THE SCIENCE, TREATMENT, AND PREVENTION OF ANTISOCIAL BEHAVIORS

EVIDENCE-BASED PRACTICE

VOLUME II

Edited by
Diana H. Fishbein, Ph.D.

To order go to http://www.civicresearchinstitute.com/stp.html and click "Add to Cart"

CRI
Civic Research Institute
4478 U.S. Route 27 • P.O. Box 585 • Kingston, NJ 08528

By Civic Research Institute, Inc.
Kingston, New Jersey 08528

This book is printed on acid-free paper.

Printed in the United States of America

Library of Congress Cataloging in Publication Data
The science, treatment, and prevention of antisocial behaviors: Application to the criminal justice system/Diana H. Fishbein

ISBN 978-1-939083-10-4

Library of Congress Catalog Card Number 2004109941

Preface

Bill Bukoski, Ph.D.
NIDA/NIH, Division of Epidemiology, Services and Prevention Research Neuroscience Center

A sea change in public health research is currently underway. At the National Institutes of Health (NIH) and particularly in the National Institute on Drug Abuse, the scientific community has recognized that an interdisciplinary approach involving self-assembled teams of scientists from genetics, behavioral health, biology, informatics, epidemiology, sociology, prevention, and treatment are needed to unravel the complexity of chronic diseases that can best be understood and addressed at the intersection of genetics, environment, and lifestyle.

An essential feature of the NIH's visionary "roadmap" is Research Teams of the Future. This special initiative recognizes that the scale and complexity of biomedical and behavioral research demands that scientists move beyond the confines of their own discipline and explore new organizational models for team science. New ways of thinking about health problems, special training, and out-of-the-box advanced organizational structures are essential. Special topics under this theme include promoting high-risk research, advancing interdisciplinary research, and public-private partnerships.

In concert with the NIH's roadmap and to advance interdisciplinary drug abuse public health research, the Division of Epidemiology, Services, and Prevention Research (DESPR) established three five-year research goals that reflect a transdisciplinary strategy for epidemiology, services research, and prevention science. These goals are:

- Measurably impact public health prevention and treatment outcomes;
- Demonstrate the role of interactions between intrapersonal and environmental factors with each other and with genetic processes; and
- Develop transdisciplinary research teams in prevention and treatment to better elucidate and address drug abuse as a chronic condition.

One of the best examples of putting this research agenda into operation is the establishment of five transdisciplinary research centers by DESPR's Prevention Research Branch. The purpose of this new initiative is to create environments in which scientists from basic, clinical, and applied disciplines can come together to develop a coherent program of transdisciplinary research. The ultimate goal of these centers is to overcome the barriers inherent in integrating cross-disciplinary concepts, methods, and findings that hold promise for the development of innovative and evidence-based drug abuse prevention interventions. Centers sites include the Center for Drug Abuse Research Translation at the University of Kentucky, the Transdisciplinary Drug Abuse Prevention Research Center at the University of Southern California, the Transdisciplinary Prevention Research Center at the State University of New Jersey at Rutgers, the Transdisciplinary Prevention Research Center at Duke University, and the

Oregon Transdisciplinary Prevention Research Center at the Oregon Social Learning Center.

Volume II of *The Science, Treatment, and Prevention of Antisocial Behaviors*, edited by Diana H. Fishbein, Ph.D., is fully consistent with this emerging trend to address complex health and human problems through both unitary and interdisciplinary science. This brilliant text provides a definitive review and assessment of interdisciplinary approaches, uniting critically acclaimed researchers from a variety of scientific disciplines who thoroughly explore the underlying mechanisms of antisocial behavior from a genetic, environmental, and neurobiological perspective.

