

# Don't Give Up on Basic Emotions

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## Abstract

We argue that there are three coherent, nontrivial notions of basic-ness: conceptual basic-ness, biological basic-ness, and psychological basic-ness. There is considerable evidence for conceptually basic emotion categories (e.g., “anger,” “fear”). These categories do not designate biologically basic emotions, but some forms of anger, fear, and so on that are biologically basic in a sense we will specify. Finally, two notions of psychological basic-ness are distinguished, and the evidence for them is evaluated. The framework we offer acknowledges the force of some of the objections to basic emotion theory whilst demonstrating that the notion of a basic emotion, once properly reformulated, is still of scientific value.

## Keywords

basic emotions, core affect, emotion primitives, natural kinds, psychological constructionism

The view that there exist a small number of “basic emotions” continues to appear in introductory psychology texts, and many scientists in other fields regard it as a solid finding they can appeal to as a basis for their own work. Yet, within affective science itself, the notion of a “basic emotion” has been subjected to increasingly powerful critiques over the past 30 years.

In the 1980s, the social constructionist movement accused basic emotion theorists of neglecting the social aspects of emotions (e.g., Averill, 1980). A more influential critique came a decade later when Ortony and Turner suggested that “there is no coherent nontrivial notion of basic emotion” (1990, p. 315). They considered and rejected various senses in which emotions may be said to be “basic,” and concluded that belief in basic emotions may be “an article of faith rather than an empirically or theoretically defensible basis for the conduct of emotion research” (1990, p. 315; Turner & Ortony, 1992; but see responses by Ekman, 1992b; Izard, 1992; Panskepp, 1992).

In recent years, psychological constructionists have argued that basic emotion theorists are mistaken in conceptualizing emotions as “biological categories imposed by nature, so that emotion categories are recognized, rather than constructed, by the human mind” (Barrett, 2006, p. 47; Russell, 2003). The idea that basic emotions are “natural kinds” is not supported by the

data, and “presents a major obstacle to understanding what emotions are and how they work” (Barrett, 2006, p. 29; see also Barrett et al., 2007; Izard, 2007; Panskepp, 2007).

In this article we argue that the idea of emotional “basicness” continues to have scientific value. We acknowledge that critics have pointed out major flaws in current formulations of basic emotion theory and we show how the theory can be revised to take account of these criticisms. This does not conclusively vindicate basic emotion theory, but rather formulates it in a way that turns the disagreements between basic emotion theorists and their critics into tractable empirical questions. Addressing these empirical questions will be more productive for affective science than simply abandoning the idea of basic emotions.

## Reference Failure and Natural Kinds

Opponents of basic emotions argue that “the notion of basic emotions will not lead to significant progress in the field” (Ortony & Turner, 1990, p. 315). The natural-kind paradigm embraced by basic emotion theorists, it is argued, “has outlived its scientific value” (Barrett, 2006, p. 29). To assess these claims, we must first clarify what gives categories scientific value.

The worst shortcoming of a scientific category is *reference failure*: there is nothing in the world to which the category

refers. The paradigm example of reference failure is “phlogiston,” a category introduced at the beginning of the 18th century to explain combustion and related phenomena. According to phlogiston theory, phlogiston is lost to the air during combustion, leaving a dephlogisticated substance as a residue. At the end of the 18th century, however, Lavoisier demonstrated that there is no such thing as “phlogiston,” and that combustion occurs when substances combine with oxygen.

A second possible shortcoming is *projectability failure*: it is not possible to extrapolate from samples of the category to the whole category. The fundamental scientific practices of induction and explanation presuppose that some of the observable correlations between properties are “projectable” (Goodman, 1954). To make the accumulation of scientific knowledge possible, correlations observed in samples need to be reliably “projected” to the rest of the category. Scientific classifications of particulars into categories embody our current understanding of where such projectable clusters of properties are to be found.

The category of “superlunary object” posited by Aristotelian astronomers offers a good example of *projectability failure*. The category does not fail to refer, because there are objects that occupy regions of space external to the orbit of the terrestrial moon. But members of the “superlunary object” category do not share much of anything besides being located outside the orbit of the moon. Hence, correlations observed in a set of samples of superlunary objects are not projectable to the whole category.

A biological species category like “*Canis lupus*,” on the other hand, classifies organisms into sets that represent reliable clusters of genetic, morphological, physiological, and behavioral properties. Biologists can and do discover properties of the species as a whole by examining a few members of the species.

In philosophy, scientific categories that allow for reliable scientific extrapolation from samples of the category to the whole category are commonly called *natural kinds* (Boyd, 1991; Hacking, 1991; Mill, 1843/1905; Quine, 1969). A natural kind is a class of particulars about which scientifically relevant generalizations can be discovered. “Superlunary object” is not a natural kind, but “*Canis lupus*” is one. On this view, natural kinds are the building blocks of scientific theories, and one of the central aims of science is to find the natural kinds in each specific domain of investigation.

It is important to note that categories are natural only relative to some specific domain(s) of properties. The category of “domestic pet” is not a natural category for investigating genetic, morphological, physiological, and behavioral properties of interest to biologists, but it may very well be a natural category in some social psychological theory or, of course, in a theory about domestication.

Furthermore, being “natural” in the sense used here should not be opposed to being “socially constructed.” A category of socially constructed objects, such as “feudal economies,” can be a natural kind in sociology, if the category participates in reliable sociological generalizations concerning political structure, distribution of means of production, income inequality, average life expectancy and so on (Boyd, 1999).

Two main accounts of natural kinds have been proposed in philosophy. According to *essentialist* accounts, the members of

a natural kind share an essence—some property which every member of the group possesses and which makes them what they are. For example, all samples of gold have the same atomic constitution, and this is what makes them samples of gold. On this view, natural kinds have sharp edges and feature in exceptionless laws of nature that hold uniformly across time and space. This essentialist notion of natural kinds applies to categories like gold, but it is unsuitable for natural kinds in the biological and social sciences (Boyd, 1999; Machery, 2005; Samuels, 2009; Wilson, Barker, & Brigandt, 2007). In those disciplines, variability among kind members is the norm, borderline cases often emerge, and generalizations tend to be exception-ridden and only locally valid.

