

## New Displays and New Emotions: A Commentary on Rozin and Cohen (2003)

Dacher Keltner and Michelle N. Shiota  
University of California, Berkeley

In this article, the authors elaborate on 3 ideas advanced in P. Rozin and A. B. Cohen's (2003) innovative study of facial expression. Taking a cue from their discovery of new expressive behaviors (e.g., the narrowed eyebrows), the authors review recent studies showing that emotions are conveyed in more channels than usually studied, including posture, gaze patterns, voice, and touch. Building on their claim that confusion has a distinct display, the authors review evidence showing distinct displays for 3 self-conscious emotions (embarrassment, shame, and pride), 5 positive emotions (amusement, desire, happiness, love, interest), and sympathy and compassion. Finally, the authors offer a functional definition of emotion to integrate these findings on "new" displays and emotions.

The contemporary study of emotion began, in one sense, with a rather simple, and for many, uncontroversial finding: People in different parts of the world interpret a limited number of facial expressions of emotion in similar ways. This simple assertion, which emerged in the well-known studies of Ekman, Friesen, and Izard in the late 1960s and early 1970s, has since spawned a variety of questions and debates (for review, see Keltner, Ekman, Gonzaga, & Beer, in press). To what extent is the recognition of facial expression actually universal? Does facial expression indeed signal emotion, social intention, or some combination of these kinds of inferences? And which emotions possess a recognizable signal?

Rozin and Cohen's article (2003), at first blush, raises an interesting possibility related to this last question: Does confusion have a recognizable signal? They turned 255 introductory psychology students into participant observers and asked them to identify, via target reports, the emotions that others expressed in the flow of spontaneous interaction. The finding that struck Rozin and Cohen, and which strikes us, is the frequency with which participants reported facial communication of "emotions" not recognized by most

emotion taxonomies in our field. These include such emotions as confusion, concentration, worry, flirtatiousness, skepticism, and indifference. This finding parallels work done in other domains of emotion. For example, if you ask participants to list states they consider emotions, odds are "love" would emerge among the most frequent responses (Fehr & Russell, 1984). By contrast, love rarely makes emotion theorists' taxonomies (but see Shaver, Schwartz, Kirson, & O'Connor, 1987).

In this brief commentary, we rely on Rozin and Cohen's (2003) innovative methods and suggestive findings as a platform to consider three broader questions. First, what does the face reveal? Second, how many emotions indeed have distinct signals? And finally, what is an emotion?

### How Are Emotions Communicated?

One of the most widespread critiques of the study of emotional expression is that it has focused on extreme, if not exaggerated, displays of emotion (e.g., Russell, 1994). This methodological emphasis was not accidental but based on a clear theoretical rationale: the coevolution of human emotional display and the capacity to perceive those displays produced prototypical displays of emotion. Nonetheless, this emphasis on prototypical displays has generated an empirical literature that is relatively silent with respect to the more subtle, varied, complex, and perhaps even idiosyncratic ways in which people express most of their emotions in real life.

---

Dacher Keltner and Michelle N. Shiota, Department of Psychology, University of California, Berkeley.

Correspondence concerning this article should be addressed to Dacher Keltner, Department of Psychology, University of California, 3319 Tolman Hall, Berkeley, California 94720-1650. E-mail: keltner@socrates.berkeley.edu

On this point Rozin and Cohen (2003) provided some very germane evidence. In analyzing participants' naïve accounts of the facial behavior associated with different emotions, they document some interesting, as yet undocumented, displays of different states (see Rozin & Cohen, 2003, Table 3). Narrowed eyes accompany the experience and social display of confusion; lip bites accompany worry; and the furrowed or lowered brow accompanies concentration, as if to signal that the person is immersed in thought and not to be disturbed. The take-home message: Regions of the face and relatively discrete actions can signal more complex states much like the more complex, prototypical facial muscle configurations that have been well-studied.

Clearly more evidence is needed before the field can think of narrowed eyes as signs of confusion or of the lip bite as a sign of anxiety. It is important to show that these expressive behaviors actually correlate with other measures of affective experience, such as self-report or autonomic response. More precise definition and coding of the facial behaviors themselves would be required (note that "narrowed eyes" could result from the movement of several facial muscles, including Facial Action Coding System Action Units 4, 6, and 7). It would also be important to show that these facial behaviors signal the specific states named and not others. It would be important to show whether the facial signals described demonstrate the dynamic properties of affective displays—in particular, a duration in the vicinity of 1–5 s. Finally, to the degree that the status of these states as universal "basic" emotions is of interest, cross-cultural work regarding the universality of display and recognition is needed. This would lend more confidence to the assertion that these are affective displays and not other kinds of displays such as emblematic displays or referential expressions (e.g., Ekman, 1993).

