SELF-DECEPTION

Findings from psychology support common experience in telling us that self-deception—active misrepresentation of reality to the conscious mind—is an everyday human occurrence. At the level of both individuals and societies, this tendency can help produce major disasters (e.g., in aviation and misguided wars—see Trivers and Newton, 1982; Wrangham, 1999; Feynman, 1988). Since we know that selection *can* fine-tune organisms to assess their circumstances accurately, and since the potential costs of misrepresentation can be so great, the question naturally arises: What evolutionary forces *favor* self-deception?

Benefits for deceiving others may be the key. Thirty years ago, Trivers noted that self-deception can make hiding the truth from others easier and more effective. In our own species, we recognize that shifty eyes, sweaty palms, and croaky voices may indicate the stress that accompanies conscious knowledge of attempted deception. By becoming unconscious of the deception, the deceiver hides these signs from the observer. He or she can lie without the nervousness that accompanies conscious deception.

Self-deception also allows us to be unconscious of ongoing motivation. We may experience a conscious stream of thoughts that act, in part, as rationalizations for what we are doing so that we may more effectively conceal the true motivation from others. When actions are challenged, a convincing alternative explanation is then at once available, complete with an internal scenario: "But I wasn't thinking that at all, I was thinking . . . ."

One major arena of self-deception is self-promotion—exaggeration of our status or abilities on the positive side, denial on the negative. If you ask high school seniors in the United States to rank themselves on leadership ability, fully 80 percent say they have better than average abilities. Professors are even more adept at self-deception—an almost unanimous 94 percent rate themselves as being in the top half of the profession! Some tricks of the trade are biased memory, biased compu-

tation, and changing from active to passive voice when changing from describing positive to negative outcomes.

People often deceive themselves about their role in social relationships. Husband and wife, for example, may agree that one party is a long-suffering altruist while the other is hopelessly selfish, but they may disagree over which is which. These may be thought of as biased social theories—theories that, through biased use of facts and logic, give ourselves a preferred position. We have social theories regarding all of our relationships, including employer–employee and the structure of our larger society (for example, is it fair regarding people such as ourselves?).

There is probably an intrinsic benefit in keeping a more optimistic view of the future than facts would seem to justify. It has been known for some time that depressed individuals tend not to go in for the routine kinds of self-inflation that we described earlier. This is sometimes interpreted to mean that we would all be depressed if we viewed reality accurately, but some researchers have suggested that the depressed state may be a time of personal reevaluation, where self-inflation would serve no useful purpose. Life is intrinsically future-oriented, and mental operations that keep a positive future orientation at the forefront appear to result in better future outcomes. The existence of the placebo effect may be another example of this principle.

Because it must be advantageous for the truth to be registered somewhere, mechanisms of self-deception presumably reside side by side with mechanisms for the correct apprehension of reality. This was demonstrated in an elegant experiment by Gur and Sackeim (1979). Their experiment was based on the fact that humans respond physiologically upon hearing a human voice, as measured, for example, by a jump in the galvanic skin response (GSR), but the person responds more intensely upon hearing his or her own voice than the voice of another. A measure of GSR in response to various recorded voices, therefore, can be used as a measure of unconscious self-recognition.

People tested for self-recognition in this way fell into four categories: some made no mistakes; some denied their own voice some of the time; some projected their own voice some of the time; and some people made both kinds of errors. When the skin response was tallied for all these verbal errors, a striking pattern emerged: in almost all cases, the skin knew better. People who verbally claimed that the voice was not their own (deniers) showed the high GSR typical of self-recognition. Those who claimed that another's voice was their own (projectors) showed the smaller jump in GSR typical of hearing another person's voice. Deniers showed the greatest change in GSR of the four groups; presumably, denial of significant features of reality requires hyperarousal, whereas projection of reality is a more relaxed enterprise. Gur and Sackeim also showed that denial and projection were motivated in a logical fashion: people who were made to feel bad about themselves started denying their own voices, while those made to feel better about themselves started projecting their voices.

If the verbal reports of Gur and Sackeim's subjects reflect their conscious beliefs rather than an intent to deceive the experimenter (an assumption that seems likely but cannot be proven), this experiment suggests the following three attributes of self-deception. (1) True and false information is simultaneously stored in a single person. (2) The false information is stored in the conscious mind while the true information is unconscious. (3) Self-deception is often motivated with reference to others.

