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Emotion Review 2014 6: 292

DOI: 10.1177/1754073914534479

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The Conceptual Act Theory: A Précis

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Abstract

According to the conceptual act theory, emotions emerge when physical sensations in the self and physical actions in others are meaningfully linked to situations during a process that can be called both cognitive and perceptual (creating emotional experiences, and emotion perceptions, respectively). There are key four hypotheses: (a) an emotion (like anger) is a conceptual category, populated with instances that are tailored to the environment; (b) each instance of emotion is constructed within the brain's functional architecture of domain-general core systems; (c) the workings of each system must be holistically understood within the momentary state of the brain, the body, and the surrounding context; (d) being emergent states, emotional episodes have functional features that physical states, alone, do not have. Similarities and differences to other theoretical approaches to emotion are discussed.

Keywords

affect, conceptual act, Darwin, emotion, psychological construction

1. What Are the Essential Elements of Your Theory of Emotion? Which Elements Are Shared by Different Theories? What Element(s) Distinguishes Your Theory From the Others?

I find it helpful to begin with an analogy. Consider the plant whose taxonomic name is “viola.” It’s commonly referred to as a “violet.” A violet is sometimes a *flower*. At other times, it is a *weed*. (Some people put violets in salad, in which case, they are *food*.)

Like all plants, violets are real in the natural world—they exist whether or not humans perceive them. *Weeds* and *flowers*, however, are real only in the social world—their existence depends on the minds (and therefore the brains) of human perceivers. The concepts for flowers and weeds are probably universal in all human cultures, yet they are not innate, nor are their instances fixed; there is nothing in the biology or molecular structure of a plant that identifies it as a weed or a flower. So how, in a given instance, is a violet transformed into a weed

or a flower? Although anger is an event, and is not an object, like a plant, the answer to this question holds the key to understanding the nature of emotion.

A plant becomes a flower or a weed when it is categorized as such by a human perceiver. The distinction between flowers and weeds is based on human intention. When a plant is deliberately cultivated, it is a flower. When a plant is not wanted, it is a weed. By virtue of this act of categorization, the plant acquires functions it does not have by its physical nature alone—flowers and weeds convey meaning, signal intent towards another person, prescribe action, and communicate value, and might even influence homeostasis and glucose metabolism in the perceiver (Barrett, 2009, 2012; Barrett, Wilson-Mendenhall, & Barsalou, in press). This is an illustration of how humans have the capacity to create a social reality, of physical consequence, by virtue of the concepts they teach one another and apply to physical instances. Employing a framework from John Searle, I have summarized these ideas by saying that when a physical object or event (X) is categorized in a certain context (C), it becomes real in the social world (Y) and acquires functions that it otherwise would not have (see Barrett, 2012).

Author note: Preparation of this manuscript was supported by a National Institute of Health Director’s Pioneer Award (DP10D003312), by grants from the National Institute on Aging (R01AG030311), the National Institute of Mental Health (R21MH099605), and the National Science Foundation (BCS-1052790), and by contracts from U.S. Army Research Institute for the Behavioral and Social Sciences (Contracts W5J9CQ-11-C-0046, W5J9CQ-12-C-0049) to Lisa Feldman Barrett. The views, opinions, and/or findings contained in this article are solely those of the author and should not be construed as an official Department of the Army or Department of Defense (DOD) position, policy, or decision.

