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## *Contributing Authors*

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**Dean T. Acheson, B.A.** Dean T. Acheson is a graduate student in clinical psychology at the University at Albany, SUNY. He earned his B.A. in psychology from Purdue University. His research focuses on investigating the role of learning mechanisms in the etiology and maintenance of fear and anxiety.

**Velma Barrios, B.A.** Velma Barrios is a graduate student in clinical psychology at the University at Albany, SUNY. She earned her B.A. in Psychology from the University of California, Los Angeles. Her research focuses on the influence of contextual factors on the acquisition and amelioration of anxiety disorders, including acceptance and mindfulness-based interventions targeting emotion regulation processes in anxiety pathology.

**Stéphane Bouchard** Dr. Bouchard is Professor at the Université du Québec en Outaouais (UQO) and he holds the Canada Research Chair in Clinical Cyberpsychology. He graduated in Psychology in 1995 from the Université Laval in Québec at the same time as he was completing a one year postdoctoral position. His research initially focused on treatment efficacy and treatment mechanisms of anxiety disorders. In 1999, he started work on delivering cognitive-behavior therapy through videoconferencing to people in rural areas. Since then, his research interests have included the use of virtual reality to treat anxiety

disorders and understanding the concept of presence. He has received numerous infrastructure and operating research grants and is co-director of the Cyberpsychology Lab at UQO. He has published more than 50 articles and book chapters and hundreds of scientific communications. As a clinical psychologist and university professor, he has supervised more than 45 students. His research continues to investigate the application of cyberpsychology to the treatment of clinical disorders.

**Shawn Cahill** Dr. Cahill is Assistant Professor of Psychology in Psychiatry at the University of Pennsylvania's Center for the Treatment and Study of Anxiety, where he is involved in treatment and research into the nature of anxiety disorders, with a particular interest in PTSD.

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**Sophie Côté, Ph.D.** Dr. Côté recently completed her doctoral thesis addressing the cognitive mechanisms underlying the efficacy of virtual reality exposure for arachnophobia. She specializes in anxiety disorders, in health psychology, and in virtual reality. Her extensive clinical experience in virtual reality exposure makes her one of the experts in Canada in this field, both in fundamental and clinical research. Previously part of the Cyberpsychology Lab of UQO and a lab in Montreal studying obsessive-compulsive disorder, depersonalization, and specific phobias in children, she currently is working on implementing virtual reality interventions in hospital settings to help patients cope with cancer and painful medical procedures.

**Michael Davis, Ph.D.** Dr. Davis was appointed the Robert W. Woodruff Professor of Psychiatry and Behavioral Sciences in the Department of Psychiatry at Emory University, September 1, 1998. Prior to this, Dr. Davis was on the faculty at Yale University for 29 years in the Departments of Psychiatry and Psychology. His faculty appointment began immediately after he received his Ph.D. in Experimental Psychology at Yale in 1969, where he worked with Allan Wagner, following undergraduate training at Northwestern University. Dr. Davis is world renowned for his work on the neural basis of fear, the role of the amygdala in conditioned fear and memory, and the acoustic startle reflex. He is a member of seven editorial boards and an elected Fellow in several professional organizations. He held an NIMH Career Development and Research Scientist Award for 25 years, and has had generous support from the National Science Foundation and National Institute of Mental Health (NIMH), including two consecutive 10-year NIMH MERIT Awards. Currently, he has about 250 publications and is exploring intracellular processes in the amygdala in connection with the formation and storage of long-term fear memories as well as studying brain systems involved in the reduction of fear and anxiety.

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**Carlos G. Finlay, Ph.D.** Dr. Finlay is currently a postdoctoral associate at the Research Institute on Addictions in Buffalo, New York. He received his degree from the University at Albany, State University of New York and completed his clinical internship at the University of Mississippi Medical Center/G.V. ("Sonny") Montgomery VAMC Consortium. His research interests include the etiology, maintenance, treatment, and threat of relapse of anxiety disorders, primarily panic disorder and post-traumatic stress disorder (PTSD).

**John P. Forsyth, Ph.D.** Dr. Forsyth earned his Ph.D. in Clinical Psychology from West Virginia University in 1997 after serving as Chief Resident in the Department of Psychiatry and Human Behavior at the University of Mississippi Medical Center. He is Associate Professor and Director of the Anxiety Disorders Research Program in the Department of Psychology at the University at Albany, SUNY. His basic and applied research focuses on variables and processes that contribute to the etiology, maintenance, and treatment of anxiety-related disorders. He has written widely on acceptance and experiential avoidance, and on the role of emotion regulatory processes in the etiology and treatment of anxiety disorders. Dr. Forsyth was the recipient of the 2000 B. F. Skinner New Research Award by Division 25 of the American Psychological Association and the 1999 Outstanding Dissertation Award by the Society for a Science of Clinical Psychology. He has authored over 50 scientific journal articles, numerous book chapters, and several teaching supplements for courses in abnormal psychology. He is a licensed clinical psychologist in New York State, serves on the editorial boards of several leading clinical psychology journals, and is associate editor of the *Journal of Behavior Therapy and Experimental Psychiatry*. He also is an author of two forthcoming books – *Acceptance and Commitment Therapy for Anxiety Disorders: A Practitioner's Treatment Guide to Using Mindfulness, Acceptance, and Value-Based Behavior Change Strategies* and *ACT on Life, Not on Anger* – describing the application of Acceptance and Commitment Therapy (ACT) for persons struggling with anxiety disorders and problem anger. He routinely gives talks and workshops on ACT and Cognitive-Behavior Therapy for anxiety and related disorders.