Chapters 2, 3, and 4 illuminate the progress in the field based on the latest scientific research; they vividly illustrate the many shortcomings of our knowledge base and elucidate the pivotal research hypotheses that will challenge future studies. A key to advancing this field is promoting a transdisciplinary approach to methods of assessment. Chapters 1, 5, 6, and 7 present a strong rationale supporting transdisciplinary perspectives to better define key constructs and to measure the many facets of antisocial behavior, none of which can fully stand alone. Progress in the science will heavily depend on resolution of methodological inconsistencies in measurement, overcoming underpowered research designs, and mobilizing the scientific community to better integrate diverse perspectives, models, and theories into a comprehensive yet critical appraisal of what is known and what is only speculated from clinical experience.

This important and groundbreaking text underscores the importance and necessity of testing and using evidence-based prevention and treatment models and programs to address and ameliorate risk and protective processes that are the underlying derivatives of antisocial behaviors. Chapters 8, 9, 10, and 11 clearly illustrate that well-tested approaches are now available to practitioners to address the negative effects of child maltreatment, to advance neurocognitive development, to resolve familial substance abuse, and to reduce aggression. The challenge for the field will be to translate this science to those most at risk of these developmental disorders or conditions.

Chapters 12, 13, and 14 present evidence that the most important settings for "pushing" this science forward are the areas of criminal justice and public health. The authors acknowledge the vital role played by well-grounded theory to develop efficacious prevention and treatment interventions for chronic behavioral and medical conditions. But these scholars caution the field to move systematically forward by building on each scientific development as we advocate for change in the services systems.

This soon-to-be classic reference stands as a scholarly review of an extremely difficult topic. Yet the book offers outstanding practical and optimistic guidance for clinicians, program developers, and public health administrators that clearly suggest that better science and better public health policy can lead to significant reductions in the prevalence and devastating effects of antisocial behavior for individuals, their families, and the public at large.

Table of Contents

PART 2: MODERN ASSESSMENT TECHNIQUES

Chapter 5: Neurophysiological and Cognitive Correlates of Antisocial Behavior

Chapter 6: State-of-the-Art in Risk Assessment—Antisocial Personality Disorder

Chapter 7: Differential Assessment of Neurological Deficits in Aggressive and Violent Behavior

PART 3: TRANSDISCIPLINARY APPROACHES TO PREVENTION AND TREATMENT

Chapter 8: The Role of Neurocognitive Models in Prevention Research

Chapter 11: Science-Based Treatment of Aggression and Agitation

PART 4: A SPOONFUL OF SCIENCE TO IMPROVE CRIMINAL JUSTICE AND PUBLIC HEALTH POLICY

Chapter 12: Understanding Violent Offenders

About the Authors

Lance O. Bauer, Ph.D., is a professor of psychiatry, director of the Neural Dynamics Laboratory, and associate scientific director of the Alcohol Research Center at the University of Connecticut School of Medicine. He received his bachelor's degree in psychology from the University of Rochester and completed his doctoral training in experimental psychology at Washington University in St. Louis. Dr. Bauer's research interests include studies of risk factors for the onset of substance dependence in adolescents and for relapse to substance dependence in adults.

Pamela Blake, M.D., is an assistant professor in the Department of Neurology at Georgetown University Hospital. She received her medical degree from Georgetown in 1990 and completed residency training at Georgetown and a fellowship at the Johns Hopkins Hospital. Dr. Blake's main research interest is in the neurobiology of aggression. She has evaluated numerous adults and adolescents within court systems around the United States, and she continues to work closely with the District of Columbia Public Defenders Service and the D.C. Superior Court. Dr. Blake is also involved in research studies at the Cognitive Neuroscience Section at the National Institutes of Health, focusing on studies of the mechanism and etiology of prefrontal cortical dysfunction in both violent offenders and perpetrators of domestic violence.