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Along with colleagues and lab members, I have developed a psychological construction of emotion, called the conceptual act theory (CAT), which uses this logic. The CAT hypothesizes that physical changes in the natural world (internal physical changes occurring within a perceiver, and sensory changes from the world such as from other people's facial muscle movements, actions, the physical surroundings, etc.) become *real as emotion* (as fear, anger, etc.) when they are categorized as such using emotion concept knowledge within a perceiver. These concepts have been learned from language, socialization, and other cultural artifacts within the person's day-to-day experience. We refer to an act of categorization as a "situated conceptualization," meaning that the conceptual knowledge that is brought to bear during an act of categorization is tied to the situation, is enactive, and prepares a perceiver for situated action (Barrett, 2006, 2012, 2013; Barrett, Wilson-Mendenhall, & Barsalou, 2014, in press; Wilson-Mendenhall, Barrett, Simmons, & Barsalou, 2011). The process of combining incoming sensory input (from the body and from the surroundings) with learned, category knowledge within the brain of the perceiver is a normal part of what it means to be conscious. Situated conceptualizing is instantaneous, ongoing, obligatory, and automatic (meaning, a person will rarely have a sense of agency, effort, or control in constructing an emotion). It rarely happens because of a deliberate, conscious goal to figure things out. It is via the process of conceptualizing that physical changes acquire functions that do not have on their own (i.e., without conceptualization).

We hypothesize that any conceptual act is embodied, because prior experience, in the form of category knowledge, comes "on-line" as the activation of sensory and motor neurons, *reaching down* to influence bodily activations and/or their representations and sensory processing. Conceptual acts are also self-perpetuating, such that experiences created today *reach forward* to shape the trajectory of future experiences. Our hypothesis is that this is the way the mind works: the act of seeing, or feeling, or thinking is at once a perception, an emotion, and a cognition. All mental states are, in fact, embodied *conceptualizations* of internal bodily sensations and incoming sensory input. These conceptualizations are *situated* in that they use highly context-dependent representations that are tailored to the immediate situation.

There are four unique hypotheses about emotions that derive from our view of situated conceptualizations: (a) emotions, like other mental state categories, are conceptual categories, consisting of populations of instances that are tailored to the environment; as a result, there is meaningful variation within each emotion category; (b) each instance of any emotion is constructed within the brain's functional architecture for creating situated conceptualizations, involving domain-general core systems; as a result, instances belonging to different emotion categories (or even nonemotional categories, such as cognitions or perceptions) have some degree of similarity to one another; (c) emotional episodes cannot be deconstructed and reduced into these domain-general systems but instead emerge from their interaction; therefore, the workings of each system cannot be studied alone and must be holistically understood within the momentary state of the brain, body, and the surrounding context; (d) being emergent states, emotional episodes have functional fea-

tures that physical states, alone, do not have. These are discussed in more detail in Barrett (2012) and in Barrett et al. (in press).

The CAT shares certain similarities with other viewpoints. Like so-called "basic emotion" approaches, it is an *evolutionary view*. Instead of assuming that natural selection sculpted a domain-specific mechanism for each emotion (a position which suffers from the weaknesses of the "adaptationist programme" discussed by Gould & Lewontin, 1979), we hypothesize that the brain's functional architecture contains domain-general processes that interact and from which emotional episodes emerge. In principle, domain-general processes are favored by evolution for their efficiency and flexibility (Laland & Brown, 2002). In addition, like the "basic emotion" approach, our view is that emotional episodes can contain species-general elements (actions that all species share, such as behavioral adaptations, like freezing, fleeing, or fighting); in our view, however, there is no one-to-one mapping between a specific behavioral adaptation (e.g., freezing) and an emotion category (e.g., fear; Barrett, 2012; see also C. T. Gross & Canteras, 2012). Furthermore, species-general processes are not sufficient for emotion; species-specific information that exist only in humans (or perhaps in limited form in great apes), such as abstract emotion concepts and language, are also required. Finally, like the "basic emotion" view, the CAT is inspired by Darwin's insights (Barrett, 2013); we take our lead from *On the Origin of Species* (Darwin, 1859/1964), however, which contained conceptual advances (e.g., population thinking) that are absent from the more essentialist thinking in *The Expression of Emotion in Man and Animals* (Darwin, 1872/2005) which "basic emotion" writers often cite as their inspiration.

