



**H**andbook of Emotion  
Elicitation and Assessment

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## Introduction

### Organizing the Tools and Methods of Affective Science

Affective science—the scientific study of emotion and emotion-related processes—is now a mature domain of inquiry, with its own standardized measures, induction procedures, data analytic challenges, subdisciplines, core theoretical debates, and so on. Though long associated with psychology, researchers in the affective sciences can now be found in a variety of disciplines. Psychologists, biologists, sociologists, geneticists, neuroscientists, ethologists, economists, behavioral ecologists, and even physicians each contribute their specific expertise like pieces of a puzzle, because emotions distribute their echoes and effects at every one of these levels and more.

A cursory scan of titles in the Oxford University Press Series in Affective Science bears this out. By 2003, the mammoth *Handbook of Affective Sciences* (Davidson, Scherer, & Hill, 2003) offered as near an exhaustive overview of the field as we are likely to see soon, making it clear that emotions are implicated in domains of inquiry as broad and diverse as brain-behavior relationships, behavior genetics, personality, social bonding and interaction, evolution, culture, decision making, psychopathology, and health. To date, both the series and the *Handbook of Affective Sciences* have focused on overviews of results and explications of theoretical developments in this diverse field. Few texts devote space to explicit discussions of the empirical tools and methodological challenges that collectively allow emotion research to proceed, despite the fact that the study of emotion often requires highly specialized designs, instruments, and strategies. In-

deed, new techniques are proliferating at an impressive rate, often without heed to the specific incremental advantages they may or may not offer. Well-validated and substantially understood measures are frequently neglected in favor of expeditious progress, convenience, or both. The field is now at a point at which a large number of excellent elicitation procedures and assessment approaches exist, and the broader application of these procedures and approaches stands to increase interlaboratory standardization and, by doing so, to increase the speed and accuracy with which emotion research can be communicated among peers. In short, it is time for a handbook that organizes and details the major methodological accomplishments of this multifaceted field, and that is what we hope to provide with the *Handbook of Emotion Elicitation and Assessment*.

In publishing this handbook, however, we emphatically do *not* wish to stifle the creative development of innovative methods. On the contrary, our hope is that this book will *accelerate* the development of new elicitation and assessment procedures by discouraging researchers from reinventing approaches for which sufficient resources currently exist. In advocating the expanded use of standard and well-researched methods and techniques, we, in fact, hope to encourage current and future emotion researchers to cast their collective gaze with greater creativity and determination toward domains that lie beyond the field's current reach.

It is also our intent that this handbook serve as something more than a mere collection of tools. Some chapters

address broad methodological problems (e.g., working with infants and children, measuring subjective emotional experience). Others seek to assist the broader community of affective scientists in being critical and conversant on topics still beyond the scope of many laboratories (e.g., comparative research, functional neuroimaging). Still others review and recommend general methodological orientations and strategies (e.g., thinking like a social psychologist in designing emotion elicitation). Ultimately, this collection should serve as a pragmatic resource for emotion researchers in need of both specific guidance and general advice. Scales are presented and described, stimuli are reviewed in a methodological context, coding systems and detailed assessment tools are suggested, innovative methodologies are proposed, current methodological problems are highlighted, and general recommendations are expressed. It is a book of resources—a kind of bookshelf consultant—for the affective scientist, or for the scientist whose foray into the affective sciences may be in its beginning stages.

The volume is organized into three general sections. The first addresses the laboratory *elicitation* of emotion, the second discusses the *assessment* of emotion, and the third focuses on methods that support research on emotion's potential biological underpinnings.

### Part I: Emotion Elicitation

Section I (chapters 1—10) covers a diversity of strategies for eliciting emotion in the laboratory. The selection of topics under elicitation procedures reflects our view that no single sensory domain is paramount—that indeed emotions can arise through a variety of modalities and that these modalities (even some that can be controversial) need to be well understood and properly implemented if comparable results across laboratories can be achieved.