Biological species are a case in point. There is a great deal of variation among members of the same species, as a glance at any bird book will confirm. Certain characters are marked as “highly variable”; some species are divided into several geographic “races”; some larger groups of birds vary in such complex and overlapping ways that they are denoted a “species complex.” All this was well known to Darwin and it is what evolutionary theory should lead us to expect.

Species are products of evolution and as such generalizations about them cannot be unrestrictedly valid across space and time, and even locally they may admit of exceptions. But despite this, classification of organisms into species is of proven utility in the biological sciences, and reflects something real in nature, rather than being solely an expression of human interests.

To accommodate variation, borderline cases, and the lack of exceptionless and universal generalizations in the special sciences, *antiessentialist* theories of natural kinds have been developed. Boyd’s influential homeostatic property cluster (HPC) theory (Boyd, 1999) suggests that if a set of properties cluster together more or less reliably because of one or more causal homeostatic mechanisms, then the objects that exhibit that cluster of properties are members of an HPC natural kind.<sup>1</sup> In Boyd’s words, “[t]he natural definition of [...] homeostatic property clusters kinds is determined by the members of a cluster of often co-occurring properties and by the (‘homeostatic’) mechanisms that bring about their co-occurrence” (Boyd, 1999, p. 141).

There is no one property that every member of an HPC kind must possess to be a member, and some individuals may have just enough of the properties to place them on the borderline for membership. This is what allows HPC kinds to accommodate the variability and borderline cases of kinds in the special sciences while preserving their suitability for prediction and explanation. HPC kinds are scientifically valuable when the imperfect co-occurrence of the cluster properties brought about by some causal homeostatic mechanism(s) is important relative to the inductive and explanatory purposes of some scientific discipline.

In this article, we rely on the antiessentialist account of HPC natural kinds, which we consider to be the one most suitable for the needs of affective science (see Griffiths, 1997, 2004; Scarantino, 2009, in press b).

### Three Notions of Basic-ness

One of the central obstacles to assessing the scientific promise of basic emotion theory is that the phrase “basic emotion” is used to mean more than one thing. Ortony and Turner (1990) made a valuable contribution by clearly distinguishing the three main senses of the term “basic” used in the literature. We will refer to these three senses as:

1. *Conceptually basic*: An emotion category is conceptually basic ( $\text{basic}_C$ ) just in case it occupies the basic level in a conceptual taxonomy.
2. *Biologically basic*: An emotion is biologically basic ( $\text{basic}_B$ ) just in case it has an evolutionary origin and distinctive biological markers.
3. *Psychologically basic*: An emotion is psychologically basic ( $\text{basic}_P$ ) just in case it does not contain another emotion as a component part.

Whether the category of basic emotions suffers from *reference failure* or *projectability failure* or neither, depends on which sense of basic emotion is in play. Ortony and Turner (1990) seem to have supposed that all three senses of basic-ness are without scientific value. They argued that the evidence is weak for either conceptually basic emotion categories, biologically basic emotions, or psychologically basic emotions. They conclude that we should stop positing basic emotions, and focus on emotion components instead. While we recognize the force of many of the points made by Ortony and Turner, we are not convinced, and will argue that positing basic emotion concepts, biologically basic emotions, and psychologically basic emotions can each be scientifically useful. To defend this position while giving critics of basic emotions their due will demand significant revision of current accounts of all three forms of “basic-ness.”

Before considering specific arguments against these three kinds of basic emotion theory, we consider a general objection that finds its force in the very presence of discrepancies in the lists of basic emotions proposed by different emotion researchers. According to Ortony and Turner (1990), if there really were basic emotions there would not be as much disagreement on their identity as there actually is. Therefore, there are no basic emotions. We reject this argument for two reasons.

Firstly, since there are different senses of “basic-ness,” some lists differ simply because they aim to collect emotions that are basic in different senses. The implication of this is that any list of basic emotions needs to state clearly in which sense the items on the list are supposed to be basic.

Secondly, lists of emotions that are basic in the same sense—for example, biologically basic—will differ simply because of incomplete evidence. For example, we may not know exactly which emotions are evolutionary adaptations. At the same time, the presence of common empirical questions and shared evidence should limit the extent of disagreements, which is what we find. As Ortony and Turner (1990) concede, some emotions appear on pretty much all lists of biologically basic emotions (e.g., fear and anger; see also Ekman, 1992b).

Another general objection we do not consider compelling is that some lists of basic emotions contain items that are not emotions, for instance surprise, desire, and interest (Ortony & Turner, 1990). Ortony and Turner’s point is that lists of basic emotions are at odds with their own theory of what an emotion is and/or with other researchers’ theories. But if so, this is primarily a disagreement between competing theories of emotions, not a straightforward problem for basic emotion theory.

So these general criticisms only show the need for conceptual clarity on what one means by “basic,” and for further empirical evidence about basic-ness in each of the three senses. In the remainder of the article we assess whether there really are basic emotions in any or all of these senses.

### Are There Conceptually Basic Emotion Categories?

#### Background

The idea of conceptually basic categories ( $\text{basic}_C$ ) was introduced by Rosch (1973, 1978). It has since been explored with respect to emotion concepts by a variety of authors (e.g., Averill 1982; de Rivera, 1981; Fehr & Russell, 1984; Shaver, Schwartz, Kirson, & O’Connor, 1987). Rosch argued that there is a level of abstraction in any conceptual taxonomy—the basic level—that is psychologically privileged with respect to a variety of cognitive tasks. *Basic-level* categories are the most abstract categories of which a representative image can be formed, the categories named more quickly by adults, the categories used most often by parents to teach a language to their children, the categories designated by shorter names, and the categories learned first by children. Paradigmatic examples of such categories include *chair*, *car*, *dog*, *table*, and *shirt*.