Like other views, the CAT is a *functional account of emotions* (Barrett, 2012). An emotion is enacted when embodied conceptual knowledge is brought on-line to shape the perception of a physical state, binding that physical state to an event in the world (so that the physical changes in the body are experienced as "about" something in the world). A body state or an action has physical functions (e.g., changes in respiration might regulate autonomic reactivity or widened eyes increase the size of the visual field), but these events do not intrinsically have functions *as an emotion*; events are assigned those functions in the act of categorizing them as emotion during the construction of a situated conceptualization.

Like "appraisal" approaches, the CAT views *emotions as acts of meaning making*. The CAT hypothesizes that emotions, like all mental states, arise through the continuous process of perceivers making meaning from the sensory input that they take in from the internal world of the body and the external world of physical surroundings. Our approach is more consistent with some "appraisal" models (i.e., constitutive appraisal models) than with others (i.e., causal appraisal models; Barrett, Mesquita, Ochsner, & Gross, 2007; J. J. Gross & Barrett, 2011). In causal appraisal models (e.g., see works by Scherer, Lazarus, Frijda, and Roseman), "appraisals" are specific mental processes that create meaning and cause emotions to occur; an "appraisal process" is a cognitive mechanism that initiates specific emotional responses (e.g., an evaluation of threat produces fear). In constitutive appraisal models (e.g., see work by

Clore and Ortony, 2013), by contrast, an “appraisal” refers to a person’s experience in a situation or context (e.g., to be afraid is to experience something as threatening); appraisals are mental contents (not processes) that are themselves caused by more basic, general mental processes that are available within any normally functioning human mind (the processes of perception, categorization, memory, etc.). Here, an “appraisal process” can be *any process* that produces this meaning (e.g., appraisal processes are whatever creates that experience of threat), although the processes are not specific to appraisal. We find it misleading to label a process by its outcome, however, because the processes in question are domain-general and therefore contribute to other outcomes as well (cf. Barrett, 2009). Appraisals are really just another way of describing emotions—the construal of affect within a situation is the emotional episode itself. (In causal appraisal models, appraisals are the specific cognitive mechanisms by which emotions are caused—they produce the situational construals that trigger emotion.) The CAT and constitutive appraisal models (particularly the Ortony, Clore, Collins [OCC] model; Clore & Ortony, 2013) are two sides of the same coin, with the former focusing on how interacting systems produce the emergent emotional instances and the latter describing the emergent whole that is created.

The CAT also acknowledges *the importance of situations*. If the conceptual system for emotion is constituted out of past experience, and if past experience is largely structured by people within a cultural context, then the vocabulary of emotion categories that develop, and the population of instances within each category, will be culturally relative. Such ideas integrate the CAT with “social construction” approaches, positing that interpersonal situations “afford” certain emotions (or certain varieties of an emotion category; see Boiger & Mesquita, in press), and with Clore and Ortony’s OCC model where the structure of emotion categories is thought to represent the structure of recurrent, important situations (see Clore & Ortony, 2013). In this way, the conceptual act theory also has the potential to become *a deeply culturally sensitive view of emotion*. Culture is not an independent variable with emotion as the dependent variable—culture does not cause emotion. Instead, emotions are performances of culture, enacted and structured through the conceptual knowledge that is enacted and transmitted as part of socialization and acculturation. Emotions are events that function as bids to structure relationships and interactions.

Also like “social construction” views, the CAT assumes that emotions are the result of collective intentionality between people (for a discussion, see Barrett, 2012). To create emotions (as when conjuring any aspect of social reality), there must be a group of people who agree that certain instances (e.g., body states or physical actions) serve particular functions (e.g., to make sense of the world, to direct subsequent action, to communicate intentions, to control the actions of others). That is, there has to be collective intentionality about the new functions served by the physical states and/or actions in various situations for those functions to actually work. People have to agree that the functions can be imposed on the instance, and they have to recognize when the imposition occurs, although they need not be conscious of the process or agree with the imposition in every

instance. So every single experience of emotion, or perception of emotion, necessarily involves invoking shared meaning, even if there is no one there to explicitly share with in the immediate moment. If a set of physical instances is collectively recognized to have a status as emotions that will give those instances their regulatory and communicative functions, then this, by definition, allows those instances to perform said functions.

