

CHAPTER 1

Introduction

LISA FELDMAN BARRETT

PAULA M. NIEDENTHAL

PIOTR WINKIELMAN

The idea that emotion reflects a combination of conscious and unconscious processes dates back to the beginning of Western philosophy, when Plato and Aristotle noticed that some emotions, such as anger, can arise via careful deliberation (e.g., about injustice), via an impulsive reaction (e.g., to pain), or via a combination of both. Scientific interest in the role of consciousness in emotion was perhaps first stimulated by William James, who asserted that emotion is a *conscious* perception of bodily changes, which themselves can have *unconscious* origins. This interest in the interplay between conscious and unconscious contributions to emotional responding has reemerged in recent years, as scientists have placed the study of emotion at the center of scientific inquiry about the human condition, and as the study of consciousness has, again, become scientifically respectable. Fields with broadly differing epistemological frameworks (e.g., cultural anthropology, philosophy, psychology, cognitive science, and various forms of neuroscience) all study something called “emotion.” And, as emotion research in these fields progresses at many levels of analysis, questions about the relationship between emotion and consciousness remain at the center of the investigations (even if only to highlight that consciousness is *not* the defining feature of an emotional state). Questions about the interplay of emotion and consciousness have expanded from examining the place of conscious feelings in emotional responding to include related

issues, such as (1) how unconscious analysis of the incoming stimulus might produce emotional responses, (2) how conscious processes regulate emotional responding (and vice versa), (3) the role of consciousness in the integration of emotion and cognition, (4) the role of bodily responses in conscious and unconscious aspects of emotion, (5) how unconscious processes produce a conscious feeling of emotion, and so on.

Unfortunately, it is commonplace for researchers who work on these diverse questions to proceed independently of one another, and to focus on one question in the absence of addressing the others. Often, theoretical models of this and that phenomenon do not have sufficient contact with one another to allow for development of large-scale theory building about emotion. Further, the existing models often fail to keep pace with the flood of experimental findings that have been generated. In addition to these problems of communication, progress in understanding the nature of emotion is hampered by disagreements about how the two critical terms, *emotion* and *consciousness*, should be defined. It often seems as if researchers who approach the study of emotion from different perspectives and who define these terms differently, inhabit different planets that orbit one another but rarely, if ever, make contact.

The present volume came about as an attempt to address these issues and bring needed coherence to the scientific study of emotion and consciousness. This interdisciplinary book brings together researchers who are working on different components of emotion processing and presents the major themes guiding their research. These major themes are represented by the five sections into which the volume is organized. Parts I through IV—Cognition and Emotion, Unconscious Emotional Processing; Perception of Visual Stimuli, Unconscious Emotional Behavior, and The Experience of Emotion—offer an up-to-date review of research relevant to different conscious and unconscious components of emotion. Part IV, Perspectives on the Conscious–Unconscious Debate, specifically discusses which emotion processes are conscious and unconscious and provides various perspectives on how these processes configure to produce an “emotion episode.” To bring further coherence and clarity to the volume, the authors were asked to answer the following three questions either within the text of their chapter or in the boxes within the chapters. The first question addressed the definition of emotion (“What is the scope of your proposed model? When you use the term *emotion*, how do you use it? What do you mean by terms such as *fear*, *anxiety*, or *happiness*?”). The second question addressed how the concept of consciousness is understood (“Define your terms: *conscious*, *unconscious*, *awareness*. Or say why you do not use the terms.”). The third question asked authors to consider how conscious and unconscious emotion-related processes are configured in their chapter

(“Does your model deal with what is conscious, what is unconscious, or their relationship? If you do not address the issue of consciousness specifically, can you speculate on the relationship between what is conscious and unconscious? Or if you do not like the conscious–unconscious distinction, or if you do not think this is a good question to ask, can you say why?”).

The three overarching questions and the major themes of the volume emerged at the end of a 3-day conference held in the Auvergne region of France in September 2003, at which all authors presented the substance of their chapters. The most remarkable aspect of the conference was discovering the similarity in concerns across theorists. Rather than a set of unrelated talks by neuroscientists, social psychologists, animal behaviorists, cognitive psychologists, and philosophers, the talks revealed enormous areas of commonality among the contributors. In fact, the conference confirmed our belief that the field is “ready” for a systematic attempt to integrate the various themes of research on conscious and unconscious processes in emotion. In what follows, we give a short preview of the major themes of the five sections and the sixteen chapters. As we preview the chapters, we hope that the reader will notice the coherence of the message that emerges from the book, despite the diversity of topics and the authors’ differing disciplinary orientations.

THE CHAPTERS

Cognition and Emotion

Part I of the volume deals with the interaction between processes that have been conventionally called *emotion* and *cognition*. Together, these three chapters begin to characterize the possible relationships between thinking and feeling and, in so doing, sketch a broad framework for understanding the emergence and interplay of conscious and unconscious processes in emotional responding. Clarifying this relationship sets the stage for chapters that directly address how conscious and unconscious processes might interact to produce an experience that can be reported.