More generally, these findings make the important point that complex states can be signaled by relatively isolated, simple actions such as narrowed eyes or lip bites. For example, in many parts of Southeast Asia, people can convey shame with a tongue bite (Haidt & Keltner, 1999). In other work, Rozin and his colleagues have found that different variants of the disgust and contempt expressions actually communicate slightly different meanings (Rozin, Lowery, & Ebert, 1994).

Taking this implication one step further, Rozin and Cohen's (2003) study encourages the field to think more broadly about the ways in which emotion is communicated. One obvious candidate is posture.

Changes in head orientation and expansion or contraction of the chest were of interest to Darwin (1872), among others, and are certain to communicate different emotions. For example, postural constriction is part of the signal of embarrassment and shame (Keltner, 1995; Keltner & Harker, 1998). Our own recent work suggests that postural expansion is involved in the pride display (Shiota, Campos, & Keltner, *in press*), and forward leans communicate romantic love (Gonzaga, Keltner, Londahl, & Smith, 2001).

Another candidate is touch. Darwin (1872) recognized early on that touch was the most universal demonstration of intimacy across species, and the importance of touch in social bonding is well-established (e.g., Klaus & Kennell, 1983; Shaver, Morgan, & Wu, 1996). This effect may be based, in part, on physiological effects of social touch such as decreased sympathetic arousal and increased vagal tone (Uvnæs-Moberg, 1997). Touch can take on many forms, and when one considers variability in the location of the touch, type of pressure, and duration, there is room for information about discrete emotional experience as well as intensity (Hertenstein, 2002).

Although neglected, the vocal communication of human emotion has received some empirical study (Scherer, 1986). More work in this area has examined nonhuman primate communication, finding, for instance, that distinct vocal calls are associated with affiliative behavior, mating, and the location of food (Snowden, *in press*). Even odor may play a role in the communication of emotion. In his review of signaling, Snowden discussed ways in which common affectlike states are communicated through scent in nonhuman species (Snowden, *in press*). The same may be true of humans.

These are all very speculative possibilities. Yet, we think they are fruitful ones and likely to generate novel insights about emotion if researchers pursue more open-ended methodologies, focus on different parts of the face and body, and look to new states, as Rozin and Cohen (2003) have done. This kind of research is likely to reveal that humans express emotion in a far more varied and continuous fashion than is currently assumed by the field.

### How Many Emotions Have Signals?

The field of emotion has been profoundly shaped by the study of facial expression. Many taxonomies of emotion hinge on the states that have universally reliable signals. In a more practical sense, the ability to measure several facial expressions in spontaneous be-

havior and to represent emotion in photographs has played a significant role in the study of emotion-related autonomic response and central nervous system activity. When new facial expressions of emotion are documented, many things are at stake, from theoretical taxonomies to potential advances in other areas to questions regarding classes of emotion (e.g., are there emotions with no signal as well as emotions with a defined signal?).

The Rozin and Cohen (2003) evidence suggests that confusion may have its own distinct signal. We have already noted the need for further evidence to bolster this claim. More generally, however, Rozin and Cohen's findings raise an interesting question: How many states have distinct signals? Recent studies suggest that more emotions may be expressed than previously thought. A selective review of the literature finds distinct displays for embarrassment and shame (Keltner, 1995; Keltner & Harker, 1998). Embarrassment is marked by a sequence of gaze aversion, controlled smile, head turn (which exposes the neck), and occasional face touch (in other studies, just the face touch is sufficient to communicate embarrassment; Haidt & Keltner, 1999). Shame is displayed in a coordinated sequence of downward gaze and head movements lasting 1–5 s. Discoveries of these displays have led researchers to relate reduced embarrassment to increased externalizing troubles in adolescent males (Keltner, Moffitt, & Stouthamer-Loeber, 1995) and increased shame to the unwillingness to disclose a past history of sexual abuse (Bonanno et al., 2002). Studies are also finding a distinct display of pride, as evident in postural expansion and upwards head and gaze movements (Shiota et al., in press). At least three self-conscious emotions appear to have distinct displays.

