and so on. A pretty good science can be built on these topics using overt, objective measures of behavior. See George Sperling's chapter for an analysis of psychological theories vis-à-vis behaviorism. The fine point is that, while the study of behavior will (out of necessity) be with us for the foreseeable future, the narrow version of "Behaviorism" (the dogma) will not return.

There is one theme that runs throughout almost every chapter in this book and that is, we will know more about the mind/brain in the next century than we do now. Arguably, each century since the Renaissance has seen progress in scientific knowledge and with exciting new tools (high-speed computers with awesome memories, PET, fMRI, EEG, and other equipment in the pipeline) we should be able to see farther, clearer, and wider. Will we know what we see? A few of the authors address this deeper question, including Baars, Pribram, Gazzaniga, and Sperling, but even these authors are more or less inattentive to the multiple influence of the probable historical consequences of present actions (a MIM).

In general, the contributors to this volume do not discuss the impact of extrascientific vectors on the future of mind sciences—an understandable omission, as the authors were instructed to write on the topic of mind sciences, not the effect of the environment on mind sciences. However, as no man is an island, no science happens in a vacuum. The fact that many authors disregard the impact of other ingredients in their views of the future of psychology may be because many Western scientists[3] have lived in nonthreatening surroundings in which stable economic and political circumstances are assumed. Yet, the reasonably stable platform enjoyed through most of this century (and others) could fall apart abruptly with cataclysmic effects on scientific activity. Consider the doomsday list[4]: the creation of a pernicious virus impervious to antidotes; life extension to an average age of 120 (see Snodgrass); irreparable damage to the atmosphere (today's headline warns that Microscopic Particles of Pollution May Cause 64,000 Deaths in 1996, and 1995 was the warmest year on record); depletion of the earth's essential natural resources; terrorism and social chaos; a decomposition of the natural chain of life (one fifth of freshwater fish species have become extinct or endangered in recent years); wars; nuclear bomb proliferation and use; a growing number of disenfranchised people (27.4 million people were considered "refugees" at the beginning of 1995), and unchecked population growth—the world's population is 5.7 billion (in 1995, an increase of 87 million over the previous year). Furthermore, social progress (as conventionally defined) has had the effect of removing people from their environment to the point where counterfeit experiences are prized more than

natural ones.[5] The sad list is much longer.[6] The idea is that scientific "progress" is a fragile flower whose growth rests as much on forces outside of itself as within itself.

The future of the science of the mind and other sciences (and all sorts of scholarship) will be influenced greatly by what I believe will be a fundamental change in the way scholarship will be performed as well as its application. The reformation of scientific activities will transfigure science so markedly that future historians will call it a "paradigm shift." This "Third Millennium Science" will usher in radical new techniques, operation modes, and communication networks, which will change the way we see ourselves and the universe, and have profound social and environmental impact. This envisioned paradigm change will (must) include forces from several different areas (MIM): the spread of information through worldwide networks which will allow all scientists working on common problems to be in contact with one another and the vast collection of relevant data (a related effect is that the location of laboratories and workstations will change, affecting city and community planning in profound ways); the invention and use of elegant techniques (imaging techniques and chemical techniques) for studying the brain will lead to better measurements and more reliable conclusions; the development of global governance, which will affect all scientific and cultural activities; and issues related to the environment and population. Other forces that will contribute to a paradigm shift include scientific and artistic validation by nonhuman objective techniques; genetic engineering in which human neurology and body functioning are fundamentally changed; the development of organic computers that interface with human brains; and contact with extraterrestrials.

I start with a nondeterministic assumption. The future of mind sciences is to be done by us. Of course, some may be passive observers and let the future happen with little advance planning, and others may consider the multiple forces that shape a science, a civilization. However, because it is reasonable to believe that we can design the future (or more specifically the potential futures), I predict that serious planning for the future will become a major new area of scholarship. Precious little is known of this field, which has been plagued with fortune tellers, palm readers, and soothsayers. The science of forecasting is a serious affair and it is likely (at least in my view) that it will become an enterprise in and of itself, not because of its predictive nature, but because of its planning nature. Can scientists do this, or is it the nature of science to do one experiment based on previous work and to meander through the stars without compass or course?

