ATTENTION DEFICIT

How Technology Has Hijacked Our Ability to Concentrate

Stuart A. Kallen

CONTENTS

The Myth and Reality of Multitasking

Some people are heavy multitaskers. They spend their days texting, shopping online, posting selfies to social media, watching TV, and playing video games, sometimes all at once. In the car they might be drinking coffee, tweaking the entertainment system, and making phone calls while maneuvering their vehicle through traffic. (They are probably breaking the law if they are holding the phone while driving; it is illegal in most states.) When multitaskers get to work or school, they might continue their activities on smartphones, laptops, tablets, and desktop computers.

Many heavy multitaskers are proud of their abilities. When filling out résumés or sitting through job interviews, they emphasize that they are good at multitasking. And many employers expect their workers to juggle several tasks at once. But numerous studies have shown that most people are not good at multitasking. Multitaskers are less productive and more prone to error, and they tire faster than those who focus on one task at a time. And multitasking can make life more difficult. Writer Hayley Phelan says that multitasking is essential to her job, but "if I keep looking at my phone or my inbox or various websites, working feels a lot more tortuous. When I'm focused and making progress, work is actually pleasurable."[35]

The Cost of Switching

Basic brain functions make true multitasking nearly impossible for most people. When the brain is focused on a single task,

portions of both frontal lobes are active. When a second task is added, the brain suffers from what neuroscientists call interference; the tasks compete for finite thinking resources in the same areas of the brain. Interference acts as a bottleneck that clogs the transfer of information between portions of the brain. When a third task is added, one will effectively be forgotten; the brain carries on by ignoring it. Neuroscientist Earl Miller affirms, "Your brain can only produce one or two thoughts [at once]. . . . We're very, very single-minded. [We have] very limited cognitive capacity."[36]

Miller says average teenagers believe they can simultaneously follow six forms of media. But like almost all multitaskers, they are instead switching back and forth between media sources. Their brains only focus on one at a time. As Miller explains, "They don't notice the switching because their brain sort of papers it over to give a seamless experience of consciousness, but what they're actually doing is switching and reconfiguring their brain moment-to-moment, task-to-task"[37] According to Miller, all that switching comes with a cost. Thought processes become scattered and slow.

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—Earl Miller, neuroscientist

Scientists have a term for this drop in mental performance; the switch-cost effect. It defines the price paid in accuracy and efficiency when switching attention between several forms of media. The switch-cost effect comes into play when a student is doing homework but stops to check the phone for an Instagram update. While this action only takes a few seconds, research shows it can take up to twenty minutes for the student to effectively refocus on homework after an interruption.

The switch-cost effect was first demonstrated in 2013 by researchers at Carnegie Mellon University's Human-Computer Interaction Lab when 136 students were given a standard test. Some had their phones switched off while other received short text messages during the test period. Those who got texts performed 20

percent worse on the test than those who did not. This increase in errors is called the screw-up effect. Miller says switching between tasks causes mistakes that would not have occurred otherwise. "Your brain is error-prone," he explains. "When you switch from task to task, your brain has to backtrack a little bit and pick up and figure out where it left off [and glitches start to occur]. . . . Instead of spending critical time really doing deep thinking, your thinking is more superficial, because you're spending a lot of time correcting errors and backtracking."[38]

Bad Taskers and Supertaskers

Despite the research, many believe they are expert multitaskers. This type of overconfidence is known as cognitive bias. It defines the tendency of individuals to overrate their skills in any situation. And those who have cognitive bias are too overconfident to realize when they are making obvious mistakes.

Individuals with cognitive bias can be found in almost every social and intellectual environment. They overrate their skills as students, teachers, professionals, and entertainers. And a 2018 study reported in the journal *Proceedings of the National Academy of Sciences* showed that cognitive bias is extremely common among heavy multitaskers. Subjects who claimed to be very good at multitasking were asked to perform several tasks at once, such as memorizing word combinations while operating a car-driving simulator. Those with cognitive bias did much worse on tests than those who did not overrate their abilities.

A team of psychologists at the University of Utah found a surprising exception to the cognitive bias rule. A small percentage of people who highly rate their own skills are observably better at multitasking than almost everyone else. Researchers in Utah discovered that a little over 2 percent of the population can be classified as supertaskers. The performance of supertaskers improves when they are completing multiple tasks at once. The brains of supertaskers operate differently; when they are multitasking, there is less activity in the frontal lobes, rather than more.

When people attempt to multitask, such as by checking their phones while sitting in class, they divide their attention so much that both tasks suffer.

