

Why we are all creatures of habit

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WE HUMANS suffer from an advanced case of self-delusion, according to Alex Pentland. We like to see ourselves as free-willed, conscious beings, self-governing and set apart from other animals by our capacity for reasoning. Yet watch people closely, says Pentland, and you find that we are more instinctual and a lot more like other creatures than we care to think.

At the Media Lab of the Massachusetts Institute of Technology, Pentland and his colleagues are doing just that. By fitting custom-made electronic "black boxes" to students, researchers and visiting executives at MIT, they can monitor people going about their day - working, meeting, eating, going out and sleeping. The devices record where the wearers go and how fast, their tone of voice, and subtle details about their body language. What they have revealed is that a good 90 per cent of what most people do in any day follows routines so complete that their behaviour can be predicted with just a few mathematical equations.



These findings are part of a quiet explosion of psychological work that is casting human behaviour in a weirdly mechanical light. "It's difficult for people to accept," says psychologist John Bargh of Yale University, "but most of a person's everyday life is determined not by their conscious intentions and deliberate choices, but by mental processes put into motion by the environment."

In other words, most of the time we are simply reacting instinctively to the world around us. This may sound disheartening if you see yourself as rational master of your destiny, but breaking down this illusion could be the key to bringing the science of human behaviour back in line with other studies of animal behaviour.

Over the past decade, one key insight that has emerged in psychology is that seemingly irrelevant details within a person's environment can strongly influence their behaviour. In one experiment, [Bargh and his team](#) asked volunteers at their lab to work through questionnaires, the hidden purpose of which was to "prime" some of them to words associated with old age, such as "Florida", "sentimental" and "wrinkle". The real test started as the participants left to go home, when the researchers secretly timed how long it took them to walk down a long corridor while leaving the building. Those volunteers who had been primed walked significantly more slowly than those who had not, as if the elderly stereotype had got into their very being.

In a similar experiment at the University of Amsterdam in the Netherlands, psychologist Ap Dijksterhuis asked two separate groups of volunteers to talk with actors who pretended to be either professors or soccer hooligans. Afterwards the subjects had to answer a series of general-knowledge questions, and the people who had been primed by interacting with "professors" did significantly better than those primed by "hooligans". It was as though being in the presence of supposed intellectuals had rubbed off on them.

The striking thing about both these experiments is that the people involved were totally unaware of what had influenced them.

Other studies suggest that our social interactions too may reflect unconscious influences far more than we suspect. In a classic experiment from the early 1990s, for example, psychologists Nalini Ambady of Harvard University and Robert Rosenthal from the University of California, Riverside, explored how college students evaluate their teachers. Students commonly fill out questionnaires at the end of the year to rate their lecturers, giving apparently logical reasons for their high or low marks. They might mention the clarity of the lectures or the confusion of the overall lesson plan, for example. Ambady and Rosenthal compared ratings made by students who had participated in a full course with others made by students who judged the same instructors solely on the basis of 30-second video clips, with

the sound turned off. Incredibly, both groups gave almost the same marks.

It appears that although we think we are reasoning out our decisions and choosing our actions deliberately, we may often just be responding more or less automatically to cues in our environment. Only afterwards do we make up reasons to explain what we did. According to psychologist Robert Provine of the University of Maryland in Baltimore, all the available evidence suggests that this should be the starting assumption in psychology. "Until proven otherwise," he says, "we should assume that consciousness doesn't play a role in human behaviour. This is the conservative position that makes the fewest assumptions."

If that is the case, then behavioural scientists had better start learning how to bring the hidden world of non-conscious influences out into the light - which is precisely what Pentland hopes to do with his electronic sensors. His approach is to toss aside all preconceptions about how conscious thoughts and verbal communications control what we do. "We should gather data and examine it like a biologist," he says, before deciding how best to explain human actions.

Researchers studying apes and other animals typically start from the idea that animals' actions follow mechanically and automatically from their instincts alone. In contrast, psychologists tend to view people as mostly self-aware individuals acting on conscious thoughts. Pentland's idea is that if we can explain and even predict much of what people do without ever referring to their words or conscious thoughts, then maybe those aren't as important as we usually believe. It is a radical thesis, but one for which his sensors provide strong support.

He and his colleagues began designing the devices six years ago, and have created unobtrusive, wearable sensors, all approximately the size of a cigarette packet. Built either from scratch, or by modifying commercial mobile phones, they use signals from cellphone base stations or global positioning satellites to track a person's location to within 2 metres. They also carry an accelerometer that monitors even small movements of the upper body, and a microphone to record various aspects of speech, including loudness, tone and speed of delivery. The information is downloaded to the team's computers at regular intervals to let them scrutinise it for any significant patterns. Over numerous experiments they have followed hundreds of people wearing the sensors for weeks or months, on the MIT campus, in hospitals and in business organisations.

In one study, Pentland's team monitored people attending a business conference and tried to predict who would exchange business cards. You might expect that this would require some knowledge of what information delegates exchanged, to see if they discovered some common interest. After all, people - especially business people - talk, listen and weigh things up before they decide to establish a contact. However, the researchers instead found they could predict business-card exchanges with 80 per cent accuracy just by looking for a particular "social signal". The key signal in this case was what they dubbed "excitement", which involves a brief burst of small body movements coupled with pronounced modulation of both volume and pitch of speech. "They act like a kid who's excited and bouncing around," says Pentland.

