

Are There Basic Emotions?

Paul Ekman
University of California, San Francisco

Ortony and Turner's (1990) arguments against those who adopt the view that there are basic emotions are challenged. The evidence on universals in expression and in physiology strongly suggests that there is a biological basis to the emotions that have been studied. Ortony and Turner's reviews of this literature are faulted, and their alternative theoretical explanations do not fit the evidence. The utility of the basic emotions approach is also shown in terms of the research it has generated.

In their argument against basic emotions, Ortony and Turner (1990) distinguished two ways in which that phrase has been used: (a) to describe elements that combine to form larger more complex emotions and (b) to denote emotions that are presumed to have a biological basis. I will not comment on the first use, because neither I nor most other current researchers who posit basic emotions use the concept in this way. My focus instead will be on the arguments and evidence that suggest that emotions are a product of our evolution, with some biological givens. This position does not deny the important role of culture and social learning processes in every aspect of emotion—the control of expressions, the symbolic representation of emotional experience, how one evaluates emotion-relevant situations, attitudes about one's own emotions, how one copes with emotion, and so on—but it is not a totally malleable system. There are constraints as a result of our evolution, and not the ones that Ortony and Turner suggested.

To make my case I first consider findings on universals in facial expression. I believe that Ortony and Turner (1990) misunderstood the evidence. I show that their alternative explanation of the findings contradicts known facts. I next consider a second type of evidence for basic emotions—emotion-specific physiology. Again, I suggest that Ortony and Turner exaggerated disagreements and took little note of the areas of agreement in findings of emotion-specific autonomic nervous system (ANS) activity. I also describe some more recent evidence, which they could not have known about, that strengthens the basic emotions position. Finally, I argue the merits of a basic emotions conceptual framework in explaining diverse findings and focusing attention on questions that need empirical answers.

Preparation of this article was supported by a Research Scientist Award from the National Institute of Mental Health (MH06091).

I thank Richard Davidson, Phoebe Ellsworth, Wallace V. Friesen, Robert Levenson, Harriet Oster, and Erika Rosenberg for their helpful criticisms and suggestions on earlier versions of this article.

Correspondence concerning this article should be addressed to Paul Ekman, University of California, 401 Parnassus Avenue, San Francisco, California 94143.

Facial Expressions

Although they acknowledged some agreement in the literature about which emotions are basic, and admitted that some of the disagreements they emphasized are due to the type of data an investigator considered in postulating which emotions are basic, Ortony and Turner (1990) concluded that "the landscape of basic emotions is close to being as disorderly as Table 1 implies" (p. 316). A careful reading of the literature they cited shows that they have exaggerated the matter, particularly in regard to facial expression. Facial expression has been a focus since Darwin (1872/1965) for those who adopt an evolutionary perspective on emotion. Much of Ortony and Turner's own argument rests on their idiosyncratic reading of past findings on expression.

Nearly 20 years ago, in reviewing the previous 30 years of research on how observers in Western cultures judge the emotion shown in facial expressions, Ekman, Friesen, & Ellsworth (1972) found that *every* investigator had obtained evidence for six emotions (happiness, surprise, fear, sadness, anger, and disgust combined with contempt).¹ Fifteen years later, reviewing subsequent research on facial expression with the further requirement that there be evidence of *universality*, Fridlund, Ekman, and Oster (1987) reaffirmed this listing. In the past few years there has been but one addition, some evidence and argument about distinguishing contempt from disgust (Ekman & Friesen, 1986, 1988; Ekman & Heider, 1988; Izard & Haynes, 1988; Ricci Bitti, Brighetti, Garotti, & Boggi-Cavallo, 1988).

Are there no more emotions that have universal facial expressions? Tomkins and McCarter (1964) reported within-culture evidence and Izard (1971) reported evidence across literate cultures for the recognition of interest and shame. I share Ortony and Turner's (1990) doubts about whether interest is an emotion, and I have some reservations about the evidence on shame, but this is not the place to discuss the details of the findings relevant to resolving those matters. For now it is sufficient to note that there is consistent evidence, across investiga-

¹ They noted that in one preliterate culture fear and surprise were not distinguished from each other, although both were distinguished from anger, sadness, disgust, and happiness.

tors, of universal facial expressions for at least five emotions. More research is needed to resolve questions about whether there are three or four more. It is important to know just how many there are, but the exact number is not germane to either my position or Ortony and Turner's.

