

● YOU know the kind of day. You set time aside to finish a report only to be constantly interrupted by crises in the office, whining colleagues, calls from family, gossip at the coffee machine and saucy emails. You end up writing the thing at home, after the kids are asleep.

For more and more people, every day feels like this – one long string of interruptions with only the gaps in between to get anything done. However bad you think it is it's probably worse. When researchers at the University of California, Irvine set out to quantify the problem, they figured people were probably overreacting, that we probably got in a good quarter-hour or so between disruptions. But after shadowing a dozen information workers for three days, they found that on average, they got just three sustained minutes of work in before being diverted. "I was shocked," says Gloria Mark, who ran the study.

It wasn't always like this. In the good old days, if somebody didn't have the chutzpah to walk over and disturb you in person, they pretty much had to rely on the telephone or the post. Now your friends and colleagues think nothing of emailing, texting, leaving voicemail and trying your mobile, and if you don't respond instantaneously to any of these, they pop by to see what's wrong. Out of touch is out of the question.

This "always on" culture is taking its toll. A survey by US information technology research firm Basex earlier this year found that interruptions take up over two hours of the working day. Even work-related interruptions disrupt your flow, and that, they estimated, costs the US economy \$588 billion a year – 6.5 times as much as the estimated cost of back pain, according to a 2004 study at Duke University in Durham, North Carolina. Last year, Glenn Wilson at the Institute of Psychiatry in London found that being bombarded with emails and phone calls has a greater effect on IQ than smoking marijuana (*New Scientist*, 30 April 2005, p 6).

Edward Hallowell, a psychiatrist based in Sudbury, Massachusetts, has seen the signs. He treats patients with attention deficit

Got a minute?

Office life can sometimes seem like a constant stream of calls, alerts and interruptions. Can technology save the working day, asks **Alison Motluk**

disorder, and says that over the last few years he has seen an increase in people claiming to have "developed" the disorder in adulthood. Patients complain that they are distracted, forgetful, disorganised and impulsive – and they can't get anything done. But for many of them the symptoms mysteriously disappear when they are on holiday.

The problem, he soon realised, was their work environment, and their lack of control over their own interruptions. "Technology used properly is a blessing, but when used wrong, it's downright destructive," says

Hallowell, who has just written a book on the subject, *CrazyBusy*.

So how do we improve the situation? As anyone working in an office knows, interruptions are often necessary: we need to discuss projects with our colleagues, take important phone calls and so on, and we need breaks. But now that there are more ways to be interrupted, it is even more difficult to keep the day under our control.

Technology may be at the root of all this, but some researchers believe it's the solution too. Put your ear to the ground and you'll hear them talking whimsically of computers that are more "understanding" and "empathetic". The systems of the future, they say, will take the time to really get to know us, to understand what's important to us, who our friends and associates are, so that it can decide whether this call should be put through or that email be given priority.

They'll recognise when we can handle being disturbed and when we want to be left alone. They will apologise when they get it wrong. Our lives will cease to be a cacophony of beeps, buzzes and rings. Instead our interruptions will be perfectly orchestrated thanks to our perfectly intuitive, round-the-clock techno-assistants. Or that's the idea.

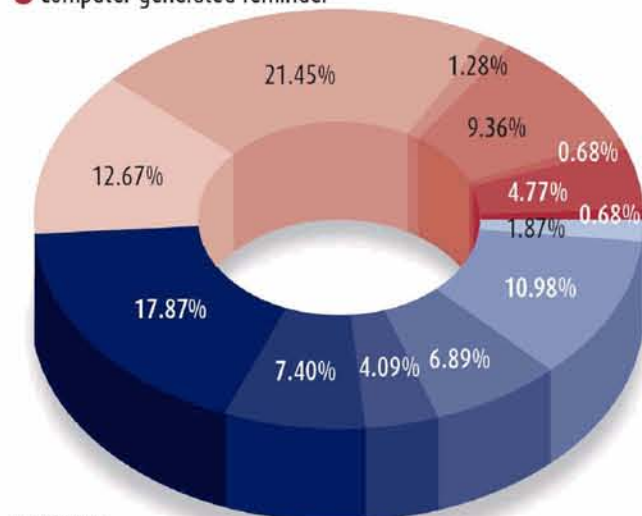
The first job for our cyber-secretaries will be to deliver us from temptation. After all, we do want most of our interruptions, we just don't want them all now, and as any compulsive email checker knows, we aren't always that good at deciding what is urgent

DIVIDED ATTENTION

Average number and types of interruptions per day in a group of IT workers

EXTERNAL

- New email notification
- Person arrives
- Checking for business updates
- Phone rings
- Voice message light
- Call from person at another desk
- Computer generated reminder



INTERNAL

- Checking/using paper documents
- Checking/using computer
- Talking
- Phone call
- Email use
- Leaving desk

SOURCE: VICTOR M. GONZÁLEZ AND GLORIA MARK



and what can wait. Mark's research backed this up: about half of all interruptions are self-generated (see Graphic).

