

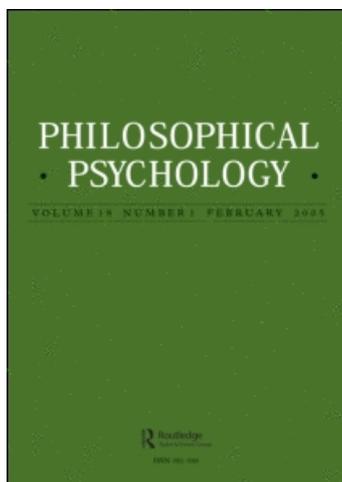
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Do discrete emotions exist?

Lisa Feldman Barrett, Maria Gendron and
Yang-Ming Huang

In various guises (usually referred to as the “basic emotion” or “discrete emotion” approach), scientists and philosophers have long argued that certain categories of emotion are natural kinds. In a recent paper, Colombetti (2009) proposed yet another natural kind account, and in so doing, characterized and critiqued psychological constructionist approaches to emotion, including our own Conceptual Act Model. In this commentary, we briefly address three topics raised by Colombetti. First, we correct several common misperceptions about the discrete emotion approach to emotion. Second, we discuss misconceptions of our Conceptual Act Model. Finally, we briefly comment on Colombetti’s Dynamical Discrete Emotion model.

Keywords: Affect; Categorization; Emotion

Over the centuries, philosophers and scientists have debated the nature of emotion. To the average person, this debate can appear self-indulgent. The situation seems simple and obvious: an emotion is a brief reaction to the world, occurring somewhere in the brain and body. When sad, a person cries and the body feels lethargic. When angry, a person yells and blood pressure rises. When happy, a person smiles and the heart slows. People effortlessly feel the despair of sadness, the heat of anger, and the thrill of happiness as distinct and bounded mental events that happen without a sense of personal agency or control. Human beings also see these emotions in other people

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(and animals) as easily as we read words on a page. As a result, people believe that English words like “sadness,” “anger,” and “fear” are the basic building blocks of emotional life.

Many philosophers and scientists, of course, agree. In various guises (usually referred to as the “basic emotion” or “discrete emotion” approach), writers argue that certain categories of emotion are natural kinds (reviewed in Barrett, 2006a). Some theorists characterize natural kinds of emotion by analogy, i.e., the individual instances that are called by the same name (“anger”) are presumed to look the same (to share a distinctive collection of universal properties that co-occur, such as a distinctive feeling, facial muscles, autonomic nervous system activity, and behavior). Others characterize natural kinds of emotion by homology, i.e., the instances of an emotion kind, such as anger, are presumed to derive from the same causal mechanism such as a dedicated, evolutionarily preserved module in the brain. In a recent paper, Colombetti (2009) proposed yet another natural kind account, which she calls the “Dynamical Discrete Emotions” approach. Her approach is similar to some other existing dynamical system approaches to discrete emotions, but stands in contrast to the more traditional discrete emotion models, as well as to psychological constructionist models, such as Russell’s (2003) model, and the Conceptual Act Model that comes from our own laboratory. In this paper, we briefly address three topics raised by Colombetti in her paper. First, we correct several mischaracterizations of the discrete emotion approach that Colombetti perpetuates. Second, we discuss her misconceptions of the Conceptual Act Model. Finally, we comment on the Dynamical Discrete Emotion model.

1. Discrete Emotion Models Past and Present

Colombetti’s (2009) discussion of the discrete emotion approach contains several common misconceptions regarding its history. First, in their most recognizable form, discrete emotion models began in the early 20th century, well before Tomkins (1962, 1963) and after Charles Darwin and William James. Although Darwin was certainly an inspiration, the basic emotion approach to discrete emotions, in its most recognizable form, was crafted by William McDougall (1908/1921, 1923), who believed that emotions are caused by a discrete number of biologically basic instincts or urges to act that humans share with all other mammals; by John Watson (1919), who reduced emotions to physical states; by Floyd Allport (1922, 1924) who introduced the facial feedback hypothesis; and, by Edwin Newman and colleagues (1930) who defined emotions as coordinated, stereotyped packets of experience, physiology, and behavior (for a review on the history of emotion in psychology, see Gendron & Barrett, 2009).