**Mary Gillis, B.A.** Mary Gillis is a graduate student in the clinical-behavioral master's program at Eastern Michigan University. After earning a bachelor's degree in Literature from Wayne State University, she worked for 15 years as a copy-editor and contributor to reference books before returning to school. In addition to teaching and research duties associated with her fellowship award, Mary presented on blood-injury-injection phobia at the Behavior Analysis Association of Michigan conference in 2004. Her current research concerns social supports for caregivers of bone marrow and stem cell transplant patients.

**Andrew Gloster, Ph.D.** Dr. Gloster completed his undergraduate work at Boston University before traveling to Europe to study the trumpet. After developing an interest in music performance anxiety, Andrew was admitted to the Ph.D. program in clinical psychology at Eastern Michigan University. His master's thesis was a unique application of ecological momentary assessment (EMA) methodology to study anxiety in musicians who were required to give a live performance before a panel of judges. In May of this year, Andrew successfully defended his dissertation, an EMA study of individuals with obsessive-compulsive disorder, and then finished his clinical internship at the University of Texas—Houston Medical School. He recently accepted a position in Germany as Assistant Professor at the Technical University of Dresden, where he will be Head of Anxiety Research. Dr. Gloster's research interests focus on the development and maintenance of anxiety, cognitive and behavioral treatments for anxiety and worry, issues surrounding comorbidity, patient accuracy in estimating functional relations of variables related to anxiety, treatment dissemination, and cross-cultural anxiety research.

**Elizabeth Hembree, Ph.D.** Dr. Hembree is Assistant Professor of Psychology in Psychiatry at the University of Pennsylvania, and serves as the Director of Clinical Training in the Center for the Treatment and Study of Anxiety. Her primary research interest and area of specialization is the study and dissemination of cognitive behavioral treatments for post-traumatic stress disorder (PTSD).

**Joe Himle, Ph.D.** Dr. Himle is an Assistant Professor at the University of Michigan School of Social Work. His research interests focus on both adult and youth obsessive-compulsive disorder, telemedicine, and cognitive-behavioral interventions for adults with depression and diabetes. He is also interested in the relationship between social anxiety and welfare and the interplay between psychosocial interventions and neurobiological variables. Dr. Himle has a joint appointment with the University of Michigan Department of Psychiatry.

**Michiyo Hirai, Ph.D.** Dr. Hirai is Assistant Professor at Washington State University. She received a Ph.D. in Clinical Psychology from Virginia Polytechnic Institute and State University in 2002. Her research areas include etiology, assessment and cognitive-behavioral treatment of anxiety disorders, the application of web-based assessment and interventions, and the role of emotions in developing and maintaining anxiety symptoms.

**Jody Hoffman, Ph.D.** Dr. Hoffman received her Ph.D. in Clinical Psychology and Industrial-Organizational Psychology from Bowling Green State University in 2003. She is currently a psychologist with Ann Arbor Consultation Services. Her research interests include evaluation of the effect of affirmative action programs, the use of ecological momentary assessment, health and the workplace, and the role of organizational value statements in recruitment.

**Flora Hoodin, Ph.D.** Flora Hoodin is Associate Professor of Psychology at Eastern Michigan University, Ypsilanti, Michigan. She completed a postdoctoral fellowship in Health Psychology and Rehabilitation Psychology at the Rehabilitation Institute of Michigan after earning her doctorate in Clinical Psychology from Wayne State University, Detroit, Michigan. For several years thereafter, she provided clinical services to patients with chronic intractable head pain in an inpatient interdisciplinary setting. Now in academia, her research

focus shadowing her clinical interests, she has published in the areas of chronic headache management and psychosocial aspects of bone marrow transplant survivorship. Recently, her research team has widened its purview to investigate how certain spinal deformities and orthopedic treatments affect and are affected by behavioral variables.

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**Dean Lauterbach, Ph.D.** Dr. Lauterbach earned his baccalaureate degree from the University of Wisconsin and his advanced degrees from Purdue University. Following completion of his clinical internship, he accepted a faculty position at Northwestern State University (NSU). He remained at NSU from 1995 to 2001, and during this time his research focused primarily on risk and resilience factors among college-age trauma victims. In 2001, Dr. Lauterbach accepted a position as Associate Professor of Clinical Psychology at Eastern Michigan University. He has continued his work on risk and resilience factors but has also expanded his interests to include victims of natural disasters and child abuse/neglect.

**Teresa Leyro, B.A.** Teresa Leyro received her B.A. in Psychology from Colby College, and is now a research assistant at Boston University. Her research experience includes helping implement novel online survey procedures to assess addictive disorders in college-aged students. Her current work on translational research investigates rates of fear learning and extinction among individuals from different diagnostic groups.

**Judith Lyons, Ph.D.** Dr. Lyons studied in Montreal (B.A., 1979, McGill University; M.A., 1982 and Ph.D., 1985, Concordia University) then completed her clinical internship in Jackson, Mississippi (1984-85). After serving as the founding clinical director of the Traumatic Stress Disorder Center at the Boston VA (1985-87), she returned to Jackson, MS to establish the Trauma Recovery Program at the G.V. ("Sonny") Montgomery VA Medical Center. She assesses and treats traumatic stress through her work with the VA, consults on personal injury and criminal cases, and participates in disaster response work with the American Red Cross. She is Associate Professor of Psychiatry and Human Behavior at the University of Mississippi Medical Center and conducts research with the support of the VA's South Central Mental Illness Research, Education and Clinical Center (MIRECC).