In Chapter 2, Paul N. Niedenthal, Lawrence W. Barsalou, François Ric, and Sylvia Krauth-Gruber introduce an idea that appears in several chapters (e.g., Anthony P. Atkinson & Ralph Adolphs, Chapter 7; Daniel Lundqvist & Arne Öhman, Chapter 5; Beatrice de Gelder, Chapter 6; Lisa Feldman Barrett, Chapter 11; Jesse J. Prinz, Chapter 15)—that (1) perceiving someone else’s emotion, (2) having an emotional response or a subjective feeling state, and (3) using emotion knowledge in conceptual tasks, all draw on fundamentally the same process that relies on somatosensory and motor representations (or embodiments). Niedenthal and colleagues review considerable evi-

dence in support of the notion that emotional processing is embodied. First, they review research showing that individuals embody the emotional gestures of other people, including facial expressions, posture, and vocal affect. They then build on these findings to argue that imitative behavior produces a corresponding state in the perceiver, leading to the general suggestion that embodied knowledge produces felt emotional states. They summarize evidence in support of the idea that both facial and postural poses facilitate the experience of emotions. The reverse is also true. Having participants imagine emotionally evocative situations to induce an emotional state produces changes in the body, although those changes are often nonspecifically associated with pleasant and unpleasant affect rather than distinct profiles of discrete emotions of anger, sadness, fear, and so on. Finally, Niedenthal et al. discuss how physical actions (e.g., arm flexion or extension, posing facial muscles) influence how well participants identify positive and negative information, how they evaluate stimuli (whether they like an ideograph or find a cartoon funny), and how well they remember details from an evocative story. Taken together, these behavioral results validate the plausibility of an embodiment view of emotional processing.

In the next section of their chapter, Niedenthal and colleagues explain how embodied representations can constitute the core conceptual content of emotion knowledge. The general point is that the body provides a fundamental way of representing knowledge about emotion. Such a view of emotional processing, they contend, allows theorists to identify more precisely which processes are, or can be, unconscious and which are conscious. In particular, Niedenthal et al. return to William James's notion that parts of embodied emotion are unconscious, or can be so, until attention is directed to them. Subjective feelings of emotion, such as the perception of bodily changes, are always conscious. In this, Niedenthal et al. agree with other contributors (e.g., Barrett, Chapter 11) that individual and cultural differences in emotion can best be conceptualized in terms of the representations that guide the direction and interpretation of the content of conscious perception.

In Chapter 3, Elizabeth A. Phelps begins with the observation that the neural systems believed to underlie "emotional" processes overlap extensively with those that are involved in "cognition," leading to questions of whether or not these are really separate processing domains. Phelps echoes a point advanced several years ago by Lane, Nadel, Allen, and Kaszniak (2000), which is consistent with other contributors to this volume, all of whom suggest that the neural architecture involved with emotional processing overlaps significantly with that which is related to cognitive processing (Atkinson & Adolphs, Chapter 7; Jeremy R. Gray, Alexandre Schaefer, Todd S. Braver, & Steven B. Most, Chapter 4; Phelps, Chapter 3;

Piotr Winkielman, Kent C. Berridge, & Julia L. Willbarger, Chapter 14). Specifically, Phelps's chapter focuses on the functions of the human amygdala, a small structure in the medial temporal lobe that is the centerpiece of many emotion models and that figures prominently in many of the chapters in this volume. Phelps advances the popular view that the amygdala is a brain region whose primary function is linked to emotion. She discusses how the amygdala is intimately involved in directing behavioral responses to the emotional significance of a stimulus in a way that is unconscious, unintentional, and may be independent from the process that generates conscious experience of emotion. Her review of her recent research on instructed fear (i.e., the valenced consequences of a stimulus are conveyed through language rather than direct experience) indicates that the amygdala also plays a role in the expression of fears that are learned symbolically (via involvement of the hippocampus) and that depend on awareness and interpretation in a way that is reminiscent of the rule-based processing discussed by Eliot R. Smith and Roland Neumann (Chapter 12). Finally, Phelps discusses how the amygdala influences attention and perception (a point underscored in several other chapters as well) and modulates long-term memory by modulating the storage of hippocampal-dependent memories. As a result of these modulatory mechanisms, individuals are more likely to become aware of emotional events as they occur.

In Chapter 3, Gray, Schaefer, Braver, and Most discuss how affect functions to resolve "control dilemmas"—that is, situations in which the organism is prepared to do more than one thing. First, they propose how affect can resolve control dilemmas that may be conscious; for example, approach–avoidance conflicts. Although a person may be strongly motivated to both approach and withdraw from something, presumably because multiple processing systems for positive and negative affect exist within the brain (Cacioppo, Gardner, & Bernston, 1999), it is impossible to do so simultaneously. Gray and colleagues also review recent findings from their laboratory that suggest that approach-related affective states (e.g., amusement) enhance verbal working memory, whereas withdrawal-related states (e.g., anxiety) enhance spatial working memory. These findings are broadly consistent with the idea that threat can enhance visual processing, presumably because it is important to know where a threat is located.