Virtual manners

Several years ago Microsoft set about designing a system called "Priorities" that could analyse each interruption for salience and urgency on your behalf. It works much like the way a doctor uses a "triage" system to decide how urgently a patient needs care. After you train it up, Priorities examines each incoming email or call to see who it is from,

what your relationship to the sender is, whether you share any projects, and so on. It scans for evidence of urgency – whether the email mentions a date, a time, or an impending meeting. It also looks for keywords that you have indicated are relevant to you, then it assigns a score.

"It works extremely well at discriminating urgent from non-urgent," says Eric Horvitz, a senior researcher at Microsoft in Redmond, Washington. He and others use it not only to prioritise messages in the office, but also to decide which ones are so important they need to be sent via his cellphone no matter where

he is. It's better than a live secretary, he says. "It knows so much about me."

It only occurred to me after a few minutes of banter with Horvitz that I too had come under the cold scrutiny of Priorities, and had been scored. As the interrupter, I was curious to know how I had fared. My initial email had received just 65 out of 100, with a 20 per cent chance of being junk, Horvitz told me – "not bad", he said, for someone who didn't work at Microsoft and with whom he had never exchanged emails before. To console me, Horvitz confided that even Bill Gates gets low scores – not because his emails aren't ►

“What your mother taught you was correct – don’t interrupt when someone is talking”

important, but because they are usually more meditative than urgent.

It looks like assessing the value of a communication is the easy part. What’s harder is figuring out when a person is in the right frame of mind to receive it. Predicting an individual’s interruptability has become the focus of a great deal of study. Mark found that employees in open plan cubicled offices, who could hear and see their co-workers, interrupted each other less, and in less annoying ways than employees who had their own offices. Although the open-space folks interrupted more often, they did so at more appropriate junctures. Can computers be trained to give us the best of both worlds?

Listening in

The key could lie in predicting a person’s interruptability. Scott Hudson at Carnegie Mellon University in Pittsburgh, Pennsylvania has tried to figure this out by painstakingly measuring everything from the number of people in an office, to whether a person was typing at their keyboard and whether a door was open or shut, and asking people to estimate the cost of an interruption. After placing microphones and sensors around the office and interrupting at different times, he was surprised to find that the most important single factor in their interruptability is whether or not someone is talking.

If they were, he discovered, there was a 76 per cent chance they didn’t want to be interrupted. That’s about as good as human observers, he points out, who on average guess with only 77 per cent accuracy that a person doesn’t want to be disturbed. “What your mother taught you was correct,” he says. “Don’t interrupt when someone is talking.” Adding several more sensors – on the phone, keyboard and mouse, for instance – bumped up accuracy to 82.4 per cent.

Still, getting it wrong every fourth or fifth time isn’t quite good enough. And, as Hudson points out, people have different jobs, not to mention different dispositions.

For a manager, talking might mean hard work, but for a procrastinating writer, it might mean break time. A computer will need to be taught what you’re like, how you work and what signals availability for you.