**Brian Marx, Ph.D.** Dr. Marx received his undergraduate degree from Boston University in 1987 and his Ph.D. in Clinical Psychology from the University of Mississippi in 1996. Following a clinical internship at the University of Mississippi Medical Center, his first aca-

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**Sandra Mendlowitz, Ph.D.** Dr. Mendlowitz received her doctorate from the University of Toronto in 1996. She is currently an assistant professor in the Department of Child Psychiatry at the University of Toronto, a full-time psychologist on the Anxiety Disorders Team, and is affiliated with the Hospital for Sick Children. Her research has primarily focused on the development and evaluation of effective treatment interventions for children and adolescents. She is also interested in how a person's readiness to change mediates treatment outcome. Several years ago, she published with Dr. Stéphane Bouchard a paper reporting the use of exposure and response prevention for bingeing with anorexic and bulimic females.

**Michael W. Otto, Ph.D.** Dr. Otto received his doctorate from the University of New Mexico, completed an internship at Brown University, and subsequently served as the Director of the Cognitive Behavior Therapy Program at Massachusetts General Hospital and Harvard Medical School. Dr. Otto is currently Professor of Psychology at Boston University. Dr. Otto's research activities are closely tied to his clinical interests and target investigations of the etiology and treatment of anxiety, mood, and substance-use disorders. Of particular interest to Dr. Otto is the development and testing of new treatments, including the combination of pharmacologic and cognitive-behavioral strategies for treatment-refractory and substance abusing patients, and the modification of treatment packages for novel populations (e.g., Cambodian refugees). He has published over 190 articles, book chapters, and books spanning these research interests. Dr. Otto is President-Elect for the Association for Behavioral and Cognitive Therapies, a fellow of the American Psychological Association, and a member of the Scientific Advisory Board for the Anxiety Disorders Association of America. He also serves as a section editor for *Cognitive and Behavioral Practice*, and on the editorial boards of *Anxiety*, *Behavior Research and Therapy*, *Clinical Psychology: Science and Practice*, *Journal of Anxiety Disorders*, *Journal Watch in Psychiatry*, and *Psychotherapy and Psychosomatics*.

**Janet L. Pietrowski, M.S.** Janet L. Pietrowski is a doctoral candidate in clinical psychology in the Department of Psychology at Eastern Michigan University. She earned her Master of Science degree in Clinical Behavioral Psychology at Eastern Michigan University. She has been convention manager of the Behavior Analysis Association of Michigan. Her research includes establishing schedule-induced behavior as an animal model of obsessive-compulsive disorder in humans. She has also studied resilience in unwed teenage mothers with a focus on how receipt of social support influences success.

**Mark B. Powers, Ph.D.** Mark Powers received his bachelor's degree in 1996 from the University of California at Santa Barbara, and a master's degree from Pepperdine University in 1997 while working under Dr. Joseph Wolpe as the managing editor for the *Journal of Behavior Therapy and Experimental Psychiatry*. He devoted two years to the management of clinical trials in schizophrenia, depression, chronic pain, generalized anxiety disorder, PTSD, panic disorder, social phobia, and pain disorder while working as a research coordinator at the University of

California at Los Angeles before entering a doctoral program at the University of Texas, and subsequently a predoctoral research position at Boston University. Dr. Powers completed his psychology internship at the University of Washington. His research has focused on the conditions that influence extinction learning, and he has published 27 journal articles and chapters. Dr. Powers has also served on the Committee on Science and Practice in Division 12 of the American Psychological Association (formerly the Task Force on Psychological Interventions or Empirically Supported Treatments). He is currently an assistant professor on the faculty of Social and Behavioral Sciences at the University of Amsterdam.

**Sarah Reiland, B.S.** Sarah Reiland earned her Bachelor of Science degree in Psychology from Seattle Pacific University in 2004 and is currently enrolled in the doctoral program in Clinical Psychology at Eastern Michigan University. Her research primarily involves risk and resilience factors in trauma survivors.

**Kerry James Ressler, M.D., Ph.D.** Dr. Ressler is Assistant Professor of Psychiatry and Behavioral Sciences at Emory University School of Medicine and an affiliate scientist at Yerkes National Primate Research Center. Dr. Ressler was trained as a molecular biologist at Harvard Medical School and as a behavioral scientist at Emory with Michael Davis, Ph.D. His current work focuses on translational research that bridges molecular neurobiology with clinical research on fear and anxiety disorders. Dr. Ressler has received several prestigious national research awards for his basic research, including the 2003 Anxiety Disorders Association of America Junior Faculty Award, two NARSAD Young Investigator awards, a Rockefeller Brothers Fund Young Investigator Scholarship, and a K01 award from NIMH.

**David C. S. Richard, Ph.D.** Dr. Richard is Director of the Psychology and Organizational Behavior programs in the Hamilton Holt School at Rollins College in Winter Park, Florida. He received his undergraduate degree in political science from the University of California at San Diego, a master's degree in Counseling and Consulting Psychology from Harvard University, and his Ph.D. in Clinical Psychology from the University of Hawaii. After completing his clinical internship at the University of Mississippi Medical Center, he held positions at Southwest Missouri State University (now Missouri State University) and Eastern Michigan University. He has published in the areas of psychological and behavioral assessment, the integration of computer technology in psychotherapy and behavior therapy, and interrater variability in the scoring of intelligence test protocols. His research interests focus on psychological and behavioral assessment, post-traumatic stress disorder and exposure therapy, ecological momentary assessment, the application of signal detection theory to diagnostic formulations of mental health disorders, and biased recall of psychological symptoms. In his spare time, he tends to a fledgling garden and refines his mai tai-making skills.

