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Cover Story

The Multitasking Generation

They're e-mailing, IMing and downloading while writing the history essay. What is all that digital juggling doing to kids' brains and their family life?

By CLAUDIA WALLIS

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It's 9:30 p.m., and Stephen and Georgina Cox know exactly where their children are. Well, their bodies, at least. Piers, 14, is holed up in his bedroom--eyes fixed on his computer screen--where he has been logged onto a MySpace chat room and AOL Instant Messenger (IM) for the past three hours. His twin sister Bronte is planted in the living room, having commandeered her dad's iMac--as usual. She, too, is busily IMing, while chatting on her cell phone and chipping away at homework.

By all standard space-time calculations, the four members of the family occupy the same three-bedroom home in Van Nuys, Calif., but psychologically each exists in his or her own little universe. Georgina, 51, who works for a display-cabinet maker, is tidying up the living room as Bronte works, not that her daughter notices. Stephen, 49, who juggles jobs as a squash coach, fitness trainer, event planner and head of a cancer charity he founded, has wolfed down his dinner alone in the kitchen, having missed supper with the kids. He, too, typically spends the evening on his cell phone and returning e-mails--when he can nudge Bronte off the computer. "One gets obsessed with one's gadgets," he concedes.

Zooming in on Piers' screen gives a pretty good indication of what's on his hyperkinetic mind. O.K., there's a Google Images window open, where he's chasing down pictures of Keira Knightley. Good ones get added to a snazzy Windows Media Player slide show that serves as his personal e-shrine to the actress. Several IM windows are also open, revealing such penetrating conversations as this one with a MySpace pal:

MySpacer: suuuuuup!!! (Translation: What's up?)

Piers: wat up dude

MySpacer: nmu (Not much. You?)

Piers: same

Naturally, iTunes is open, and Piers is blasting a mix of Queen, AC/DC, classic rock and hip-hop. Somewhere on the screen there's a Word file, in which Piers is writing an essay for English class. "I usually finish my homework at school," he explains to a visitor, "but if not, I pop a book open on my lap in my room, and while the computer is loading, I'll do a problem or write a sentence. Then, while mail is loading, I do more. I get it done a little bit at a time."

Bronte has the same strategy. "You just multitask," she explains. "My parents always tell me I can't do homework while listening to music, but they don't understand that it helps me concentrate." The twins also multitask when hanging with friends, which has its own etiquette. "When I talk to my best friend Eloy," says Piers, "he'll have one earpiece [of his iPod] in and one out." Says Bronte: "If a friend thinks she's not getting my full attention, I just make it very clear that she is, even though I'm also listening to music."

The Coxes are one of 32 families in the Los Angeles area participating in an intensive, four-year study of modern family life, led by anthropologist Elinor Ochs, director of UCLA's Center on Everyday Lives of Families. While the impact of multitasking gadgets was not her original focus, Ochs found it to be one of the most dramatic areas of change since she conducted a similar study 20 years ago. "I'm not certain how the children can monitor all those things at the same time, but I think it is pretty consequential for the structure of the

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family relationship," says Ochs, whose work on language, interaction and culture earned her a MacArthur "genius" grant.

One of the things Ochs' team of observers looks at is what happens at the end of the workday when parents and kids reunite--and what doesn't happen, as in the case of the Coxes. "We saw that when the working parent comes through the door, the other spouse and the kids are so absorbed by what they're doing that they don't give the arriving parent the time of day," says Ochs. The returning parent, generally the father, was greeted only about a third of the time, usually with a perfunctory "Hi." "About half the time the kids ignored him or didn't stop what they were doing, multitasking and monitoring their various electronic gadgets," she says. "We also saw how difficult it was for parents to penetrate the child's universe. We have so many videotapes of parents actually backing away, retreating from kids who are absorbed by whatever they're doing."