What of Ortony and Turner's (1990) claim that

the universality of a facial expression associated with some particular emotion does not establish that it is the emotion that has a special status. It might be more profitable to consider the linkage between certain components of emotions and other components of expression as being basic and biologically given than it is to attribute this property to the emotions themselves. (p. 321)

To support this speculation they created a straw man to demolish, stating "it is possible for facial expressions to arise independently of emotions (p. 321)," as if anyone had claimed otherwise. Of course facial expressions occur without emotion, and the fact that they do is not relevant to whether there are universal facial expressions of emotion.

Facial muscular action is not dedicated just to emotional display. We (Ekman & Friesen, 1969, 1975) described *emblematic* facial expressions, such as the wink; like hand gestures, these are movements that have precise symbolic meaning and are socially learned and culturally variable. I (Ekman, 1979) also distinguished facial *conversational signals* that in seven different ways illustrate speech as it is spoken, much like the hands often do. There are also a number of instrumental facial actions, such as kissing and spitting.

The question more cogently posed, once the straw man is put aside, is whether the facial expressions that have been precisely identified for each of the emotions I have described ever occur either without emotion or without an attempt to fabricate the appearance of emotion. No one has ever reported any systematic, replicated, objective evidence that this occurs in any culture.²

Ortony and Turner (1990) mentioned examples of a few single muscle actions that have signal value in support of their contention that the information signaled by complex facial expressions of emotions is derived out of their muscular elements. What is universal, they said, is the "biologically determined subcomponents that might underlie emotions" (p. 321). The complex expressions that I and others have studied are somehow derivative.³ There are a number of problems with this part of their argument.

There is not a shred of evidence that the four single muscular actions that Ortony and Turner (1990) described have universal significance. For example, Friesen and I have unpublished evidence that observers interpret as sadness photographs that show the inner corners of the brows raised obliquely in the center of the forehead, an appearance produced by the action of a single muscle, the medial portion of the frontalis. However, neither we nor anyone else has gathered evidence to show this muscular action has the same signal value across cultures. I think it would, but neither my opinion nor Ortony and Turner's should be sufficient to establish this. Ortony and Turner must be held to the same requirements met by those who have established cross-cultural agreement about the emotions signaled by complex facial expressions. They must obtain cross-cultural evidence about the biological significance they claim for each of

the muscular subcomponents involved in each of the universal facial expressions, and by the various combinations of those subcomponents, if they want their speculation to be taken seriously.

Even if some elemental muscle movements were to be shown to have universal signal value, that would not prove that the meaning of the complex facial expressions is derived from the meanings of the muscular elements. It might just as well be the reverse, that the meaning of single muscle actions may be derived from the role of those muscles in complex emotional expressions.

Ortony and Turner's (1990) proposal presumed not only that each of the muscles involved in an emotional display has some universal meaning, but it implied that all facial expressions of emotion are composed of more than one element. That is not substantiated by those who have actually measured facial behavior (see Fridlund et al., 1987). Although some muscle movements, such as the brow lowering and drawing together produced by the corrugator muscle,⁴ occur in combination with other actions in a number of negative emotional expressions, there are other muscle actions that occur in only one emotion (e.g., the narrowing and tightening of the red margins of the lips produced by the orbicularis oris, pars medialis is evident only in anger). Often the combination of more than one muscle movement is necessary to clearly signal a single emotion, but that is not always the case. Only one muscle is needed to signal disgust clearly (levator labii superioris, alquae nasi, which raises the nares, pulls up the infraorbital triangle, and wrinkles the sides of the nose), and that muscle action does not occur systematically in any other emotion. The zygomatic muscle, which pulls the lip corners upward, can alone signal enjoyment, but it occurs in combination with other muscles to signal sadness. Facial muscle action is not a neat or a tidy system, and it is certainly not one that fits Ortony and Turner's theoretical preconceptions.

My discussion of the facial expression literature has made three points. First, that when this single data source—agreement among observers in diverse cultures about which emotions are shown in facial expressions—is considered, there has been a great deal of convergence across investigators, much more than Ortony and Turner (1990) admitted. Second, that no one who has gathered this type of data has suggested another

² The fact that people can deliberately simulate the appearance of an expression is not evidence against the existence of distinctive patterns of facial movement for each emotion. It remains an interesting empirical question to determine how closely such simulations approximate spontaneous emotional expressions. See Ekman, Davidson, and Friesen's (1990) recent findings of subtle differences between actual enjoyment and other types of smiling expressions.

