

Foundation (\$20 million). Additional funding totaling more than \$122 million annually has been pledged by private foundations: the Allen Institute for Brain Science, the Howard Hughes Medical Institute, the Kavli Foundation, and the Salk Institute for Biological Studies.

Sanes says that, like the Human Genome Project, which boosted existing efforts to decipher the entire sequence of DNA in human chromosomes, the BRAIN Initiative will “coordinate, focus, and enhance efforts toward goals neuroscientists already agree are very valuable”—the building of tools that will enable more detailed studies of brain activity. The original Brain Activity Map proposed by Church and his colleagues will be considered, but Sanes reports that the committee is keeping an open mind and will solicit

expert input on how best to focus the effort.

So far, the announcement has generated a mix of excitement, skepticism, and confusion among scientists, in part because the details, such as how funds will be distributed, what the specific goals will be, and how they’ll be accomplished, are still unclear. A major question concerns the scope of the effort. “My own hope is that we try to make a big impact in a limited area that we think is very important,” Sanes says. One open question, for instance, is whether to focus on mapping “functional” connections—recording the activity of many brain cells as they fire in order to understand how their actions interrelate—versus visualizing the structural connections among neurons, often called the “connectome.”

The ultimate goal of recording the activity of the tens of billions of neurons in the

human brain seems unworkable. But Sanes points out that “even achieving the first steps was unimaginable a few years ago.” New technologies have made it possible to record ever-increasing numbers of cells, and a leap in computing power allows scientists to collect and analyze the huge amounts of data such recordings generate.

Sanes believes that this is a good time to build on those advances. How the actions of brain cells generate the mental activities of the brain remains a mystery—and “as a purely scientific challenge,” he says, “I believe, and many people believe, this is the biggest challenge of the century.”

—COURTNEY HUMPHRIES

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PAST IS PROLOGUE

The Social Life of Memory

LEADING A healthy social life depends on the ability to predict the behavior of others accurately. Most people expect a loud, aggressive bully to be cruel, and a passive, quiet loner to shy away from confrontation. More often than not, that’s correct. Yet exactly how the brain predicts such behavior has long been unclear.

Now research by Kenan professor of

psychology Daniel Schacter and several coauthors, published in the March issue of the journal *Cerebral Cortex*, suggests that the brain, when making behavioral predictions, uses the part devoted to memory.

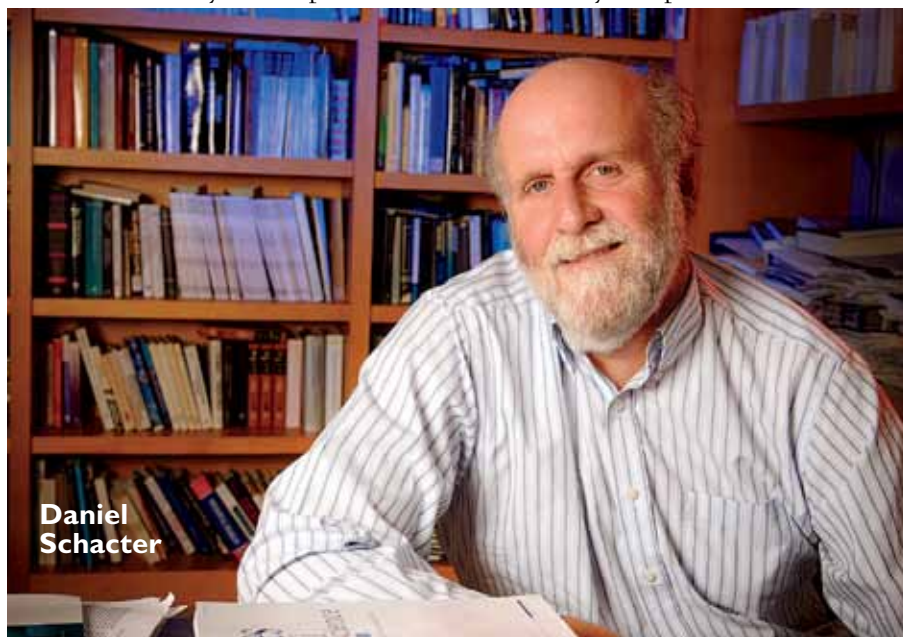
During the past decade, Schacter says, a revolution has occurred in the field of memory science: researchers have shown that memory is responsible for much more

than the simple recall of facts or the sensation of reliving events from the past. “Memory is not just a readout,” he explains. “It is a tool that’s used by the brain to bring past experience to bear when thinking about *future* situations.”

In fact, Schacter continues, memory and imagination involve virtually identical mental processes; both rely on a specific system known as the “default network,” previously thought to be activated only when recalling the past. This discovery led to a rich vein of research, he reports. For instance, the link between memory and imagination could explain why those with memory problems, such as amnesiacs or the elderly, often struggle to envision the future.

Schacter and his fellow researchers have applied this new way of thinking about memory to the realm of social behavior. If people use memory to imagine their own futures, why wouldn’t they use it to imagine others’ futures as well?

To test this proposition, the researchers presented 19 volunteers with four different protagonists, each with a distinct personality constructed from two variables: extroversion and agreeableness. After the subjects completed a series of exercises designed to familiarize them



with the protagonists' personalities, they were placed in a functional magnetic resonance imaging scanner and asked to consider how each protagonist would react to various social situations—for instance, encountering a homeless veteran begging for change. As the subjects gave their predictions, the researchers analyzed their brain function to ascertain which mental systems were in use.

When considering scenarios about other people, the subjects' "default network" went to work, just as it did in making predictions about themselves. But the re-

searchers also noticed activity in the medial prefrontal cortex and the cingulate, areas associated with social processing and the creation of "personality models." This activity was so acute that Schacter and his colleagues, simply by analyzing each subject's brain activity, could tell whether the person envisioned was the agreeable or disagreeable extrovert, or the agreeable or disagreeable introvert.

The researchers concluded that memory and social cognition therefore work in concert when individuals hypothesize about the future behavior of others. The

brain regions responsible for forming "personality models" and assigning them identities are intrinsically linked to the memory/imagination systems that simulate the past and future. These results add yet another function—making social predictions—to the ever-growing list of useful things that memory does.

—PETER SAALFIELD

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PAY FOR PROGRESS

Social Impact Bonds

HOMELESSNESS is a complex social problem that societies often treat, but rarely fix. Existing social services do little to remedy

the underlying causes, and governments too often lack the resources and long-term commitment to invest in preventive approaches that could improve lives and reduce society's

burden in a lasting way. And there are many similar problems, from chronic unemployment to juvenile delinquency, that impose ongoing costs on governments and taxpayers. But a new funding mechanism—social impact bonds (SIBs)—may offer an innovative means of harnessing private capital to achieve measurable gains on some of the most persistent social ills. Weiner professor of public policy Jeffrey Liebman is spearheading an effort at Harvard Ken-

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