Second, Gray and colleagues discuss how affect can resolve unconscious control dilemmas, such as those that involve selective attention. For example, individuals demonstrate the phenomenon of attentional capture when threatening information preferentially draws their attention. Current affective states, mood, or chronic affective styles might help to resolve such instances, freeing individuals from the constraints of the immediate features of the external environment. The general idea that runs throughout

this chapter, then, is that affect impacts thought and behavior by “tuning” the more cognitive parts of the system to prioritize some functions over others, perhaps when other forms of conflict management, such as contention scheduling, fail to work. Gray et al. suggest (as do others in this volume, e.g., Louis C. Charland, Chapter 10; Barrett, Chapter 11) that affect is a type of valuation function that allows the individual to regulate the influence of internal and external constraints (i.e., the demands of the situation as well as the subjective importance of the event).

Unconscious Emotional Processing: Perception of Visual Stimuli

Part II of the volume describes the mechanisms implicated in the act of perceiving an emotional episode in another person. The chapters in this section (Lundqvist & Öhman, Chapter 5; de Gelder, Chapter 6; and Atkinson & Adolphs, Chapter 7) emphasize the early perceptual contributions to emotional responding (in contrast to the relatively later, more conceptual processing that involves knowledge and memory; e.g., Niedenthal et al., Chapter 2) and fill in some of the detail that other chapters draw on when discussing the interplay of the two (e.g., Phelps, Chapter 3; Smith & Neumann, Chapter 12; and Klaus R. Scherer, Chapter 13).

The three chapters included in this section have several points in common. Most importantly, all discuss the time-line for assessing the evaluative significance of a visual stimulus (primarily the processing of static faces, because that is the focus of most research). These chapters address the early processes that allow a person (1) to code the evaluative significance of visual stimuli, or (2) to detect fear, depending on the underlying assumptions. The early or “low” pathway (involving the superior colliculus and pulvinar nucleus of the thalamus) unconsciously conveys low-frequency information to the amygdala for the initial coding of evaluative significance. This mechanism mediates affective reactions to a stimulus even before it is registered in consciousness, and allows people with blindsight to code the affective significance of things they cannot consciously see. De Gelder, in particular, reviews the literature that investigates the existence of such a pathway, and whether there are additional sensory contributions to blindsight, such as subjective feelings. This pathway is activated within the first 100 milliseconds of evaluative processing. By approximately 300 milliseconds, higher-frequency visual information is conveyed via a later or “high” pathway that provides object-identification information to the visual cortex. This information combines with feedback from the amygdala to the visual cortex, which modulates sensory processing by directing attention to those aspects of the environment that are most salient to the organism for dealing with threatening information. It is via these connections that the amygdala

evaluates facets of the affective significance of complex objects (such as faces).

De Gelder and Atkinson and Adolphs (Chapters 6 and 7) are similar in other respects as well. Both discuss whether the scientific findings on emotion perception of static faces generalizes to understanding dynamic facial and body movements. In daily life, information from the face is processed in the context of information coming from other modalities, such as body movements, voice, and so on. Although scientific investigations tend to focus on how organisms process information from one sensory system at a time (usually the visual system in humans, the auditory system in rats), information processing in everyday life is typically multimodal. Thus this is an important emerging area of research in understanding emotion perception. Both chapters also discuss how perception might interact with the subjective experience of emotion or feelings. De Gelder suggests that feelings help guide people with blindsight. Atkinson and Adolphs point out overlap in neural areas involved in emotion perception and those correlated with the subjective experience of emotion, suggesting that the two processes may inform one another. This emphasis on embodiment in perception and experience of emotion is a unifying theme in many of the chapters.

Lundqvist and Öhman (Chapter 5) begin their chapter by identifying an assumption that is largely agreed upon by emotion researchers (although there are alternative points of view, e.g., Michael J. Owren, Drew Rendall, and Jo-Anne Backorowski, Chapter 8; Barrett, Chapter 11). These authors argue that humans emit stereotypic behaviors that encode and signal the presence of specific emotions, and that this ability evolved in concert with efficient routines for automatically decoding facial signals. Evolution has equipped humans with an expressive face to send emotional signals, as well as a highly efficient system for decoding these signals and therefore recognizing threatening versus friendly faces. Lundqvist and Öhman review research in which faces depicting emotional configurations, presented under conditions that prevent their representation in conscious awareness, evoke psychophysical and neural responses that reflect nonspecific emotional (some might say *affective*) activation. The emotional expression on a face (threatening or friendly) regulates subsequent visual processing in a preattentive way. As a result, threatening faces (when compared to friendly faces) stand out more from the background and are easier to detect. Moreover, Lundqvist and Öhman outline how specific features of the face preattentively direct subsequent processing. In particular, eyebrows are important for conveying affective importance (followed by mouth and eyes). They go on to provide a model for facial signal decoding that integrates LeDoux's (1996) research on the subcortical route for evaluation of

incoming sensory information with Haxby, Hoffman, and Gobbini's (2000) model of face processing. Early sensory processing extracts information about the threat or safety value of facial signal in a preattentive way, and then directs the way that facial information is subsequently processed in the inferior occipital gyrus and superior temporal sulcus.

