

Comment: Evolutionary Criteria for Considering an Emotion “Basic”: Jealousy as an Illustration

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Abstract

Modern evolutionary psychology provides a cogent criterion for considering an emotion as “basic”: Whether the emotion evolved to solve an adaptive problem tributary to reproduction. Criteria such as distinctive universal signals, presence in other primates, or contribution to survival are not relevant, even though some basic emotions have these properties. Abundant evidence suggests that *sexual jealousy* is properly considered a basic emotion, even though it lacks a distinct expressive signature, contributes to adaptive problems of mating rather than survival, and may or may not be present in other primates.

Keywords

basic emotions, evolution, jealousy

The scientific literature on emotions is rife with debates about whether there exist “basic” emotions. Debates also surround the proper criteria for evaluating whether an emotion is basic or not. The most prominent proponent of the existence of basic emotions is Paul Ekman, who originally hypothesized the existence of six or seven: anger, disgust, fear, happiness, sadness, and surprise are the most agreed-upon six, with contempt being a seventh candidate (Ekman, 1973, 1999; Ekman & Cordaro, 2011). Since his original formulation, Ekman has expanded both the criteria for considering an emotion as basic as well as the number of emotions that might meet those criteria.

The central original criterion for evaluating an emotion as basic, within Ekman’s theoretical framework, is whether the emotion has a *distinctive facial expression* that can be recognized universally (see also Darwin [1872], who considered a range of emotions, some with distinctive facial features). Other criteria proposed by Ekman for considering emotions as basic include distinctive universal signals, presence in other primates, distinctive physiology, rapid onset, brief duration, automatic appraisal, and unbidden occurrence (Ekman, 1994). In this brief

note, I argue that two of these key criteria are problematic from the perspective of modern evolutionary psychology—distinctive universal signal (facial expression or some other signal) and presence in other primates.

Jealousy does not appear on Ekman’s list of basic emotions. Indeed, no theorists have proposed that jealousy has a distinctive and universally recognized signal, facial or otherwise (e.g., try making a “jealous face” as a thought experiment). Nor does jealousy always have a rapid onset or brief duration. Rather than being considered “basic,” jealousy within Ekman’s framework may be considered “derived” or a “blend” of different emotions such as anger, fear, and sadness (Ekman, personal communication).

The second key proponent of basic emotions from a somewhat different evolutionary framework is Robert Plutchik, who proposes eight primary emotions—anger, fear, sadness, disgust, surprise, anticipation, trust, and joy (Plutchik, 1980). Plutchik’s criteria for basic emotions include: (a) present in nonhuman animals, (b) universally present across cultures in humans, and (c) functional in helping organisms solve adaptive problems of survival. As with Ekman’s framework, jealousy does not make Plutchik’s list of basic or primary emotions.

Although the frameworks of Ekman and Plutchik are both “evolutionary,” viewed from the vantage point of modern evolutionary psychology the central criteria for considering an emotion as “basic” or “primary” require reevaluation. Specifically, considering an emotion or any other evolved psychological mechanism as basic requires the answer to one key question: *Did the emotion evolve, shaped by selection, because it solved an adaptive problem—that is, served a specific function—tributary to reproductive success during the time of its evolution better than rival designs extant in the population at the time?* (see also Nesse, 1990; Tooby & Cosmides, 2008; Tracy, 2014).

This criterion for considering an emotion as basic or primary requires a bit more elaboration in order to contrast it with the theoretical frameworks of Ekman and Plutchik. Unlike both

Ekman's and Plutchik's frameworks, there is no requirement of presence in nonhuman animals, primate or otherwise. No one would deem the adaptation of echolocation not "basic" in bats, even if it existed rarely (or never) outside of bat species. Some adaptations exist in only a single species, such as language in humans (Pinker & Bloom, 1990). Although many or most emotions may indeed exist in other species or exist in somewhat different forms, existence in other species is neither necessary nor sufficient for deeming an emotion as basic according to modern evolutionary psychology.

Second, possessing adaptive functionality is equated with the current understanding of function in modern evolutionary biology and psychology (e.g., Buss, 1995; Dawkins, 1982; Tooby & Cosmides, 2008; Williams, 1966). Specifically, differential *reproductive* success, not differential *survival* success, is properly considered the "engine" of the process of evolution by selection. Survival is important only inasmuch as it contributes to reproduction. Moreover, some adaptations evolved that were detrimental to survival, but they evolved nonetheless because they contributed to relative reproductive success. Examples include the cumbersome plumage of peacocks, the costly production of enormous racks in elk, and elevated levels of testosterone and risk-taking in human males—all of which lead to shorter lifespans for the males encumbered by them. Because these qualities recurrently led to greater mating success, however, they evolved despite their costs in the currency of survival.