J. Douglas Bremner, M.D., is an associate professor of psychiatry and radiology and director of the Emory Center for Positron Emission Tomography at Emory University School of Medicine in Atlanta, Georgia. He is also the director of Mental Health Research at the Atlanta Veterans Administration Medical Center in Decatur, Georgia. In November 2000, Dr. Bremner moved to Emory from Yale, where he spent the first twelve years of his career. Dr. Bremner's research has used neuroimaging and neurobiological measures to study the neural correlates and neurobiology of posttraumatic stress disorder related to combat and childhood abuse, as well as the related area of depression. He received a bachelor of art degree in literature and in 1987 received his medical degree at Duke University, followed by residencies in psychiatry in 1991 and nuclear medicine in 1997 at Yale School of Medicine, leading to a double board certification. Dr. Bremner has authored or co-authored over 100 peer-reviewed articles and book chapters and has written or edited three books, most recently *Does Stress Damage the Brain? Understanding Trauma-Related Disorders from a Mind-Body Perspective* in 2002. He has received several awards for his work, including the Chaim Danieli Award for Research and Service in Traumatic Stress from the International Society for Traumatic Stress Studies.

Christian Caldji, Ph.D., first became interested in neurosciences through the influence of Dr. Susan Davies as an undergraduate student at the University of Western Ontario. His second influence was Dr. C. H. Vanderwolf, his research supervisor in his project studying the influence of the antimuscarinic drug scopolamine on learned behavior in the rat. Following his graduation, Dr. Caldji began his graduate training

under Dr. Michael J. Meaney at McGill University in Montreal. It is here that Dr. Caldji developed his new interest in maternal behavior and its effects on the development of neural systems mediating the expression of fearfulness in the rat. During this period, he has published his work in numerous papers and has been the recipient of the Canadian Institutes of Health Research Doctoral Research Award.

Julio Cantero, M.D., is currently an epilepsy-EEG fellow at Columbia Presbyterian Hospital in New York City. Dr. Cantero received his medical degree from the Universidad Javeriana in Bogota, Colombia, in 1994 and trained as a neurology resident at Georgetown University in Washington, D.C., before joining Columbia University. His main research interests are headache, women and epilepsy (catamenial epilepsy, contraceptives and epilepsy), and clinical trials of new compounds for the treatment of epilepsy. His current work includes studies on EKG changes during seizures and effects of coenzyme Q10 on symptomatic and cryptogenic epilepsy. Dr. Cantero also worked as an anatomy and physiology instructor in the Department of Human Function and Structure at Javeriana University and Military University, in Bogota, between 1995 and 1999.

Danielle Champagne, B.S., Ph.D., obtained her bachelor's degree in physiology from the Université de Laval and her doctorate in neurological sciences from McGill University in Montreal. She is currently a postdoctoral fellow of the Natural Sciences and Engineering Research Council of Canada at the University of Lieden in the Netherlands. Her studies examine the effects of maternal care on the development of hypothalamic neural connections in relation to endocrine function.

Frances A. Champagne, B.A., Ph.D., obtained her bachelor's degree in psychology from Queen's University in Kingston, Ontario and her doctorate in neurological sciences from McGill University in Montreal. She is currently a postdoctoral fellow of the Canadian Institutes of Health Research at Cambridge University, examining the function of imprinted genes for maternal behavior.

Leslie Citrome, M.D., is the director of the Clinical Research and Evaluation Facility at the Nathan S. Kline Institute for Psychiatric Research in Orangeburg, New York, and a professor of psychiatry at the New York University School of Medicine. He earned his medical degree in 1983 from McGill University in Montreal, and completed his residency in psychiatry in 1987 at New York University-Bellevue and his master's degree in public health in 1996 at Columbia University's School of Public Health, both in New York City. He is board-certified in psychiatry by the American Board of Psychiatry and Neurology and by the Royal College of Physicians and Surgeons of Canada. Dr. Citrome is involved as principal investigator, co-investigator, and collaborator on a number of ongoing projects centering on psychopharmaceutical approaches to schizophrenia, including new and novel medications, management of treatment refractory schizophrenia, and the management of aggressive and violent behavior. He is also an active member of the Medication Utilization and Outcomes Research Program. He is the author or co-author of over 150 research reports, reviews, and abstracts in the scientific literature, and has lectured extensively throughout the United States, Canada, and Europe.