Unconscious Emotional Behavior

Part III of the volume deals more directly with emotion-related behaviors. Both chapters (Owren, Rendall, & Bachorowski, Chapter 8, and Mark E. Bouton, Chapter 9) discuss emotional behaviors in a way that is consistent with the basic assumption of appraisal theories of emotion: Stimuli do not have intrinsic value; rather, the meaning of a stimulus is determined by a particular organism in a particular context at a particular point in time. Both highlight the importance of context in determining the value of a stimulus, and in doing so, are consistent with other contributions to this volume (e.g., Barrett, Chapter 11). Both chapters have the potential to change how scientists define *meaning*, by suggesting that what a stimulus means depends on the organism's affective response to it. Furthermore, both suggest that affective meaning is, for most part, unconscious (although conscious feelings that derive from the initial assessment of affective meaning can play a role in meaning making, e.g., Gerald L. Clore, Justin Storbeck, Michael D. Robinson, & David B. Centerbar, Chapter 16).

In Chapter 8, Owren, Rendall, and Bachorowski introduce a somewhat different set of assumptions about unconscious emotion processing than those discussed in the chapters on emotion perception. Rather than assuming that a person emits behavior that encodes his or her emotional state, such that his or her emotions can be decoded and recognized by another person, or that threat information can be extracted from behavioral signals, Owren and colleagues suggest that the meaning of any signal (e.g., a sound or visual image) is determined by the affective change it induces in the perceiver. In particular, Owren and colleagues propose that affect induction may play a key role in the communicative value of mammalian vocalizations. Instead of viewing mammalian vocalizations as a sort of symbol-like language (where one call means there is a predator, another call means that there is food, and so on), Owren and colleagues argue that sounds act on the nervous system, either directly because of their intrinsic acoustic properties, or indirectly because people have learned that certain sounds (e.g., the distinctive features of a person's voice) consistently predict threat or reward. Repeated pairings of individually distinctive sounds with positive or negative outcomes give the sounds themselves come to have predictive value for subsequent affective outcomes.

In these ways, mammals can influence the affective states and behaviors of others by the sounds that they make, and they do so in a way that can be disconnected from their own internal state. For example, a parent can speak to a child in a soothing tone (despite his or her own fatigue or frustration) and hug or help the child in repeated occasions, such that the parent's voice comes to have affective meaning for the child. Another example: A presidential candidate can discuss policies that will have negative consequences for you and your family; in a short time, the very sound of his or her voice becomes aversive. As these two examples illustrate, the vocalizer's signals may have affective consequences that are consciously and deliberately chosen, or that can be unintended. Either way, however, the affective consequences of the signal for the listener are often unconscious and automatic in that the listener has no initial control over the effects of the incoming signal. Owren and colleagues build on this argument to suggest that affect induction is one way that affective communication takes place: through a completely implicit mechanism on both sides of the communication.

Although a vocalization need not always reflect the internal state of the sender, at times it certainly can reflect that state, resulting in a completely unconscious form of affective communication. If a sender's affective state leads to a particular kind of expressive behavior (e.g., to yell at a child), this behavior can have a negative affective impact on the receiver (based on the acoustic properties of the sound, or because the receiver has learned that punishment will follow). This transaction, then, constitutes a completely unconscious process in which the affective state of one person is communicated to and impacts the affective state of another. Such a process also suggests a plausible mechanism for understanding how affective states can be shared. In clinical psychology, there is a saying that people often end up making others feel the way they do. Perhaps this is one mechanism (even the main mechanism) by which this contagion takes place.

In Chapter 9, Bouton directly addresses issues of classical conditioning and emotional response. In doing so, he provides an important grounding for other chapters in this volume (such as Owren et al., Chapter 8) that appeal to some form of classical conditioning in explaining how a stimulus comes to evoke a response. Bouton reviews important findings from his research in animal learning and discusses how they may be instructive for emotion theory. He discusses how emotion-related behaviors deal with a given evocative unconditioned stimulus, and reviews literature to demonstrate that the constellation of behavior elicited depends on contextual factors. Context can be defined in several ways: (1) as distance from a motivational object (a predator or food), (2) as the interoceptive state at the time of learning, and (3) in terms of time (e.g., the duration of the conditioned stim-

ulus, or, said another way, the time between the appearance of the conditioned stimulus and the appearance of the unconditioned stimulus, which, in turn, evokes the emotional response).