Opening this section, Rottenberg, Ray, and Gross (chapter 1) offer detailed instructions on the acquisition and use of standardized emotional film clips, and Bradley and Lang (chapter 2) discuss the proper use of their well-known International Affective Picture System (IAPS). Other chapters provide detailed instructions and recommendations for using emotional *behavior*. Ekman (chapter 3) provides detailed recommendations for using his Directed Facial Action (DFA) task, and Laird and Strout (chapter 4) review the implementation of what they refer to as a “family” of elicitation techniques that utilize emotional behaviors. Wiens and Öhman (chapter 5) clarify the often murky methodological waters surrounding the elicitation of “unconscious” emotion via masking techniques and provide invaluable specific recommendations for their use.

Of course, although essential (especially when implemented properly), films, images (perhaps especially masked ones), and emotional behaviors can be limited in their ability to elicit *intense* forms of emotion in the laboratory or,

indeed, some forms of emotion altogether. Famous among the elicitation-resistant laboratory emotions is anger, but the elicitation of intense or “authentic” emotional responses in the laboratory is, in general, challenging. Harmon-Jones, Amodio, and Zinner (chapter 6) offer recommendations for the use of strategic laboratory social interactions in the elicitation of emotion with high levels of both experimental control and ecological validity. In chapter 7, Roberts, Tsai, and Coan review a specific strategy for eliciting emotional reactions that are not only authentic but often quite intense. Their *dyadic interaction task* offers the possibility of studying emotional processes in social contexts and at levels of intensity that are often beyond what is achievable—either methodologically or ethically—using ordinary laboratory challenges.

Eich, Ng, Macaulay, Percy, and Grebneva (chapter 8) describe their *MCI technique*, a theoretically based elicitation procedure that places music (M) and contemplation (C) in an idiographic (I) context, such that individuals are not subjected to other experimental procedures until they are *known* (via occasional measurements) to be sufficiently induced into a target mood. Their instructions include lists of widely available pieces they have used for this purpose, and with the advent of online music stores (e.g., iTunes), acquisition of this music has become inexpensive and convenient.

Rolls (chapter 9) reviews the use of primary reinforcers in the elicitation of emotion and emotional processes (e.g., physiological processes associated with emotion). In providing his recommendations, he also outlines a broad model of emotions as reflecting brain systems that respond to rewards and punishments. In this way, Rolls invokes fundamental evolutionary processes that foreshadow later chapters on the biological underpinnings of emotion and emotional responding. Similarly, Levenson (chapter 10) reviews methodological issues in the elicitation of emotion in neurological patients. The reader is particularly referred to this chapter for Levenson's excellent review of a broad array of elicitation techniques, many of which do not receive dedicated chapters in this volume.

### Part II: Emotion Assessment

Emotion elicitation is of little use if we are incapable of reliably measuring emotional responses. Leading off this section, Gray and Watson (chapter 11) describe the history and proper use of a variety of paper-and-pencil scales designed to assess both state and trait affect, with particular emphasis on the widely used Positive and Negative Affect Schedule (PANAS). It would be hard to overestimate the impact of such scales, especially because the reliable and valid measurement of subjective experience is such a formidable task (as noted by Nielsen and Kaszniak later in chapter 22). Wilson, MacLeod, and Campbell follow this in chapter 12 with a discussion of information-processing approaches to understanding emotion and emotional effects. This work offers a new and fruitful heuristic for understanding the role of emo-

tion in a variety of cognitive contexts, with a specific focus on our conceptual understanding of cognitive vulnerabilities to affective disorders such as depression and anxiety.

Cohn, Ambadar, and Ekman (chapter 13) introduce behavior coding with their review of the Facial Action Coding System (FACS). Their chapter discusses the major facial elements associated with emotional expression and describes procedures for extended training and certification in FACS coding. In chapter 14, Cohn and Kanade describe their important ongoing work in the domain of automated facial analysis (AFA), an emerging technology that holds the promise of automating FACS coding. Owren and Bachorowski (chapter 15) present methods for measuring a complementary mode of emotional expression in their comprehensive discussion of vocal acoustics associated with emotional responding, and, synthesizing across channels of expression, Coan and Gottman (chapter 16) describe the Specific Affect (SPAFF) Coding System for coding emotional behavior at the construct level. This system trains coders to be constantly mindful not only of emotional facial expressions but also of vocal acoustic properties and verbal content.