Rosch argued that this privileged position resulted from the fact that basic categories are the *most abstract* categories within the hierarchy which *still have many relevant properties in common*. Categories *superordinate* to basic categories have few properties in common, and are very distinct from one another. Categories *subordinate* to basic categories have many properties in common, but are not very distinct from one another.

To test this hypothesis, Rosch (1978) asked a group of experimental subjects to list “all attributes [they] could think of” for instances of each category. What they discovered was that

[v]ery few attributes were listed for the superordinate categories, a significantly greater number [...] for the supposed basic-level objects, and not significantly more attributes [...] for subordinate-level objects than for basic-level. (1978, p. 194).

Interestingly, Rosch (1978, p. 194) also discovered that “basic objects were the most general classes to have motor sequences in common,” namely ways in which humans habitually engage in motor interaction with them.

In a seminal study, Fehr and Russell (1984) investigated the emotion taxonomy, and proposed that basic-level emotion categories correspond to middle-level categories such as “anger,” “fear,”

“love,” “happiness,” “sadness,” “pride,” “envy,” “courage,” and “lust.” They argued that emotion categories at this level satisfy a number of the characteristics associated with basic-level categories. For instance, they are designated by shorter names, people appear to be able to visualize facial expressions distinctive of them, and people have “similar responses” to other people experiencing them (Fehr & Russell, 1984, p. 482).

Shaver et al. (1987) further supported the existence of basic-level emotion categories, but restricted Fehr and Russell’s (1984) initial list to *prototypical* middle-level emotion categories, characterized as those categories that come to mind more quickly as examples of “emotion” and those categories children learn first. Shaver et al.’s (1987, p. 1065) list of basic-level emotion categories includes only five items: “anger,” “sadness,” “love,” “fear,” and “joy.”<sup>2</sup>

### *Prospects for a Theory of Conceptually Basic Emotion Categories*

Ortony and Turner (1990) questioned the evidence for a basic conceptual level in the emotion hierarchy. For instance, they argued that it is not the case that we can summon images of anger as we can summon images of a chair, because images of anger will always be images of angry people rather than images of anger in the abstract. We are not persuaded by this distinction: images of angry people are also images of anger, just as images of red objects are also images of redness.

Ortony and Turner also pointed out that not everyone is convinced that early acquisition of a category is evidence for its basic-ness (e.g., Mandler, Bauer, & McDonough, 1991). We can debate what qualifies as reliable evidence for conceptual basic-ness—perhaps early acquisition does not—but at this stage of research it is widely accepted that there exists a basic and psychologically privileged level of categorization. As Murphy (2002, p. 213) puts it, the cumulative “evidence for basic-level performance advantages is considerable.” If this is true in general, we see no good reason to think that the emotion hierarchy constitutes an exception. What remains to be empirically determined is, of course, exactly which emotion categories are conceptually basic.

Another open question concerns the structure of both basic-level (e.g., “anger”) and nonbasic-level (e.g., “emotion,” “annoyance”) folk emotion categories. For centuries, emotion theories have tried to come up with classical definitions of emotions consisting of individually necessary and jointly sufficient criteria. As a result, a plethora of alternatives are now available (e.g., Kleinginna & Kleinginna, 1981, reviewed more than 100 definitions). The problem is that no classical theory has so far been able to acquire a clear lead over its competitors, and all theories appear beset by pesky counterexamples.

We follow Fehr and Russell (1984) in thinking that the best explanation for this lack of consensus is that folk emotion categories have a nonclassical structure (Clare & Ortony, 1991, present a qualified dissent). Fehr and Russell’s (1984) specific proposal is that folk emotion categories are associated in long-term memory with prototypical scripts (see also Ben Ze’ev, 2000).

An emotion’s script “contains prototypical causes, beliefs, physiological reactions, feelings, facial expressions, actions, and consequences” (Fehr & Russell, 1984, p. 482). For example, the anger prototype may contain a slight of some kind as a prototypical cause, heightened heartbeats and muscle tension, an unpleasant feeling, bare teeth and clenched fists, an aggressive action tendency, and a general physiological preparation for violent confrontation. The core idea is that something is a member of the (basic-level) “anger” category insofar as it achieves enough similarity with this anger prototype.

Whether or not the details of Fehr and Russell’s account are viable, we think it goes in the right direction. Folk emotion categories are unlikely to belong to the very restricted class of ordinary terms that are classically definable (see Machery, 2009, for a recent summary of what led to the demise of the classical theory of concepts).

The job of articulating a descriptively accurate account of emotion and its subordinate categories constitutes what one of us has labeled the Folk Emotion Project (Scarantino, in press a). At the core of this project is the task of figuring out which sorts of “family resemblances,” to use Wittgenstein’s expression, motivate the inclusion of members into folk emotion categories.

This project should not be confused with the study of the emotions themselves. Figuring out the structure of folk emotion categories is different from articulating a scientifically fruitful account of what emotions are. The latter task is what we call the Scientific Emotion Project, which aims to find out what the natural kinds of emotions are, and in which inductively and explanatorily relevant scientific generalizations they can be embedded.

Failure to keep the Folk Emotion Project and the Scientific Emotion Project separate can lead to fallacious arguments. For instance, one may be tempted to conclude from the fact that a certain emotion (e.g., anger) is designated by a basic-level category (e.g., “anger”) that it is a basic emotion in the biological or in the psychological sense. Or one may think that a requirement for being a basic-level category is designating an emotion that is also basic in the biological or psychological sense.

But the fact that a certain lexical category occupies a privileged position in a taxonomy only tells us something about the psychological process of categorization, not about the items being categorized. We see no good reason to expect that categories that strike an optimal balance between informativeness and distinctness (conceptually basic) will also be, or have to be, categories that collect items that have an evolutionary origin (biologically basic) and/or have no other emotions as parts (psychologically basic).