Look, no words!

The team also identified another signal, "freeze", which is almost the opposite of "excitement", involving a sudden lull in activity, without much movement or talking. In this case the sensor readings for people passing a presentation booth showed that 75 per cent of those showing the "freeze" signal went on to approach the booth for further information.

By ignoring words and thoughts and focusing on social signals alone, the group's predictions have reached an unnerving level of accuracy in some cases. For example, in a study at the offices of Vertex in Inverness, UK, one of the world's largest call centre companies, Pentland and colleagues were able to predict with 87 per cent accuracy whether an operator's phone call would result in a sale, just from a few seconds of the recorded voice. Even though only about half the calls overall ended in sales, operators who spoke invitingly, with lots of variation of tone and volume, were almost always successful, regardless of what they said. It seems that even in economic transactions involving real money, what you say matters less than how you say it.

More disconcerting yet, in studies of people in head-to-head business negotiations over 45 minutes, the researchers found that the sensors could predict with 80 per cent accuracy who would come out on top solely by observing body movements and tone of voice, and then for only a few seconds. One key social signal in this case was "mirroring", where people unconsciously mimic the gestures and movements of a conversational partner, which shows empathy and understanding. Those who mirrored most, tended to be most successful. Also important was "engagement", which involves talking more and controlling the pace of a conversation. These signals alone seemed to drive the outcome, while the "reasons" people gave later for what happened - often citing strategy and tactics - seemed unnecessary to explain the outcome.

If these were findings from apes or other animals, Pentland argues, they would hardly raise an eyebrow. After all, everyone "knows" that animals don't think too much, and generally act on instinct. So maybe the same is true of ourselves. "The data support the view that a lot of human behaviour is

largely automatic and determined by instincts alone," says Pentland. Dijksterhuis agrees. "Almost everything we do is automatic," he says. "I'm more and more inclined to draw the conclusion that consciousness is a pretty unimportant thing." Provine goes even further. He suspects we only think we act consciously because our inner voice is so skilled at making up seemingly reasonable narratives and explanations of our unconsciously generated behaviour.

Others think such interpretations go too far. They argue that we clearly are capable of conscious thought and that our mental capabilities undoubtedly exceed those of other animals: no ape is ever likely to reproduce the reasoning that led Einstein to the theory of relativity, or even the mundane calculations that we all do every day, such as when we compare products or plan our finances.

Just because a person's behaviour can be predicted fairly well from a few simple signals, it doesn't necessarily follow that the accompanying conscious thoughts are unimportant, says psychologist David Shanks of University College London. What's more, even if we do learn quite a lot about each other from non-verbal cues, we may still use these to make conscious judgements about one another. Language and reasoning may be what take us from 80 per cent accuracy at predicting what others do up to something closer to 100 per cent, suggests Shanks.

Nevertheless, Pentland and others maintain it is still astonishing that 80 per cent of behaviour seems to be determined by mental processes that are simpler and more automatic than we ordinarily think. And if unconscious decision-making and behaviour is a lot more important than psychologists and social scientists have traditionally suspected, it raises the deeper question of what this "instinctual" form of thinking does for us, and how it might complement conscious thought.

One obvious possibility is that automatic behaviour reflects how our brains have evolved to deal efficiently with tasks we meet repeatedly. As Bargh points out, our brains routinely push the control of some activities from conscious to non-conscious, such as when we learn to play a musical instrument, touch-type or drive a car. "It would be impossible to function effectively," he says, "if you had to deal with all aspects of life with conscious, controlled mental processes." What's intriguing, however, is that this automatic control seems to reach beyond mere habit, influencing important matters such as economic decisions and our dealings with others. Perhaps, Dijksterhuis suggests, this is because unconscious, automatic thinking is sometimes more effective than conscious thought.

For example, in experiments published last year (*Science*, vol 311, p 1005), he and colleagues asked volunteers to choose between several objects. Some people were allowed time to carefully deliberate about which they would prefer, while others had to go on gut instinct. The researchers also varied the difficulty of the choices. Some were relatively easy, with the objects - oven mitts or toothpaste - differing in only one or two attributes. Others were much more difficult, such as a choice between cars or houses that differed in many aspects. In the simpler tasks, people acting consciously made better decisions, but for more complex choices, acting on instinct proved most successful. The reason, Dijksterhuis suspects, is that conscious thinking cannot cope with evaluating many elements at once, whereas unconscious thinking is more holistic and can. "During unconscious thought," he says, "people can integrate lots of information together to make an overall judgement."

If unconscious thinking comes into its own whenever we face information overload, it is hardly surprising that we use it so much in our complex social interactions. In fact, this may be its most important sphere of influence. The power and benefits of responding instinctively to our social environment are especially clear if you consider any tight-knit group of individuals, from the musicians in a jazz quartet to soldiers spending months in close quarters. Nobody is surprised that you can predict the behaviour of these people from that of their associates, notes Pentland. "They are so focused on the group's overall performance, and so sensitive to exactly complementing the others in the group that they almost cease to be an individual at all."

Looked at like that, perhaps the best way to understand human behaviour is to ignore the supposedly rational, consciously generated actions of individuals. "It may be that important parts of our personal thinking are actually caused by the social network we're in - triggered by unconscious and automatic signalling and imitation," Pentland says. If so, then we are certainly not the rational wizards we once thought. Possibly, we are not really individuals at all.

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