Second, although Charles Darwin (1872/1965) has provided endless inspiration to the discrete emotion approach, Darwin did not really have a model of emotion *per se*. He took a teleological approach to emotion, writing about emotion in a commonsense way to support his (at the time) uncommon views on natural selection

(cf. Fridlund, 1992; for a discussion, see Russell & Fernandez-Dohls, 1997). Darwin suggested at several points that emotional expressions in humans are simply vestiges of the past that, in the present moment, “may not be of the least use” (Darwin, 1872/1965, p. 48). The emphasis on the functionality of expressions came later with a re-interpretation of Darwin by Floyd Allport (1924).

Third, although William James is often described as having a discrete emotion view, he actually argued against the idea of discrete, recurring kinds of emotions. James wrote, “surely there is no definite affection of ‘anger’ in an ‘entitative’ sense” (1894/1994, p. 206). James was a psychological constructionist who believed that emotions were mental events that could be decomposed into more basic elements. These elements were not specific to emotion *per se*. James wrote that emotion is dependent on more basic processes “occurring in the motor and sensory centres” rather than the existence of “separate and special and centres, affected to them [emotions] alone” (James, 1890/1998, p. 473). James’ constructionist approach to emotion was typical of his more general approach to psychology: “a science of the relations of mind and brain,” James wrote, “must show how the elementary ingredients of the former correspond to the elementary functions of the latter.” (1890/1998, p. 28). Because the words naming commonsense emotion categories are merely descriptive, James argued that they should be dispensed with. The “trouble with emotions in psychology,” he wrote, “is that they are regarded too much as absolutely individual things. . . . But if we regard them as products of more general causes (as ‘species’ are now regarded as products of heredity and variation), the mere distinguishing and cataloguing becomes of subsidiary importance” (James, 1890/1998, p. 449). This idea, that emotions categories are merely descriptive rather than biologically privileged, is another unifying assumption among constructionist theories of emotion.

Colombetti (2009) not only perpetuates historical inaccuracies that are deeply embedded in the field of emotion, but she continues the tradition of assuming that certain categories of emotion are grounded by some biological or behavioral essence despite the mounting evidence (across almost a century) that such essences do not exist (for recent reviews, see Barrett, 2006a; Barrett, Lindquist, Bliss-Moreau, 2007; also see Ortony & Turner, 1990; Russell, 2003). In Colombetti’s article, for example, she argues that the amygdala is the brain locus of fear, therefore justifying the claim that it is a biologically basic emotion. Yet, the amygdala is neither consistently nor specifically related to fear, to emotion, or even to anything affective *per se* (cf. Barrett, Lindquist, Bliss-Moreau, 2007). The amygdala is not consistently engaged by fear stimuli (Barrett & Wager, 2006), and patients with amygdala damage can identify depictions of fear when their gaze is directed to the diagnostic portions of the face (Adolphs et al., 2005) involving the sclera of the eyes (Whalen et al., 2004) or when they view another part of that person’s body (Atkinson, Heberlein, & Adolphs, 2007). The amygdala is routinely engaged by positive stimuli (e.g., Mather et al., 2004; Williams, Morris, McGlone, Abbot, & Mattingley, 2006) and novelty (e.g., Dubois et al., 1999; Schwartz et al., 2003; Wilson & Rolls, 1990; Wright, Dickerson, Feczko, Negeira, & Williams, 2007; Wright et al., 2003; Wright et al., 2008;