HUMAN BEINGS HAVE ALWAYS HAD A CAPACITY to attend to several things at once. Mothers have done it since the hunter-gatherer era--picking berries while suckling an infant, stirring the pot with one eye on the toddler. Nor is electronic multitasking entirely new: we've been driving while listening to car radios since they became popular in the 1930s. But there is no doubt that the phenomenon has reached a kind of warp speed in the era of Web-enabled computers, when it has become routine to conduct six IM conversations, watch American Idol on TV and Google the names of last season's finalists all at once.

That level of multiprocessing and interpersonal connectivity is now so commonplace that it's easy to forget how quickly it came about. Fifteen years ago, most home computers weren't even linked to the Internet. In 1990 the majority of adolescents responding to a survey done by Donald Roberts, a professor of communication at Stanford, said the one medium they couldn't live without was a radio/CD player. How quaint. In a 2004 follow-up, the computer won hands down.

Today 82% of kids are online by the seventh grade, according to the Pew Internet and American Life Project. And what they love about the computer, of course, is that it offers the radio/CD thing and so much more--games, movies, e-mail, IM, Google, MySpace. The big finding of a 2005 survey of Americans ages 8 to 18 by the Kaiser Family Foundation, co-authored by Roberts, is not that kids were spending a larger chunk of time using electronic media--that was holding steady at 6.5 hours a day (could it possibly get any bigger?)--but that they were packing more media exposure into that time: 8.5 hours' worth, thanks to "media multitasking"--listening to iTunes, watching a DVD and IMing friends all at the same time. Increasingly, the media-hungry members of Generation M, as Kaiser dubbed them, don't just sit down to watch a TV show with their friends or family. From a quarter to a third of them, according to the survey, say they simultaneously absorb some other medium "most of the time" while watching TV, listening to music, using the computer or even while reading.

Parents have watched this phenomenon unfold with a mixture of awe and concern. The Coxes, for instance, are bowled over by their children's technical prowess. Piers repairs the family computers and DVD player. Bronte uses digital technology to compose elaborate photo collages and create a documentary of her father's ongoing treatment for cancer. And, says Georgina, "they both make these fancy PowerPoint presentations about what they want for Christmas." But both parents worry about the ways that kids' compulsive screen time is affecting their schoolwork and squeezing out family life. "We rarely have dinner together anymore," frets Stephen. "Everyone is in their own little world, and we don't get out together to have a social life."

Every generation of adults sees new technology--and the social changes it stirs--as a threat to the rightful order of things: Plato warned (correctly) that reading would be the downfall of oral tradition and memory. And every generation of teenagers embraces the freedoms and possibilities wrought by technology in ways that shock the elders: just think about what the automobile did for dating.

As for multitasking devices, social scientists and educators are just beginning to assess their impact, but the researchers already have some strong opinions. The mental habit of dividing one's attention into many small slices has significant implications for the way young people learn, reason, socialize, do creative work and understand the world. Although such habits may prepare kids for today's frenzied workplace, many cognitive scientists are positively alarmed by the trend. "Kids that are instant messaging while doing homework, playing games online and watching TV, I predict, aren't going to do well in the long run," says Jordan Grafman, chief of the cognitive neuroscience section at the National Institute of Neurological Disorders and Stroke (NINDS). Decades of research (not to mention common sense) indicate that the quality of one's output and depth of thought deteriorate as one attends to ever more tasks. Some are concerned about the disappearance of mental downtime to relax and reflect. Roberts notes Stanford students "can't go the few minutes between their 10 o'clock and 11 o'clock classes without talking on their cell phones. It seems to me that there's almost a discomfort with not being stimulated--a kind of 'I can't stand the silence.'"