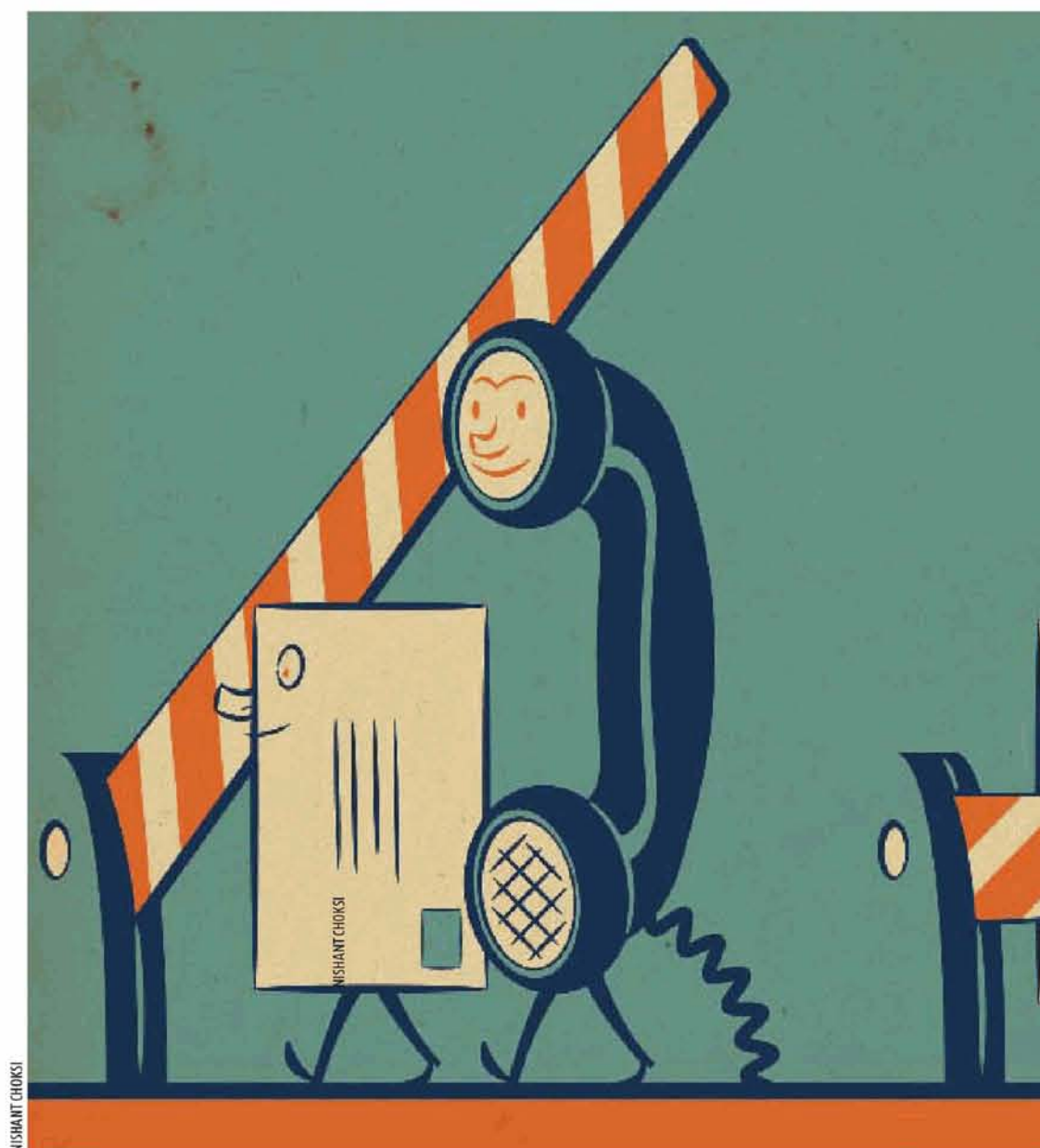
This too is a pet research area for Microsoft. Some years ago, they ran an “interruption workbench”, which filmed people over their shoulders as they worked and were interrupted. At the end of the day, the volunteers had to indicate how irritating or acceptable each interruption in their day had been – and to assign it a dollar value.

That led to something they call BusyBody. It’s a device that lives up to its name: not only does it paw through your calendar and eavesdrop on your office, it spies on you too, taking note of things like head position and

activity level. Then it pools the information to help decide whether you are in a state to receive any non-urgent communications.

Put BusyBody side by side with Priorities, as is the case in a prototype dubbed Bestcom, and you have a system that is able to weigh the benefits of keeping you informed against the cost of interrupting you. During a telephone conversation I had with Horvitz, for instance, the system held back all emails and diverted two calls. Presumably none of them were deemed more urgent than I was.

On another day, when I called at a pre-arranged time, only to get an answering machine, an email arrived from Horvitz a few minutes later saying his system had informed him that I called but his meeting had run over; could he call me in 10 minutes? Had I been a



Saving the day

Tips for surfing the wave of interruptions: -

- Get a bigger monitor. A Microsoft study found it helped people work up to 44 per cent faster – one of the biggest boosts to productivity yet.
- Put up a clear “do not disturb” sign, or an obvious signal that you are busy. Insist that your colleagues respect it.
- Rearrange your office furniture so your desk faces away from the flow of people, so no one can catch your eye.
- Always stand up to talk to someone who is

interrupting you, so they know what they’re doing.

- Put a big clock in plain view of visitors and check it while you are talking.
- Be prepared: if an interruption is likely to take longer than 2 minutes, add it to your to-do list and go back to what you were already doing.
- Keep a notebook open and write down what you are doing as soon as you are interrupted.
- Cutting 2 centimetres off the front legs of a chair makes it just uncomfortable enough to keep visits short.



Microsoft employee, that option would have been presented to me on screen, even as the phone was ringing. It would have checked his calendar and offered me alternative times to ring back. "We found that if we just deferred callers for a few minutes, there was a lower cost of interruption," says Horvitz. That cost, of course, is shifted back to the caller, who has to interrupt whatever they are doing at the new time and try again. Unless, that is, you're his wife, Bill Gates, or a handful of others with "breakthrough" privileges.