³ Ortony and Turner's (1990) language for describing the appearance of the face was imprecise. They did not understand, for example, that the phrase "furrowed brow in anger" (p. 319) could refer to the four visibly different brow configurations produced by either the corrugator muscle alone, by combinations of that muscle with the medial frontalis, or by the lateral frontalis or the entire frontalis muscle.

⁴ Darwin (1872/1965) said that the corrugator muscle is involved in difficulty of any kind, and I have explained how it is involved in many nonemotional activities (Ekman, 1979).

emotion that might have a universal expression beyond those discussed above. Third, that an evolutionary view of emotion is consistent with the evidence on facial expression, which is further buttressed by phylogenetic evidence (cf. Redican, 1982). Ortony and Turner gave a different explanation of how we should interpret the evidence on cross-cultural agreement about the emotions shown in facial expressions, but their proposal not only is unsupported by much systematic research, it contradicts what is known about the role of the muscles in expression. Ortony and Turner admitted that there is no cross-cultural evidence to support their position, and they acknowledged that the cross-cultural evidence for the position they have attacked is "impressive."

Physiology

Facial expression is only one data source relevant to the question of basic emotions. Evidence of universality in other features of emotion also provides a basis for postulating basic emotions. Because of space limitations I focus on just one other aspect of emotion, ANS activity, citing new findings that are consistent with a basic emotions viewpoint. Elsewhere (Ekman, *in press*), I describe seven other characteristics of basic emotions.

Ekman, Levenson, and Friesen (1983) reported different patterns of ANS activity for the emotions of anger, fear, sadness, and disgust. Ortony and Turner (1990) rightly questioned whether these patterns were due to the emotions or to other extraneous phenomena not controlled for in that study. They could not have known of Levenson, Ekman, and Friesen's (1990) findings that ruled out many of those extraneous possibilities and that further replicated their earlier findings, because Levenson et al.'s report appeared at the same time as Ortony and Turner's article. Ortony and Turner should, however, have noted the similarity between Ekman et al.'s earlier findings and findings by other investigators of emotion-specific ANS activity (Ax, 1953; Graham, 1962; Roberts & Weerts, 1982; Schwartz, Weinberger, & Singer, 1981).

Ortony and Turner (1990) also could not know that Ekman et al.'s (1983) findings of emotion-specific ANS activity were replicated in an older population (Levenson, Carstensen, Friesen, & Ekman, 1991). This study also reported new evidence, on both young and old subjects, that the same emotion-specific patterns in heart rate and skin conductance were found regardless of which of two tasks had been used to elicit the emotion (an imagery task or a task requiring voluntarily making different facial configurations). Finally, they would not know that Ekman et al.'s findings of the emotion-specific ANS appear to be universal, because our report (Levenson, Ekman, Heider, and Friesen, *in press*) on that is just now in press. Examining members of a very different culture—the Minangkabau of Sumatra, Indonesia, who are fundamentalist Moslem and matrilineal—we replicated our earlier findings on emotion-specific ANS activity.

What are we to make of the fact that there is not evidence of distinctive patterns of autonomic physiology for every emotion that every theorist has ever mentioned, not even for every emotion for which there is a universal expression? My own view is that these different patterns of ANS activity evolved to prepare the organism for quite different motor actions that were likely to be adaptive for particular emotions, such as anger, fear, or disgust. I do not expect to find emotion-specific ANS activity

for either happiness or contempt, emotions in which it is unlikely that any specific pattern of motor activity would have been relevant to survival. I do expect to find distinctive patterns of central nervous system activity marking each of the basic emotions, and there are some beginnings of such evidence (Davidson, Ekman, Saron, Senulis, & Friesen, 1990; Ekman, Davidson, & Friesen, 1990; and new findings just being prepared for publication in which Davidson and I found emotion-specific patterns of regional brain activity distinguishing among five emotions).

Why Call Them Basic Emotions?

Let me consider a related but different question that Ortony and Turner (1990) posed in one of the headings of their article: "Why Postulate Basic Emotions?" They provided much of my own answer when they said,

The idea is that the biologically based basic emotions are more likely to be found in more human cultures and in more species, whereas other emotions are more likely to vary across cultures and to be species specific. From this position, it is but a short step to a search for emotion-specific neurophysiological and anatomical substrates that can be found in all mammals and perhaps even in some related vertebrates. (p. 317)

For reasons I cannot fathom, they then dismissed this matter, going off on a tangent to raise questions about surprise, interest, and desire.