Experience sampling and the analysis of time are of increasing interest to affective scientists, and with good reason. Technical and data analytic advances in recent years have made the study of these important variables—long neglected as they have been—more available and affordable. Ruef and Levenson (chapter 17) describe a device for continuous, fluid reporting of emotional responding through time called the *affect rating dial*. The basic design and implementation of this tool offers a host of advantages to researchers interested in the chronotropy of emotional responding, the study of psychophysiological coherence in emotional responding, and the synchrony of emotional responding among interacting dyads. Stein and Hernandez (chapter 18) then describe the Narcoder, a program that allows researchers greater access to the richness of emotional thoughts and language, as well as the ways in which verbal content can indicate emotional understanding and subjective well-being. In chapter 19 Brandstätter brings the analysis of time together with a detailed look at subjective emotional experience in his discussion of the time sampling diary (TSD). Brandstätter has been a pioneer in applying methods of frequent experience sampling across time and situations. His chapter offers clear instructions for implementing his particular approach, including innovative data analytic methods for use with TSD data, once collected. Researchers will find his approach broadly applicable, as well as a useful foundation for future iterations of time sampling methodologies.

Practical methodological concerns associated with special populations and problems are highlighted in the next three chapters. In chapter 20, Matsumoto and Yoo walk the reader through the myriad methodological issues that frequently arise in the study of emotion across cultures. Matsumoto and Yoo take the reader beyond simple two-culture comparison studies, offering descriptions of different types of cultural comparisons, as well as recommendations for

maximizing the interpretability, repeatability, and impact of such studies. Similarly, Henderson and Fox (chapter 21) offer a host of pragmatic and theoretical recommendations for the sound study of emotion in infants and children. Developmental milestones (e.g., in social-cognitive development and attentional control) hold implications for the kinds of questions that can likely be asked in such populations, and the validity of parental reports of child and infant emotionality raise additional methodological and pragmatic concerns. Ethical issues also come to the fore in dealing with infants and children in ways that are not as common with adult populations. Finally, Nielsen and Kaszniak (chapter 22) raise a number of vexing questions about the nature and measurement of subjective emotional experience. These questions range from how well such reports actually capture the richness of experience to whether such reports are capable of providing insights about underlying emotional events, especially at the level of physiology. Rather than cautioning affective scientists to shy away from measuring emotional experience (as, they note, so many have done), Nielsen and Kaszniak celebrate the “rich phenomenality of emotion” and call on researchers to expand their notions of experience measurement to include dimensions of motivational, perceptual, and cognitive awareness and to explore alternative reporting methodologies.

### **Part III: Methods for Understanding the Biological Bases of Emotion**

When first considering a section on methods for understanding the biological bases of emotion, we quickly realized that the section could easily expand into a book of its own. In fact, several related books currently exist (e.g., Cacioppo, Tassinary, & Berntson, 2000, or the revision due out later in 2006), few or none with an explicit emphasis on emotion. We heartily recommend these books to affective scientists intent on exploring the biology of emotion. We also note, however, that emphasis on the biological bases of emotion—and of virtually every other domain of psychological science—is on the rise, both in the media and as a function of funding priorities at most granting agencies. At the very least, affective scientists now need to be conversant on a variety of topics related to the physiology and evolution of emotion. Chapters in this section thus satisfy a number of practical goals.

Parr and Gothard (chapter 23) introduce readers to the assumptions, general methods, and ethics of conducting research on emotion in nonhuman primates. Much of what they have to say is applicable to a wide range of animals. Their chapter sets the tone for many in this section in that its function is to acquaint readers with an overview of what they will need in order to gain access to and become proficient with nonhuman primate populations, as well as how to become better consumers of the literature in this area. In chapter 24, Curtin, Lozano, and Allen provide readers with a quite com-

prehensive introduction to the psychophysiological laboratory. This pragmatic chapter approximates a manual for readers, assuming sufficient funding, to actually set up a psychophysiological laboratory of their own. The authors note that psychophysiological equipment continues to become both cheaper and better with each passing year, thus making it easier for the relative novice to break in. The concrete, practical advice available in this chapter exceeds most in this volume.