Wright, Wedig, Williams, Rauch, & Albert, 2006), quickly habituates to stimuli as they become familiar (Breiter et al., 1996; Wedig, Rauch, Albert, & Wright, 2005; Wright et al., 2001; Wright et al., 2003), and amygdala lesions disrupt normal responses to novelty in primates (e.g., Prather et al., 2001). Instead, the amygdala appears to help orchestrate attention, physiology, and physical actions to allow the brain to learn more about incoming sensory information to better predict its value the next time it is encountered. Once its value is known for that particular context, in that particular instance, the amygdala's work is done. When the threat or rewarding value of the sensory stimulation again becomes uncertain, the amygdala is again engaged (Herry et al., 2007). The idea that the amygdala is the locus of fear is but one example of the oversimplification of affective neuroscience findings that is often perpetuated in the service of the discrete emotion perspective.

One persistent problem for discrete emotion models is that they do not capture the reality that William James described so well: not all instances of an emotion referred to by the same word (e.g., "anger") look alike, feel alike, or have the same neurophysiological signature. When another driver cuts off in traffic, you might yell and wave your fist. When a disobedient child breaks a rule, you might calmly re-explain. When you hear the voice of a disliked politician, you might turn off the radio. When a colleague insults your opinion, you might sit very still and perhaps even smile. You might tease a friend instead of criticize. And so on. During these instances, your blood pressure might go up, or down, or stay the same. Sometimes you will feel your heart beating in your chest, and other times you will not. Your hands might become clammy, or they might remain dry. Sometimes your eyes will widen but other times your brow will furrow, or you may even smile. Variability has been observed within individuals over time, across individuals from the same culture, and of course across cultures. Despite this variability, science must account for how all these instances are members of the same category (in this case, the category anger).

Since the beginning of psychology, those who have written from a discrete emotion perspective have struggled with how to account for observed variability in emotional responding. Like others before her, Colombetti acknowledges that modern discrete emotion models have difficulty explaining such variability, and argues that this makes these models more complicated. What Colombetti largely fails to address is how all the varied instances can be grouped into one category in a discrete emotion model. If a creature can aggress in the presence of a threat and in the presence of an offense, what makes the first an instance of aggression fear and the second anger? If a rat sometimes freezes in the face of threat, sometimes retreats, and at other times kicks up its bedding at a threat, what makes them all instances of fear?

Even electrical stimulation of the exact same brain site does not produce the same emotion in a reliable and consistent fashion time and time again (for a review, see Barrett, Lindquist, Bliss-Moreau, 2007). In a summary of this research, renowned neuroscientist Elliot Valenstein (1973) wrote "it is not realistic to conceive of all nerve cells responding without variation to the same stimulus and being arranged without variation to convey impulses in a fixed direction and sequence" (p. 112). Study after study demonstrates that the behaviors and experiences elicited from

electrical stimulation are strongly influenced by the context in which the stimulation took place and the pre-existing temperament of the stimulated animal. Valenstein concluded, “if studies with relatively homogenous, inbred animals suggested that there is a great amount of uncontrolled variability in the behavior produced by brain stimulation, we should expect an even greater source of unpredictability in the case of primates and especially humans” (1973, p. 92).

2. Correcting Misconceptions about the Conceptual Act Model

Over a series of papers published within the last several years, our lab has outlined a new psychological constructionist approach to emotion called the Conceptual Act Model (Barrett, 2005, 2006b, 2009, in press, Barrett & Bar, 2009; Barrett & Lindquist, 2008; Barrett, Lindquist, & Gendron, 2007; Barrett, Lindquist, Bliss-Moreau et al., 2007; Barrett, Mesquita, Ochsner, & Gross, 2007; Barrett, Ochsner, & Gross, 2007; Duncan & Barrett, 2007; Lindquist & Barrett, 2008). When compared to a basic emotion approach, our model asks very different questions about the nature and function of emotion. Colombetti (2009) provides a critical discussion of the Conceptual Act Model, but has mischaracterized some of the main points. We see this as a problem that arises from the fact that we have laid out the various parts of the Conceptual Act Model in bits and pieces in different papers, and Colombetti relies only on some of these sources.