**Barbara Olasov Rothbaum, Ph.D.** Dr. Rothbaum is Associate Professor of Psychiatry at the Emory School of Medicine in the Department of Psychiatry and Behavioral Sciences and director of the Trauma and Anxiety Recovery Program at Emory. Dr. Rothbaum specializes in research on the treatment of individuals with affective disorders, particularly focusing on anxiety and post-traumatic stress disorder (PTSD). She has won both state and national awards for her research, is an invited speaker internationally, authors scientific papers and chapters, has published two books on the treatment of PTSD, and received the

Diplomate in Behavioral Psychology from the American Board of Professional Psychology. She is currently president of the International Society of Traumatic Stress Studies (ISTSS). Dr. Rothbaum is also a pioneer in the application of virtual reality to the treatment of psychological disorders.

**Jasper A. J. Smits, Ph.D.** Jasper Smits received his Ph.D. from the University of Texas at Austin. As part of his research and clinical training, he completed a fellowship at Harvard Medical School/Massachusetts General Hospital. Currently, Dr. Smits is Assistant Professor in the Department of Psychology at Southern Methodist University, where he directs the Anxiety Research & Treatment Program. With the intent to increase the efficacy of existing interventions for the anxiety disorders, and specifically for social anxiety disorder and panic disorder, Dr. Smits' research program focuses on (a) enhancing the understanding of factors that drive or maintain pathological anxiety; and (b) the development of techniques that facilitate anxiety reduction and decrease the risk of relapse. He has authored several empirical papers elucidating mediators and moderators of exposure treatment efficacy, as well as a number of review articles that help hone clinicians' attention on factors that may attenuate the effectiveness of exposure-based treatments for anxiety disorders.

**James Todd, Ph.D.** Dr. Todd is Professor of Psychology at Eastern Michigan University. He holds a Ph.D. in Developmental and Child Psychology from the University of Kansas. He is co-editor, with Edward K. Morris, of *Modern Perspectives on John B. Watson and Classical Behaviorism* and *Modern Perspectives on B.F. Skinner and Contemporary Behaviorism*. He is past-President and current Secretary-Treasurer of the Behavior Analysis Association of Michigan. He has written on the history of Division 25 (Experimental Analysis) of the American Psychological Association, evolution of psychology textbooks, and misconceptions about behavior analysis. His current research includes establishing schedule-induced behavior as a model of obsessive-compulsive disorder and determining the basic behavioral processes underlying activity anorexia.

**Laura Vernon, Ph.D.** Dr. Laura Vernon is Assistant Professor at Auburn University. She received her Ph.D. in clinical psychology from the University of Illinois at Urbana-Champaign in 2000. Her research focuses on the role of emotion, cognitive processes, and coping in the anxiety disorders.

**Stacey A. Waller, Ph.D.** Dr. Waller earned her doctoral degree in Clinical Psychology from Western Michigan University in 2004. She is currently a staff psychologist in the Department of Behavioral Medicine and Psychiatry at West Virginia University School of Medicine. Her primary area of interest is cognitive-behavioral treatment of anxiety disorders.

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# *Preface*

C. S. Lewis once wrote that courage is the highest virtue because all other virtues depend upon it. For individuals with long-standing fears, a healthy dose of courage may be needed before taking the plunge into exposure therapy. Although exposure remains one of behavior therapy's most efficacious treatments, it is not for the faint of heart. Exposure treatments require that clients tolerate the very fear and anxiety they have so deliberately avoided. Over time, the effects of exposure therapy may be seen not only in the reduction of anxiety, but in the emergence of new and more adaptive behavioral repertoires that promote greater client self-efficacy for managing previously feared situations.

This book arose from an observation a couple of years ago that the proliferation of research surrounding exposure therapy over the last four decades had not produced a volume that conveniently brought together an accounting of its application across the anxiety disorders. Individual chapters describing exposure, meta-analyses comparing exposure to other psychotherapeutic interventions, and treatment manuals detailing the proper application of exposure therapy, are relatively common. However, a single volume that brought together an array of voices who considered exposure therapy from a multiplicity of perspectives was needed.

With the help of our publisher, Academic Press, we set about convening leading clinicians and researchers in exposure therapy and behavior analysis to produce a volume that was at once accessible both to novices and experienced clinicians. The book starts with an introduction to exposure therapy that presents essential features of exposure techniques, mechanisms of action, and issues pertaining to assessment. Jim Todd and Janet Pietrowski then detail the contribution animal models have made in our understanding of how exposure therapy works. John Forsyth, Velma Barrios, and Dean Acheson follow with a consideration of exposure therapy in light of the evolution of behavior therapy and highlight the role of verbal processes in mediating and sustaining fear reactions. In the fourth chapter, Mark Powers, Jasper Smits, Teresa Leyro, and Michael Otto discuss the limitations of understanding the

effects of exposure therapy solely in terms of extinction and discuss the clinical implications of context effects, particularly with regard to relapse.

With the first four chapters serving as a foundation, the book then moves into consideration of specific anxiety disorders. Dean Lauterbach and Sarah Reiland discuss exposure therapy in the context of post-traumatic stress disorder. Frank Castro and Brian Marx follow with a chapter on adult survivors of childhood sexual abuse. Rounding out the chapters considering trauma-related themes, Carlos Finlay and Judith Lyons discuss issues surrounding the use of exposure therapy with war veterans.

The next two chapters focus on the use of exposure therapy with individuals diagnosed with obsessive-compulsive disorder. Jonathan Abramowitz and Karin Larsen provide a review of the research literature and a case study report in Chapter 8, and Sandra Mendlowitz describes the use of exposure therapy with a child in Chapter 9.