In the realm of positive emotions, it is often assumed that there is one positive emotion—happiness—and by implication, one display of positive emotion, the Duchenne smile, which involves the action of the *orbicularis oculi* (Ekman, 1993). Although it may be true that the Duchenne smile is common to expressions of many positive emotions, recent studies find that other facial actions differentiate the displays of positive emotion. For example, the momentary experience of love is expressed in a coherent pattern of smiling, mutual gaze, open postures, and forward leans (Gonzaga et al., 2001). Desire is signaled in a variety of lip-related actions, including lip licks, wipes, and tongue protrusions (Gonzaga, Turner, Keltner, Altemus, & Campos, 2002). And there is some evidence to suggest that laughter and smiling

have distinct experiential correlates and social consequences (Keltner & Bonanno, 1997). These findings suggest that at least five positively valenced states—love, desire, amusement, happiness, and interest (Reeve, 1993)—have distinct displays. In our own research, we have shown that awe and amusement, in this case posed rather than experienced, have distinct actions (Shiota et al., in press).

Finally, Eisenberg and colleagues have collected impressive evidence indicating that a display of sympathy, namely oblique eyebrows and concerned gaze, is correlated with increased sympathy, heart rate deceleration, and increased helping behavior, and that this display is different from that of distress (Eisenberg et al., 1989). Ensuing judgment studies have found that posed displays of sympathy are not judged with a great deal of reliability, however (Haidt & Keltner, 1999). It should be noted that the emotions in the original list of basics have what Ekman has called “snapshot” qualities, in that a single moment in time at the apex of the expression is sufficient for decoding, whereas these other displays involve a flow of movement over time (Ekman, 1993).

### What Is an Emotion Anyway?

Our cursory review suggests that humans convey many more emotions through facial behavior and other signals than previously assumed. As researchers open the door, as Rozin and Cohen (2003) have done, to new, or at least newly recognized emotions, they raise perhaps the most vexing question of all: What exactly is an emotion? Are we justified in calling confusion, concentration, and worry emotions? In asking this kind of question, the field refines its conceptualization of emotion.

As Rozin and Cohen (2003) suggested, definitions and taxonomies of emotion tend to derive from researchers' particular methods. For those guided by the study of facial expression, the basic or primary emotions are the six tested in the early facial expression studies of Ekman, Friesen, and Izard: happiness, surprise, anger, sadness, fear, and disgust. Lists based on appraisal research tend to include more complex, self-conscious emotions such as shame and guilt (e.g., Scherer, 1997). Lists based on animal models of physiology tend to include more positive emotions, such as lust and maternal love, than most (e.g., Panksepp, 1998). Lists based on emotion vocabulary or “core relational themes,” as described in narratives, tend to include more social emotions, such as love and pride (e.g., Lazarus, 1991; Shaver et al., 1987).

For this reason, it is often productive to turn to emotion taxonomies of lay individuals or other cultures, as Rozin and Cohen (2003) have done, to broaden our conceptualization of emotion. The list of emotion words available to the participant observers in Rozin and Cohen's study was based on pretest data from a similar set of observers, and therefore reflects states that lay observers consider facially communicable emotions.

In looking at this extensive list of emotions, it is noteworthy how many emotions involve reactions to the individual's understanding or state of knowledge vis-à-vis the environment. There seems to be a family of emotions, epistemology-based emotions, that arise in response to the nature of the individual's worldview. Confusion and concentration, in particular, are primarily reactions to information—confusion is the feeling that the environment is giving insufficient or contradictory information, and concentration is the feeling that the information provided by the environment has reached the maximum level one can process. Worry also involves uncertainty about the possible negative status of a situation and calls for confirmation one way or the other.

Historically, little attention has been given to these "epistemological emotions" (although see Oatley & Johnson-Laird, 1987). Other emotions that arise in response to the individual's understanding of the external world include amusement, awe (Keltner & Haidt, in press), and interest (Reeve, 1993). Rozin and Cohen's (2003) findings suggest that these are common states that have readily identifiable signals. Of course, more evidence is needed regarding these states' appraisal patterns and physiological profiles before the field can more confidently include them under the rubric *emotion*.

