

Brain Drain

TACKLING MULTIPLE TASKS AT ONCE MAY BE COUNTERPRODUCTIVE.

BY LEIGH FARR

HIGH-TECH DEVICES DRIVE THE WAY WE WORK AND play. At home and in the workplace, Americans are bombarded by an influx of information from our cell phones, computers, televisions and portable gadgets. A recent nationwide survey revealed that 60 percent of respondents spent between one and six hours a day viewing content on electronic devices.

Sadly, our effort to navigate the ocean of distractions that demand our attention doesn't necessarily make us more productive, say brain experts. In fact, our vigilance may have the opposite effect.

"Studies show that when we multitask, even though we think we're getting more done, we're less efficient because we make more errors," says Gary Small, MD, professor of psychiatry and biobehavioral sciences at the David Geffen School of Medicine at UCLA and author of *iBrain: Surviving the Technological Alteration of the Modern Mind*. "We're working faster, but sloppier."

Media Muddle

The truth is our brains may not be wired to process the constant stream of digital distractions.

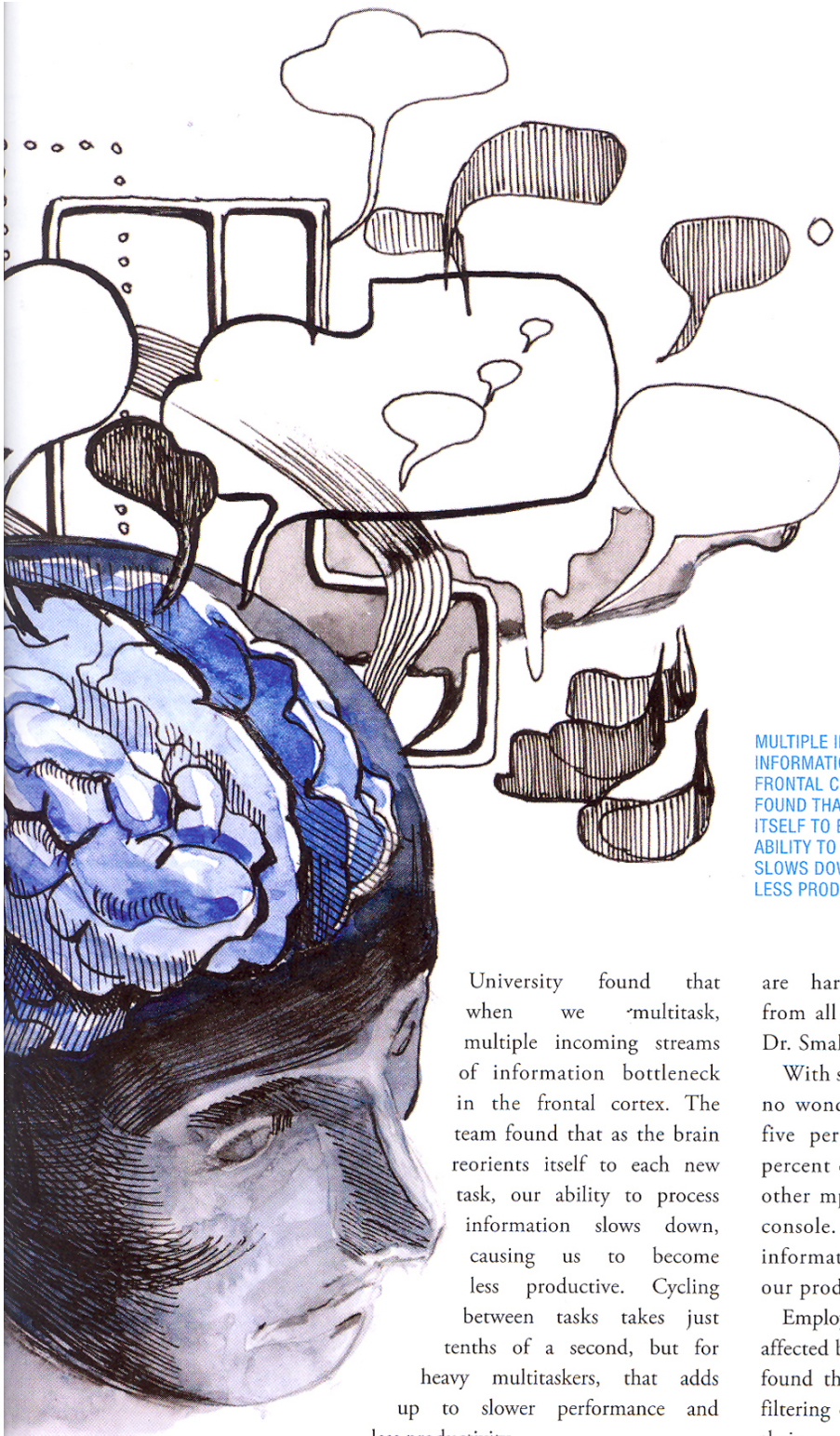
We may simply be better at processing one piece of information at a time.