Panic and phobia are considered in the next two chapters. Ellen Koch, Andrew Gloster, and Stacey Waller review the use of exposure therapy in the treatment of panic disorder in Chapter 10 and supplement the review with a case study of a man who developed panic symptoms after the deaths of two close relatives. Michiyo Hirai, Heather Cochran, and Laura Vernon then review the use of exposure therapy in the treatment of phobia in Chapter 11.

The next four chapters focus on the use of exposure therapy in behavioral medicine and recent developments in psychopharmacology. In Chapter 12, Flora Hoodin and Mary Gillis review the use of exposure in individuals complaining of pain anxiety or experiencing a blood injection phobia. In the next chapter, Joe Himle and Jody Hoffman discuss novel application of exposure therapy in the treatment of a case of hypochondriasis. Chapters 14 and 15 highlight psychopharmacology as Brett Deacon comprehensively reviews outcome studies examining combined pharmacotherapy and exposure therapy treatment regimens. Kerry Ressler, Michael Davis, and Barbara Rothbaum then describe exciting recent advances in the understanding of the biological bases of extinction and how the pharmacological blockade of *N*-methyl-*D*-aspartate (NMDA) receptors speeds extinction learning.

The last three chapters in the book offer an exploration of contemporary developments and trends in the field. Stéphane Bouchard, Sophie Côté, and David Richard review the outcome literature for virtual reality applications of exposure therapy in Chapter 16. Elizabeth Hembree and Shawn Cahill then discuss obstacles to successful implementation of exposure therapy and myths surrounding the use of exposure. The book closes with a chapter by David Richard and Andrew Gloster in which they review litigation pertaining to exposure therapy (or, more appropriately, the lack of evidence of litigation) and discuss the results of an empirical study examining attitudes that clinicians, clients, and others hold toward various forms of exposure therapy.

The book is a healthy mix of literature review, theory, case studies, and empirical research. The overall format of the book was purposefully eclectic and designed to

share with the reader the rich history and varied application of exposure therapy. We hope that it will serve as a useful reference for years to come. We would like to thank all the chapter contributors, our diligent undergraduate and graduate student assistants (especially Shawn Mason, Jennifer Mainka, and Laszlo Erdodi), and the helpful staff at Academic Press for their efforts. Your willingness to be a part of this project is greatly appreciated. We would also like to extend a special thanks to our families for their support and encouragement.

*David C. S. Richard  
Dean Lauterbach  
July 25, 2006*

# *Description, Mechanisms of Action, and Assessment*

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There can be no doubt that exposure therapy in its many variations represents one of the most efficacious treatment approaches available to clinical psychologists. Even today, however, exposure therapy is frequently overlooked as a preferred treatment for anxiety in favor of other treatments that have garnered less empirical support. To complicate matters, popular accounts of the causes and treatment of anxiety symptoms frequently omit mention of learning mechanisms or exposure therapy. For example, in a recent article in *Scientific American Mind*, Siegel (2006) claims that “once a person has learned to feel apprehensive about something, he or she may always feel dread associated with that experience (p. 47),” even though there is ample evidence that behavioral treatments for anxiety can reduce apprehension and in many cases, eliminate it. To complicate matters, he then contends that the best way to defeat fear is to practice the “five Rs”: regular sleep, regular meals, regular entertainment, regular exercise, and regular work schedule. Although the five Rs are probably helpful, they represent recommendations that could apply to anyone, not just individuals with an anxiety disorder.

Omitting mention of the success exposure therapy has had in treating a variety of anxiety-related problems is commonplace in the popular media and leads one to a curious yet disheartening conclusion. Despite years of empirical work that points overwhelmingly to the efficacy of exposure therapy across a number of anxiety disorders, as well as significant efforts to disseminate these results, both the public-at-large and mental health workers seem to know little about exposure therapy and/or the reasons why it works. For example, in the aforementioned article, the author

fails to mention exposure therapy, let alone distinguish it from other treatments that are less empirically supported. Instead, he generically describes therapy as “time-consuming” and asks rhetorically, “is such verbal support enough?” (p. 46). Of course, for decades, behavior therapists have resoundingly responded to this question in the negative.

Unfortunately, one article in the popular press may have a greater effect on public awareness than the most rigorously designed empirical study. It is not so much that exposure therapy is *dismissed* as it is *ignored*. We speculate that the roots of neglect are complex, are applicable to behavioral approaches more generally, and probably stem from the fact that many clinical psychologists either are not well versed in learning theory, routinely assume behavioral approaches are superficial in their treatment of complex human suffering, or reject principles of conditioning as being irrelevant to the therapeutic enterprise.

This chapter has multiple goals. First, we define the key characteristics of exposure therapy. As we will see, exposure techniques come in many forms, but all share certain features in common. In addition, some techniques that have not traditionally been considered a form of exposure therapy clearly include certain exposure elements. It is our position that exposure is a critical component of any successful therapy for anxiety and that exposure is an active treatment mechanism in therapies that were not originally construed as a form of exposure (e.g., written disclosure, eye movement desensitization and reprocessing (EMDR), systematic desensitization, anger management).

Second, we present different perspectives as to why exposure therapy works. Our coverage is introductory with an emphasis on contemporary models. More comprehensive reviews of mechanisms of action in exposure therapy have been published elsewhere (e.g., Tryon, 2005). Finally, we address the assessment of fear reduction as it relates to exposure therapy. Because clinicians most often use exposure therapy with individual clients, we discuss the different methods for assessing treatment-related fear reduction and the complexities of reliable, repeated assessment of individuals.