Bouton further discusses how specific types of context influence an emotional response to the conditioned stimulus. First, he presents evidence that one form of emotional responding—*anxiety*—results from the direct association between the context (i.e., conditioned stimuli [CS] of long duration) and the unconditioned stimulus (US). In doing so, he links anxiety to the phenomenon of reinstatement (in which an extinguished response returns if the animal is merely reexposed to the US alone) and suggests that anxiety (i.e., responses to CS of long duration) is mediated by the bed nucleus of the stria terminalis (BNST, part of the extended amygdala) and the hippocampus. In fact, reinstatement effects may be a form of background contextual conditioning that is mediated by the hippocampus (Phillips & LeDoux, 1994).

Second, Bouton suggests that another form of emotional responding—*panic*—results from an association between the context and retrieval of particular CS–US pairings. Here, context works as cue to retrieve current meaning of a CS after it has been conditioned in one context and extinguished in another. The context controls whether the organism responds negatively to the CS (because the CS–US association is retrieved from memory) or not (because the CS–no US association is retrieved). Said another way, context can directly determine which meaning of the CS is retrieved after extinction. In doing so, Bouton links panic to the phenomenon of renewal (in which a change of context after extinction can cause a robust return of conditioned responding) and suggests that this form of responding is amygdala mediated, although it is possible that areas of the medial prefrontal cortex might be involved (Milad & Quirk, 2002; Morgan, Romanski, & LeDoux, 1993).

The Experience of Emotion

The next two chapters deal with how conscious and unconscious processes contribute to the experience of emotion. For the average person, emotional feelings are the most salient and defining feature of “having” an emotion. Although there is more to emotion than just the subjective component, the experience of emotion is a psychological phenomenon that is worthy of scientific investigation in its own right.

In Chapter 10, Charland presents readers with a provocative look at the nature of valenced feelings. He marshals an argument, primarily on philosophical grounds, that pleasant and unpleasant (hedonic) feelings are

not an intrinsic property or quality of raw (first-order) emotion experience (as claimed by Barrett, Chapter 11; Cacioppo et al., 1999; Russell, 2003), but are rather created by evaluating and interpreting the emotion experience when that experience is represented in second-order awareness. In other words, valence is not a property of feeling but an interpretation of a feeling as good or bad. Charland argues that valence is laden with personal meaning and is inseparably tied to an experience of the personal significance of what emotion experience means for us at a particular point in time. In Charland's view, valence is an appraisal of first-order, raw feelings (which he defines according to Lambie & Marcel, 2002). Valence does not exist prior to reporting on feeling—it is a property of self-report. In this way, valence, as a property of second-order experience, is probably a function of attention. Charland's view provides a counterpoint that should cause emotion researchers to pause before too quickly accepting the now popular view that stimuli are evaluated for their ability to predict threat or safety, thereby inducing an affective response by a preattentive, automatic, or implicit means of processing (Lundqvist & Öhman, Chapter 5; de Gelder, Chapter 6; Atkinson & Adolphs, Chapter 7; Barrett, Chapter 11; Winkielman, Berridge, & Wilbarger, Chapter 14). His view also challenges the idea that the meaning of a stimulus is defined by the affective reaction that it induces (Owren, Rendell, & Bachorowski, Chapter 8). Furthermore, Charland highlights the important observation that raw feelings (whatever their content, be it pleasure–displeasure, arousal–activation, anger, sadness, fear, etc.) can be judged on moral grounds, on how expected or unexpected they were, on how socially appropriate they are, and so on. Therefore, it is important to distinguish the contents of initial raw feelings from subsequent judgments of their desirability (e.g., Barrett, 1996), even if those judgments then go on to influence raw feelings in a recursive way.

In Chapter 11, Barrett begins with a critical examination of a guiding assumption within many scientific models of emotion (and one that appears in several chapters in this volume): People experience emotion because people have “emotions”—internal mechanisms that, once triggered, cause observable changes in behavior and feeling. She questions the view that the experience of emotion issues from separate mechanisms for anger, sadness, fear, and so on, and outlines an alternative hypothesis. Specifically, she suggests that the basic building blocks for emotional life are affective (i.e., involve core positive and negative affect) and conceptual (i.e., involve processes of categorization and interpretation). Barrett builds upon Russell's (2003; Russell & Barrett, 1999) idea of core affect by suggesting that evaluative processing produces an ongoing stream of neurophysiologi-

cal change (i.e., change in a person's homeostatic state) that can evoke evolutionarily tuned behaviors for dealing with stimuli of significant value. These changes are then available for representation (although not necessarily) in awareness as feelings of pleasure–displeasure and activation–deactivation. She also argues that the experience of emotion is psychologically constructed via the same processes that influence the experience of color and people's experience of each other. Conceptual knowledge about emotion (i.e., emotion categories that are acquired in childhood and vary across cultures) shapes the perception of core affect into an experience of emotion in much the same way that category knowledge about people shapes our perceptions of other people's behavioral actions into meaningful acts. Simply put, then, people experience an emotion when they categorize an instance of affective feeling.