More generally, what are emotion researchers to make of the list that Rozin and Cohen's (2003) participants produced? The following is our reproduction of their list to address that question:

afraid (fearful, anxious, apprehensive, scared); agreement; amused (giddy, humor, silly, joke, laugh, mischievous, secretive, sly, teasing); anger (annoyed, insult, irritated); ashamed (embarrassed, sheepish, shy, timid); attracted; awed; awkward; bored (indifferent); concentration; concerned (worried); confident (proud); confused (consternation, puzzled, uncertain); content (fulfilled, pleased, relaxed, satisfied); pensive (contemplative, thoughtful); contempt (disdain); cool; curious (inquisitive, interested, intrigued); desperate; disappointed; sad (unhappy); disapproving (dislike); discomfort (pain); disgust (grossed out); envious (jealous); excited; flirtatious (sexy, coy); frustrated; guilty; happy

(joyful); sarcastic (wry); surprised (shocked); skeptical; sympathetic; tired; upset; and worried (upset, nervous).

Clearly, there is a great deal of overlap with current emotion taxonomies. There are also new states worthy of study, as we have noted. And certainly, researchers would tend to recategorize these states into fewer categories; for example, desperate, disappointed, and sad would probably go into one category.

We note several trends in this list. Nearly all of the words reflect transient states rather than traits. Most words reflect a reaction to some situational elicitor outside the self. These elicitors fall into two broad categories: social events and information. Finally, most of the words are evaluative and imply that some effect on or action by the elicitor is desired. For instance, "confusion" is a negatively valenced state that can be alleviated if the environment provides more information.

Whereas emotion taxonomies and definitions tend to emphasize intrapersonal functions of emotion (see Levenson, 1999, for a discussion of this type of function), this list suggests that a defining feature of emotion is its social extension, that is, how an inner state influences the social environment. The valence of the emotion words used in this study implies a desire to influence or change the environment. With respect to the states described here, displays of confusion may say "I don't understand—tell me more." Displays of worry may say "I think something's wrong out there, but I'm not sure—please deny or confirm." Concentration displays may say "I've got all the information I can handle right now—don't send any more yet." Emotions are functional, providing an impetus for change and a mechanism by which to influence one's surroundings (Barrett & Campos, 1987; Keltner & Gross, 1999; Keltner & Haidt, 2001; Shiota, Campos, Keltner, & Hertenstein, in press).

In light of these considerations, we offer the following definition: An *emotion* is a universal, functional reaction to an external stimulus event, temporarily integrating physiological, cognitive, phenomenological, and behavioral channels to facilitate a fitness-enhancing, environment-shaping response to the current situation. This definition reflects the content of the operational list used by Rozin and Cohen (2003) as well as research from a range of methodological paradigms.

The states on which Rozin and Cohen (2003) focused—confusion, worry, and concentration—fulfill part, but not all, of this definition. All could be construed as reactions to information presented by the



environment—external stimulus events. The function of these epistemology-based emotions remains a bit of a mystery. Studies of the antecedents, signals, and consequences of confusion, worry, and concentration would be germane and are likely to reveal that these states have clear purposes after all.