The two final chapters introduce readers to two broad domains of affective neuroscience: work with lesion patients and intracranial recording and functional magnetic resonance imaging (fMRI). Both provide sufficient methodological knowledge that interested readers should become significantly better consumers of this literature, but both may also serve as excellent introductions to these domains for individuals intending to actually commence research in these exciting areas. Moreover, as more affective scientists forge collaborations with individuals who have access either to rare neurological patient populations or hugely expensive neuroimaging facilities, these chapters can serve to provide a depth of understanding of these approaches that exceeds the level of relatively informal meetings and conversations but foregoes very steep investments in formal training and time.

Adolphs begins, in chapter 25, with descriptions of types of lesion studies while noting that lesion methods in humans are absolutely vital for the establishment of causal links between neural activity and behavior. Indeed, he asserts (and we agree) that other methods, such as fMRI, are as sole measures *incapable* of identifying causal links between neural structures and emotional behaviors. (This alone is an important methodological lesson, worthy of a great deal of emphasis.) As Adolphs makes abundantly clear, lesion methods have grown extremely sophisticated and stand to make powerful contributions to our understanding of the neurobiology of emotion. Norris, Coan and Johnstone (chapter 26) follow with their discussion of functional neuroimaging in the study of emotion. With their chapter, Norris and colleagues strive not only to provide methodological information critical to the design, analysis, and understanding of fMRI research but also to place fMRI in a broader conceptual context, commenting on the impact fMRI has had on the field of affective science. They note that although fMRI has provided unprecedented access to neural processes, inferential overreaching and misunderstanding has frequently occurred. They discuss the reasons for such misunderstanding and make recommendations for avoiding it in the future.

### **Our Core Assumption: Methods Follow Questions**

In assembling a book that emphasizes tools and methods, we were gratified to have one of our core assumptions confirmed by our contributing authors: that the great diversity of methodological approaches represented here reflects the fact that affective science is highly theory-driven. Our intent

was to provide a resource that would be broadly useful to researchers across a wide variety of disciplines and subdisciplines precisely because the approaches contained here (with a few exceptions) do not tend to be tied to specific theories. Although some have argued—and it is doubtless true—that the tools of science themselves often serve as powerful heuristics for new theoretical developments in the sciences (Gigerenzer, 1991), we find this to be somewhat less true (but not entirely untrue) of the study of emotion. Perhaps because “grand theories” of emotion have existed for some time, tools have often been adapted, co-opted, and developed for the purpose of settling contentious debates or disconfirming commonly held notions; that is, with prespecified propositions in mind. It is perhaps for this reason that the study of emotion has long served as a magnet for interdisciplinary collaboration. It is increasingly apparent that a complete understanding of any emotional process is going to require attention paid to multiple levels of analysis, from the cultural to the behavioral, psychological, experiential, physiological, and molecular. This practice will increase in frequency in the coming years and decades, with significant progress coming from the use of a wide variety of approaches, within and across studies. We find this prospect exciting and hope that readers of this volume will begin to enjoy a greater familiarity with a diversity of methods, all the while maintaining a focus on questions they are interested in answering as opposed to the specific methods they are interested in using.

### **Conclusion**

We said earlier that we hoped, with the *Handbook of Emotion Elicitation and Assessment*, to provide a volume that organizes and details the major methodological achievements in the affective sciences. We feel that this mission has been very nearly accomplished—“very nearly” because there are so many more methods and approaches that we would like to have included (e.g., quantitative and molecular genetics, statistical methods for affective scientists, etc.) but that took us a step or two too far from our original purpose. Nevertheless, our sincere hope is that readers will discover a substantial trove of practical assistance between these covers and that this assistance will prove useful for years to come.

### **References**

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