With this framework, Barrett suggests that the content and structure of category knowledge about emotion determine the content of what people feel. She argues that conceptualizing involves sensory–motor representations (drawing on Barsalou's situated conceptualization view, as discussed in Niedenthal et al., Chapter 2), such that conceptual knowledge about emotion can seamlessly shape the perception of core affect into the experience of an emotion. In her view, the experience of emotion is a perceptual act, guided by embodied conceptual knowledge about emotion. The result is a model of emotion experience that has much in common with the social-psychological literature on person perception and with literature on embodied conceptual knowledge as it has recently been applied to social psychology (e.g., Niedenthal et al., Chapter 2). What differentiates her model from these existing models of emotion experience is the emphasis on categorization processes as constituting a core mechanism driving the differentiation of emotion experience. Like other contributors to this volume, Barrett situates her theory in William James's original ideas about the embodiment of experienced emotion.

Perspectives on the Conscious–Unconscious Debate

The final section of this volume is devoted to examining various issues that relate to conscious and unconscious emotion. First, each chapter discusses the ways in which conscious and unconscious processes configure to produce an emotional response (however it is defined). Second, each critically examines the idea that feelings are presumed to have a causal status with regard to emotion, questioning whether feelings really are the main mediators between emotion and behavior. Finally, several of the chapters ask the provocative question about whether it is meaningful to talk about “unconscious” emotion.

Smith and Neumann (Chapter 12) frame many existing models of emotion in a general dual-process framework. First, they discuss an associative system that records information slowly and builds up representations based on a large sample of experiences, and that produces “schematic processing” by filling in information quickly and automatically in a preconscious, pattern-completion sort of way. Associative processing operates automatically and preconsciously to structure people’s conscious experience, with little dependence on attention or cognitive resources. Smith and Neumann argue that associative processing also serves an alarm function, and this idea provides a framework for integrating material from other chapters that discusses the role of the amygdala in affect or emotion generation. Second, they discuss a rule-based system that is involved in a kind of emotion generation in which events can be learned quickly, even after a single trial, that requires attention and other cognitive resources for its operation, and that is often associated with a sense of subjective effort.

By discussing emotion in dual-process terms, Smith and Neumann integrate the science of emotion into a larger framework that makes contact with other major theories of the human mind. Importantly, they point out that emotion theorists should resist the tendency to refer to associative processing as emotion elicitation, and to rule-based processing as emotion regulation. In addition to the more automatic forms of emotion generation, it is possible to “think” oneself into an emotion by remembering a past event or by imagining something yet to happen. In fact, remembering prior emotional events and imagining hypothetical events are two of the most popular ways of inducing emotion in the lab. Similarly, there are both rule-based forms of regulation (e.g., such as the reappraisal strategy investigated by Gross (1999, 2002) and Ochsner, Bunge, Gross, and Gabrieli (2002) and associative forms of regulation (as in contextual conditioning and extinction, as discussed by Bouton, Chapter 9).

In Chapter 13, Scherer discusses how unconscious and conscious processes configure to produce an emotional response, and concludes that the majority of emotional work is done by unconscious processes. He suggests that the emotion process for an individual begins with evaluating the significance of a stimulus event. By evaluation, Scherer means something more complex than a simple “good for me/bad for me” judgment. Rather, he suggests that people automatically judge the stimulus event according to a set of appraisal rules or criteria (e.g., novelty, agreeableness, goal conduciveness, and so on). These appraisals of stimulus meaning result in differentiated emotion. In his view, appraisals also cause specific preparatory responses associated with proprioceptive information that, when synchronized with conceptual knowledge about emotion, produces a conscious experience of emotion.

Scherer's model, as a type of appraisal model, is rooted in the view that the meaning of a stimulus for a given person in a given context at a particular point in time elicits an emotional response, such that the character of that response is dictated by the contextual constraints. In principle, Scherer's view admits great flexibility in emotional responding, although he organizes emotional responses into the familiar set of "basic" categories. In this, as in several other points, Scherer's model bears some similarity to those of other theorists in this volume. He argues that emotional responses occur only when a stimulus has significant consequences in relation to a person's needs, goals, or values; in this way emotion may be a sign of a potential control dilemma, as characterized by Gray et al. in Chapter 4. At the heart of Scherer's model are two types of processing mechanisms that determine the emotional value of a stimulus—pattern matching and rule-based inference—and these are emblematic of the dual-process foundation of many emotion models (as discussed by Smith & Neumann, Chapter 12). Finally, Scherer proposes the intriguing idea that an identifiable emotional response results from a sort of perceptual binding that takes place when several types of information are synchronized. In this, he foreshadows the importance of understanding how cross-modal processing proceeds in emotional responding.