Let us now turn to the question of whether there are biologically basic emotions.

## **Are There Biologically Basic Emotions?**

### *Background*

The notion of biological basic-ness (basic<sub>B</sub>) is arguably the most central in debates over basic emotions. Theories of basic<sub>B</sub> emotions find their inspiration in Darwin’s (1872) work on the

evolution of emotional expressions. In the 1960s Darwin's approach was embedded into a general theory of affects by Tomkins (1995), and fully articulated into modern basic emotion theory by Ekman (1980, 1999), Izard (1977, 1992), Panksepp (1982, 1998), and others. There are several accounts of basic<sub>B</sub> emotions, but here we focus on Ekman's, arguably still the most influential.

Ekman characterized the notion of biological basic-ness as indicating "the view that emotions evolved for their adaptive value in dealing with *fundamental life tasks*" (Ekman, 1999, p. 46).<sup>3</sup> Fundamental life tasks include avoiding predators, progressing towards goals, coping with losses, finding mates, fighting, and so on (cf. Tooby & Cosmides, 2000). Ekman (1999, p. 47) argued that emotions acquired adaptive value because they quickly mobilize and coordinate resources needed to deal with such tasks, and because they "inform conspecifics, without choice or consideration, about what is occurring."

The defining characteristics of basic<sub>B</sub> emotions follow from the hypothesis that they are evolutionary adaptations selected because of their speed and communicative effects. Ekman summarized the properties of basic<sub>B</sub> emotions as follows:

Markers of biologically basic emotions:

1. Distinctive universal signals
2. Distinctive physiology
3. Automatic appraisal, tuned to:
4. Distinctive universals in antecedent events
5. Distinctive appearance developmentally
6. Presence in other primates
7. Quick onset
8. Brief duration
9. Unbidden occurrence
10. Distinctive thoughts, memories, images
11. Distinctive subjective experience" (Ekman, 1999, p. 56)

On this view, a biologically *nonbasic* emotion is an emotion that did not evolve for its adaptive value in dealing with fundamental life tasks and/or that is not characterized by the markers of basic emotions.

The physiological, expressive, behavioral, cognitive, and experiential responses characteristic of basic<sub>B</sub> emotions are assumed to be automatically elicited and coordinated by an "affect program" geared toward dealing with the specific life task the basic emotion under consideration evolved to solve. Some assume that affect programs have a neurobiological underpinning and are hardwired, manifesting themselves in some cases at birth (e.g., fear) and in other cases at predictable stages of development (e.g., lust) (e.g., Panksepp, 1998).

Importantly, basic<sub>B</sub> emotion theory can make room for cultural influences. As the organism develops, social rules are acquired that may inhibit some of the emotional responses under way, possibly leading to emotional leakages (e.g., Ekman & Friesen, 1969, on display rules). At the same time, basic<sub>B</sub> emotion theorists understand cultural influences as being constrained by the fact that they operate on a package of coordinated responses governed by a preexisting and already activated affect program.

Ekman's list of basic<sub>B</sub> emotions has changed over time, but the following is a representative sample: "amusement, anger, contempt, contentment, disgust, embarrassment, excitement, fear, guilt, pride in achievement, relief, sadness/distress, satisfaction, sensory pleasure, and shame" (Ekman, 1999, p. 55). Each of these emotions, Ekman (1999) emphasized, forms a *family*. Instances of irritation, rage, and fury, for instance, all belong to the *anger family*. Other theorists of basic<sub>B</sub> emotions have proposed different lists, which overlap with Ekman's own to various degrees. According to Panksepp, the basic emotional networks in mammalian brains include "SEEKING, RAGE, FEAR, LUST, CARE, PANIC, and PLAY" (Panksepp, 2007). On Izard's list of basic emotions, we find "interest, joy/happiness, sadness, anger, disgust, and fear" (Izard, 2007).

According to Ekman and his associates, the most compelling evidence for basic<sub>B</sub> emotions is constituted by *judgment studies* and *production studies* on emotion-specific facial expressions. Judgment studies aim to show that observers in diverse cultures recognize the same expressions as emotion-specific. Production studies aim to show that the same emotion-specific facial expressions universally express the same basic<sub>B</sub> emotions (cf. Matsumoto, Keltner, Shiota, O'Sullivan, & Frank, 2008).

Critics have proposed two main theses they consider fatal for the scientific prospects of basic<sub>B</sub> emotion theory:

*No one-to-one correspondence (NOC) thesis:* There is no one-to-one correspondence between anger, fear, disgust, happiness, sadness, surprise, etcetera, and any physiological, neurobiological, expressive, behavioral, or phenomenological responses.

*Low coordination (LC) thesis:* There is low coordination between physiological, neurobiological, expressive, behavioral, cognitive and experiential responses among instances of anger, instances of fear, instances of disgust, instances of happiness, etcetera.

Evidence for NOC consists of examples of anger, happiness, sadness, surprise, etcetera, that lack the emotion-specific responses posited by basic<sub>B</sub> emotion theorists and/or examples of things other than anger, fear, disgust, happiness, sadness, surprise, etcetera, that have the emotion-specific responses posited by basic<sub>B</sub> emotion theorists. Evidence for LC consists of examples of anger, happiness, sadness, surprise, etcetera, that are instantiated in the absence of a coordinated package of physiological, neurobiological, expressive, behavioral, cognitive, and experiential responses.

For instance, Ortony and Turner (1990, p. 321) considered the evidence for the universality of facial expressions, concluding that "the linkage between facial expressions and emotions is not inviolable." One of their key points was that some instances of anger, fear, disgust, happiness, sadness, etcetera, are not going to be associated with the expressions typical of anger, fear, disgust, happiness, sadness, etcetera. Furthermore, expressions typical of anger, happiness, sadness, surprise, etcetera, can be associated with other emotions (e.g., crying is typical of

sadness, but it is occasionally produced by joy). They concluded that “some facial expressions are characteristic of some emotions [...] they constitute a guide rather than a guarantee” (Ortony & Turner, 1990, p. 321). The same lack of one-to-one correspondence, Ortony and Turner (p. 320) claimed, affects neural and autonomic changes as well.

