

# Getting just the gist may prevent brain overload

SCIENCE



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You don't need to know how a tree grows to put out a newspaper.

You don't need to know how a car works to drive one, and you don't need to know how an airplane works to fly. You don't even need to know how a computer works to send e-mail.

It's all because of the way your brain works.

Human brains are pretty good at coping with reality without really understanding it. And that's a good thing, because reality can get pretty complicated.

Imagine the intricate chain of causes and effects underlying something like the human heartbeat, for example. You wouldn't want to have to explain the circulatory system every day to keep your blood flowing.

Curiously, though, people seem unaware of how much they don't understand about how everything works. In fact, they often convince themselves that they actually do understand the workings of many

familiar devices and processes. But tests of such self-professed knowledge reveal that many people vastly overrate their explanatory prowess.

"Our sense of how the world works is vastly cruder than we think," says Yale University psychologist Frank Keil. "Laypeople ... think they understand the world in far more detail than they really do."

Experiments revealing this discrepancy typically ask people to rate their ability to explain common mechanisms — say a helicopter, or a cylinder lock. At first, people generally express a fair amount

of confidence in their understanding, or ability to explain the device in question. But then they are asked to write out their explanation. After that, self-rating of understanding drops dramatically.

Next, experimenters pose questions designed to elicit evidence of deeper understanding — such as, "How would you pick a cylinder lock?" After such questions, self-ratings drop even more.

Finally, when presented with an expert's explanation of how something works, people reduce their own self-ratings yet again.

In essence, people begin by thinking they could diagram the workings of a helicopter, and end up admitting that all they know is that the blades spin and the helicopter rises.

It's an interesting question, says Dr. Keil, why such ignorance does not seriously impair most people's pursuit of success in life. "The answer," he writes, "could lie in the benefits of being shallow."

A lack of understanding, com-

bined with the illusion of understanding, may just be nature's way of avoiding information overload.

"There must be some way in which we know when we have grasped enough information to function effectively in everyday life," Dr. Keil writes in a paper to be published in *Trends in Cognitive Sciences*. "The strategy for the future is not to focus on how little we know when we think we know more but rather to ask how we are able to develop such efficient ways of tracking the causal structure of the world around us without overloading our computational and storage systems."

The secret, it seems, is a knack for getting the gist and dispensing with details. Maintaining the illusion of detailed knowledge is actually just an unacknowledged realization that somebody else knows the details.

It's like following a path through the woods, Dr. Keil suggests. You might think you are quite a navigator, skilled at mak-

ing your way home without a compass. But in fact, your mind has been freed from the need for navigational reasoning by the previous work of a path-breaking expert.

In a similar way, grasping the gist of some explanation is sufficient for most purposes, especially if knowing the gist allows you to identify which experts to ask if you really do need to know more.

"The intuitive understandings of the world that do exist in the mind of each individual are all the more remarkable for the power and success that they achieve with such compact and efficient means," Dr. Keil writes.

So a shallow understanding is not as awful as it seems, and is even in some ways beneficial, thanks to the availability of support from formal science. And yet, in a way, real science harbors some illusions of its own, Dr. Keil observes.

"Reality falls short of popular images of what individual scientists know and do," he writes. "Sci-

entific explanations are often much shallower and less complete than they might seem to the outsider."

And yet, though "glaringly incomplete in key respects," science still manages to make progress, Dr. Keil notes. Somehow the ability to grasp the gist of nature is enough for a scientist — aided, of course, by the specialized knowledge available from other scientists.

No one scientist — or scientific discipline — can grasp the entire forest of reality in all its details. But by combining the forces of specialists who understand each individual tree, science can construct a pretty accurate picture of the forest as a whole.

In that way, scientists can build a pretty strong illusion that they really understand the way the whole universe works — relying on all those experts who can't necessarily see the forest for the trees.

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