding of music. This reinforces both the strength of these neurons and the efficiency of the connections. So it’s easier for an experienced musician to learn a complicated piece of music than it is for a beginner.

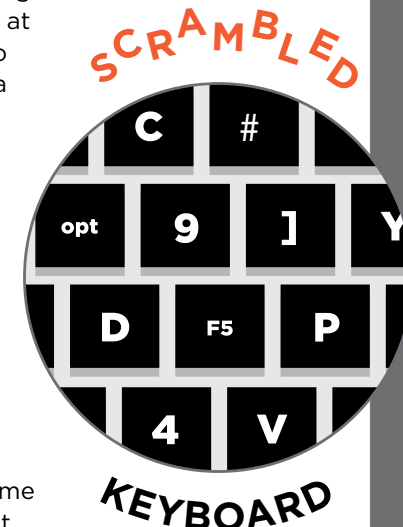
Practicing certain skills strengthens the related synaptic connections. At the same time, the brain will get rid of connections that are not used. This ability of the brain to modify its circuitry is strongest in the teen years. This means that it is easier for you—as a teen—to learn something new and remember it, such as a foreign language, than it is for an adult. It also means that teens can shape who they will become as adults through their experiences and actions.



DRUGS AND BRAIN DEVELOPMENT

As a teen, you have a lot of say about how your brain develops. But using drugs can undo all of your hard work. Think of your brain like a computer and yourself as a programmer.

Imagine you sit at the keyboard to write code for a program. But what if the keys were scrambled? If you typed your name using the keyboard to the right, with your fingers positioned for standard touch typing, your name would come out unrecognizable. If you were typing code, your program wouldn’t work correctly.



Similarly, drug abuse during your teen years scrambles how information flows between your synapses. Using drugs can negatively affect your attention, memory, and problem solving—not just as a teen, but well into your future. Drug use during your teen years can even “wire” your brain for addiction—a devastating disease that affects millions of lives.

WHERE’D YOU GET THOSE FANCY SYNAPSES?

The brain is composed of a network of *neurons* (brain cells) connected by *synapses* (“living circuits” through which information flows). The complexity of this network is what allows humans to create art, feel emotion, solve problems, and be unique individuals, among many other things.

NEWBORN

A newborn’s brain starts out with at least 100 billion neurons. The brain is focused on basic body functions, such as heart rate, breathing, eating, and sleeping.



0 to 3 YEARS

At its peak, the brain of a toddler may create as many as 2 million synapses a second. The brain is focused on fundamental skills like talking, playing with others, and following directions.



3 YEARS

By age 3, brains have approximately a quadrillion* synapses, many more than needed. Some synapses are strengthened, but many are gradually discarded (synaptic pruning).



TEEN YEARS

Though the brain reaches its full physical size by age 12, the process of synaptic pruning continues in response to new experiences throughout the teen years.



20s to 30s

Synaptic pruning is in the final stages. The brain has become more efficient based on experience, requiring less effort to accomplish familiar activities.