Each time we tackle a new task such as answering an email or tracking a Twitter feed, the region of our brain called the frontal cortex prioritizes the task and determines what cognitive processes will carry it out. As much as we'd like to think we're multitasking when we attempt to accomplish more than one such task at a time, our brain is actually toggling between the tasks as they are introduced.

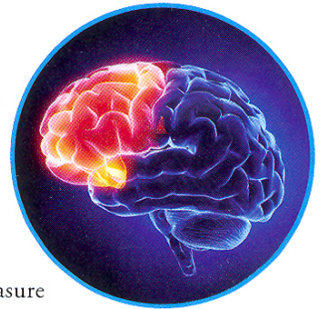
"In general, humans are not able to effectively multitask due to the constraints of our cognitive systems," says Anthony Wagner, PhD, professor of psychology and neuroscience at Stanford University. "What this means is that when we believe we are multitasking, what we are actually doing is task switching – that is, shifting back and forward between the multiple tasks we are attempting to perform." Decades of research show that we are slower, and often less accurate, when we task-switch compared to when we focus on a single task for a long period, adds Dr. Wagner. And the more complex or unfamiliar the tasks, the longer it takes for our brains to adjust.

Using functional magnetic resonance imaging (fMRI) technology, researchers at Vanderbilt





MULTIPLE INCOMING STREAMS OF INFORMATION BOTTLENECK IN THE FRONTAL CORTEX. RESEARCHERS FOUND THAT AS THE BRAIN REORIENTS ITSELF TO EACH NEW TASK, OUR ABILITY TO PROCESS INFORMATION SLOWS DOWN, CAUSING US TO BE LESS PRODUCTIVE.



University found that when we “multitask, multiple incoming streams of information bottleneck in the frontal cortex. The team found that as the brain reorients itself to each new task, our ability to process information slows down, causing us to become less productive. Cycling between tasks takes just tenths of a second, but for heavy multitaskers, that adds up to slower performance and less productivity.

Cognitive Overload

If multitasking decreases productivity and puts a damper on creative thinking, why has it become a national pastime? “Part of the reason is our brains

are hardwired to feel pleasure from all the mental stimulation,” says

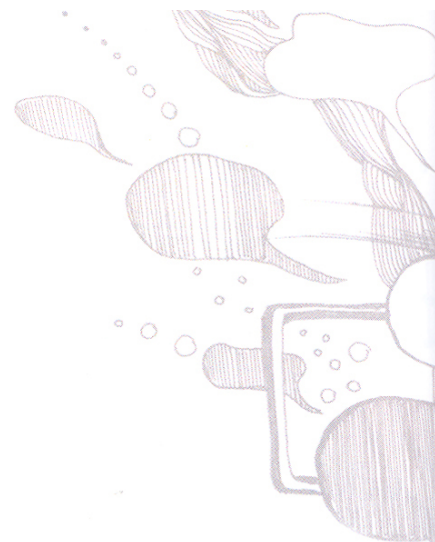
Dr. Small. “Multitasking is a brain-firing party.”