This line of critique has been extended by psychological constructionists, who have provided a wealth of data to show that there is no one-to-one correspondence between discrete emotions such as anger, happiness, sadness, and surprise and any physiological, neurobiological, expressive, behavioral, phenomenological responses, as well as a low degree of association among responses (Barrett, 2006; Barrett et al., 2007; Russell, 2003; Warnick, LaPorte, & Kalueff, 2011; see Izard, 2007, and Panskepp, 2007, for responses).

It should be noted that Ekman himself states that facial expressions for basic<sub>B</sub> emotions are variable, but this is not the same kind of variability. His view is that expressions change within families—for example, expressions change within the anger family—but at the same time that all varieties of the same basic emotion such as anger “share certain configurational (muscular patterns) features, by which they recognizably differ from the family of fear expressions, disgust expressions, etc.” (Ekman, 1992a, p. 172). This is precisely what psychological constructionists deny, suggesting instead that no configurational features are shared by all members of the anger family, of the fear family, of the disgust family, etcetera.

### *Prospects for a Theory of Biologically Basic Emotions*

We find the evidence for the NOC thesis and for the LC thesis provided by psychological constructionists compelling (cf. Scarantino, 2009). However, we do not think it follows that there are no biologically basic emotions. Instead, the critique suggests two revisions to basic<sub>B</sub> emotion theory. First, basic emotion theorists should stop using unqualified folk emotion categories such as “anger,” “fear,” “disgust,” “happiness,” “sadness,” etcetera, to designate basic<sub>B</sub> emotions. Second, basic<sub>B</sub> emotion theorists should embrace an antiessentialist approach to natural kinds, and reformulate their definition of a basic<sub>B</sub> emotion accordingly.

Most basic emotion theorists follow Ekman in using folk emotion category names to characterize candidate basic emotions. This has led to a serious conflation of two projects that, as we have argued, should be kept separate. One is the Folk Emotion Project, which aims to unveil what makes something a member of a folk emotion category. The other is the Scientific Emotion Project, which aims to discover natural kinds of emotions and the reliable scientific generalizations that are true of them.

The Folk Emotion Project and the Scientific Emotion Project are very different things. The Folk Emotion Project is comparable to the anthropological study of the ways in which human beings categorize living organisms (“folkbiology”; Medin & Atran, 1999). The Scientific Emotion Project is comparable to biological systematics, which seeks the best scientific classification

of organisms. The scientific taxonomy of emotions should not be constrained by folk emotion categories any more than the scientific taxonomy of organisms should be constrained by the categories of folkbiology. The fact that some cultures do not classify large, flightless birds with other birds is no reason for a taxonomist to exclude them from the taxon *Aves*.

A similar distinction is drawn in Russell (1991), who argues that emotion theorists can be engaged in *descriptive* or *prescriptive* projects with respect to emotion concepts. In a descriptive project such as the Folk Emotion Project, the objective is simply to describe the characteristics of ordinary emotion concepts. In a prescriptive project such as the Scientific Emotion Project, the objective is to come up with emotion concepts suitable for scientific investigation.

But if a certain emotion is labeled “anger” or “fear” or “disgust” without qualification, as basic emotion theorists commonly do, the theory’s critics are entitled to criticize it by finding ordinary instances of “anger” or “fear” or “disgust” that lack the requisite biological signature and response coordination. Since folk emotion categories, as we have argued earlier, are highly heterogeneous and unlikely to share anything more than family resemblances, it is not hard to come up with instances of the folk categories “anger,” “fear,” “disgust,” “happiness,” “sadness,” etcetera, that fail the criteria for biological basic-ness (see Barrett, 2006, for some examples).

However, *some* members of the “anger,” “fear,” “disgust,” “happiness,” and “sadness” categories *do* meet Ekman’s criteria for being a basic<sub>B</sub> emotion. One example is the kind of fear produced by sudden loss of support. It has a distinctive and possibly universal signal, a distinctive physiology, an automatic appraisal tuned to an antecedent universally present in all cultures, a distinctive developmental appearance, presence in other primates, quick onset, brief duration, unbidden occurrence, distinctive thoughts, memories and images, and distinctive subjective experience (Öhman & Mineka, 2001).

So the “biologically basic emotion” concept does not suffer from *reference failure*: there exist emotions in the world that are basic<sub>B</sub> in just the sense indicated by Ekman. The “biologically basic emotion” concept probably escapes *projectability failure* as well: the items that satisfy Ekman’s markers of basic-ness are likely to constitute a homogenous domain for purposes of scientific extrapolation (more on this follows). But it is true that, as argued by Barrett (2006), folk emotion categories such as “anger,” “fear,” “disgust,” “happiness,” and “sadness” suffer from *projectability failure*: the markers of biological basic-ness observed in a set of samples of anger, or fear, or disgust, etcetera, cannot be reliably “projected” to all other instances of the folk category (cf. Griffiths, 1997; Scarantino, 2009, in press a).

It follows that biologically basic emotions should not be designated by folk emotion terms. Two main alternatives should be considered. One is using a neologism (e.g., threat-coping system), while the other is using modified versions of the folk categories, signaling that what is referred to is not the whole folk category, but just a part of it (e.g., fear<sub>B</sub> or fear<sub>BASIC</sub>). As one of us has argued, this decision cannot be taken a priori, but depends on the extent to which the folk categories and the

revised basic emotion categories overlap (see Scarantino, in press a, in press b). We claim, but will not argue here, that there is sufficient overlap between the set of items that satisfy Ekman's criteria of biological basic-ness and the set of items that fall into folk emotion categories to make the terminological choice of anger<sub>B</sub>, fear<sub>B</sub>, disgust<sub>B</sub>, happiness<sub>B</sub>, sadness<sub>B</sub>, surprise<sub>B</sub>, etcetera, preferable to the choice of neologisms.