Gen M's multitasking habits have social and psychological implications as well. If you're IMing four friends while watching That '70s Show, it's not the same as sitting on the couch with your buddies or your sisters and watching the show together. Or sharing a family meal across a table. Thousands of years of evolution created human physical communication--facial expressions, body language--that puts broadband to shame in its ability to convey meaning and create bonds. What happens, wonders UCLA's Ochs, as we replace side-by-side and eye-to-eye human connections with quick, disembodied e-exchanges? Those are critical issues not just for social scientists but for parents and teachers trying to understand--and do right by--Generation M.

YOUR BRAIN WHEN IT MULTITASKS

ALTHOUGH MANY ASPECTS OF THE networked life remain scientifically uncharted, there's substantial literature on how the brain handles multitasking. And basically, it doesn't. It may seem that a teenage girl is writing an instant message, burning a CD and telling her mother that she's doing homework--all at the same time--but what's really going on is a rapid toggling among tasks rather than simultaneous processing. "You're doing more than one thing, but you're ordering them and deciding which one to do at any one time," explains neuroscientist Grafman.

Then why can we so easily walk down the street while engrossed in a deep conversation? Why can we chop onions while watching Jeopardy? "We, along with quite a few others, have been focused on exactly this question," says Hal Pashler, psychology professor at the University of California at San Diego. It turns out that very automatic actions or what researchers call "highly practiced skills," like walking or chopping an onion, can be easily done while thinking about other things, although the decision to add an extra onion to a recipe or change the direction in which you're walking is another matter. "It seems that action planning--figuring out what I want to say in response to a person's question or which way I want to steer the car--is usually, perhaps invariably, performed sequentially" or one task at a time, says Pashler. On the other hand, producing the actions you've decided on--moving your hand on the steering wheel, speaking the words you've formulated--can be performed "in parallel with planning some other action." Similarly, many aspects of perception--looking, listening, touching--can be performed in parallel with action planning and with movement.

The switching of attention from one task to another, the toggling action, occurs in a region right behind the forehead called Brodmann's Area 10 in the brain's anterior prefrontal cortex, according to a functional magnetic resonance imaging (fMRI) study by Grafman's team. Brodmann's Area 10 is part of the frontal lobes, which "are important for maintaining long-term goals and achieving them," Grafman explains. "The most anterior part allows you to leave something when it's incomplete and return to the same place and continue from there." This gives us a "form of multitasking," he says, though it's actually sequential processing. Because the prefrontal cortex is one of the last regions of the brain to mature and one of the first to decline with aging, young children do not multitask well, and neither do most adults over 60. New fMRI studies at Toronto's Rotman Research Institute suggest that as we get older, we have more trouble "turning down background thoughts when turning to a new task," says Rotman senior scientist and assistant director Cheryl Grady. "Younger adults are better at tuning out stuff when they want to," says Grady. "I'm in my 50s, and I know that I can't work and listen to music with lyrics; it was easier when I was younger."

But the ability to multiprocess has its limits, even among young adults. When people try to perform two or more related tasks either at the same time or alternating rapidly between them, errors go way up, and it takes far longer--often double the time or more--to get the jobs done than if they were done sequentially, says David E. Meyer, director of the Brain, Cognition and Action Laboratory at the University of Michigan: "The toll in terms of slowdown is extremely large--amazingly so." Meyer frequently tests Gen M students in his lab, and he sees no exception for them, despite their "mystique" as master multitaskers. "The bottom line is that you can't simultaneously be thinking about your tax return and reading an essay, just as you can't talk to yourself about two things at once," he says. "If a teenager is trying to have a conversation on an e-mail chat line while doing algebra, she'll suffer a decrease in efficiency, compared to if she just thought about algebra until she was done. People may think otherwise, but it's a myth. With such complicated tasks [you] will never, ever be able to overcome the inherent limitations in the brain for processing information during multitasking. It just can't be, any more than the best of all humans will ever be able to run a one-minute mile."