## WHAT IS EXPOSURE THERAPY?

### **Characteristics of the Feared Stimulus**

Exposure therapy has been shown to be effective in the treatment of anxiety problems. The term *exposure* broadly means exposure to a feared stimulus of some sort. Anxiety-evoking stimuli can be animate (e.g., spiders, dogs), inanimate (e.g., thunderstorms, earthquakes, germs), represent feared situations (e.g., fear of public speaking, test anxiety), or be intrusive thoughts or memories of past events (e.g., a repeated recollection of a prior sexual abuse). Reactions to these various stimuli can range from mild anxiety to full-blown panic symptoms. Further, anxiety may be

exacerbated in the absence of a physical stimulus through exaggerated expectations of impending doom. Thus, although the stimulus itself may be easily identified in treatment, anxiety to the feared stimulus is usually compounded by catastrophic self-statements that magnify the perceived threat an individual may experience.

By its very nature, exposure therapy implies that new learning occurs as a person is exposed to a feared stimulus, or representation of the feared stimulus, in the absence of an actual threat. Although there is some debate as to what exactly occurs in the brain during exposure, new behavioral repertoires are developed and reinforced each time an individual successfully manages a previously feared situation. How exposure is conducted in treatment is often a function of the nature of the fear. For example, although it may be possible to develop an approach task for a spider phobic that utilizes a real spider, an example of exposure *in vivo*, the same option is not available for a female adult survivor of child molestation. Instead, imaginal exposure would be preferred, for both practical and ethical reasons. In either case, successful exposure to the actual stimulus (a spider) or to the memory of an event (child molestation) implies a reduction in one's physiological response to the feared stimulus, as well as the probability that subsequent avoidance and escape responses will occur.

### **Characteristics of the Anxiety Response**

In the brain, responses to feared stimuli are first mediated by the visual thalamus, visual cortex, and amygdala. The brain then activates the sympathetic nervous system, which is responsible for initiating a fight-flight response. The fight-flight response is the body's way of preparing for and reacting to a threat. Although all individuals have experienced the fight-flight response at some point in their lives, exposure therapy is justified when conditional stimuli, or cues, associated with the feared stimulus frequently occur in the person's natural environment and have the effect of evoking a response. Typically, individuals then develop avoidance and escape strategies to minimize exposure to cues that may have a significant effect on the quality of one's life. For example, we know of one individual who survived a horrific automobile accident and subsequently refused to drive or ride in an automobile. As a result, he commuted to work using the city bus, even though the trip took two hours in each direction.

#### ***Pervasiveness***

Although the terms *frequency*, *intensity*, and *duration* may be obvious to the reader, generalized responding (or pervasiveness) is a hallmark of pathological anxiety. Anxiety is pervasive when a stimulus evokes fear or avoidance behavior irrespective of context. For example, a fear of spiders is pervasive if it occurs regardless of how a spider is encountered (e.g., in the backyard, at the zoo, in the bedroom, in

one's imagination). A person with obsessive-compulsive disease (OCD) may have a strong fear of germs that does not depend on the way he or she contacts the germ.

### ***Persistence***

Another hallmark feature of fears typically treated using exposure therapy is the persistence of the problem. Most clients do not seek exposure therapy as their first treatment option. Instead, they often agree to exposure therapy after other treatment efforts have failed. Sometimes, this might be after many years of suffering. The fact that anxiety responses do not seem to alleviate appreciably over a long period implies that new learning has not taken place. Ironically, those individuals who have not experienced success using other treatment modalities are often the most proficient at using elaborate avoidance and escape responses that preempt new learning from occurring.

## **Core Elements of Exposure Therapy**

Although there are many variations of exposure therapy, all share some common elements. Our purpose here is to describe the similarities in different forms of exposure therapy without recourse to proposed underlying mechanisms of action.

### ***Systematic Exposure to a Stimulus***

Exposure therapy, as its name implies, involves deliberate and planned exposure to a feared stimulus, or representation of the stimulus, until the intensity of a person's distress recedes to a level that is (1) lower than pretreatment levels and (2) acceptable to the client. A feared stimulus is one that reliably evokes changes in multiple modes of behavior characteristic of an anxiety response (e.g., physiological responses, subjective experience of fear, catastrophic cognitions) and may be detected across multiple methods of assessment (e.g., self-report, behavioral observation, psychophysiological measures), although perfect congruence of data across assessment measures is not necessarily expected. Although reduction of *all* anxiety is not the goal of treatment, reduced anxiety in the presence of the previously feared stimulus has been commonly interpreted as evidence of habituation and therefore, therapeutic gain (Foa & Kozak, 1986). Systematic exposure to a feared stimulus or representation of the stimulus constitutes the core element of any exposure therapy.

For some individuals, the stimulus does not evoke anxieties but rather cravings that are physiologically mediated and difficult to resist, as in the case with cigarettes, alcohol, opiates, and other recreational and illicit drugs. Similarly, some environments set in motion a chain of behaviors that occur at high rates and are maladaptive, as in the case of persons with gambling problems. Cue exposure therapy is an extinction-

based treatment paradigm that has attempted to moderate cue reactivity associated with drugs or gambling through repeated exposure to conditional stimuli while preventing the stereotyped response from occurring. The efficacy of cue exposure therapy remains contested, with a recent meta-analysis concluding there is no demonstrated efficacy for its use (Conklin & Tiffany, 2002), although some researchers questioned the wisdom of conducting the analysis across heterogeneous addiction populations (Drummond, 2002). Although cues encountered by individuals with a substance use or gambling problem can certainly evoke responses characterized by anxiety and distress, individuals with addiction problems typically do not *fear* the cues. Instead, the distress a person feels results from efforts to inhibit select behaviors that, in the short term, gratify the urge evoked by the cues. Thus, an individual does not fear a hypodermic needle, cigarette, or slot machine; anxiety results when an individual attempts to resist engaging in behaviors previously associated with these conditional stimuli and reinforced by the past effects of their use (e.g., a “rush” when shooting heroin, a nicotine high when smoking a cigarette, or the thrill of winning money on the slots).