Although the neurological bases of self-deception are not well understood, we do know enough to question the common impression that information reaching our brain is immediately registered in consciousness, and that signals to initiate activity always originate in the conscious mind. While a nervous signal reaches the brain in only 20 milliseconds, it takes a full 500 milliseconds for the signal to register in consciousness. This is all the time in the world, so to speak, for emendations, changes, deletions, and enhancements to occur. Indeed, neurophysiologists have shown that stimuli can affect the content of an experience at least as late as 100 milliseconds *before* the occurrence reaches consciousness.

Neurobiologists have recently produced striking evidence that at least some processes of denial and rationalization reside in the left hemisphere of the brain. People who have suffered a stroke in the left hemisphere (with paralysis on the right side of the body) recognize the seriousness of their condition, but a fraction of those with a right-hemisphere stroke (left-side paralysis) vehemently deny that there is anything wrong with them, a condition known as anosognosia. When confronted with strong counter-evidence, these patients indulge in a remarkable array of rationalizations to deny the cause of their inability to move (arthritis, general lethargy, etc.).

Ramachandran (1998) has noted that there is a strong similarity between the strategies of these patients and what the psychoanalyst Sigmund Freud referred to as "psychological defense mechanisms" in normal people (e.g., rationalizations, denials, and repression of unpleasant memories). The anosognosics, however, display these mechanisms in exaggerated form. For example, one anosognosic woman with a paralyzed arm had been asked to tie shoelaces. When asked later whether she had done so, she replied, "Oh, yes, I tied it successfully with both my hands." The odd wording of this response (that she tied it with "both my hands")

suggested to Ramachandran that the lady "doth protest too much," and may have had an unconscious recognition of the truth of her condition despite the vehemence of her denial. Further experimentation allowed him to show that such patients do indeed have an unconscious awareness of their paralysis.

What could be the benefit of this kind of self-deception? Ramachandran suggests that it allows people to create a coherent belief system that makes stable, consistent behavior possible in the face of a confusing flood of incoming sensations. In order to act consistently (or at all), the brain must put this information together into a story that makes sense. As Ramachandran explains, "When something doesn't quite fit the script . . . you very rarely tear up the entire story and start from scratch. What you do, instead, is to deny or confabulate in order to make the information fit the big picture. Far from being maladaptive, such everyday defense mechanisms keep the brain from being hounded into directionless indecision by the 'combinational explosion' of possible stories that might be written from the material available to the senses." The right hemisphere presumably acts as a kind of "reality check" on this tendency, and when it is disabled by injury, the exaggerated denial of anosognosia results. This explanation is probably not the entire story, however, because it does not explain why the deceptions of the left hemisphere are consistently biased in the direction of self-promotion (individuals with anosognosia insist that they are able to do things they cannot). Perhaps the same things that lead the rest of us to rate ourselves above average operate here.

Ramachandran's arguments are consistent with Gazzaniga's (1992) observations on "split-brain" patients (people whose severe epilepsy has been controlled by surgically severing the connections between the two cerebral hemispheres). In these patients, the left brain is unaware of what the right brain knows, and vice versa. Show a salacious picture to the right hemisphere only, and the patient will respond appropriately (for example, with embarrassed laughter), but the verbal left hemisphere won't know why. That won't stop it from inventing a reason, however. The reason given by the patient will be a fabrication consistent with what the left hemisphere knows; hence, Gazzaniga calls the left hemisphere the brain's "interpreter."

Self-deception, therefore, may have several adaptive functions. Trivers has suggested that self-deception was favored by selection in part to make deception of others more effective. Ramachandran has argued that self-deception enables us to act consistently in spite of a confusing and sometimes conflicting barrage of sensory inputs. In both cases, the truth is perceived somewhere in the brain, but the most adaptive behavior requires the conscious mind to alter or suppress the evidence.

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SELFISH GENE

A key feature of Mendelian inheritance is that it is usually fair: organisms pass on the two copies of each gene with equal frequency to the next generation. This means that the process of inheritance per se has no directional effect on allele frequencies, and it is only natural selection—the differential survival and reproduction of individuals with different genotypes—that can have such an effect. Thus, most genes persist in populations because they increase the fitness of the organisms in which they reside. However, not all inheritance is fair, and in particular some genes contrive to be inherited at a