

# Is GPS ruining our ability to navigate for ourselves?

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I absolutely love GPS. I think the ability to get from one place to another, anywhere in the country, is one of the greatest gifts of modern technology. I've often thought that I wouldn't mind getting rid of my smartphone if I could somehow keep one app: Google Maps. However, over the countless hours I've used it, I've wondered about a troubling idea. Could our dependence on GPS be destroying our ability to navigate for ourselves, without GPS?

There isn't a clear answer. We do have a reason to believe that when we only use GPS for directions, we're not improving our own navigating skills. Many of the scientists who study the brain are concerned with what this might be doing to us.

"I do think GPS devices cause our navigational skills to atrophy [waste away], and there's increasing evidence for it," says Nora Newcombe, a Temple University psychologist who studies how people learn and understand how to move through physical spaces. "The problem is that you don't see an overview of the area, and where you are in relation to other things. You're not actively navigating — you're just listening to the voice."

## How our brains navigate without GPS

There's more than one way to solve the problem of how to get from one place to another, which is what navigation is.

Researchers have found that we have about two strategies for navigating.

The first one is slowly creating a spatial map inside your brain. As you explore an area, you think about how streets fit together, how to move between different locations,



and your current position in it all. Eventually, your mental map lets you navigate between any two points in the area, even if you've never taken the route between them before. You are creating a little model of where places are and how it relates to all the different ways to move between them inside of your brain.

The second strategy involves using a series of landmarks and steps. For example, someone at your school might tell you how to get to a certain classroom: go down the hall, turn left at the first hallway, and the classroom is four doors down on the right. When you walk back and forth from the park, your friend's house, or school, this is the way that you will automatically navigate. You don't have to think about where you are, you're just following steps you remember.

These two ways of navigating might not sound that different, and we use each of them depending on where we are going. Even though they're similar, brain scans of people navigating show that we use different parts of our brain for each strategy.

The strategy that uses a spatial map in your brain uses the same part of the brain that stores memories. The other strategy uses the same part of your brain that helps you form habits.

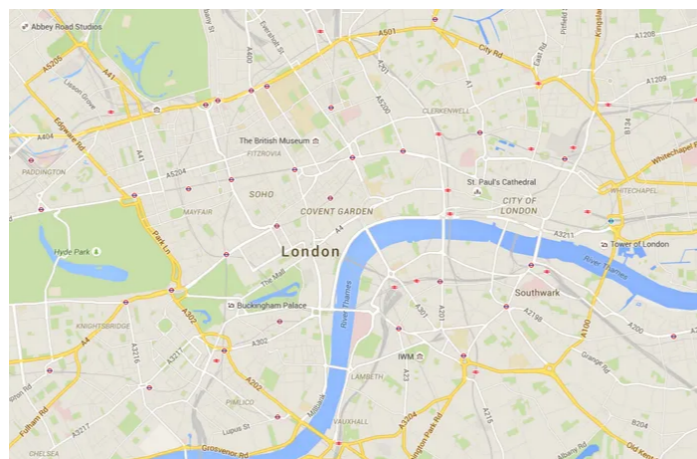
## **Your Ability to Navigate Can Get Better – Or Worse**

We all know people who are great at navigating and others who seem to get lost all the time. Everyone can learn a route for getting from Point A to Point B. People who aren't good at navigation just memorize step-by-step directions. They aren't as good at creating mental maps as people who are good at navigating.

The part of the brain that is for memories (called the hippocampus) is actually bigger in people who have to learn where a lot of places are, like taxi drivers in large cities. This discovery raised a question: are people with a large hippocampus becoming taxi drivers or do taxi drivers grow a bigger hippocampus?

It turns out that a person's hippocampus will actually grow as they learn to navigate to lots of places and develop large mental maps. This means that navigational ability can change over time.

The ability to be a good navigator is something that you can learn and practice to become better. People who are "bad" at navigation just don't practice navigating frequently enough.



## **How GPS Might Cause Our Navigation Skills to Weaken**

Following directions from a GPS usually doesn't involve using a mental map. Instead of looking

around while you are traveling and figuring out the best way to go, you listen to one direction at a time from a device and wait for the next one.

This could be a problem because it reduces how often we practice making mental maps. Remember, the more we navigate with mental maps the more we are practicing navigation which can cause our hippocampus to grow. It might even mean that our hippocampus will

shrink and we get even worse at navigating without step-by-step directions.



We don't have direct evidence that using GPS leads to a shrinking hippocampus. Scientists have not found a way to reliably test this hypothesis out yet.

But there is reason to believe GPS users aren't creating the same sort of mental maps as those who don't use GPS. People who navigate with a physical map can later draw a map of the area with more detail than people who used GPS.

## Why Navigation Isn't a Useless Skill

It might be easy to say it doesn't matter that we are getting worse at navigating. For people who don't enjoy navigating or get lost easily, it is nice to have a device that can help you find where you want to go.

Of course, GPS devices don't eliminate the chance of getting lost. Even if they did, there's something more at stake.

One major sacrifice is our connection to the environment we travel through. People who rely on GPS directions while driving stare at their GPS screen more and the outside world less. Instead of directly experiencing and exploring physical locations, you cut right through it with a path determined by a device. You don't really remember the landscape of where you traveled, just the route you took.



There's even some worry that a smaller and weaker hippocampus might be a risk factor in age-related dementia. Navigating for yourself might help keep your brain healthier as you get older.

## How to Use GPS While Preserving Your Ability to Navigate

Smartphones with GPS are incredibly useful, and no one is suggesting that you completely give them up. You have to make smart choices about when to use GPS. If you use it in a way that helps you learn about the environment then you are strengthening your memory and navigation. If you turn it on and follow the instructions it tells you, then you're weakening your ability to navigate and create mental maps.

Here are some tips on the best way to use GPS:

- 1. Use GPS only when necessary.**
  - a. It's okay to use GPS when you're in a new place. Avoid using it as a crutch or help to get between places you should already know.
- 2. Orient yourself before using turn-by-turn directions.**
  - a. Google Maps lets you look at the map before you hit "start." You can look at the map and identify the start and end of your route before you begin.
- 3. Use GPS on the way there, but not the way back.**
  - a. This forces you to pay attention to the environment as you follow GPS instructions, because you know you'll need to remember each turn on your way back. As you go through the step-by-step instructions, look to see how intersections or exits will appear from the opposite direction.
- 4. If possible, don't use GPS while actually driving.**
  - a. You might try with your parent or sibling to get somewhere without directions off the phone. You can read the directions from the phone, try to memorize them, then close the GPS before you start driving. Even if you have to cheat and look at it again, this will allow you to exercise your navigation muscle more than if you used GPS the whole time.