A critical difference between cue exposure approaches and the use of exposure therapy for anxiety disorders, therefore, is that the problem behavior in the former almost always is characterized by a maladaptive *approach* response. The response, or chain of behaviors, is ultimately reinforced by the potent pharmacological properties of the drug and the physiological consequences of not taking the drug (e.g., withdrawal symptoms). Anxiety disorders, on the other hand, are characterized by maladaptive avoidance and/or escape responses that are reinforced by their *supposed* effects. For example, the focal problem for an individual with OCD may be anxiety that develops in response to an object that possesses germs or toxins. Avoidance and escape behaviors (e.g., washing money with an antibacterial soap, cleaning one’s hands with alcohol) function to reduce anxiety in the short term by placating the individual’s exaggerated fear of potential harm to self. Exposure and response prevention techniques provide the individual with corrective information that has the effect of recalibrating the person’s estimates of potential harm so as to more realistically align with actual probabilities. When an individual learns that harm is no more likely to occur as the result of not engaging in the avoidance or response behavior, the supposed value of the behavior in warding off a threat is weakened.

Although cue exposure therapy is similar in its rationale to the various forms of exposure described in this volume, the focus here is on reducing avoidance and escape behaviors as they apply to stimuli that are *feared*. Exposure therapists aim to expose individuals to previously feared stimuli in the absence of an actual threat to create a corrective learning experience that subsequently moderates the client’s estimated probability of the presence of a real threat. Exposure therapy also has the effect of reinforcing an alternative behavioral repertoire that supplants the maladaptive avoidance and escape responses. Thus the focus of this volume is not on responses associated with addiction but on the application of exposure therapy to anxiety-disordered populations.

***Representation***

Exposure therapy also implies presentation or representation of the feared stimulus for therapeutic purposes. The stimulus may be presented in reality (in vivo), imaginably, virtually (in virtuo), or as part of a writing exercise. Systematically exposing the client to the stimulus, or parts of it, distinguishes exposure therapy from other treatments that may have an incidental exposure component. Simply referencing a feared stimulus, or reinterpreting its meaning, may include an element of exposure (and may have a therapeutic effect) but does not constitute formal exposure therapy. Talking about the meaning of a traumatic event is one step removed from actually processing horrific images encountered during an event and the memories associated with them. Although a client may imagine the feared stimulus or situation as the result of a cognitive intervention (e.g., the mere mention of the word *Vietnam* may conjure up memories from a firefight), exposure in this instance is secondary to the larger goal of having the client reinterpret the meaning of the event or reevaluate the validity of beliefs and cognitions associated with the event. In exposure therapy, the exposure itself is conceived as a necessary precondition for change, with all subsequent modifications in cognitions, and interpretations of meaningfulness, occurring as a result of fear reduction. Thus, although it is not the express purpose of exposure therapy to facilitate reinterpretation of a feared situation, this often is a by-product of the intervention.

***Repeated and/or Prolonged Exposure***

Although there have been reports of significant clinical change after a prolonged single session of exposure therapy (Heading, Kirkby, Martin, Daniels, Gilroy, & Menzies, 2001; Thom, Sartory, & Jöhren, 2000; Veltman, Tuinebreijer, Windelman, Lammertsma, Witter, Dolan, et al., 2004; Breitholtz & Öst, 1997, Öst, 1989), a central feature of exposure therapy is that intervention is repeated across sessions and/or prolonged within-session. Guidelines for prolonged exposure have been developed by Hembree, Rauch, and Foa (2003). Repeated and prolonged exposure has been justified in terms of habituation—a decrement in a fear response owing to repeated processing or reliving of the event. Others have argued that repeated exposure in quick succession may lead to superior extinction effects in humans, as it does in mice (Quirk, 2004).

**Additional Elements of an Exposure Therapy  
Treatment Package*****Response Prevention***

Most forms of exposure therapy also include a response prevention component. Because avoidance and escape responses, by definition, function to reduce the individual's exposure to an aversive stimulus, a consequential effect is that individuals

fail to acquire new learning regarding the feared stimulus. Thus, avoidance and escape responses have powerful short-term effects because they preempt or alleviate anxiety. However, they also inhibit new learning and prevent introduction of corrective information that would ultimately reduce the intensity of an individual's emotional response.

Although response prevention can take any of a number of forms, a common misconception is that response prevention is coercive, in that the therapist is responsible for preventing an escape response in a client. Unfortunately, the term itself errantly implies a heavy-handedness on the part of the therapist. In truth, prevention occurs only with the willing and informed participation of the client. The therapist usually serves to prompt or remind the individual not to engage in the behavior when it occurs and encourages the client to engage in alternative behaviors that function as an alternative response repertoire. As a result, response prevention serves both to prevent the occurrence of maladaptive behaviors and to reinforce more adaptive or appropriate behavior.

### ***Fear Hierarchy***

Therapists rarely expose patients to their greatest fear without some level of preparation. Clients often progress through a graded hierarchy of fears that are arranged from least to most fear evoking. For example, a hierarchy might be composed of several progressively challenging scenarios involving a feared object. Alternatively, clients may recount a sequence of events from a traumatic memory, starting with those events that evoke the least anxiety and progressing to the most distressing images and recollections.