It would be nice if one could judge the value of a conceptual approach by whether or not it cuts "nature at its joints" (Ortony & Turner, 1990, p. 319). Although I am tempted to say that those joints are nakedly exposed by the findings on universality in expression and physiology, I realize that this is arguable, as it should be. There will always be room to argue about how to interpret solid evidence.

Instead let me suggest that the value of the basic emotion approach is in the questions it directs attention to and the research findings that are generated by those who work from this stance. As Ortony and Turner (1990) described, from a basic emotions approach one would look to find universals in expression, in physiology, and in the antecedent events for emotions. One would also look for some similarities phylogenetically. It would also be sensible to see whether emotional expressions are evident early in life and in the blind, who have no opportunity to learn expression by imitation. Ortony and Turner dismissed such findings as routine, not remembering that such evidence did not exist 30 years ago. Facial expressions were then considered to be an inaccurate source of culture-specific information, and neither expression nor emotion was then the popular topic it is today. Tomkins's (1962, 1963) theory of basic emotions⁵ inspired a number of researchers who obtained some of the evidence we now have and now argue about how to interpret.⁶

⁵ Plutchik (1962) proposed another theory of basic emotions at the same time, but I do not believe his work influenced the researchers who produced the findings I have cited.

⁶ Those influenced directly or indirectly by Tomkins include Camras, Campos, Davidson, Demos, Ekman, Friesen, Hager, Haviland, Izard, Levenson, Malatesta, Oster, Stettner, and Yarczower. Although some of these researchers did not adopt Tomkins's entire theoretical position, they did subscribe to his emphasis on basic emotions and the importance of the face.

What we now know about the universality and the development of expression, and much of what is being learned about emotion-specific physiology, has been guided by this approach. That is its merit, the questions it emphasizes and the knowledge that it has and is producing.

In their conclusion, Ortony and Turner (1990) appeared to have totally reversed their argument, acknowledging the basic emotions position:

there are some basic classes of appraisals, such as the perception of an inescapable threat, that are associated with response patterns, such as fleeing or immobility, and that in some organisms, such responses, or better the urge to produce them, occur in physiological, cognitive, phenomenal, and behavioral complexes. It would be a cluster of such components that constitutes an emotion, rather than a single constituent of them. (p. 329)

I do not want to dwell on their last statement, as none of the researchers who postulate basic emotions claim any single constituent is the emotion (not even Tomkins, although he can most easily be misread as implying that). It seems, however, that Ortony and Turner did reify appraisal as the only key element in emotion, despite their disclaimer.⁷

Although our words are different, Ortony and Turner's (1990) concluding statement that I quoted above differs only slightly from what I wrote nearly 15 years ago:

What is an emotion? It certainly is not any one of the elements I have described: response systems, appraiser, program, or elicitors. . . . Is there a *sine qua non* for emotion? I disagree with past theorists who say it is visceral reactions, or cognitive appraisal or facial responses. . . . Looking from the outside, without access to know what is occurring in the central nervous system, how can an observer tell when emotion is present? The estimate that emotion is present is more likely to be correct when: the response system changes are complex, when it is not just a facial, or skeletal, or vocal, or autonomic, or coping response but a combination; the changes are organized in the sense of being interrelated and distinctive for one or a combination of emotions; the changes happen quickly; some of the response system changes are ones common to all people; some of the responses are not unique to *homo sapiens*. This is *not* the only time emotion occurs, but when an observer's estimate is *most* likely to be safe. (Ekman, 1977, p. 61-62)

⁷ Harriet Oster pointed this out to me.