Our work is not done yet. A second revision of current (biologically) basic emotion theory is required in response to the constructionist critique. What does it take to be an instance of anger<sub>B</sub>, fear<sub>B</sub>, disgust<sub>B</sub>, happiness<sub>B</sub>, sadness<sub>B</sub>, or surprise<sub>B</sub>? Ekman and his followers have offered a list of markers of biological basic-ness, but offered inconsistent and incomplete remarks over the years concerning their interpretation. In recent writings, Ekman (1999, p. 56) has stated that he does not "think any of the characteristics should be regarded as the *sine qua non* for [basic] emotions." At the same time, he has written that he has gone "back and forth on the question of whether or not a universal signal is the *sine qua non* for emotion" (Ekman, 1999, p. 47), once again presenting such claim "as a challenge" to the theory's critics. Ekman has also argued, in open contradiction with the *no sine qua non* interpretation, that "[i]t is necessary to posit emotion-specific central nervous system (CNS) activity in my account of basic emotions" (Ekman, 1999, p. 50).

We suggest that basic<sub>B</sub> emotion theorists should explicitly embrace an antiessentialist account of natural kinds. As discussed earlier, the natural kinds characteristic of the life sciences are often defined by a property cluster and one (or more) mechanisms that cause those properties to co-occur. None of the cluster properties are individually necessary for category membership, and the mechanism(s) brings about different subsets of the cluster in different circumstances. Nonetheless, the imperfect co-occurrence of the properties is important relative to the inductive and explanatory purposes of some particular life science.

For example, ecosystem types like "tropical rainforest" tend to share ecological properties, such as high species diversity, a closed canopy, and low soil nutrient levels, but none of these properties is essential for membership. Members of the category resemble one another because of abiotic mechanisms such as the effect of latitude on climate and biotic mechanisms like ecological succession. These mechanisms cause them to imperfectly share a cluster of co-occurring properties. Finally, these co-occurring properties are relevant to ecology, in the sense that ecologists can formulate useful predictions and explanations using the "tropical rainforest" category.

We suggest that anger<sub>B</sub>, fear<sub>B</sub>, disgust<sub>B</sub>, happiness<sub>B</sub>, and sadness<sub>B</sub>, should be interpreted as HPC kinds. On this view, Ekman's markers of biological basic-ness belong to a property cluster and they imperfectly co-occur due to some yet-to-be understood mechanism which may have a dedicated neural basis. No cluster properties are individually necessary, and a significant amount of variability is permitted among instances of the same biologically basic emotion.

In the case of basic<sub>B</sub> emotions, variability is precisely what we should expect. Since basic<sub>B</sub> emotions evolved to deal with fundamental life tasks, and since the same life task requires

different responses in different circumstances, there is no good reason to expect a unique biological signature for each biologically basic emotion (see Scarantino, in press b).

At the same time, responses should be coordinated by the underlying causal mechanism(s), and should manifest predictable patterns in varying circumstances. The evidence that folk emotion categories such as anger, fear, disgust, happiness, sadness, and so on manifest low response coordination, we emphasize, does not count as evidence that the biologically basic emotions anger<sub>B</sub>, fear<sub>B</sub>, disgust<sub>B</sub>, happiness<sub>B</sub>, and sadness<sub>B</sub> manifest low response coordination. Just as we should not expect the response coordination characteristic of "short-term memory" to extrapolate to all instances of what we call "memory" in English, we should not expect the response coordination characteristic of, say, "anger<sub>B</sub>" to extrapolate to all instances of what we call "anger" in English.

At this stage, a critic may worry that we have made basic<sub>B</sub> emotion theory virtually unfalsifiable. But the claim that there is a set of emotions that form the biologically basic emotion category "anger<sub>B</sub>" is not harder to falsify than the claim that there is a set of biotic communities that form the ecological category "tropical rainforest." These claims all stand or fall depending on whether the proposed categories have demonstrable explanatory and predictive value in their respective domains.

The falsification of biologically basic emotion theory would result from mounting evidence that there are few, if any, scientifically relevant generalizations applicable to those instances of emotions that satisfy the homeostatic property cluster defining of basic<sub>B</sub> emotions. For example, if instances of anger which possessed many of the properties in the cluster associated with "basic anger" turned out to have very little in common at the neural level, this would count as a negative finding. The absence of a dedicated neural mechanism might not be fatal on its own, but it would throw some doubt on whether the cluster individuates a biologically basic emotion given the causal importance of neural properties.

So we hope that our analysis will help shift the focus of the debate from the *no one-to-one correspondence thesis* (NOC) and the *low-coordination thesis* (LC), which are no threat to the revised version of (biologically) basic emotion theory we have proposed, to the investigation of the extent to which basic<sub>B</sub> emotions are predictively and explanatorily useful in understanding affective phenomena. We consider this question to be still up for grabs, and largely dependent on the contentious relation between basic and nonbasic emotions, an issue we address in the next section.

## Are There Psychologically Basic Emotions?

### Background

The idea that some emotions are psychologically basic (basic<sub>P</sub>) represents a third important strand in debates on basic emotions. Ortony and Turner (1990, p. 324) defined psychologically basic emotions as emotions that "do not have other emotions as constituents."<sup>4</sup> This definition has one minor shortcoming. Suppose that annoyance is a species of anger, and that

anger is psychologically basic. It would follow that annoyance is also psychologically basic despite being a species of anger, which is counterintuitive. So we offer the following modified definition: an emotion is psychologically basic if it does not have other emotions as constituents and it is not a species of another emotion.