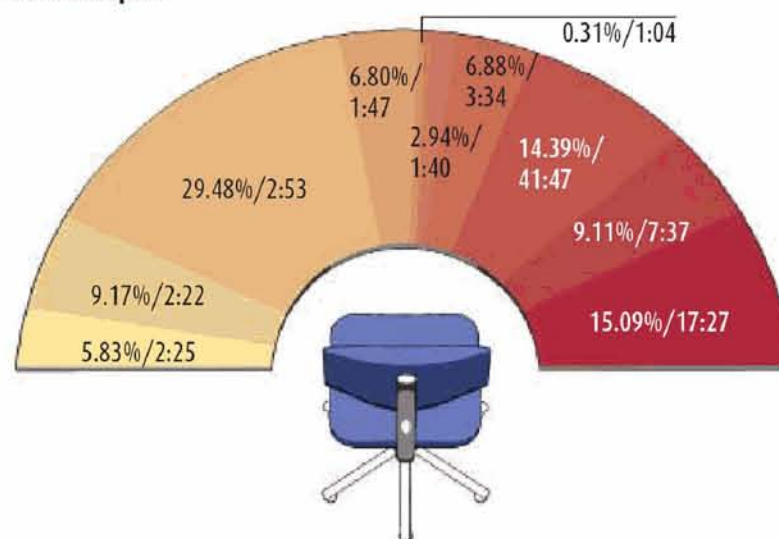
There are other potential costs, for instance, to privacy. Of course the good boss won't use the information a computer collects about a person's work habits to decide who gets the axe and who the raise, he or she won't listen in on your conversations or blame you for claiming to be uninterruptible when you're really surfing the net for a new pair of shoes, but can you be sure the information stays private? What's more, as "Clippy", Microsoft's erstwhile animated office assistant demonstrated, there are few things more likely to annoy busy people than a computer that thinks it's really helpful – no one wants a computer that tuts and shakes its head every time it catches you napping.

No matter how good the training, computers will always make some mistakes, says Rosalind Picard at the MIT Media Lab in Boston. One possible way to get over the irritation factor, she says, is to make the system more considerate. "People interrupt

THE DISTRACTED WORKER

How the working day breaks down by percentage and time interruption

- Using phone
- Using email
- Using PC
- Paper documents/books
- Using other tools
- Talking to people at other desks
- Interacting with people at your desk
- Formal meetings
- Going to other workspaces
- Other (unknown, personal)



SOURCE: VICTOR M. GONZÁLEZ AND GLORIA MARK

you at the wrong time a lot," says Picard. "The ones who keep their jobs are the ones who say 'I'm sorry', who take a second to be empathetic" A computer can do this too.

Picard tested two systems designed to interrupt people between one and 60 times a day to ask about their stress level and interruptability. One was merely polite. The other was polite, but it also showed concern for the person being intruded upon, and apologised if it was a bad time. When people with "caring" computers were later asked how often they had been interrupted that day, they significantly underestimated the number. Those who had been spared the faux emotion were more accurate. "We want [computers] to be willing to make mistakes, and to recover from them. We want them to be able to say they're sorry," says Picard.

But even the best-timed interruption, even the one abjectly apologised for, will disrupt

One thing that would help, she thinks, would be if others could somehow know what project you are working on at any given time. "Broadcast to colleagues what the working sphere is," she says. That way, they'd be able to better estimate the cost of an interruption.

There's no doubt that handing over just a little control to the machines could make our lives that bit easier. But just as the answer machine revolution was followed by the counter-revolt of "telephone tag" – leaving several messages for each other but never actually talking – no doubt we will find downsides to these technologies too. Hallowell thinks that in the end the solution comes down to us, and whether we can use technology wisely. "We haven't learned to master it – it has mastered us," he says. "We need a new etiquette."

Ramona Creel, a professional organiser for people's home and work lives, agrees.

"There are few things more likely to annoy busy people than a computer that thinks it's really helpful"

our flow, which in turn will affect productivity. It's not simply that interruptions steal time away from other projects, they also make it hard to get back to what you were doing in the first place – if you can even remember what it was. According to Mark, only 77 per cent of interrupted work is resumed the same day. Even when you do manage to pick up where you left off, typically it takes an average of 25 minutes and two intervening tasks before you do. Can technology help with this too?

Mark thinks it can. People tend to have what she calls "working spheres", or discrete projects that may use several applications at once. She found that interruptions were not nearly as bad if they were related to the project a person was already working on. However, being forced to leave one working sphere and enter another was highly disruptive.

Her clients know there's a problem, but they want to blame something tangible, like a filing system. "I think it's mental," she says. "You have to respect your time before others will."

You have to have the backbone to be honest with people, she says: tell them you really don't have a minute if you don't. Take a lesson from Picard's computers, and apologise while you're saying it. And like Horvitz's Bestcom, you can offer to schedule a meeting for another time, or have regular times each day when you have an open-door policy. If you are interrupted, take a moment to note where you left off, so you have less trouble getting back on track. Finally – and this will be painful – have the guts to turn off your email, phone and instant messenger until the job is done. ●

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