Like other psychological constructionist models, the Conceptual Act Model states that an emotion word, like “anger,” “sadness,” and “fear” name commonsense categories, and do not refer to basic elemental building blocks or “atoms” of emotion. The events named by these words emerge from the interaction of more basic psychological ingredients that are not themselves specific to emotion. The Conceptual Act Model focuses on three basic psychological ingredients—*affect* (internal sensations that are experienced as pleasure or displeasure with some degree of arousal), *categorization* (what people know about emotion), and *executive control*.

The basic idea is that during emotional experience (“how do I feel?”) and emotion perception (“is the rat afraid?”; “is my friend angry?”; “is my dog guilty?”), representations of internal sensations from the body (experienced as *affect*) and external sensations from the world are made meaningful via the process of *categorization* (just as visual sensation are transformed into sight). This *categorization* uses emotion knowledge that has been learned via prior experience. Together, different recipes (the combination and weighting of these three sources of information—sensations from the world, sensations from the body, and prior experience) create the variety of mental states that represent your own feelings of your experience or someone else’s behavior named with emotion words. These conceptualized states are like mental tools that the human brain uses to modify and regulate the internal state of the body that holds it (either directly or by acting on the world in a particular way). This process doesn’t happen in stages, or because people

consciously experience the need or motivation to conceptualize. It happens as a natural consequence of the way the brain works.

To categorize something is to render it meaningful so that it then becomes possible to make reasonable inferences about that thing, to predict what to do with it, and to communicate our experience of it to others. Categorizing functions like a chisel, dividing up the sensory world into figure and ground, and allowing us to refer to things by name. It fashions the present by drawing on experiences from the past, constructing what the neuroscientist calls “the remembered present” (Edelman, 1987).

In our view, three of Colombetti’s claims about the Conceptual Act Model of emotion are mistaken. First, Colombetti argues that the Conceptual Act Model cannot be used to explain the emergence of emotion. This is an ironic claim, because our model was designed for exactly that purpose, with an emphasis on accounting for the substantial variety in human emotional life (e.g., Barrett, in press a). The Conceptual Act Model attempts to deal with variability head on, as an intrinsic aspect of emotion, rather than dealing with it as a type of regulation, after the fact. It is a red herring to criticize psychological constructionist models for not being able to explain how emotions configure as coherent packages in the brain, body, behavior, and experience, when the model does not depend on the existence of such coherences (whose existence has yet to be empirically demonstrated in a consistent and convincing way). We are not claiming that the American stereotype of an anger (or sadness or fear) response never occurs in real life. Rather, we have argued, like Russell (2003), that the prototype of the each category is rare, and does not define the category. Furthermore, we have observed that the variability in what responses look like and how they feel across different emotion categories does not outweigh the variability observed within a category. This variability not only exists across cultures or across people within a culture—it also exists within a person across situations. A viable model has to account for this variability when explaining what emotions are and how they work. The Conceptual Act Model does just that.

Second, Colombetti argues that the Conceptual Act Model does not explain how emotion episodes can be categorized if there is no fixed rule to categorize them to begin with. In fact, our lab has outlined a hypothesis for how people learn emotion categories when those categories have no statistical regularities in biology or behavior to ground them (see Barrett, 2006b, in press a; Barrett, Lindquist, & Gendron, 2007). In short, we argue that words drive the process of emotion category acquisition (because words introduce statistical regularities whether there would otherwise be done). Of course, some of the categories used by the brain are indeed grounded in statistical regularities in the world. From birth, the human brain captures statistical regularities in sensory-motor patterns and stores them as internal representations. Words are then applied to these categories later in development. Other categories have no statistical regularities. For these categories, words act like the glue that holds a category together. Searle (1995) calls these ontologically subjective categories. Without words, these categories would not exist. According to the Conceptual Act

Model, emotion categories are ontologically subjective categories, or what are also called nominal kinds (cf. Barrett, 2009; Barrett, Lindquist, & Gendron, 2007).