Magnificent things in the future aside, we will still be trying to understand it all with a brain born and bred in the Pleistocene whose function is to mate, eat, and smell the roses. Will we be able to comprehend what we have wrought, or will we revert to the pursuit of more bucolic pleasures?

As the arrows glide along their inquisitive paths, we know not their final destination. However, if only a few of these predictions are realized, the 21st century will appear on the surface to be profoundly different from the one we are about to depart but basic human psychology will be essentially the same.

## Notes

**1.** Pribram borrows the terms "deep" and "surface" from Noam Chomsky, but his theory bears little in common with linguistic theory.

**2.** Sperling uses the term "dustbowl empiricism," which most people associate with Midwestern schools of psychology who, in the 1940s and 1950s, insisted on hard data and clear empirical measures of psychological phenomena. It is noted that Richard Thompson calls it the "dustbowl *of* empiricism" and mentions in his chapter that Harry Harlow had that inscribed on a chamber pot in his office.

**3.** Here I refer to Western scientists in general, not contributing authors to this book, some of whom have suffered through violent social upheaval, including wars.

**4.** Data based on *Vital Signs: 1996* by Lester R. Brown. Washington DC: Worldwatch Institute.

**5.** I am both amused and upset when I see a huge stretch limousine barreling along the roadway next to beautiful Lake Tahoe with a television set turned on for its passengers.

**6.** See Solso (1995) for more on this topic.

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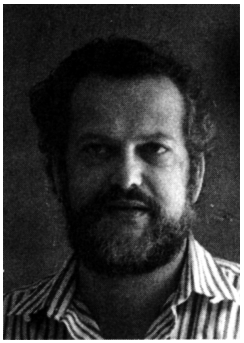
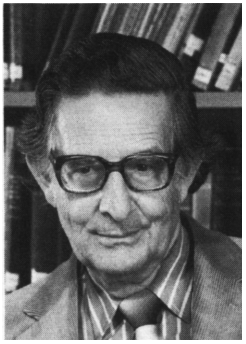
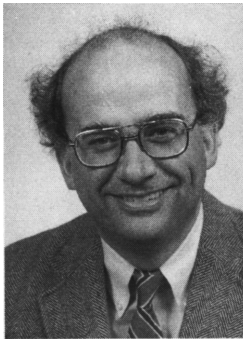
# About the Authors



**Bernard J. Baars** received his Ph.D. in Cognitive Psychology from UCLA in 1977. Since then he has held research positions at the University of California at San Diego, State University of New York, the University of California at San Francisco, and the Wright Institute, where he has worked since 1986. He is Founding President of the Association for Scientific Study of Consciousness and is Founding Co-Editor of *Consciousness and Cognition: An International Journal*. Dr. Baars is the author of *Consciousness Discovered: A Walk Through the Theater of the Mind* as well as numerous book chapters and journal articles relating to consciousness and cognition.



**Hans J. Eysenck** moved from Berlin to England in 1934 in order to escape the Hitler regime. From 1942–45 he was Experimental Psychologist at the Mill Hill Emergency Hospital. In 1946 he founded and became Director of the Department of Psychology in the newly formed Institute of Psychiatry and was Professor of Psychology in the University of London until his retirement in 1983. He is founder and editor of the journal *Personality and Individual Differences*, and founder and past editor of *Behaviour and Research Therapy*. Dr. Eysenck is now Professor Emeritus of Psychology and currently is actively participating in research into personality and individual differences, the psychophysiology of intelligence, and the genetics of personality and intelligence, as well as studying psychosocial factors in the prevention of cancer and coronary heart disease. He was awarded the Distinguished Scientist Award of the American Psychological Association in 1988 and became a William James Fellow of the American Psychological Society in 1994. He is the author of 77 books and has written or contributed to over 1,050 scientific papers.