This shift is important when it comes to jealousy because sexual jealousy does not necessarily solve a problem of survival. Rather, it has been hypothesized to exist because it contributed to the solution of adaptive problems of mating. The primary functions of both male and female sexual jealousy are hypothesized to include deterring infidelity, deterring mate poachers, and deterring defection from the mateship. These effects historically contributed to reproductive success for both men and women by monopolizing a mate's reproductively relevant resources over the long run. Among men, it additionally increased the probability of his genetic paternity in offspring—a key adaptive function of male sexual jealousy. Jealousy's irrelevance to survival in no way disqualifies it as basic or primary. Of course, successful mate retention also may contribute to solution to a survival problem, especially for women who retain mates who partially function as "body guards." The key point, though, is that contribution to relative reproductive success, not relative survival success, defines the critical selection pressures responsible for the evolution of basic emotions and all other psychological adaptations.

Finally, the fact that jealousy does not exhibit distinctive and universally recognized features or facial expressions is irrelevant to whether or not it qualifies as a basic emotion. A principled evolutionary analysis suggests that *only emotions whose evolved functions centrally require sending a signal to conspecifics will have a universally recognized expressive signature*. Some hypothesized functions of emotions require a distinctive observable signature. Anger, for example, has been hypothesized to function (in part) to recalibrate the welfare trade-off

ratios of humans to whom anger is directed (Sell, Tooby, & Cosmides, 2009). Jealousy, in contrast, may have a signaling function in some contexts (e.g., to threaten mate poachers to back off), but no signaling function in other contexts (e.g., when it functions to recalibrate one's own mate value relative to that of one's mate or mating rivals who show interest in one's mate). Indeed, in some contexts, people intentionally suppress the overt expression of experienced jealousy in order *not* to signal to a partner a perceived mate-value discrepancy (Buss, 2000).

The key point is that basic emotions must have evolved to have at least one distinct adaptive function, with *function understood as the specific way in which it contributed to differential reproductive success*. Whether an evolved emotion comes with a universally recognized signal (some do, some do not) and whether it contributes to an adaptive problem of survival (some do, some do not) are not proper criteria for considering an emotion basic within the framework of modern evolutionary psychology.

Basic emotions, of course, are expected to be universal, that is, present in most or all humans across cultures. However, universality alone can never be used as a sole criterion. There exist some universals of humans, such as the use of fire, which may have attained their universality not because specific adaptations for them evolved, but rather because they were discovered and then spread across populations through a process of cultural transmission.

Phenomena that seem like jealousy may exist in other primate species such as chimpanzees (de Waal, 1982). Nonetheless, these phenomena take unique forms and have distinctive design features in humans due to the particular mating strategies within the human repertoire. Male chimpanzees, for example, show a jealous-like behavior toward the female and lower ranking males primarily when the female is in estrus. In contrast, men show sexual jealousy throughout the ovulation cycle of their partner, although there is some evidence that it may be especially acute when the partner is ovulating (Haselton & Gangestad, 2006).

According to the foregoing analysis, a compelling case can be made that jealousy is indeed a primary or basic emotion. There is good evidence that the complex emotion of jealousy evolved primarily because it solved several key adaptive problems of mating that were (and possibly still are) tributary to reproduction. Jealousy in mating relationships is largely irrelevant to survival, and in some cases actually is detrimental to survival. A man whose jealousy upon discovering a mate poacher engaged in sexual relations with his wife might cause him to launch a physical assault (a crime of passion) puts himself at risk of getting injured or killed by the man he is attacking. Jealousy hardly promotes survival. But if it led over the long course of human history to greater on-average *reproductive* success, relative to extant rivals lacking jealous information processing procedures, it would have evolved despite its on-average cost to individual survival.

Jealousy, in short, fulfills the key modern evolutionary criterion of being a basic emotion, even though it lacks a distinctive facial expression or other universally recognized signal, even

though its central functions in solving adaptive problems are typically not linked to survival (and may be detrimental to survival), and whether or not it is present in other species.

A focus on evolved function in solving recurrent adaptive problems historically tributary to reproductive success opens the door for a much expanded set of emotions considered to be evolutionarily basic. These include sexual attraction, sexual arousal, parental love, romantic love, guilt, shame, pride, gratitude, and likely many others. The sexual and mating emotions in particular, so monumentally important in reproduction, seem strikingly absent from theories of basic emotions that focus heavily on survival.

This modern evolutionary psychological analysis comports well with emotion approaches that emphasize the importance of situational, psychological, relational, and cultural contexts (e.g., Barrett, 2014; Mesquita & Boiger, 2014; Moors, 2014). Nonetheless, it departs from those views in at least three key ways: (a) emphasizing a deep time recurrent statistical structure to those contexts that defines the selective pressure responsible for the evolution of emotion adaptations; (b) specifying that those statistical structures define the contexts to which emotion adaptations are “designed” to respond (emotions, of course, can be cooped to respond to a wider range of contexts outside of their “proper functional domain,” much as our fingers can be coopted for typing on keyboards, even though that is not their evolved proper function); and (c) the evolutionary psychological premise that domain-general emotion/cognitive procedures are insufficient to guide humans toward the small islands of successful adaptive solutions amidst the vaster oceans of catastrophically maladaptive solutions (Tooby & Cosmides, 1990).

A focus on evolved function leads to a task analysis of hypothesized design features—internal representations, affective elements, information-processing procedures, behavioral outputs—that could, in principle, fulfill the hypothesized function and solve the relevant adaptive problem. In short, a focus on evolved function furnishes a theoretically cogent criterion for “basic emotions.”

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