2. One Way to Clarify Just What a Claim Includes Is to Ask What It Excludes. That Is, What Would Falsify a Claim? Please Elaborate on Those Distinguishing Elements of Your Theory by Stating How, at Least in Principle, They Would Be Falsified

The conceptual act theory would be falsified if it were shown that conceptual knowledge is not required for an emotional episode to emerge or for emotion perception to proceed. Studies that purportedly find evidence for other approaches (e.g., congenitally blind athletes showing critical components of pride expressions) do not falsify the CAT unless it can be shown that results cannot stem from conceptual processing (e.g., representations of color are similar in congenitally blind, color-blind, and normally sighted individuals, implying that blind individuals possess conceptual knowledge for things they cannot see; Shepard & Cooper, 1992). To date, most experiments dealing with emotion have not taken this strong inferential step of ruling out alternative hypotheses that can account for their data. In fact, the emotion literature could benefit from more frequent attempts at strong inference, where different theoretical accounts are compared within the same experiment.

For many years, it was believed that any evidence for the biological distinctiveness of emotions was evidence for a “basic emotion” view and against a “constructionist” view. But evidence of biological distinctiveness between instances of two different emotion categories does not necessarily falsify the CAT per se (see Barrett, 2013). In fact, the CAT makes very specific predictions about how, at the biological level of analysis, instances of the same emotion category might be different, and how instances of different emotion categories might be similar (Barrett, 2013; for recent examples of evidence, see Kassam, Markey, Cherkassky, Loewenstein, & Just, 2013; Touroutoglou, Lindquist, Hollenbeck, Dickerson, & Barrett, under review; Wilson-Mendenhall et al., 2011; Wilson-Mendenhall, Barrett, & Barsalou, 2013). For example, evidence that each emotion can be consistently and specifically localized to an anatomically constrained and homologous circuit or network within the brain (i.e., that is inheritable and homologous in other animals) would falsify the CAT. Networks that don’t have these properties actually provide support for the CAT (e.g., Touroutoglou et al., 2014). Evidence that there are distinct circuits for behavioral adaptations does not falsify the CAT because we do not define emotions as actions (Barrett, 2012; for a similar view, see LeDoux, 2012). Pattern classification analyses (e.g., Kassam et al., 2013) and meta-analyses (e.g., Lindquist, Wager, Kober, Bliss-Moreau,

& Barrett, 2012) of neuroimaging findings support (rather than falsify) the CAT.

The ability to test any biological hypothesis about emotion networks requires that the definition of emotion be stipulated in advance, in a way that scientists can agree on or at least acknowledge as potentially correct. Such an achievement is difficult, however, because scientists tend to define emotion in ways that serve their own underlying assumptions and scientific goals that differ from one another (at least across different schools of thought or approaches). As a result, the biological evidence that is most relevant depends on the phenomenon as stipulated.

The CAT reminds us to resist the temptation to falsely distinguish biology and psychology. All semantic categories, even those that are highly abstract, have characteristic patterns of activation within the human brain (e.g., Naselaris, Preng, Kay, Oliver, & Gallant, 2009). These representations are not necessarily static and shift with attention (e.g., Cukur, Nishimoto, Huth, & Gallant, 2013), so that biology is not equivalent to innateness. Nor is it evidence that something is evolutionarily preserved.

