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## Classification of Emotions

**D**mitry Mendeleyev's periodic table of the chemical elements was one of humanity's great intellectual achievements. Not only did it list all the naturally occurring elements known at the time, but it systematized them as well. It predicted the properties of other elements yet to be discovered or created in laboratories. It also paved the way for research on atomic structure that established why the elements on the table are the only elements that could exist.

Psychological researchers understandably envy that accomplishment. In the earliest decades of psychology (the late 1800s and early 1900s), psychologists called the "structuralists" tried to identify elements of the human mind, such as ideas or sensations. They presumed that the elements of psychology would be the building blocks that combine to form all of human behavior and experience. The search for the elements of the mind proved frustrating, however, and psychologists eventually abandoned that goal.

However, even if the mind in general does not have elements, perhaps certain aspects of psychology have elements. For several decades, psychological researchers tried to list all the naturally occurring, or primary, motivations or drives (e.g., Madsen, 1959;

McDougall, 1932; Murray, 1938; Young, 1936). A few are obvious: hunger, thirst, sex, comfortable temperature, and avoidance of pain. Urination, defecation, and sleep are less obvious, but reasonable choices after we think about them. But psychologists' lists continued to grow, and different psychologists offered different choices. Breathing certainly belongs on the list, but is it just one motivation, or should we count inhaling and exhaling separately? Is activity a drive? How about curiosity? Infant care? Aggression? Laughter? Listening to music? Eventually psychologists gave up trying to list all the drives, because deciding what should go on the list seemed more trouble than it was worth.

One area in which many psychologists continue to seek the "elements" is emotion. Many consider it feasible to list a limited set of "basic" emotions—emotions that are fundamentally distinct from one another, as chemical elements are from one another. Researchers working from this perspective refer to certain emotions as "basic" or "primary." If such "emotional elements" do exist, then other emotion experiences would be compounds or "blends" of the basic emotions.

Not everything in nature comes in elements, though. In fact, other than the chemical elements,

most of the categories we use to think about the world reflect somewhat arbitrary conceptual divisions, rather than absolute, “real” divisions. So the question is, do people have a set number of discrete, irreducible emotions with natural boundaries, or do we have a continuous gradation of possible emotions that we divide up in an arbitrary way? Chemists established through centuries of research that no tinkering or blending could turn lead into gold—they are fundamentally different. Psychologists also need research to establish whether sadness and anger, for example, are also fundamentally different or just reflect different proportions of the same ingredients. Chemists have also established that the elements sodium and chlorine combine to form table salt. In a similar way, psychologists ask whether all emotional experience involves combinations of a few, discrete units. In fact, although much current research presumes that such elements exist, the whole idea of “basic emotions” has been called “an article of faith” rather than a conclusion based on empirical evidence (Ortony & Turner, 1990, p. 315). Some of the research needed to answer these questions has been done, but there’s still a long way to go before we can reach a confident consensus.

Resolving this issue would have huge implications for how we study emotions and how we link emotions to the rest of human behavior and experience. However, what is at stake here goes well beyond the study of emotions. To say that certain emotions are natural elements of our experience seems to affirm the idea of “human nature.” It implies that we are “born that way.” For example, if anger is a naturally occurring elemental emotion, then we might draw three conclusions. First, except for the effects of brain damage, genetic mutations, or other abnormalities, everyone probably experiences anger in a similar way—it’s just a normal part of life. Second, the emotion anger is probably an evolved characteristic, such as upright walking and language, which means that experiencing anger in certain kinds of situations helped our ancestors survive and reproduce long ago. Third, the eliciting events, bodily feelings, facial expressions, and be-

haviors associated with anger should be the same in all cultures—they “hang together” wherever you go.

An alternative view is that our emotions, as with much of the rest of our experience, are “socially constructed.” That is, the way we describe our emotions and even how we perceive them are based on the “narratives” (stories) that our culture tells about human feelings (Neimeyer, 1995). A social constructivist perspective presumes that emotion words represent arbitrary categories of experience, rather than “real” ones. Thus, the English word *anger* may represent a combination of feeling offended, having high blood pressure and a certain facial expression, and wanting to hurt or yell at somebody, but another language may lack a word for this combination or may have a word that reflects a somewhat different combination of features. Just as we learn from our culture what to consider a food, beauty, and so forth, we may learn from our culture exactly what (if anything) constitutes anger, fear, and sadness.

Some psychologists have argued that even the colors we see are socially constructed; that is, the reason we see the world in terms of red, yellow, green, and blue is that our language has words for those colors. Some other culture might have divided up the colors in a different way, so that they would see some other colors as “primary.” Doing good research on that question is much more complicated than it might sound (Roberson, Davies, & Davidoff, 2000), but most researchers now believe that what we regard as the best examples of *red* or *green* stand out as “central” or “primary” colors for people in other cultures also.