**Michael S. Gazzaniga** earned his Ph.D. in psychobiology from the California Institute of Technology in 1964. He has been a professor at the University of California at Santa Barbara, New York University Graduate School, the State University of New York, Cornell University Medical College, the University of California at Davis and Dartmouth Medical School. He is Fellow of the American Association for the Advancement of Science (1980), the American Neurological Association (1981), the Society of Experimental Psychologists (1982), and the American Psychological Association (1982). He is Editor-in-Chief of the *Journal of Cognitive Neuroscience*, Associate Editor of *Cerebral Cortex*, and edited *The Cognitive Neurosciences*. Dr. Gazzaniga, as much as any other researcher, has helped to bring together the research of neurology and psychology, blazing the path for cognitive neuroscience in the 21st century.

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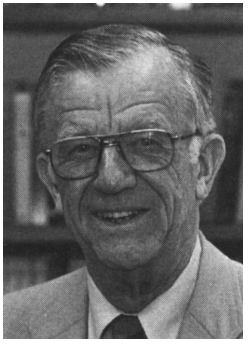
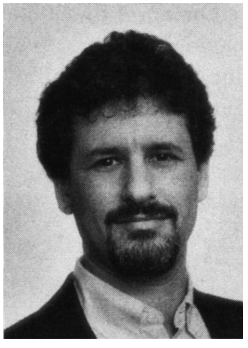


**Ernest R. Hilgard** began an unprecedented career in psychology following his Ph.D. from Yale University in 1930. Three years later he accepted a position at Stanford, where he has spent the rest of his career. He is perhaps best known for his work at the Laboratory of Hypnosis Research at Stanford, where he served as Director from 1957 to 1979. In addition to serving as President of the American Psychological Association (APA), Dr. Hilgard is a member of the National Academies of Education and Sciences. His numerous awards include the Warren Medal in Experimental Psychology, the APA's Distinguished Scientific Contribution Award, and the APA Certificate for Distinguished Lifetime Contributions to Psychology. His classic textbooks include *Conditioning and Learning*, *Theories of Learning*, and *Introduction to Psychology*. In addition to his distinguished career in academia, Dr. Hilgard has a remarkable public service record which includes a U.S. Education Mission to Japan; a Consultant on Education to James B. Conant, West Berlin; and a Consultant on Education to Hebrew University, Jerusalem.

**Jerome Kagan** received his Ph.D. in Psychology from Yale University in 1954. Since then, he has held the position of Instructor in Psychology at The Ohio State University, Senior Research Associate and Chairman of the Department of Psychology at the Fels Research Institute, and Professor of Psychology at Harvard University (where he has remained since 1964). He is Fellow of the American Association for the Advancement of Science and the American Academy of Arts and Sciences; a recipient of the Distinguished Scientist Award of the Society for Research in Child Development, the William James Award and G. Stanley Hall Award of the American Psychological Association, and the Distinguished Scientist Award of the American Psychological Society; and is Head of Section J of the American Association for the Advancement of Science. His hundreds of publications, including contributions to 12 textbooks, deal primarily with his multifaceted approach to developmental psychology.



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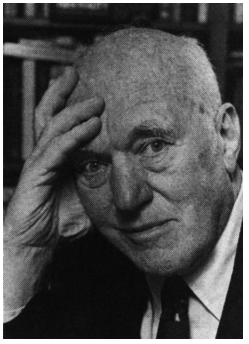

**Neal E. Miller** has had a long and distinguished career in psychology, beginning with his Masters Degree from Stanford and Ph.D. from Yale in 1935. After 30 years of teaching and research at Yale, where he was James Rowland Angell Professor of Psychology, he moved to Rockefeller University, where he is emeritus professor. Dr. Miller was awarded the Citation for Outstanding Lifetime Contribution to Psychology as well as the National Medal of Science. He has served as President of the American Psychological Association, the Society for Neuroscience, and the Academy of Behavioral Medicine Research, and is a member of the National Academy of Science. He is the recipient of numerous honorary degrees from the University of Pennsylvania and the University of Michigan as well as an honorary degree in celebration of the 500th anniversary of the University of Uppsala, Sweden.