Many philosophers and psychologists have suggested that some emotions are psychologically basic while other emotions are blends of these basic ones. Descartes (1649/1989), for instance, argued that there exist only six psychologically basic emotions: admiration, love, hatred, desire, joy, and sadness. In psychology, Plutchik (1962) proposed that the psychologically basic emotions are anger, fear, acceptance, joy, surprise, anticipation, disgust, and sadness. Combinations of these eight basic<sub>p</sub> emotions are supposed to form all other emotions by blending with one another, just as combinations of the three primary colors form all colors.

Prinz (2004) suggests an alternative to “blending” as the mechanism which makes nonbasic<sub>p</sub> emotions from basic<sub>p</sub> ones, namely *cognitive elaboration* (Izard, 1992, 2007, offers a similar analysis). Cognitive elaboration occurs when a basic<sub>p</sub> emotion combines with other mental states that are not emotions in their own right, for instance thoughts. Prinz gives the example of *shadenfreude*, which he characterizes as a combination of the basic<sub>p</sub> emotion of joy and a thought about the suffering of another which functions as a joy elicitor.

Ortony and Turner (1990) have one main criticism of the notion of psychological basic-ness: “the view of [basic emotions] as psychological primitives runs into a serious conceptual problem, namely that some basic emotions turn out to be more basic than others” (p. 325). Consider anger, a common candidate for psychological basic-ness. Ortony and Turner (p. 325) suggest that anger involves *displeasure* at some perceived slight, from which it follows that is not psychologically basic because it includes displeasure as a component. We may then say that displeasure is more psychologically basic than anger, but we would have to give up on the idea that anger is psychologically basic.

What is true of anger, Ortony and Turner (1990) claim, is true of all other allegedly basic<sub>p</sub> emotions. To the best of our understanding, their argument is that affective states such as pleasure and displeasure are always going to be more basic<sub>p</sub> than discrete emotions such as anger, fear, acceptance, joy, surprise, and so on, and therefore that no discrete emotion can be basic<sub>p</sub>.

Ortony and Turner’s (1990) argument reveals an ambiguity in the idea that some emotions are psychologically basic. It can mean either of two very different things:

*Emotional primitivity*: A discrete emotion is psychologically basic in the *emotion primitive* sense (basic<sub>EP</sub>) if it does not have other discrete emotions as constituents and it is not a species of another discrete emotion.

*Affective primitivity*: An affective state is psychologically basic in the *affective primitive* sense (basic<sub>AP</sub>) if it does not have other affective states as constituents and it is not a species of another affective state.

So being psychologically nonbasic<sub>EP</sub> means either having another discrete emotion as a component or being a species of another discrete emotion, and being psychologically nonbasic<sub>AP</sub> means either having another affective state as a component or being a species of another affective state. Crucially, being an *emotional primitive* entails being an *affective primitive*, but not vice versa, because the class of *affective states* is larger than, but includes, the class of *discrete emotions* (as well as moods, preferences, likings, attitudes, etc.).

Since we follow psychological constructionists in thinking of pleasure and displeasure as affective states distinct from discrete emotions (see Russell, 2003), we conclude that Ortony and Turner’s (1990) argument shows at best that anger, fear, disgust, and so on are not psychologically basic in the affective primitive sense. Their argument does not show that anger, fear, disgust, and so on are not psychologically basic in the emotional primitive sense, nor that there are no emotional primitives, nor that there are no affective primitives.

### *Prospects for a Theory of Psychologically Basic Emotions*

Ortony and Turner’s (1990) argument makes an implicit case for the existence of affective primitives such as pleasure and displeasure, which are components of discrete emotions but do not seem to have other affective states as components. This view has been developed by psychological constructionists, who have singled out *pleasure* and *arousal* as affective primitives that combine into *core affect*, a blend of hedonic and arousal values hailed as “the most basic building block of emotional life” (Barrett, 2006, p. 48; Russell, 2003).

All other affective states are supposed to be built out of core affect and possibly other ingredients. For instance, mood is understood as “prolonged core affect without an object” (Russell, 2003, p. 149). Discrete emotions are understood as emerging from a *conceptual act* of categorization of core affect (Barrett, 2006). A core affective state of high pleasantness and high arousal may be categorized as happiness, a state of low pleasantness and high activation as fear, a state of low pleasantness and low arousal as sadness, and so on. On Barrett’s (2006, p. 49) view, “categorizing the ebb and flow of core affect into a discrete experience of emotion corresponds to the colloquial idea of ‘having an emotion.’”

What motivates psychological constructionists is the view that discrete emotions are nonbasic<sub>AP</sub>, and the conviction that emotion science should focus on affective primitives, “elemental—but still psychological—building blocks” (Russell, 2003, p. 46). The implicit assumption is that natural kinds in affective science only exist at this lower, elemental level of analysis. But we see no reason why there should not be natural kinds at both lower and higher levels of analysis. In our view, emotion science should search for natural affective kinds, categories that permit extrapolation from samples of the category to the whole category, at whatever level they can be found. Some natural affective kinds will be psychologically basic in the affective primitive sense, but others will not be.

An analogy may help. Water is a natural kind for chemistry. Yet water is a chemical compound constituted by hydrogen and oxygen molecules, so it has other chemical substances as components. Furthermore, the atoms of the basic chemical elements are themselves composed of more basic parts, namely protons, neutrons, and electrons. So neither *chemical compounds* like water nor *chemical elements* like oxygen and hydrogen are without components, but they both fully qualify as natural kinds for chemistry.

To sum up, being an affective primitive is not a necessary condition for being a natural kind in affective science. Consequently, although we consider the project of psychological constructionists well worth pursuing, we resist the view that the focus of affective science should shift away from discrete emotions if they turned out not to be affective primitives. We agree that the focus of affective science should shift away from any discrete emotions that turned out not to be natural kinds. But whether discrete emotions are natural kinds and whether they are affective primitives are orthogonal issues.