Furthermore, the CAT cautions us to resist the lure of essentializing when interpreting biological data. This is important, because temptations are everywhere. Most recently, it is possible to see essentialistic thinking in interpretations of pattern classification techniques (see Barrett, 2013). It is tempting to believe that the patterns distinguishing different emotional episodes within a single study are *the patterns* to distinguish emotion categories, rather than the patterns that distinguish those particular instances of emotions (and therefore the patterns might not generalize across experiments). For example, two recent pattern classification studies that used similar methods and stimuli did not replicate each other in the patterns they report that distinguish between emotions in each study (Kragel & LaBar, in press; Stephens, Christie, & Friedman, 2010). Similarly, our meta-analytic pattern classification of brain activity distinguishing different emotions (Wager et al., under review) does not replicate a recent study that also reports patterns of distinctiveness (Kassam et al., 2013). From our perspective, these are not surprising results, because experiments elicit emotional instances that are heterogeneous (even though the data are often interpreted as if they reveal truths about emotion types).

3. How Does Your Theory View the Relation of Emotional Experience (the Subjective Conscious Feeling in an Emotion) to the Perception of Emotion in Another? What Is Each Process? Are They Qualitatively Different Processes? The Same Process? Are They Linked?

The conceptual act theory hypothesizes that the same processes interact to create emotional experiences and emotion perceptions, and to regulate emotion. In our view, experience versus perception, and generation versus regulation, are phenomenological distinctions, not mechanistic ones (Barrett, 2006, 2013; Barrett et al., 2014, in press).

We hypothesize that every moment of consciousness arises from the *conceptual act* of applying stored knowledge to incom-

ing sensory input from within the perceiver and from the world, inside the brain of the perceiver. To say that it is an “act” does not mean it is deliberate, but rather that it is not a passive event because the perceiver is not merely detecting and experiencing what it is out there in the world or what is going on inside his or her body—prior experiences (i.e., knowledge) play a role in directing sensory sampling, and in making meaning of the sensory array to create momentary experiences, whether or not they are creating an instance of emotion, perception, or cognition. The word “act” merely signals that every mental event is, to a considerable extent, infused with top-down (perceiver-based) input. Without that top-down input, the mental event does not exist for that perceiver (although it might exist for another perceiver who uses such knowledge). Thus, it is meaningless to ask if an emotion “exists” independently from any observer. For example, the question “is a freezing rat afraid?” has no scientific answer. Instead, it is scientifically meaningful to ask “from the perspective of a human observer, is the rat afraid when it freezes?” (yes, if conceptual knowledge for fear is used to make meaning of the freezing behavior in a given context); or, “from the perspective of the rat, is it afraid when it freezes?” (no, because it does not possess a conceptual category for fear).

To call the application of stored knowledge to incoming sensory input an “act” is also not meant to imply that this occurs as a discrete event. It is continuously occurring, usually in the form of predictions (Barrett et al., in press).

We further hypothesize that at every waking moment, the brain is predicting sensory input from the body and from the world and making sense of this input using past experience organized as an embodied, conceptual system. Whether a person experiences an emotion perception, an emotional experience, or even a cognition (such as an appraisal) depends on attentional focus. When the brain is foregrounding sensations from the world, the person will experience a perception (and affective feelings within the perceiver are used as information about the state of the world). When the brain is foregrounding sensations from the body, perhaps because these sensations are particularly intense (or because such focus has been useful and reinforced in a prior situation like this one, or because of an explicit focus on them), the person will experience an emotional episode. When the brain is focusing on internally generated content, the person will experience a cognition. In each case, information from the world, the body, and from prior experience was present—what differed was the attentional focus within the dynamic conceptualization.

4. Emotions Are Now Typically Thought of as Having Components, Such as Changes in the Peripheral Nervous System, Facial Movements, and Instrumental Behavior. What Precisely Does Your Theory Say About the Relation of Emotion to the Components?