Applying the social-construction idea to emotions suggests that we learn from people around us what emotions to feel, how to express them, and how to interpret other people’s expressions. By this view, emotions are not human nature—we have to learn them. If, however, expressions and their meanings are similar across cultures, then certain aspects of our emotions are “given.” We have certain inborn categories of emotions, or at least certain fixed dimensions along which emotional experience varies. You may be wondering, “Do I really have to choose

one perspective or the other?" Probably not, although psychologists studying emotion often make it seem like we do. As is so often the case, both perspectives may be right, in different ways. In this chapter, we'll discuss research that deals with the "basic emotion" question.

## ■ Criteria for "Basic Emotions"

Chemists established that gold is an element by failing in repeated attempts to make it from other kinds of metal. They demonstrated that water is a compound because one can make it by combining oxygen with hydrogen. Psychologists cannot literally combine one part of anger with one part of fear in a test tube. How can we identify elemental, or basic emotions, or even decide whether such a concept is meaningful?

Psychologists don't just fail to agree on which emotions, if any, are basic. They also disagree on what evidence would be decisive. We consider five popular criteria here, but remember that not everyone accepts these criteria (e.g., Ekman, 1992; Johnson-Laird & Oatley, 1989; Lazarus, 1991; Shaver, Schwartz, Kirson, & O'Connor, 1987; Tooby & Cosmides, 1990).

The least controversial criterion is that *a basic emotion should be universal* within our species. That is, if an emotion is basic, it should occur in all societies in nearly all people, except perhaps infants or those with brain damage or genetic mutations. Finding some emotion in all societies is no guarantee of its being basic, but finding it in some societies and not others would imply that it is socially constructed and not a built-in aspect of human nature.

For example, nearly every culture and every language has words that translate approximately as happiness, sadness, and fear, so those are at least good candidates to be basic emotions. A few societies report that they never experience anger or don't have a word for anger. Does that mean they feel no anger at all, or just that they control it effec-

tively? (Or maybe they just don't want to talk about it.) Some psychologists have argued that certain societies have "culture-specific" emotions. This might seem like an easy question to address—just look through foreign-language dictionaries and see which English emotion words map onto words in other languages—but it's more complicated than that. For example, the German word *Schadenfreude* refers to the pleasure one feels at seeing someone else get hurt, especially one's enemy. The English language doesn't have a corresponding word, but be honest, have you never felt that way? Perhaps German-speakers are just more honest about admitting it.

There are many other examples as well. We will introduce them here and discuss them in more detail in Chapter 3 and in later chapters on specific emotions. The Japanese call one emotion *amae*, variously defined as "the pleasant feeling of depending on someone else" or "the feeling of comfort in another person's acceptance." That emotion may seem unfamiliar to you, but researchers who study *amae* deny that it is culture specific; rather, they believe people in other cultures feel it, but don't always encourage it or talk about it (Doi, 1973; Lambie & Marcel, 2002; Morsbach & Tyler, 1986). People of the Ifaluk culture (in the Micronesian islands of the Pacific) report an emotion called *fago*, which does not translate as any single English word. It corresponds to a combination of compassion, love, and sadness (Lambie & Marcel, 2002). Whereas an Ifaluk psychologist might regard *fago* as a basic emotion, English speakers regard it as a blend of other emotions. As you see, it is difficult to determine the cross-cultural universality of an emotion just from language or self-report data. However, researchers have looked for evidence of universality in other aspects of emotion. Later we will discuss the evidence on facial expressions of emotion—a line of research that has been especially important.

A second criterion is a bit more complex. According to many theorists, *a basic emotion must facilitate a functional response to a specific, prototypical life event, or "antecedent."* The idea is that if we all

share an emotion, we must have evolved the ability to feel it, and if we evolved the tendency to feel it, it must be useful for dealing with some common problem. For example, in every culture that we know about, sadness is experienced in response to a loss, such as the death of a loved one, and it is functional because it elicits social and practical support from other people. Fear, a response to danger, facilitates escaping from a threat. With a little effort, you can describe the events that lead to surprise, anger, happiness, and several other emotions.

However, once an emotional mechanism has evolved for certain situations, a similar situation may trigger it even where the emotion is not evidently useful. For example, a child is sad after separation from a parent (for good reasons, because parents provide nurturance and protection from danger) and also sad when separated from a stuffed animal (where the sadness has no apparent function). Parents feel a rush of tenderness and compassion when picking up an infant (where the evolutionary function is obvious—if you don't take care of your infant, it probably won't pass on your genes), and many people, including one of us (M.S.), also feel tenderness and compassion when picking up a pet cat. In each of these cases, the capacity to feel the emotion is functional, even if the emotion also occurs in some less useful situations.

A third criterion is that *a basic emotion should be evident early in life*. Newborn infants cry when they hear a sudden, loud noise or if they hear another baby crying. If we were to label this expression with a single emotion term, that term would be "distress." During early infancy, the infant's facial expressions do not distinguish among distress, fear, anger, and sadness (Messinger, 2002). So, by this criterion, distress qualifies as a basic emotion. In contrast, we would not think of nostalgia as a basic emotion, because it emerges much later in life (if at all) and depends on many kinds of experience.