Kevin Conway, Ph.D., is deputy branch chief and a program director in the Epidemiology Research Branch at the National Institute on Drug Abuse, where he develops and administers a portfolio of drug abuse research on etiology, genetic epidemiology, and antisocial behaviors. Prior to joining NIDA in 2001, Dr. Conway was an associate research scientist in the Genetic Epidemiology Research Unit in the Department of Epidemiology and Public Health at the Yale University School of Medicine. Dr. Conway earned his doctorate in experimental psychology in 1998 from Temple University in Philadelphia.

Richard J. Davidson, Ph.D., is the Vilas professor of psychology and psychiatry at the University of Wisconsin. He received his doctorate in psychology from Harvard University in 1976 and has been at the University of Wisconsin since 1984. Dr. Davidson is internationally renowned for his research on the neural substrates of emotion and emotional disorders. He has received numerous awards, including a National Institute of Mental Health Research Scientist Award, an Established Investigator Award from the National Alliance for Research in Schizophrenia and Affective Disorders, and the Hilldale Award from the University of Wisconsin at Madison. He directs the NIMH-funded Wisconsin Center for Affective Science, serves on the board of directors for the Society for Psychophysiological Research, is an associate editor of the journals *Cognition and Emotion* and *Psychophysiology*, and is on the editorial boards of numerous major journals. Dr. Davidson is also president of the Society for Research in Psychopathology and serves as a core member of the MacArthur Foundation Research Network on Mind-Body Interactions.

Peter J. Delany, D.S.W., is the deputy director of the Division of Epidemiology, Services, and Prevention Research at the National Institute on Drug Abuse and a co-collaborating scientist on the NIDA-funded *National Criminal Justice Drug Abuse Treatment Studies Program*. Before assuming his current position, he was deputy chief of the Services Research Branch at NIDA and was responsible for the development of treatment and health services research focusing on criminal justice-involved populations, the organization and management of drug abuse treatment, and underserved populations. Dr. Delany received his bachelor's degree from the University of Maryland, College Park, and his master's and doctoral degrees in social work from the Catholic University of America in Washington, D.C., where he holds an adjunct faculty position in the National Catholic School of Social Work. His primary research interest has been in the development of organization and service system models to meet the needs of underserved populations. He also collaborates on NIDA's cooperative Drug Abuse Treatment Outcomes Studies.

Diana H. Fishbein, Ph.D., received a joint doctorate in criminology and psychobiology from Florida State University. She developed and directs the Transdisciplinary Behavioral Science Program for RTI International, which is designed to build research collaborations for the advancement of interdisciplinary research on high-risk behaviors, including drug abuse and violence. Dr. Fishbein began her career with a National Institutes of Health postdoctoral fellowship in neuroscience at the University of Maryland School of Medicine and as a professor of criminology at the University of Baltimore. A former staff fellow at the National Institute on Drug Abuse, where she

directed neurobiological studies on disruptive behavioral disorders and substance abuse, she was later a senior researcher with the U.S. Department of Justice to develop and evaluate crime prevention programs and subsequently assumed the position of Drug Abuse Prevention Coordinator and Evaluator at the H.I.D.T.A. Research Program, centered at the University of Maryland and funded by the White House Drug Policy Office. She is presently principal investigator of five studies to assess the effects of psychosocial conditions on biological processes that affect risk for psychopathology and to identify underlying mechanisms for differential responses to interventions. Dr. Fishbein consults regularly with federal, state, and local agencies for purposes of training, technical assistance, scientific peer reviews, expert witnessing in criminal court, and development of research protocols. Publications include numerous scientific articles, chapters, and monographs on antisocial behavior and drug abuse, in addition to policy papers. She is a primary author of two textbooks, *The Dynamics of Drug Abuse* and *Biobehavioral Perspectives in Criminology*, as well as the general editor of *The Science, Treatment and Prevention of Antisocial Behavior*, volumes I and II, and the author of chapters in these volumes.