With so many multimedia gadgets in our homes, it’s no wonder we often juggle high-tech tasks. Eighty-five percent of Americans own a cell phone, 76 percent own a computer, 47 percent have an iPod or other mp3 player and 42 percent own a video game console. We are bombarded by an endless stream of information and researchers say it’s taking a toll on our productivity.

Employing fMRI to highlight those regions of the brain affected by multitasking, scientists at Stanford University found that frequent media multitaskers have difficulty filtering out unimportant stimuli that aren’t relevant to their current goal. As a result they get bogged down by irrelevant information and their performance suffers.

According to study author Dr. Wagner, “We are slower and less accurate when task switching because the information that we use to perform one task can actually cause interference when we subsequently try to perform another task.”

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"WE'RE WORKING FASTER, BUT SLOPPIER." – GARY SMALL, MD

Stress Factor

Attempting to do too much at the same time can also cause you to feel stressed.

"We can assess a particular kind of activity as being productive but at the same time we can have high levels of anxiety, stress and all kinds of other emotions at the same time that we feel productive," says Barbara Schneider, PhD, a professor at the College of Education and Department of Sociology at Michigan State University.

A new study performed by researchers at the University of California, Irvine, showed that computer users in an office setting who were bombarded by more technological distractions experienced higher levels of stress and were less able to concentrate than those with fewer distractions.

The scientists attached heart rate monitors to participants as they worked and used software sensors to monitor the number of times the subjects changed computer windows.

Workers with email switched screens twice as often and experienced constant, unvaried heart rates, a physiological marker of stress, while those without email had more natural, variable heart rates. A steady, unvaried heart rate has been linked to higher levels of cortisol in the brain, a hormone linked to stress.

Train Your Brain

There's no doubt that technology is permanently woven into our cultural fabric. And for people who weren't raised on a high-tech diet, adjusting to the digital lifestyle can be challenging.

"There is a new generation gap that we call the brain gap between young digital natives who are much more willing or interested in immersing themselves in the new technology and the older digital immigrants who come to it more awkwardly," says Dr. Small.

TO EXPAND YOUR ABILITY TO PROCESS INFORMATION, DR. SMALL RECOMMENDS TACKLING COMPLEX VIDEO GAMES OR PERFORMING ONLINE SEARCHES TO DEVELOP THE FRONTAL LOBE REGION OF THE BRAIN.



KEEP YOUR FOCUS

Feeling bombarded by multimedia? Try these simple steps to avoid information overload:

1. Turn it off. When you're working on a project, turn off instant messaging (IM).

2. Silence your phone. When mid-task, turn your cell phone ringer off.

3. Let them wait. Save checking emails for specific times during the day.

4. Hide your phone. Put your smartphone in a drawer while working.

5. Be antisocial. Allow yourself to be out of the loop for certain periods of the day.

6. Save it. TiVo your favorite shows and watch them later.

7. Stay focused. Set a timer and perform one task for 10 minutes.



The good news, he says, is you can become more adept at using technology, within limits. "We can build our multitasking skills, but each person's brain has a limit as to when it's too much," he says.

To expand your ability to process information, Dr. Small recommends tackling complex videogames or performing online searches to develop the frontal lobe region of the brain.

In a recent study at UCLA, Dr. Small and his team demonstrated that using technology triggers key areas in the brain that control decision-making and complex reasoning. Using fMRI scans, the researchers found that participants who were computer savvy showed double the level of brain activation while surfing the Net compared to those with little computer experience.

"In our study of older adults, when they searched online they very rapidly increased neuroactivation so they could train these circuits to respond more robustly," says Dr. Small. "Your frontal lobe functions can improve." Dr. Small compares training your brain to learning to

juggle, in which you start out with two balls, and then increase to three balls as you improve.

"It's a way of building brain muscle but you need to ratchet it up at a pace that makes sense." And if your brain feels overloaded, you can always go offline to recharge your batteries. That unread email can wait. ❖



POINTS OF CONTACT

To learn more about media multitasking from *The New York Times*, visit nytimes.com and search for "Your Brain on Computers – Series."

To find out more about multitasking and how it affects your brain, visit the American Psychological Association website at apa.org and search for "multitasking."



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