Other research shows the relationship between stimulation and performance forms a bell curve: a little stimulation--whether it's coffee or a blaring soundtrack--can boost performance, but too much is stressful and causes a fall-off. In addition, the brain needs rest and recovery time to consolidate thoughts and memories. Teenagers who fill every quiet moment with a phone call or some kind of e-stimulation may not be getting that needed reprieve. Habitual multitasking may condition their brain to an overexcited state, making it difficult to focus even when they want to. "People lose the skill and the will to maintain concentration, and they get mental antsiness," says Meyer.

IS THIS ANY WAY TO LEARN?

LONGTIME PROFESSORS AT UNIVERSITIES around the U.S. have noticed that Gen M kids arrive on campus with a different set of cognitive skills and habits than past generations. In lecture halls with wireless Internet access--now more than 40% of college classrooms, according to the Campus Computing Project--the compulsion to multitask can get out of hand. "People are going to lectures by some of the greatest minds, and they are doing their mail," says Sherry Turkle, professor of the social studies of science and technology at M.I.T. In her class, says Turkle, "I tell them this is not a place for e-mail, it's not a place to do online searches and not a place to set up IRC [Internet relay chat] channels in which to comment on the class. It's not going to help if there are parallel discussions about how boring it is. You've got to get people to participate in the world as it is."

Such concerns have, in fact, led a number of schools, including the M.B.A. programs at UCLA and the University of Virginia, to look into blocking Internet access during lectures. "I tell my students not to treat me like TV," says University of Wisconsin professor Aaron Brower, who has been teaching social work for 20 years. "They have to think of me like a real person talking. I want to have them thinking about things we're talking about."

On the positive side, Gen M students tend to be extraordinarily good at finding and manipulating information. And presumably because modern childhood tilts toward visual rather than print media, they are especially skilled at analyzing visual data and images,

observes Claudia Koonz, professor of history at Duke University. A growing number of college professors are using film, audio clips and PowerPoint presentations to play to their students' strengths and capture their evanescent attention. It's a powerful way to teach history, says Koonz. "I love bringing media into the classroom, to be able to go to the website for Edward R. Murrow and hear his voice as he walked with the liberators of Buchenwald." Another adjustment to teaching Generation M: professors are assigning fewer full-length books and more excerpts and articles. (Koonz, however, was stunned when a student matter-of-factly informed her, "We don't read whole books anymore," after Koonz had assigned a 350-page volume. "And this is Duke!" she says.)

Many students make brilliant use of media in their work, embedding audio files and video clips in their presentations, but the habit of grazing among many data streams leaves telltale signs in their writing, according to some educators. "The breadth of their knowledge and their ability to find answers has just burgeoned," says Roberts of his students at Stanford, "but my impression is that their ability to write clear, focused and extended narratives has eroded somewhat." Says Koonz: "What I find is paragraphs that make sense internally, but don't necessarily follow a line of argument."

Koonz and Turkle believe that today's students are less tolerant of ambiguity than the students they taught in the past. "They demand clarity," says Koonz. They want identifiable good guys and bad guys, which she finds problematic in teaching complex topics like Hutu-Tutsi history in Rwanda. She also thinks there are political implications: "Their belief in the simple answer, put together in a visual way, is, I think, dangerous." Koonz thinks this aversion to complexity is directly related to multitasking: "It's as if they have too many windows open on their hard drive. In order to have a taste for sifting through different layers of truth, you have to stay with a topic and pursue it deeply, rather than go across the surface with your toolbar." She tries to encourage her students to find a quiet spot on campus to just think, cell phone off, laptop packed away.

GOT 2 GO. TXT ME L8ER

BUT TURNING DOWN THE NOISE ISN'T EASY. By the time many kids get to college, their devices have become extensions of themselves, indispensable social accessories. "The minute the bell rings at most big public high schools, the first thing most kids do is reach into their bag and pick up their cell phone," observes Denise Clark Pope, lecturer at the Stanford School of Education, "never mind that the person [they're contacting] could be right down the hall."