Bennett W. Fletcher, Ph.D., is in the Division of Epidemiology, Services and Prevention Research at the National Institute on Drug Abuse and is NIDA's collaborating scientist on the national Criminal Justice Drug Abuse Treatment Studies, a cooperative research program to develop and test models for an integrated approach to the treatment of criminal justice-involved individuals with drug abuse or addictive disorders. Dr. Fletcher served as chief of NIDA's Services Research Branch from 1996 to 2001, where he directed a program of health services research on drug abuse treatment, including research to study the impact of the organization, financing, and management of health services on the quality, cost, access to, and outcomes of treatment for drug abuse disorders. Dr. Fletcher has led initiatives to support research on drug treatment effectiveness, financing and economics of treatment, the organization and management of treatment services, and treating vulnerable drug-abusing populations including adolescents, women, and those at risk for HIV infection. He is the collaborating scientist on NIDA's cooperative Drug Abuse Treatment Outcome Studies.

Mark T. Greenberg, Ph.D., holds the Bennett Endowed Chair in Prevention Research at Penn State University's College of Health and Human Development and is the director of the Prevention Research Center for the Promotion of Human Development at the university. He received his bachelor's degree from Johns Hopkins University and his doctorate from the University of Virginia. Since 1981, Dr. Greenberg has been examining the effectiveness of school- and family-based curricula to improve the social, emotional, and cognitive competence of elementary-age children. Dr. Greenberg consults with government agencies and foundations at the local, state, federal, and international level on topics related to child development and mental health promotion. In 2002, he was awarded the Distinguished Research Scientist Award of the Society for Prevention Research.

Rebecca J. Houston, Ph.D., is currently a postdoctoral fellow in the Alcohol Research Center at the University of Connecticut School of Medicine. Dr. Houston received her bachelor's degree in psychology from the University of Arkansas at Little

Rock in 1997 and her doctorate in applied biopsychology from the University of New Orleans in 2002. Her research program focuses on the biological substrates of aggressive and impulsive behavior, particularly within the contexts of personality and substance use disorders. Dr. Houston focuses primarily on psychophysiological techniques, such as electroencephalograms and event-related potentials, in the development of appropriate identification, assessment, and treatment approaches for aggressive, antisocial, and impulsive behavior.

Christopher T. Hyde, Ph.D., earned his bachelor's degree in biology and a master's degree in chemistry from the University of Delaware. He worked as a research chemist for ten years before returning to the university to earn his doctorate in clinical psychology. He is a licensed psychologist specializing in the evaluation of children with academic and emotional difficulties. He conducts comprehensive evaluations on children and youth who have academic difficulties, are in the legal system, and are receiving "deep end" mental health services. His research focus is the cognitive and physiological aspects of mental disorders. He founded BioAssessments, LLC to explore a novel biological marker of impulsivity. He also develops turnkey systems for computerized presentation of cognitive tasks synchronized with physiological measurements. Current applications include the study of attention in controls and children with attention deficit hyperactivity disorder, substance abuse, cardiovascular disease, and schizophrenia.

Christine L. Larson, Ph.D., is a licensed psychologist and assistant professor of clinical psychology at Michigan State University and a member of the training faculty at the university's Neuroscience Program. She received her doctorate in psychology from the University of Wisconsin at Madison in 2003 after completing her undergraduate studies there. Dr. Larson's research focuses on understanding the neural substrates of emotion and mood and anxiety disorders. In recent work she has attempted to assess the time course of responses to discrete affective stimuli using psychophysiological and neuroimaging techniques to provide a more thorough understanding of affective style and emotional dysfunction. She is widely published.

Michael J. Meaney, Ph.D., is currently James McGill professor of medicine and full professor in the Department of Psychiatry and Department of Neurology and Neurosurgery at McGill University in Montreal. He is also the director of the Program for the Study of Behavior, Genes and Environment at the university. Dr. Meaney received his doctorate from Concordia University in Montreal and did his postdoctoral studies at the Rockefeller University in New York City. He is interested in the mechanisms by which adversity in early life might alter neural development so as to render certain individuals at risk for pathology later in life. Early life events serve as potent determinants of vulnerability/resistance to chronic illness, including depression, anxiety disorders, schizophrenia, and drug abuse.

