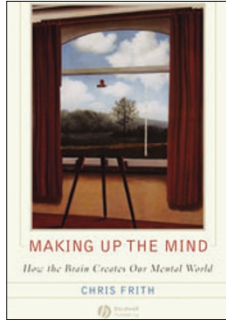


Fantasies that coincide with reality



Making Up the Mind

By Chris Frith

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Reviewed by Rebecca Saxe

Perceiving the outside world and one's own actions in it might seem easy, at least when compared with trying to infer the thoughts, feelings and goals inside other people's heads. These intuitions are wrong, however, and debunking them is the main task of Chris Frith's new book, *Making Up the Mind*. The apparently effortless perceptions of the world and the self mask sophisticated computation and 'unconscious inferences'. On the other hand, he claims, these same kinds of inferences support access to other people's feelings and intentions. There is no qualitative difference between perceiving minds and perceiving anything else.

If perceiving the world is a hard problem, studying these perceptions is possibly a harder one. By their nature, 'unconscious inferences' are not accessible to introspection. Indeed, the major trick of the scientific psychologist's trade is to devise alternative nonintrospective methods for studying the mind. The need for such methods arises not just because conscious experiences are 'soft', imprecise or hard to verify, the reasons that Frith entertains in his prologue. More importantly, as he shows in the rest of the book, the contents of introspection are simply unreliable as guides to the real structure of the mind.

Frith is especially enthusiastic about one such method: studying the brain. Brain function provides a window onto the intermediate stages of mental computations, between the inputs at the senses and the outputs in behavior and conscious experience. These days, this approach is called 'cognitive neuroscience' and its popularity is booming with the increasing availability of noninvasive brain scanners.

Making Up the Mind is an accessible and enthusiastic introduction to the field, and a great way to whet the appetites of smart beginners. Particularly nice is Frith's clear affection for doing science. During one experiment, he remembers, "we all had a very exciting Saturday in the imaging laboratory, which is not reflected at all in the paper we wrote about it afterwards." At another point, he expands on a reference to "my lab" with this footnote, "In the 1960s, this was a small bathroom that had been converted into a 'laboratory' by putting a sheet of hardboard over the bathtub."

Part 1 of the book covers the most charismatic discoveries of cognitive and neuropsychology, the gaps between the real world and the world

constructed by the mind: phantom limbs, blindsight, anosognosia, change blindness, color constancy (including a fantastic demo in the color plates), priming, motor adaptation, illusions of causal control, synesthesia, implicit memory, dreams and hallucinations. (Surprisingly, he doesn't mention confabulation or false memories, two other famous illustrations of his thesis that our brains 'make up' our world.) The message is that nothing that appears simple or direct in our perceptions of the world, and of ourselves, can be taken for granted.

So how does the brain construct the consciously experienced world? No one knows. Instead of giving an answer, Part 2 introduces some basic concepts: neurons and synapses, associative and operant conditioning, Bayesian inference, and forward and inverse models. The result is a useful informal survey of the foundations of current research.

Finally, in Part 3, Frith turns back to problems of perception, now focusing on the question of social perception: how can we ever 'know' about someone else's thoughts, feelings or goals? The situation, Frith claims, is not as bad as it looks. Other people's actions are represented in the same way we represent our own actions, using a forward model to predict their causal effects. Frith illustrates this idea with an illusion. When a sound acts as a signal to start an action, the cause (the sound) and the effect (the hand motion) are perceived to be closer together in time than they really are, both for one's own and other people's actions, but not for an externally caused event. Another great example that Frith does not mention, which was reported by Sebanz and colleagues, is that the (task-irrelevant) direction that an arrow is pointing interferes with participants' ability to respond on the basis of color, if and only if the arrow points to another possible action, either for the participant or for another person. That is, a representation of another person's possible (but unseen) actions can compete with the participant's own action plans.

In all, *Making Up the Mind* is an accessible, fun and up-to-date introduction to the hot ideas and phenomena in and around cognitive neuroscience. Only the conclusion feels out of place. In it, Frith writes that we all do successfully 'read minds', achieving direct access to other people's thoughts and goals. How we take this conclusion depends on what Frith means by success. It is true that inferences about other minds are not qualitatively harder than other inferences, but neither are they (as Frith sometimes implies) any easier or more accurate. Inferences about other minds have the same structure as self-perception, going beyond the data given using a sophisticated combination of prior knowledge and current data, and then masked by an illusion of effortlessness. As a result, inferences about others are just as prone to leaps, gaps and confabulations. The conclusion ought to leave us where the book began in the prologue. Psychologists who want to study the mind scientifically do not rely on social perceptions of the participants any more than they rely on introspection, precisely because social mind-reading fails. Our experiences of how minds work, both our own and other people's, are just fantasies whose predictions often coincide with reality. That is why we still do need an empirical science of the mind.

COMPETING INTERESTS STATEMENT

The author declares no competing financial interests.

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