Parents are mystified by this obsession with e-communication--particularly among younger adolescents who often can't wait to share the most mundane details of life. Dominique Jones, 12, of Los Angeles, likes to IM her friends before school to find out what they plan to wear. "You'll get IMs back that say things like 'Oh, my God, I'm wearing the same shoes!' After school we talk about what happened that day, what outfits we want to wear the next day."

Turkle, author of the recently reissued *The Second Self: Computers and the Human Spirit*, has an explanation for this breathless exchange of inanities. "There's an extraordinary fit between the medium and the moment, a heady, giddy fit in terms of social needs." The online environment, she points out, "is less risky if you are lonely and afraid of intimacy, which is almost a definition of adolescence. Things get too hot, you log off, while in real time and space, you have consequences." Teen venues like MySpace, Xanga and Facebook--and the ways kids can personalize their IM personas--meet another teen need: the desire to experiment with identity. By changing their picture, their "away" message, their icon or list of favorite bands, kids can cycle through different personalities. "Online life is like an identity workshop," says Turkle, "and that's the job of adolescents--to experiment with identity."

All that is probably healthy, provided that parents set limits on where their kids can venture online, teach them to exercise caution and regulate how much time they can spend with electronics in general. The problem is that most parents don't. According to the Kaiser survey, only 23% of seventh- to 12th-graders say their family has rules about computer activity; just 17% say they have restrictions on video-game time.

In the absence of rules, it's all too easy for kids to wander into unwholesome neighborhoods on the Net and get caught up in the compulsive behavior that psychiatrist Edward Hallowell dubs "screen-sucking" in his new book, *CrazyBusy*. Patricia Wallace, a techno-psychologist who directs the Johns Hopkins Center for Talented Youth program, believes part of the allure of e-mail--for adults as well as teens--is similar to that of a slot machine. "You have intermittent, variable reinforcement," she explains. "You are not sure you are going to get a reward every time or how often you will, so you keep pulling that handle. Why else do people get up in the middle of the night to check their e-mail?"

GETTING THEM TO LOG OFF

MANY EDUCATORS AND PSYCHOLOGISTS SAY parents need to actively ensure that their teenagers break free of compulsive engagement with screens and spend time in the physical company of human beings--a growing challenge not just because technology offers such a handy alternative but because so many kids lead highly scheduled lives that leave little time for old-fashioned socializing and family meals. Indeed, many teenagers and college students say overcommitted schedules drive much of their multitasking.

Just as important is for parents and educators to teach kids, preferably by example, that it's valuable, even essential, to occasionally slow down, unplug and take time to think about something for a while. David Levy, a professor at the University of Washington Information School, has found, to his surprise, that his most technophilic undergraduates--those majoring in "informatics"--are genuinely concerned about getting lost in the multitasking blur. In an informal poll of 60 students last semester, he says, the majority expressed concerns

about how plugged-in they were and "the way it takes them away from other activities, including exercise, meals and sleep." Levy's students talked about difficulties concentrating and their efforts to break away, get into the outdoors and inside their head. "Although it wasn't a scientific survey," he says, "it was the first evidence I had that people in this age group are reflecting on these questions."

For all the handwringing about Generation M, technology is not really the problem. "The problem," says Hollowell, "is what you are not doing if the electronic moment grows too large"--too large for the teenager and too large for those parents who are equally tethered to their gadgets. In that case, says Hollowell, "you are not having family dinner, you are not having conversations, you are not debating whether to go out with a boy who wants to have sex on the first date, you are not going on a family ski trip or taking time just to veg. It's not so much that the video game is going to rot your brain, it's what you are not doing that's going to rot your life."

Generation M has a lot to teach parents and teachers about what new technology can do. But it's up to grownups to show them what it can't do, and that there's life beyond the screen.

—With reporting by Sonja Steptoe/Los Angeles, Sarah Sturmon Dale/Minneapolis, With reporting by Wendy Cole/Chicago

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