Moreover, Colombetti seems to assume that the process of categorization only occurs during special times, like on those rare occasions when the face, voice, body, and brain all configure in some expected (or predetermined) way (that is, during what Russell (2003) refers to “blue ribbon” emotional episodes). The Conceptual Act Model assumes otherwise. In our view, human brains categorize—continuously, effortlessly, relentlessly. The idea is that every moment of your waking life, your brain is simultaneously processing internal sensory stimulation from the body (experienced as affect) and external sensory information from the world, and categorizing it using stored representations from prior experience (Barrett, 2009). The brain draws from its vast repository of stored representations in the blink of an eye to continuously and unintentionally categorize the sensory stimulation from the world and from the body and give it meaning. In this way, the components that make up an emotional episode (physiology, feeling, behavior) are not different from the components that make up every waking moment of life. Affective feelings and actions and physiology exists—but there is nothing intrinsic about them that makes them emotion, as opposed to memory or beliefs or perceptions (Duffy, 1934; Hunt, 1941), apart from someone categorizing them that way.

Third, Colombetti mistakenly refers to like the Conceptual Act Model as a “dimensional model.” We understand this error, which we believe originates from discussions of Wilhelm Wundt. Most modern treatments of Wundt (1897/1998) focus on his model of “simple feelings” or what are now referred to as “momentary affective states.” Wundt described all mental states as having an affective component that can be described according to three independent qualities: pleasant/unpleasant, arousing/subduing, and strain/relaxation. Wundt’s well-developed dimensional account of affect overshadowed the other points he made about emotion, such as his proposal that emotions are emergent phenomena (what he called “psychical compounds”) that result from the combination of affective and ideational components. Wundt’s view, in fact, is the essence of a psychological constructionist approach to emotion. As a modern example of this approach, the Conceptual Act Model favors neither dimensions nor categories, but instead integrates the two. The dimensional aspect can be found in the suggestion that all emotional events, at their core, are based in a psychologically primitive kind of affective response to events in the world as positive or negative, helpful or harmful (although the neural states that instantiate a pleasant or unpleasant affective state may be numerous and varied). The categorical aspect can be found in the suggestion that people automatically and effortlessly categorize the ebb and flow of core affect using conceptual knowledge for emotion.

The Conceptual Act Model dissolves additional dualisms that are present within the emotion literature. For example, the Conceptual Act avoids the hopeless distinction between evolution and social forces by suggesting that affect and categorization processes are given by nature. Humans are born with the ability to have simple affective responses and quickly acquire categories that develop into a

conceptual system that provides the grounding for perception. The content represented by affective and conceptual systems is learned and may vary across individuals and cultures.

3. The Dynamical Discrete Emotion Model

In principle, we agree with Colombetti that something like a dynamical systems approach is a viable and fruitful framework for understanding what emotions are and how they work. A dynamical systems approach certainly bears some similarity to the constraint satisfaction approach that we outlined in Barrett, Ochsner, & Gross (2007). But Colombetti's particular version, with an emphasis on producing putative coherent patterns, is probably not correct, if for no other reason than that science has not yet verified the existence of such patterns.

4. Concluding Remarks

We believe that any model of emotion must account for all the data, not just those that conveniently match people's beliefs about emotion. We proposed the Conceptual Act Model to do just that. It is our view that, when all its parts are considered, the Conceptual Act Model is not subject to the criticisms that Colombetti raises. Furthermore, our model frees the field from assuming that the discreteness of emotions result from their status as natural kind categories, because the scientific evidence of almost a century does not support the view that emotion categories represent natural kinds. It provides a framework and a set of ready hypotheses that are designed to account for an accurate picture of the incredible variety in emotional life. And, perhaps most importantly, our model is consistent with the current understanding of how the brain creates the mind (Barrett, 2009).

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