Karen A. Nolan, Ph.D., is a research scientist at the Nathan Kline Institute for Psychiatric Research and an assistant professor of psychiatry at New York University School of Medicine. She did her undergraduate work in psychology and psycholinguistics at Brandeis University and completed her doctoral training in experimental

psychology at the Johns Hopkins University. She has conducted basic and clinical research in aphasia, Alzheimer's disease, and schizophrenia. Since 1996, Dr. Nolan's research has focused on the problem of aggression in schizophrenia. She was recently awarded a grant to study the functional significance of the catechol-O-methyltransferase genotype and cognition and aggressive behavior in schizophrenia. Dr. Nolan has also been directly studying the phenomenology of assaultive behavior on an inpatient research unit in parallel with genetic and neurocognitive studies of the same subjects.

Carine Parent, B.S., obtained her bachelor of science degree in psychology/biology from McGill University in Montreal. She is currently a doctoral student at the university, examining the effects of early experience on cognitive processing of emotionally salient information in animal models.

Katherine M. Putnam, Ph.D., is an assistant professor in the Department of Psychiatry at Boston University Medical Center for Posttraumatic Stress Disorder at the Veteran's Administration Healthcare System in Boston. She completed her doctorate degree from Stony Brook University, her clinical internship at the Boston VA Medical Center Consortium, and her postdoctoral work at the University of Wisconsin at Madison in the Laboratory for Affective Neuroscience. Her research program focuses on the physiological (central and peripheral) manifestations of disordered emotion processing in depression, borderline personality disorder, and PTSD and links these to phenomenological physiological processes, including treatment response. To this end, she uses experience sampling methodology, electrophysiology, and functional magnetic resonance imaging techniques. She has received Young Investigator awards from the National Alliance for Research in Schizophrenia and Depression and the Borderline Personality Disorder Research Foundation.

Nathaniel R. Riggs, Ph.D., is a postdoctoral research associate in the Prevention Research Center at Penn State University. He received his bachelor's degree from the University of Washington and his doctorate from Penn State. Dr. Riggs has been examining the effectiveness of after-school programs in improving the social, emotional, and academic competence of school-age children. He consults with the Pennsylvania Department of Education and Pennsylvania Center for Schools and Communities in providing school- and after-school-based prevention staff evaluation strategies for systematic program improvement.

Ralph C. Serin, Ph.D., is a faculty member in the Carleton University Department of Psychology. He received his doctorate in 1988 from Queen's University in Kingston, Ontario. From 1975 to 2003, he was employed with the Correctional Service of Canada in various capacities, most recently as the director of Operations and Programs Research with the Research Branch. He has published in the areas of treatment readiness and responsivity, risk assessment, psychopathy, sexual offenders, and the assessment and treatment of violent offenders. His main interest is the interface between psychology and criminal justice, with a focus on correctional issues and the contribution of psychology to the assessment and management of offenders. He holds adjunct positions in the Departments of Psychiatry at Queen's University and the

University of Toronto and is a psychological consultant to the Ministry of Correctional Services at Brockville Jail in Brockville, Ontario.

Joseph T. Shields, Ph.D., is an associate professor of social work at the National Catholic School of Social Service, the Catholic University of America in Washington, D.C. Dr. Shields received his undergraduate and graduate degrees in sociology from the Catholic University of America, where he was also an associate member of the Life Cycle Institute until 1994. His primary research interests are in the area of the structure and development of service organizations. His current work includes studies on the interaction between patient and organizational characteristics as they relate to patient outcomes, with particular interest in faith-based alternative programming. Dr. Shields also served from 2000 to 2002 as a social science analyst with the National Institute on Drug Abuse.

