

PSYCHOLOGY

The Unseen Mind

Timothy D. Wilson and Yoav Bar-Anan

Can people think they are undecided about a political issue after they have already made up their minds? The study by Galdi *et al.*, on page 1100 in this issue (1), suggests that they can, which raises intriguing questions about how well people know their own minds. The short answer, based on research in social psychology, is not very well.

Social psychologists have discovered an adaptive unconscious that allows people to size up the world extremely quickly, make decisions, and set goals—all while their conscious minds are otherwise occupied. The human mind operates largely out of view of its owners, possibly because that's the way it evolved to work initially, and because that's the way it works best, under many circumstances. Without such an efficient, powerful, and fast means of understanding and acting on the world, it would be difficult to survive. We would be stuck pondering every little decision, such as whether to put our left or right foot forward first, as the world sped by (2–7). But as a result, we are often strangers to ourselves, unable to observe directly the workings of our own minds.

One way we know this is from computer-based measures that assess implicit attitudes and traits, such as the one used by Galdi *et al.* to measure people's automatic associations to a political issue. Typically, people perform a simple cognitive task (usually sorting words into groups), and their accuracy and speed of performance provide information about the associative strength between the different concepts used in the task. Automatic attitudes are measured by comparing people's associations between the attitude object and words with positive versus negative meaning. A common finding, using such implicit measures, is that people's automatic responses correspond poorly to their self-reported attitudes (8–10). For example, Galdi *et al.* found that the correlation between people's automatic

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Confabulation. As in this drawing by Saul Steinberg, people construct images of themselves. In real life, people do not realize that their self-knowledge is a construction, and fail to recognize that they possess a vast adaptive unconscious that operates out of their conscious awareness.

associations and reported attitudes about a political issue were low and mostly nonsignificant. To be sure, there are many interpretations of such a lack of correspondence. Some argue that low correlations between automatic responses and self-reports reflect attempts to hide one's attitudes and not a lack of awareness of them (11). But there is widespread agreement that people lack access to a broad range of mental processes, and that attitudes can affect people's behavior (such as voting) without their awareness.

Curiously, people seem to be unaware of their own unawareness, rarely answering "I don't know" when asked to explain their decisions. People freely give reasons for their preferences, even when it is clear that these reasons are confabulations and not accurate reports. In one study, for example, researchers showed participants photographs of two women and asked them to choose the one they found more attractive (12). The experimenter then showed people the photograph they preferred and asked them to explain the reasons for their choice. On some trials, through

The human mind operates largely out of view, and yet people are unaware of their unawareness, confabulating reasons for their actions and preferences.

sleight of hand, the experimenter actually showed people the photograph they found less attractive. It might seem that people would immediately see through this ruse, but surprisingly, they noticed the switch only about a quarter of the time. Even more surprisingly, in the 75% of the trials in which they did not notice the switch, participants had no problem coming up with plausible reasons for their choice. One participant, for example, said, "She's radiant. I would rather have approached her in a bar than the other one. I like earrings"—even though he initially found the other woman, who wasn't wearing earrings, more attractive. Perhaps most tellingly, the researchers could not find any differences in the kinds of reasons people gave for their real versus their false choices, suggesting that people were confabulating reasons in both cases.

Other studies have also found that people confabulate when asked to explain the reasons for their preferences (2, 13, 14), a message that has not been heeded by political pollsters. Exit polling, in which voters leaving the polling booth are asked about their voting decisions, is common in the United States and elsewhere, not only as a means of predicting the outcome of an election, but also as a way of uncovering why people voted the way they did. In the recent presidential primaries in the United States, for example, voters were asked which qualities of the candidates were most important when deciding how to vote (for example, "has the right experience" versus "has the best chance to win [the presidency] in November"), as well as to rate how much the candidates' campaign ads influenced their decision. Political operatives and pundits pore over the answers to questions such as these to try to gain insights about why people voted the way they did. But to social psychologists and academic political scientists, people's answers are highly suspect. Voters explain their reasons by relying on cultural and idiosyncratic causal theories that may bear little relation to the real reason for their preferences (2, 3, 15). The Galdi *et al.*

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study suggests that pollsters should be equally skeptical of voters who say they are undecided, because they may have already made up their minds at an implicit level.