### ***Reduction of Distractions***

Research on the effectiveness of exposure therapy has shown that removing distractions during the exposure sessions is associated with better treatment outcome. Distractions can take several forms and may include the perception of available safety. This finding is not surprising, as distractions enable the patient to avoid thinking about a feared stimulus and therefore inhibit new learning.

### ***Experiencing the Present***

Regardless of the way exposure therapy is conducted, clients are encouraged to confront their fears in the present tense. For example, a client recounting a traumatic event in exposure therapy is encouraged to describe the event as if it were being relived. Treatment focuses on processing the emotions as though they were recurring. As a result, clients are gently prompted during recall to avoid using past tense verbiage, as it implies temporal distance from the events and reduces the degree to which the client may be immersed in the processing. Thus, a client who

says “I felt horrified” would be prompted by the therapist to say “I feel horrified.” In vivo and in virtuo treatments also stress the importance of processing emotion in the present by exposing the client to a feared stimulus (in vivo) or simulated imagery of the feared stimulus (in virtuo).

### *Use of Adjunctive Treatments*

Therapists rarely use exposure in the absence of other treatments. In fact, exposure therapy is often used in conjunction with other treatments and in many cases, only after other treatments have had little or no effect on reducing client symptoms. When using exposure therapy, clinicians must determine whether concurrent treatments will inhibit or potentiate the effects of exposure therapy. In this regard, there are many considerations. For example, anxiolytic medications may inhibit the client’s ability to experience anxiety during an exposure session. Other medications may enhance the effects of exposure therapy and speed extinction.<sup>1</sup>

Interactive effects are not limited to pharmacological treatments, however. Psychosocial interventions may encourage the development of coping skills that functionally distract the patient from confronting a feared stimulus during exposure. Alternatively, a client who is also participating in group therapy may converse with other patients who may be skeptical of the treatment if they do not understand its rationale. In any case, there is a general consensus among exposure therapy practitioners that selection of adjunctive treatments should carefully consider the treatment’s potential interaction with exposure therapy.

## MECHANISMS OF ACTION

### **Complexities in Isolating Mechanisms of Action**

As Foa and Kozak (1986) note, exposure may represent a common mechanism that explains therapeutic change in treatment across theoretically disparate approaches. Most forms of therapy involve exposure to aversive stimuli in some way, whether the exposure involves talking about a distressing event, promoting mastery, or framing the exposure in the context of resolving long-standing intrapsychic issues. Further, any treatment technique that reduces the probability of escape and avoidance behavior in response to an aversive stimulus should have the effect of facilitating corrective learning experiences and reinforcing a repertoire of alternative adaptive behaviors.

To the degree that elements of exposure, whether incidental or systematic, occur in theoretically dissimilar treatments that supposedly work as a result of mechanisms that are actually inert, the power of inferential statistical methods to detect statistically significant differences between exposure therapy and other treatments

<sup>1</sup>See the chapter discussing *N*-methyl-D-aspartate (NMDA) receptor antagonists by Ressler, Davis, and Rothbaum in this volume.

is reduced. This issue has been at the center of the debate surrounding EMDR, since a number of dismantling studies concluded that eye movements have no effect therapeutically beyond what appeared to be a core exposure element to treatment (see McNally, 1999, for a review). In this case, the supposed equivalence of treatment effects reflected nothing more than a comparison of topographically dissimilar, yet functionally equivalent, treatment methods. Viewed in this way, EMDR is not so much a new treatment as a repackaged version of exposure elements with additional components that have yet to show incremental treatment validity above and beyond the effects of exposure alone. Because EMDR without finger waving bears a strong likeness to imaginal exposure, McNally concluded that, “what is effective in EMDR (imaginal exposure) is not new, and what is new (eye movements) is not effective” (p. 1). The idea that EMDR shares similar mechanisms of action with exposure therapy has been echoed by others as well (e.g., Spates & Koch, 2003; Spates, Waller, & Koch, 2000).

A problem in designing sophisticated comparative outcome studies involves isolating treatment mechanisms that are orthogonally represented across conditions. Unfortunately, there are inherent limits to treatment dismantling. Because most treatment packages represent a constellation of techniques that may or may not be directly relevant to the underlying theory, dismantling designs often sacrifice ecological validity by creating an artificial treatment context that is unrepresentative of actual practice. For example, removing the exposure elements inherent in EMDR yields an unrepresentative facsimile of EMDR. Alternatively, researchers may design dismantling studies that assess the incremental treatment validity of a supplemental procedure (e.g., finger oscillation) for exposure therapy. Because exposure therapy is known to be efficacious, however, there is a ceiling as to the effect supplemental procedures can have beyond the treatment effect of exposure therapy alone. If the ceiling of maximum possible improvement under any therapeutic condition is close to the current ceiling for exposure therapy, then the unique effect attributable to any supplemental procedure will necessarily be small. Detection of a statistically significant and clinically meaningful treatment effect for such a small effect would require a level of statistical power greater than current studies possess.

Similarly, Pennebaker and Beall's (1986) written emotional disclosure paradigm appears to contain significant exposure elements, despite the fact that Pennebaker and colleagues have claimed that no one theory can account for the therapeutic effects of written disclosure. Written emotional disclosure, however, clearly possesses a strong exposure element. In a cleverly crafted study, Sloan, Marx, and Epstein (2005) assigned 79 college students to one of three groups: written disclosure about a specific traumatic event, written exposure about any traumatic event (different events could be disclosed across sessions), and a control condition in which participants wrote about trivial life events. They found that only individuals in the group writing about a specific event showed statistically significant and clinically meaningful changes in post-traumatic stress disorder (PTSD) symptoms, depressive symptomatology, and subsequent physical health complaints. In contrast, the