References

- Ax, A. A. (1953). The physiological differentiation between fear and anger in humans. *Psychosomatic Medicine*, 15, 433-442.
- Darwin, C. (1965). *The expression of emotions in man and animals*. Chicago: University of Chicago Press. (Original work published 1872)
- Davidson, R. J., Ekman, P., Saron, C., Senulis, J., & Friesen, W. V. (1990). Emotional expression and brain physiology I: Approach/withdrawal and cerebral asymmetry. *Journal of Personality and Social Psychology*, 58, 330-341.
- Ekman, P. (1977). Biological and cultural contributions to body and facial movement. In J. Blacking (Ed.), *Anthropology of the body* (pp. 34-84). San Diego, CA: Academic Press.
- Ekman, P. (1979). About brows: Emotional and conversational signals. In M. von Cranach, K. Foppa, W. Lepenies, & D. Ploog, (Eds.) *Human ethology* (pp. 169-248). Cambridge, England: Cambridge University Press.
- Ekman, P. (in press) An argument for basic emotions. *Cognition and Emotion*.
- Ekman, P., Davidson, R. J., & Friesen, W. V. (1990). Emotional expression and brain physiology II: The Duchenne smile. *Journal of Personality and Social Psychology*, 58, 342-353.
- Ekman, P., & Friesen, W. V. (1969). The repertoire of nonverbal behavior: Categories, origins, usage, and coding. *Semiotica*, 1, 49-98.
- Ekman, P., & Friesen, W. V. (1975). *Unmasking the face*. Englewood Cliffs, NJ: Prentice-Hall.
- Ekman, P., & Friesen, W. V. (1986). A new pan-cultural expression of emotion. *Motivation and Emotion*, 10, 159-168.
- Ekman, P., & Friesen, W. V. (1988). Who knows what about contempt: A reply to Izard and Haynes. *Motivation and Emotion*, 12, 17-22.
- Ekman, P., Friesen, W. V., & Ellsworth, P. (1972). *Emotion in the human face: Guidelines for research and an integration of findings*. New York: Pergamon Press.
- Ekman, P., & Heider, K. G. (1988). The universality of a contempt expression: A replication. *Motivation and Emotion*, 12, 303-308.
- Ekman, P., Levenson, R. W., & Friesen, W. V. (1983). Autonomic nervous system activity distinguishes between emotions. *Science*, 221, 1208-1210.
- Fridlund, A., Ekman, P., & Oster, H. (1987). Facial expressions of emotion. In A. Siegman & S. Feldstein (Eds.), *Nonverbal behavior and communication*, (pp. 143-224). Hillsdale, NJ: Erlbaum.
- Graham, D. T. (1962). Some research on psychophysiological specificity and its relation to psychosomatic disease. In R. Soessler & N. S. Greenfield (Eds.), *Physiological correlates of psychological disorder* (pp. 221-238). Madison: University of Wisconsin Press.
- Izard, C. (1971). *The face of emotion*. New York: Appleton-Century-Crofts.
- Izard, C., & Haynes, O. M. (1988). On the form and universality of the contempt expression: A challenge to Ekman and Friesen's claim of discovery. *Motivation and Emotion*, 12, 1-16.
- Levenson, R. W., Carstensen, L. L., Friesen, W. V., & Ekman, P. (1991). Emotion, physiology, and expression in old age. *Psychology and Aging*, 6, 28-35.
- Levenson, R. W., Ekman, P., & Friesen, W. V. (1990). Voluntary facial expression generates emotion-specific nervous system activity. *Psychophysiology*, 27, 363-384.
- Levenson, R. W., Ekman, P., Heider, K., & Friesen, W. V. (in press). Emotion and autonomic nervous system activity in an Indonesian culture. *Journal of Personality and Social Psychology*.
- Ortony, A., & Turner, T. J. (1990). What's basic about basic emotions? *Psychological Review*, 97, 315-331.
- Plutchik, R. (1962). *The emotions: Facts, theories and a new model*. New York: Random House.
- Redican, W. K. (1982). An evolutionary perspective on human facial displays. In P. Ekman (Ed.), *Emotion in the human face* (2nd ed., pp. 212-280). Cambridge, England: Cambridge University Press.
- Ricci Bitti, P. E., Brighetti, G., Garotti, P. L., & Boggi-Cavallo, P. (1988, August). *Is contempt expressed by pan-cultural facial movements?* Paper presented at the XXIV International Congress of Psychology, Sydney, Australia.
- Roberts, R. J., & Weerts, T. C. (1982). Cardiovascular responding during anger and fear imagery. *Psychological Reports*, 50, 219-230.
- Schwartz, G. E., Weinberger, D. A., & Singer, J. A. (1981). Cardiovascular differentiation of happiness, sadness, anger and fear following imagery and exercise. *Psychosomatic Medicine*, 43, 343-364.
- Tomkins, S. S. (1962). *Affect imagery and consciousness: Vol. 1. The positive affects*. New York: Springer.
- Tomkins, S. S. (1963). *Affect, imagery and consciousness: Vol. 2. The negative affects*. New York: Springer.
- Tomkins, S. S., & McCarter, R. (1964). What and where are the primary affects? Some evidence for a theory. *Perceptual and Motor Skills*, 18, 119-158.

Received August 22, 1990

Revision received November 5, 1990

Accepted February 10, 1991 ■