As a matter of historical record, most theorists who have defended the notion of psychologically basic emotions have been interested in the question of whether there is a small set of discrete emotions that are emotional primitives, without worrying about whether or not such emotional primitives are also affective primitives. They have tried to reduce the wide variety of discrete emotions to a more manageable and fundamental subset of discrete emotions. A prospective payoff of this project is that if the component emotions are natural kinds, the compound emotions can also be thought of as natural kinds on account of their components, and the emotion domain acquires theoretical unity underneath the superficial dissimilarities (Prinz, 2004).

A common way to defend the notion of psychologically basic emotions is to try to identify the set of psychologically basic<sub>EP</sub> emotions with the set of biologically basic<sub>B</sub> emotions (e.g., Plutchick, 1962; Prinz, 2004). On this view, basic<sub>B</sub> emotions constitute the components of all psychologically non-basic<sub>EP</sub> emotions. The challenge faced by this approach is that biologically nonbasic emotions, which by definition lack the property cluster that characterizes basic<sub>B</sub> emotions, have to be reduced to a combination of basic<sub>B</sub> emotions all of which satisfy the cluster (cf. Griffiths, 1997). This demands explaining how a combination of short-lived basic<sub>B</sub> emotions could give rise to a long-lived nonbasic emotion<sub>EP</sub>, how a combination of basic<sub>B</sub> emotions that do not involve higher cognition could give rise to a nonbasic emotion<sub>EP</sub> that does involve higher cognition, how a combination of basic<sub>B</sub> emotions that involve distinctive physiological changes could give rise to a nonbasic<sub>EP</sub> emotion that does not involve distinctive physiological changes, and so on. We do not think this challenge has been met yet, although Prinz has made a serious effort to meet it with his proposal that a nonbasic emotion consists of one or more biologically basic emotions plus a cognitive component (Prinz, 2004; for a critique, see Griffiths, 2008; Scarantino, in press a).

We emphasize that what we have said so far does not show that there are no psychologically basic<sub>EP</sub> emotions. Our objective

in this section has only been to show that one cannot easily transition from the claim that some emotions are basic<sub>B</sub> to the claim that they are also basic<sub>EP</sub>. Furthermore, we have rejected the view that there is a “serious conceptual problem” (Ortony & Turner, 1990, p. 325) with the notion that some emotions are psychologically basic in either the affective primitive or the emotion primitive sense. Whether we have strong evidence for primitivity in either sense is an empirical question and remains to be determined.

## Conclusion

In this article we have argued, contra Ortony and Turner (1990), that there exist at least three coherent, nontrivial notions of basic-ness: conceptual basic-ness, biological basic-ness, and psychological basic-ness. These notions are orthogonal to one another: whether or not a certain emotion is designated by a basic-level category is independent of whether or not that emotion is biologically basic, which is in turn independent of whether or not that emotion is psychologically basic. We think we have significant evidence for the existence of some conceptually basic emotion categories (e.g., “anger,” “fear”), even though further investigation is in order to figure out the full set of such categories. These conceptually basic emotion categories are unlikely to designate natural affective kinds, because they collect very different emotions under the same heading.

We have also argued that folk emotion categories such as “anger,” “fear,” “disgust,” and so on do not designate biologically basic emotions, because some of their members lack the requisite biological markers and response coordination. At the same time, we have suggested that some forms of anger, fear, disgust, and so on are biologically basic. Our proposal is to designate them with subscripted versions of the relevant folk emotion categories (e.g., “anger<sub>B</sub>,” “fear<sub>B</sub>,” “disgust<sub>B</sub>”).

Throughout our discussion we have argued for a clear distinction between two projects: the Folk Emotion Project which investigates how people actually categorize emotions, and the Scientific Emotion Project which investigates how emotions should be categorized for scientific purposes.

Finally, we have considered the notion of psychological basic-ness, and distinguished two versions of it: *emotional primitivity* and *affective primitivity*. We have argued that the search for affective primitives should be considered as complementary to the search for natural affective kinds of discrete emotions, rather than as competing with that search. The search for emotional primitives, we think, has yet to deliver positive results. We have considered one common strategy for selecting emotional primitives, namely identifying them with biologically basic emotions, and presented some challenges to this view.

The framework we have offered advances the debate on basic emotions by acknowledging some of the critiques whilst demonstrating that the notion of basic-ness—in either the conceptual, the biological, or the psychological sense—does not suffer from any fundamental shortcoming. By untangling some of the conceptual knots of the debate, we hope we have assisted its resolution through empirical research. We conclude that, far

from being a mere article of faith, belief in basic emotions still constitutes an empirically promising basis for the conduct of emotion research.

## Notes

- 1 As generally understood, homeostatic mechanisms are mechanisms that preserve the internal stability of biological systems (e.g., mechanisms that regulate internal body temperature). Boyd (1991) uses the phrase metaphorically to refer to mechanisms that preserve the co-occurrence of a cluster of properties which define a natural kind.
- 2 “Surprise” strikes Shaver et al. (1987) as a borderline case of basic-level emotion category, because it does not come to mind as an example of emotion as promptly as other basic-level categories (cf. Fehr & Russell, 1984), and it is not acquired by infants as quickly as other basic-level categories.
- 3 The notion of a fundamental life task *per se* does not provide a clear criterion of inclusion for biologically basic emotions. First, having evolved to deal with a fundamental life task is not sufficient for being a biologically basic emotion. Biological drives like hunger and thirst, for instance, evolved to deal with fundamental life tasks, but they are not generally considered to be biologically basic emotions. Second, emotions traditionally considered to be nonbasic (e.g., grief and hatred) arguably solve fundamental life tasks at a social level of analysis. We thank an anonymous referee for encouraging us to emphasize the ambiguity of the notion of a “fundamental life task.”
- 4 Ortony and Turner (1990, p. 324) also mentioned a different criterion of psychological basic-ness, according to which an emotion is psychologically basic when it has “elementary eliciting conditions.” It is not entirely clear to us what “elementary eliciting conditions” are supposed to be, and we do not consider this notion of psychological basic-ness salient in the literature, so we will disregard it in what follows.

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