Michael Vanyukov, Ph.D., is an assistant professor of pharmaceutical sciences, psychiatry and human genetics at the University of Pittsburgh and scientific director of the university's National Institute on Drug Abuse-funded Center for Education and Drug Abuse Research. He received his master's degree from the Moscow State University and his doctorate from the Institute of Medical Genetics, Moscow. His research program is focused on the mechanisms of variation in behavioral traits, particularly those associated with the risk for substance use disorders. His NIDA-funded projects examine the role of and relationships between DNA polymorphisms, personality, and environmental factors in the intergenerational transmission and ontogenesis of liabilities to deviant behaviors such as substance abuse and antisociality.

Jan Volavka, M.D., Ph.D., is professor of psychiatry at the New York University School of Medicine. He is also chief of the clinical research division at the Nathan S. Kline Institute for Psychiatric Research in Orangeburg, New York. He earned his medical degree from Charles University in 1959 and his doctorate in medical science from the Academy of Sciences in 1965, both in Prague. He later completed a fellowship with the Department of Neurology at the London Hospital in the United Kingdom and at the Max Planck Institute for Psychiatry in Munich, Germany. Dr. Volavka is board certified in psychiatry by the American Board of Psychiatry and Neurology, and he is an active researcher in the area of psychopharmacology and aggression. His book, *Neurobiology of Violence*, was published in 2002 and more than 200 of his articles have appeared in refereed journals. The articles deal with psychopharmacological treatments of schizophrenia and schizoaffective disorder, neurobiology and management of aggressive behavior, substance use disorders, clinical electroencephalography, and theory of experimental design of drug trials. In 1988, he received the Award for Excellence in Research from the New York State Office of Mental Health.

George E. Woody, M.D., is a professor in the Department of Psychiatry at the University of Pennsylvania. He graduated from Amherst College in 1960 and Temple University Medical School in 1964, interned at Bryn Mawr Hospital in Bryn Mawr, Pennsylvania, from 1964 through 1965, was a general medical officer in the Navy from 1965 through 1967, and a resident in psychiatry at Temple University Hospital until 1970. In 1971, he began work at the Drug Dependence Treatment Unit of the

Philadelphia Veterans Administration Medical Center and the University of Pennsylvania, where he became increasingly involved in treatment outcome studies, and in 1999 he moved entirely into clinical research. His interests are in assessing the efficacy of psychosocial and pharmacological treatments for addiction; the relationship between drugs of abuse, psychiatric symptoms, and treatment outcome; and risk factors for HIV infection among persons who abuse drugs. He has been an active participant in many funded grants, including studies of LAAM (levo-alpha-acetylmethodol), naltrexone, antidepressants, and buprenorphine. He reviews papers for many journals, has authored or co-authored over 200 publications and was a member of the DSM-IV Work Group on Substance Use Disorders and the FDA Drug Abuse Advisory Committee. He has been co-editor of two treatment improvement protocols on methadone maintenance, helped develop Addiction Treatment Practice Guidelines for the VA, is a member of the VA QUERI (Quality Enhancement Research Initiative), and is a founding member of the Board of Addiction Psychiatry of the American Psychiatric Association. He was a member of the Institute of Medicine committees that reported on future directions for alcohol research in 1990 and for drug abuse research in 1996. He was twice a member of the Board of Directors of the College on Problems of Drug Dependence, is a life fellow of the American Psychiatric Association, a member of the American College of Neuropsychopharmacology, and is currently the director of the Delaware Valley Node of the National Institute on Drug Abuse's Clinical Trials Network. He has lectured nationally and internationally and has collaborated on studies in Brazil, Russia, and Germany. He was recently awarded a Doctor Sui Causa from Pavlov State Medical University in St. Petersburg, Russia and is the recipient of a NIDA Senior Scientist "K" award.

Tie-Yuan Zhang, Ph.D., obtained his doctorate in neuroscience from the University of Seoul in Korea and is currently a postdoctoral fellow at McGill University in Montreal, Quebec. His studies examine the effects of environmental enrichment on the development of the prefrontal cortex and attention using sensory gating models of information processing.