This means the brains of supertaskers become less active with additional tasks. While researchers do not fully understand how this works, they believe that this lower level of activity allows the brains of supertaskers to work more efficiently. As psychology professor and lead author of the study David Strayer says, "Their brains are doing something we can't do."[39]

One of the supertaskers in Strayer's study is known as Cassie. She was able to operate a driving simulator, do math problems, and listen to commands being given to her through a cell phone. While most people failed the test after a few minutes, Cassie seemed to be getting more efficient. Strayer explained, "It's a really, really hard test. Some people come out woozy—'I have a headache'. . . that sort of thing. But she solved everything. . . . She made zero mistakes. And she did even better when she was driving."[40]

Scientists speculate that supertaskers like Cassie are rare because there are few evolutionary benefits related to performing more than one mental task at a time. As technology becomes even more embedded in everyone's daily lives, more people might evolve into supertaskers. But for now, supertaskers are an exception.

Phishing for Multitaskers

People can fool themselves into thinking they are good at multitasking, but online fraudsters know better. These criminals, who conduct phishing attacks and phone scams, understand that distracted multitaskers make easy targets. Scammers produce millions of emails, SMS texts, and robocalls every day to lure the digitally distracted into giving away passwords, personal information, and money.

Internet crime increased nearly 70 percent in 2020, according to the Federal Bureau of Investigation. And the tactics of phishers became more sophisticated. Scammers fool the public by using names and logos of banks, government tax bureaus, and law enforcement agencies. They might pretend to be a lawyer, doctor, or family member in need of urgent financial help. And mobile devices are the main scammer target. When compared to large computer monitors, smartphone screens are small. Tiny message boxes make it difficult for some to see the names, links, and web addresses sent by fraudsters. And people are so busy multitasking that they might click on a harmful link by accident. A 2018 study from Michigan State University showed that people switch apps over one hundred times a day. This means they are not paying attention to details. Professor of decision sciences Cleotilde Gonzalez says, "If you are on an iPhone, looking at a Facebook message or quickly trying to figure out what an SMS is telling you, there is a higher chance that you are going to fall into the trap of a phishing attempt."[41]

> **"If you are [multitasking], there is a higher chance that you are going to fall into the trap of a phishing attempt."[41]**
>
> —Cleotilde Gonzalez, professor of decision sciences

Multitasking and Homework

Multitasking has been shown to have negative consequences on productivity, health, and behavior. But a 2019 study by Ohio State University discovered that multitasking can also help adolescents feel better about the main task they are trying to accomplish. Young people ages eleven to seventeen were given a task they did not want to do—their homework. Researchers found that those who texted with friends while doing homework felt better about the chore while multitasking. However, the pleasant feelings decreased after a while as more mental energy was needed to multitask.

The study also showed that those who were performing rewarding tasks, such as drawing or playing music, felt less desire to multitask. Professor of communications Zheng Wang, who coauthored the study, explains the findings: "It suggests that adolescents may be less likely to multitask if they already find their tasks rewarding. Efforts by teachers to make lectures more interactive and efforts by parents to engage children in activities that offer opportunities to play, explore and learn all should help reduce multitasking."

Zheng Wang et al., "Multitasking and Dual Motivational Systems: A Dynamic Longitudinal Study," *Human Communication Research*, October 2019. https://academic.oup.com.

When it comes to online fraud, cognitive bias once again comes into play. Most people think they are too sophisticated to get scammed. And there is a stereotype that only gullible older people are tricked by cybercriminals. The reality is that older people spend less time with digital devices and are more distrustful of messages from people they do not know. That is why phishers most often target young people, who generally spend more time online. According to psychologist Gareth Norris, "Younger people use technology all the time, they're on the phones all the time. And actually, they give information out quite freely, and they're not too worried about it."[42]

Deadly Multitasking

Multitasking can turn from dangerous to deadly when the smartphones are used by people driving vehicles. When drivers send

SOURCE NOTES

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5. Quoted in Ira Flatow, "Decoding 'the Most Complex Object in the Universe,'" NPR, June 14, 2013. www.npr.org.
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TIPS FOR REDUCING DIGITAL DISTRACTIONS

Digital distraction is a common problem that can interfere with learning, working, and socializing with others. These problems have attracted attention from a wide range of psychologists, researchers, and scientists who recommend the following steps for reducing the use of digital devices.

- Use an app to track online time and limit the number of launches for social media and gaming apps.
- Turn off push notifications.
- Put a rubber band around the phone to remind yourself not to pick it up.
- Schedule an hour a day for mindless scrolling.
- Delete social media and gaming apps.
- Put the phone in a different room while studying and turn it off at night.
- Get a low-tech “dumbphone” that can only be used for texts and calls.
- Take up art, music, writing, or another hobby that does not involve using a digital device.
- Participate in physical activities such as hiking, biking, and sports.

FOR FURTHER RESEARCH

Books

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