In Chapter 14, Winkielman, Berridge, and Wilbarger present the argument that affective states can drive behavior in the absence of conscious feeling. First they discuss evolutionary and functional considerations regarding the independence of mechanisms that control basic affective reactions from those of consciousness. They then present a functional neuroanatomical model of unconscious affect, in which they identify the subcortical areas that are essential for triggering basic affective reactions and the cortical systems that support the conscious experience of affect. They suggest a functional decoupling of affect state and affective feelings based on evidence from neuropsychology, neuroscience, and experimental psychology that is consistent with the elicitation–experience distinction drawn by Prinz in Chapter 15. Their view is largely consistent with other contributors who address emotion perception (Lundqvist & Öhman, Chapter 5; de Gelder, Chapter 6; Atkinson & Adolphs, Chapter 7), emotion and awareness (Phelps, Chapter 3), and affective responding (Owren et al., Chapter 8; Barrett, Chapter 11), although they stand in contrast to some of the ideas presented in Charland (Chapter 10). Furthermore, Winkielman et al. argue that these findings support the existence of unconscious emotion as well, with the argument that mechanisms responsible for differentiated emotion responding (e.g., fear, anger, disgust) can function in organisms that differ widely in their capacity for conscious experience and often do not require elaborated cortical processing. This position is in contrast to other that of

other contributors (Barrett, Chapter 11; Clore, Storbeck, Robinson, & Centerbar, Chapter 16) who allow for unconscious affect but not unconscious emotion as coordinated packets of distinctive responses. Finally, Winkielman et al. present a functional discussion of when and why an affective state is likely to be represented in awareness (or not). The basic idea is that to be conscious, affect needs to be represented by a hierarchical system of subcortical and cortical networks as well as integrated with higher-order categorical processes.

Prinz, in Chapter 15, also discusses two types of pathways in emotion processing that are similar to, but do not overlap with, the associative and rule-based processes discussed by Smith and Neumann (Chapter 12) and Scherer (Chapter 13). First, Prinz argues that some paths are involved in emotion elicitation of which a person is not aware. Similar to Scherer, Prinz argues that these paths produce a small set of “basic” emotion categories that can be distinguished by their behavioral and autonomic patterns (although there may be some heterogeneity within a category). Yet, no single somatic component corresponds to an emotional state on its own. Rather, Prinz echoes Scherer in suggesting that some sort of integration is necessary. Second, he argues that a separate path is involved in the conscious perception of these embodied states. He draws an analogy between emotion processing and visual processing, where emotion elicitation is more like early visual processing, and the conscious experience of emotion is more like mid-level visual processing in which patterns of responses are perceived. As suggested by other authors contributing to this volume, perception requires attention, although attention need not be effortful or intentional. All told, Prinz outlines a model of emotion that is similar to that of William James and consistent with other views of embodied emotional processing that are discussed in this volume.

In the concluding chapter, Clore, Storbeck, Robinson, and Centerbar call attention to and question seven of the assumptions (“sins”) that ground much of the existing research on emotion and that characterize many (although certainly not all) of the perspectives offered in this volume. Each challenge does find common ground, however, with at least one other contribution in this volume. First, Clore et al. question whether emotion can truly be considered implicit or unconscious. They suggest that although most emotional processes are unconscious, there may be no unconscious emotions per se. In this, they agree with Barrett (Chapter 11). Second, Clore et al. question the tendency to treat subcortical processing (i.e., involving the amygdala) in humans as the locus of “real” emotion, with cortical contributions serving only a regulatory function after the fact. In addition, they make the provocative claim that the particular subcortical route discovered by LeDoux, which serves as the centerpiece of emotional pro-

cessing in many of the chapters in this volume, really has limited influence on emotion-related processing in humans. Third, Clore et al. question the causal status of affective feelings. In their view, an unconscious affective state can have a direct influence on behavior. In this, Clore et al. seem to agree with Barrett (Chapter 11) and Winkielman et al. (Chapter 14). But Clore et al. also allow that unconscious affect can indirectly influence behavior through conscious feeling. In particular, these authors argue that conscious feelings are a potent tool for ensuring that explicit judgments and choices are consistent with the judgments and choices that are derived from unconscious affect. In this sense, feelings can be used to resolve any control dilemmas (Gray et al., Chapter 4) that may be in evidence. Moreover, Clore et al. suggest that feelings of arousal play a role in attention and that unconscious components of arousal play a role in memory. To some extent, this view agrees with points made by Phelps (Chapter 3).

Fourth, Clore et al. argue against the notion that preferences precede inferences, instead arguing that evaluative processing is a special case of semantic processing. Fifth, they argue against the idea that expressive actions (such as arm flexions) have direct, fixed effects on affective state. Instead, they suggest that affect is elicited by a mind in context, and they review data showing how the influence of a physical action on affect depends on the contextual meaning of an action. This view seems entirely consistent with Owren et al. (Chapter 8), and also with contemporary views of embodied conceptual processing, such those advanced by Niedenthal et al. (Chapter 2) and Barrett (Chapter 11) who see embodied processes as largely driven by contextual considerations. Sin #6 addresses the common wisdom that the amygdala is adequate to trigger emotion. Instead, Clore et al. argue that semantic processing appears to be necessary for affective computations involving visual stimuli. They seem to base this argument on the fact that areas of the visual association cortex (linked with stimulus recognition) are important in the amygdala's response to stimuli. Certainly, the amygdala alone is not sufficient for affective computations, but it would certainly seem necessary, and the difference between the position advanced by Clore et al. and that represented in other chapters in this volume is one of emphasis more than kind.