Emotions are often defined as coordinated changes in the autonomic nervous system, voluntary behaviors and subjective experience. Yet this definition is not unique to emotion, because

every waking moment of life involves changes in the autonomic nervous system, in voluntary behaviors, and in feeling. By coordinated, I mean that *in that instance*, there is coordination among systems (e.g., Obrist's [1981; Obrist, Webb, Sutterer, & Howard, 1970] concept of cardiosomatic coupling). Whether a given pattern of coordination replicates across instances of a conceptual category (e.g., "Do all instances of fear have the same pattern of coordination?") is a completely separate issue.

The conceptual act theory shares a family resemblance with componential approaches to emotion. According to the CAT, a perceiver's brain architecture can be thought of as a situated conceptualization generator producing the sequences of brain states that correspond to the mental features that the person experiences. So in our approach, the psychological components refer to psychological primitives (affect, categorization, attention, language, etc.) that work together to construct emotional episodes. These systems or ingredients are domain-general, meaning that they interact to construct cognitions, perceptions, and to guide action. At the biological level, the components refer to domain-general brain networks or ingredients that work together to construct mental states (Barrett & Satpute, 2013; Lindquist & Barrett, 2012). These do not have a one to one correspondence with the psychological primitives.

Emotions can be said to emerge from the interactions of these core systems producing a unified conscious field. The concept of emergence goes beyond describing mere interactions, however, to indicate that the emergent whole has properties that the parts do not (i.e., an appraisal is a way of describing the emergent meaning of a mental event; it is not a mechanism or a cognitive part of an emotion). Interactions of core systems create the neural "ecosystem" that mental states, like an instance of emotion, emerge from. As a consequence, emotions cannot be reduced to these core systems. Furthermore, each system cannot be manipulated and studied independently, because the state of any one system depends on the state of the whole (i.e., a holistic approach is necessary). This represents a serious analytic challenge for a psychological construction, however, since most data analytic and modeling strategies are based on reductionist analytic methods.

5. Is There Variability in Emotional Responding Within a Given Category of Emotion (Such as Fear, Anger, etc.)? If so, How Does Your Theory Explain That Variability?

In the conceptual act theory, emotions (like all mental states) are not assumed to be platonic, physical types (or even a modal physical type), but instead are treated as abstract, conceptual categories that are populated with variable instances optimized for a particular situation or context. Variability is created when initial physical responses (as affective predictions) are optimized for a particular situation or context as sensory inputs (from the body and the world) are made meaningful using highly context-dependent and culturally dependent conceptual information about emotion derived from past

learning or experience. There appear to be at least five sources of the variation that occurs for emotional episodes within a category of emotion: (a) the behavioral adaptations that serve as initial, affective predictions about how to best act in a particular situation (e.g., it is possible to freeze, flee, fight, or faint during fear); (b) the concepts that develop for emotion; (c) the vocabulary used for emotions; (d) the variation in the types of situations that arise in different cultures; and (e) stochastic processes.

If each emotion word names a conceptual category, and there is a lot of variation in the instances within that category, then how did we end up with beliefs that each emotion has a specific facial expression, bodily pattern, and so on? The CAT proposes that these patterns are stereotypes that represent the goal that is at the core of each emotion category (Barrett, 2006). Specifically, the hypothesis is that an emotion word names a dynamic, goal based category. According to Larry Barsalou (1985), the prototype of such a category best meets the goal, even if it does not actually exist in nature. The ideal of the category is not the one that is most frequently encountered, but the one that maximally achieves the goal of the category.

If each emotion category is actually a population of variable instances, then experiments can be designed to model and capture those instances (rather than attempting to evoke only the most typical instance in the lab, which itself produces variation that then has to be explained after the fact). For example, we explicitly studied how neural responses differed during fearful and angry instances of both social threat and physical danger, as well as how neural responses during fear and anger were similar when experienced in a similar context (e.g., social threat; Wilson-Mendenhall et al., 2011). In fact, a growing number of articles are designed explicitly to capture heterogeneity within emotion categories, both within individuals and across cultures (Barrett et al., 2014, in press).

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