### References

- Barrett, R., & Campos, J. (1987). Perspectives on emotional development II: A functionalist approach to emotions. In J. D. Osofsky (Ed.), *Handbook of infant development* (2nd ed., pp. 555–578). New York: Wiley.
- Bonanno, G. A., Keltner, D., Noll, J. G., Putnam, F. W., Trickett, P. K., LeJeune, J., et al. (2002). When the face reveals what words do not: Facial expressions of emotion, smiling, and the willingness to disclose childhood sexual abuse. *Journal of Personality and Social Psychology*, *83*, 94–110.
- Darwin, C. (1872). *The expression of the emotions in man and animals*. London: John Murray.
- Eisenberg, N., Fabes, R. A., Miller, P. A., Fultz, J., Shell, R., Mathy, R. M., et al. (1989). Relation of sympathy and distress to prosocial behavior: A multimethod study. *Journal of Personality and Social Psychology*, *57*, 55–66.
- Ekman, P. (1993). Facial expression and emotion. *American Psychologist*, *48*, 384–392.
- Fehr, B., & Russell, J. A. (1984). Concept of emotion viewed from a prototype perspective. *Journal of Experimental Social Psychology: General*, *113*, 464–486.
- Gonzaga, G. C., Keltner, D., Londahl, E. A., & Smith, M. D. (2001). Love and the commitment problem in romantic relations and friendship. *Journal of Personality and Social Psychology*, *81*, 247–262.
- Gonzaga, G. C., Turner, R., Keltner, D., Altemus, M., & Campos, B. (2002). *Love and desire in intimate bonds*. Manuscript submitted for publication.
- Haidt, J., & Keltner, D. (1999). Culture and facial expression: Open-ended methods find more expressions and a gradient of recognition. *Cognition and Emotion*, *13*, 225–266.
- Hertenstein, M. J. (2002). Touch: Its communicative functions in infancy. *Human Development*, *45*, 70–94.
- Keltner, D. (1995). The signs of appeasement: Evidence for the distinct displays of embarrassment, amusement, and shame. *Journal of Personality and Social Psychology*, *68*, 441–454.
- Keltner, D., & Bonanno, G. A. (1997). A study of laughter and dissociation: The distinct correlates of laughter and smiling during bereavement. *Journal of Personality and Social Psychology*, *73*, 687–702.
- Keltner, D., Ekman, P., Gonzaga, G. C., & Beer, J. (in press). Facial expression of emotion. In R. Davidson, K. Scherer, & H. Goldsmith (Eds.), *Handbook of affective science*. London: Oxford University Press.
- Keltner, D., & Gross, J. J. (1999). Functional accounts of emotion. *Cognition and Emotion*, *13*, 467–480.
- Keltner, D., & Haidt, J. (2001). Social functions of emotions. In T. Mayne & G. Bonanno (Eds.), *Emotions: Current issues and future directions* (pp. 192–213). New York: Guilford Press.
- Keltner, D., & Haidt, J. (in press). Approaching awe, a moral, aesthetic, and spiritual emotions. *Cognition and Emotion*.
- Keltner, D., & Harker, L. A. (1998). The forms and functions of the nonverbal display of shame. In P. Gilbert & B. Andrews (Eds.), *Interpersonal approaches to shame* (pp. 78–98). Oxford, England: Oxford University Press.
- Keltner, D., Moffitt, T., & Stouthamer-Loeber, M. (1995). Facial expressions of emotion and psychopathology in adolescent boys. *Journal of Abnormal Psychology*, *104*, 644–652.
- Klaus, M. H., & Kennell, J. H. (1983). *Bonding: The beginnings of parent–infant attachment*. New York: Mosby, Inc.
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York: Oxford University Press.
- Levenson, R. W. (1999). The intrapersonal functions of emotion. *Cognition and Emotion*, *13*, 481–504.
- Oatley, K., & Johnson-Laird, P. N. (1987). Towards a cognitive theory of emotions. *Cognition and Emotion*, *1*, 29–50.
- Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions*. New York: Oxford University Press.
- Reeve, J. (1993). The face of interest. *Motivation and Emotion*, *17*, 353–375.
- Rozin, P., & Cohen, A. B. (2003). High frequency of facial expressions corresponding to confusion, concentration, and worry in an analysis of naturally occurring facial expressions of Americans. *Emotion*, *3*, 68–75.
- Rozin, P., Lowery, L., & Ebert, R. (1994). Varieties of disgust faces and the structure of disgust. *Journal of Personality and Social Psychology*, *66*, 870–881.
- Russell, J. A. (1994). Is there universal recognition of emotion from facial expression? A review of the cross-cultural studies. *Psychological Bulletin*, *115*, 102–141.
- Scherer, K. S. (1986). Vocal affect expression: A review and a model for future research. *Psychological Bulletin*, *99*, 143–165.
- Shaver, P. R., Morgan, H. J., & Wu, S. (1996). Is love a “basic” emotion? *Personal Relationships*, *3*, 81–96.
- Shaver, P., Schwartz, J., Kirson, D., & O’Connor, C. (1987). Emotion knowledge: Further exploration of a pro-

- prototype approach. *Journal of Personality and Social Psychology*, 52, 1061–1086.
- Shiota, M. N., Campos, B., & Keltner, D. (in press). The faces of positive emotion: Prototype displays of awe, amusement, and pride. *Annals of the New York Academy of Sciences*.
- Shiota, M. N., Campos, B., Keltner, D., & Hertenstein, M. J. (in press). Positive emotion and the regulation of interpersonal relationships. In P. Philippot & R. S. Feldman (Eds.), *The regulation of emotion*. Mahwah, NJ: Erlbaum.
- Snowden, C. (in press). Animal communication of emotion. In R. Davidson, K. Scherer, & H. Goldsmith (Eds.), *Handbook of affective science*. London: Oxford University Press.
- Uvnaes-Moberg, K. (1997). Physiological and endocrine effects of social contact. In C. S. Carter, I. I. Lederhendler, et al. (Eds.), *The integrative neurobiology of affiliation* (pp. 146–163). New York: Academy of Sciences.

Received October 16, 2002

Revision received November 14, 2002

Accepted November 14, 2002 ■