Finally, Clore et al. argue that appraisal theories have been fundamentally misunderstood; the claims made by appraisal theorists have generally not concerned the processes involved in generating emotion, as intimated by Prinz (Chapter 15) and many other critics. Rather, these theories reveal the structure of emotion—the rules about which emotions are felt when. In this sense, appraisals describe the structure of emotion in terms of its cognitive, perceptual, or situational causes, but not in terms of some temporal flow of processes.

COMING TOGETHER

Due to the exquisite balance of similarity and difference—in focus, in level of analysis, and in mechanistic accounts—we believe that the chapters in this volume contain a research agenda and a set of core themes and integrative theories for future work on emotion and consciousness. It has often been said that the literature on emotion is a group of descriptions of very small pieces of the very large “elephant” that is emotion (e.g., Russell & Barrett, 1999). For this very reason, some researchers prefer to avoid theorizing about emotion altogether, even when developing influential theories of memory, attention, or social cognition. Emerging from this volume, we believe, is a semblance of an elephant.

One reason for the elephant’s emergence is that broader models can now account for, and integrate findings across, levels of analysis, so that psychological concepts of thinking and feeling, conscious and unconscious can be biologically grounded. One example of a broad model that emerges from several chapters is the “embodiment” perspective, which explains fundamental and sweeping concepts such as empathy, emotion perception, emotion experience, perspective taking, emotional learning, and conflict resolution with an increasingly similar set of assumptions and mechanisms. A core affect perspective (Russell, 2003) also holds some promise for integrating findings across several key literatures involved with understanding emotion-related processing. This perspective is broadly consistent with the data discussed in many chapters of this volume, and in neurobiological models of emotion-related processing (e.g., Rolls, 1999). Of course, there may be other models, as well.

That being said, many features of the elephant need to be empirically established. Although the contributors to the present volume do not always agree in the content of their arguments, we moved toward agreement on what the central arguments are and how to resolve them. This consensus means, we hope, that future debates in the area of emotion can begin to use the same language and take place within compatible scopes of inquiry—rather than on different planets.

REFERENCES

- Aristotle. (1941). On the soul. In R. McKeon (Ed.), *The basic works of Aristotle*. New York: Random House.
- Barrett, L. F. (1996). Hedonic tone, perceived arousal, and item desirability: Three components of self-reported mood. *Cognition and Emotion*, *10*, 47–68.
- Cacioppo, J. T., Gardner, W. L., & Bernston, G. G. (1999). The affect system has par-

- allel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology*, 76, 839–855.
- Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, 74, 224–237.
- Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology*, 39, 281–291.
- Haxby, J. V., Hoffman, E. A., & Gobbini, M. I. (2000). The distributed human neural system for face perception. *Trends in Cognitive Sciences*, 4, 223–233.
- Lambie, J. A., & Marcel, A. J. (2002). Consciousness and emotion experience: A theoretical framework. *Psychological Review*, 109, 219–259.
- Lane, R. D., Nadel, L., Allen, J. J. B., & Kaszniak, A. W. (2000). The study of emotion from the perspective of cognitive neuroscience. In R. D. Lane & L. Nadel (Eds.), *Cognitive neuroscience of emotion* (pp. 3–11). New York: Oxford University Press.
- LeDoux, J. E. (1996). *The emotional brain: The mysterious underpinnings of emotional life*. New York: Simon & Schuster.
- Milad, M. R. & Quirk, G. J. (2002). Neurons in medial prefrontal cortex signal memory for fear extinction. *Nature*, 240, 70–74.
- Morgan, M. A., Romanski, L. M., & LeDoux, J. E. (1993). Extinction of emotional learning: Contribution of medial prefrontal cortex. *Neuroscience Letters*, 163, 109–113.
- Ochsner, K. N., Bunge, S. A., Gross, J. J., & Gabrieli, J. D. E. (2002). Rethinking feelings: An fMRI study of the cognitive regulation of emotion. *Journal of Cognitive Neuroscience*, 14(8), 1215–1229.
- Phillips, R. G., & LeDoux, J. E. (1994). Lesions of the dorsal hippocampal formation interfere with background but not foreground contextual fear conditioning. *Learning and Memory*, 1, 34–44.
- Rolls, E. T. (1999). *The brain and emotion*. New York: Oxford University Press.
- Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review*, 110, 145–172.
- Russell, J. A., & Barrett, L. F. (1999). Core affect, prototypical emotional episodes, & other things called emotion: Dissecting the elephant. *Journal of Personality and Social Psychology*, 76, 805–819.