Why are people so unaware of their unawareness? One reason may be because we do have access to a good deal of information that is immediate, compelling, and privileged. The fact that we experience a rich mental life makes it hard to recognize that the vast majority of our mental processes are not directly observable. As an analogy, one of us was recently driving on a California coast highway when he saw a sign indicating that a nearby beach was a haven for elephant seals. He and his wife stopped and saw five gigantic seals sunbathing on the beach, and after observing them for a few minutes they turned to go, satisfied that they had had the prototypical elephant seal experience. It was only when they looked down the beach that they realized that they had gone to the wrong overlook—a mere 50 yards away there were hundreds of seals

sleeping, playing, and snuggling. Unfortunately, when it comes to human introspection, there is no overlook from which one can see the vast contents of the adaptive unconscious. We are left with the illusion that the few “elephant seals” we can see—the feelings and thoughts that are conscious—are the entirety of our mental life.

Research psychology is helping to dispel this illusion. Studies such as that by Galdi *et al.* are documenting how the adaptive unconscious works and people’s limited introspective access to it. As these studies become more widely known, people might realize that there are many more elephant seals than the few they can observe directly—that is, that their conscious thoughts and feelings are but a small part of the workings of their minds. And, political pollsters might learn that there are some questions better left unasked.

References and Notes

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ASTRONOMY

Stars in the Making

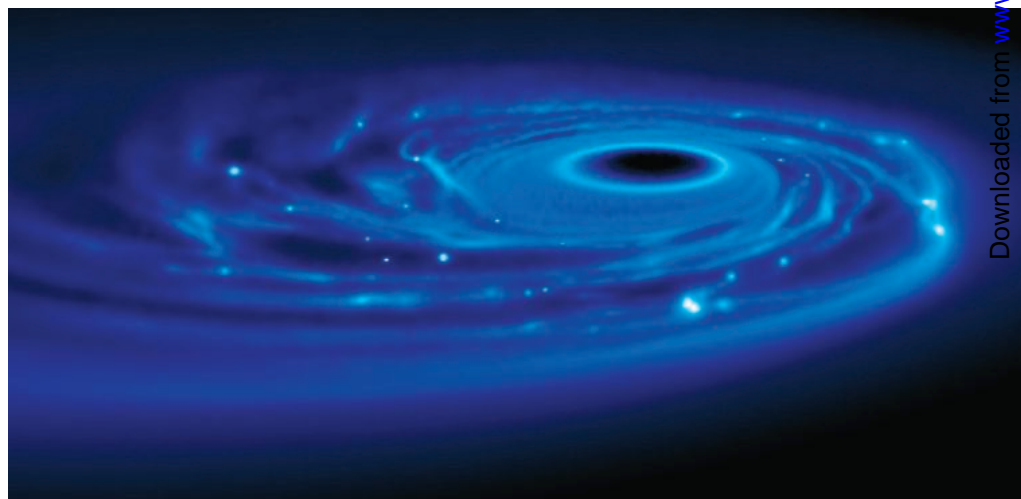
Philip J. Armitage

One of the remarkable properties of star formation is its apparent universality. Although stars form with masses that span three orders of magnitude, the distribution of masses among a population of newly formed stars—the initial mass function (IMF)—is the same across many different environments within the Milky Way. Theorists believe that this universality breaks down in extreme conditions, for example, when the first stars formed from the metal-free gas of the Big Bang. Observational tests of that theory, however, are lacking. Hence the excitement surrounding the suggestion, bolstered by simulations reported by Bonnell and Rice on page 1060 of this issue (*1*), that a new mode of star formation may be needed to explain stars observed in the immediate vicinity of the supermassive black hole at our own galactic center.

First of all, it is surprising to find any star formation close to a massive black hole. Stars customarily form from tenuous clouds of molecular gas, which would be ripped apart by the tidal gravitational field of the black hole out to a distance of several light-years.

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The observation of stars close to the galactic center requires a rethink of the star formation process.



Unexpected stars. Computer simulation (*15*) of star formation from an eccentric gas disk around a supermassive black hole.

Observations of the galactic center, however, reveal two populations of massive stars whose short lifetimes mean that they must have formed relatively recently. Within this expected disruptive zone and closest (within a light-month) to the black hole are the S-stars, with orbital periods as short as a decade (*2, 3*). Long-term monitoring of these stars’ orbits has been used to measure the black

hole mass, and higher precision should ultimately reveal departures from Newtonian orbits due to the effects of relativity and the predicted presence of a cluster of as-yet-unobserved stellar-mass black holes. Slightly farther out—but still within the zone where ordinary star formation is inhibited—is a second population of around 100 massive stars that formed just 6 million years ago. Many of