The problem is, how early in life must an emotion occur to qualify as basic? Newborns do not smile or laugh, although they do respond to a par-

ent's happy tone of voice by opening their eyes wider (Mastropieri & Turkewitz, 1999). Perhaps that means they experience happiness, perhaps not. Smiling and frowning emerge gradually within two or three months (Izard, 1994). Expressions of fear (as opposed to distress) develop by about six months. Expressions of anger develop gradually over a longer period. We can easily see anger in an 18-month-old, but for a 6-month-old infant, the boundary between anger and distress is still not certain. The onset of disgust is also difficult to specify. Even newborns spit out bitter or sour food, but children must be several years old before they begin to show disgust at anything other than bad-tasting food. When do children first show surprise? If you cover a toy and then remove the cover and the child sees a different toy, not the one that was hidden, even infants well under a year old stare at the new toy longer than usual. But they do not show a facial expression that resembles the adult "surprise" expression (Camras et al., 2002). Again, it is a matter of definition whether we say infants less than a year old show surprise.

Children don't show evidence of embarrassment or shame until they are about a year and a half old, and because of that delay, most psychologists regard shame and embarrassment as "social emotions," different from the primary emotions that develop earlier. But that conclusion is hardly rock solid. Most expressions, after all, are not present in newborns, and all take time to approach their mature form. Besides, nearly everyone accepts the idea that the capacity for language is part of human nature, even though language capacity does not emerge until children are more than a year old. In short, the "present from infancy" criterion is problematic.

A fourth criterion, also widely used, is the basis for much of the emotion research since the 1970s. Many psychologists assume that *if an emotion is basic, people should have a built-in way of expressing it, such as through facial expressions or tone of voice*. Furthermore, in accordance with the first criterion (similarity across cultures), it is important to demonstrate

that people in all cultures can recognize the same facial expressions and interpret them in approximately the same way. A great deal of research (and controversy) deals with facial expressions, and we shall consider this topic in some detail later in this chapter.

If the evidence were strong enough, a fifth criterion would probably be the most persuasive: that *each primary emotion should have its own physiological basis*, presumably a certain kind of activity in the brain or the autonomic nervous system. For example, suppose that some kind of brain damage, drug treatment, or genetic mutation caused someone never to feel anger, while leaving other emotions unimpaired. That evidence would strongly implicate anger as a primary, independent emotion. If some other brain damage or mutation impaired fear, and still another impaired happiness, then we could identify those as primary emotions also. On the other hand, if some other emotion—shame, for example—could not be impaired without altering the others, we might conclude that it was “not basic.” Although researchers have conducted studies of the physiology of the emotions, the current evidence does not conclusively demonstrate that any emotion is physiologically distinct from the others.

## ■ Facial Expressions of Emotion

One of the most important aspects of the basic-emotions controversy is the question of how similar the emotions are across cultures. Any emotion that seems similar across cultures is at least a reasonable candidate as a “basic” emotion. Evidence of significant variation across cultures would support the idea of social construction.

Much of the research evidence relevant to the universality question has involved facial expressions of emotion (e.g., Ekman, 1972; Russell, 1994), and many studies have focused on the ways in which people around the world decode such expressions. Because this research has been so influential, these classic studies deserve extra attention.

## Darwin's Theory of Emotional Expression

After Charles Darwin developed his theory of evolution by natural selection, he became curious about the expression of emotional states (Darwin, 1872/1998). He had noticed strong similarities in the physical behaviors that animals of a great many species exhibited when they were threatened, angry, sad, or excited. For example, many species react to a threat by changing posture to appear larger; birds raise their feathers and spread their wings, cats arch their backs and their hair stands on end, and primates stand on their hind legs and lift their arms. Darwin also noted that some of the most common human expressions of emotion occur in monkeys and apes as well, including the expressions of fear and anger (see Figure 2.1).

In his classic book *The Expression of the Emotions in Man and Animals*, Darwin (1872/1998) argued that expressions of emotion probably evolved because they conferred some kind of survival or reproductive advantage on individuals who displayed them. For instance, animals that react to threats by making themselves look larger increase their chance of surviving that threat because the change in appearance might scare off the attacker. In much of the book, Darwin argues that human expressions of emotion are also the result of evolutionary processes that link us to our closest primate relatives.

How might emotional expressions have evolved? Darwin (1872/1998) suggested three mechanisms that might lead to species-typical expressions: action of the nervous system, serviceable associated habits, and the principle of antithesis. Those hypotheses remain our most prominent explanations today.

*Action of the nervous system* refers to changes that occur as a result of overall sympathetic arousal. When you become highly aroused with any emotion, you breathe rapidly and perspire. An intense emotion prepares you for vigorous action, but if the circumstances do not permit you to do anything,



**FIGURE 2.1** Nonhuman primates have some facial expressions that clearly resemble those of humans and use them in similar situations.

your hands may tremble. Trembling is a common sign of fear, but people also sometimes tremble with anger or joy. The expressions that occur as by-products of arousal signal the intensity of an emotion, although they do not distinguish well between one type of emotion and another.

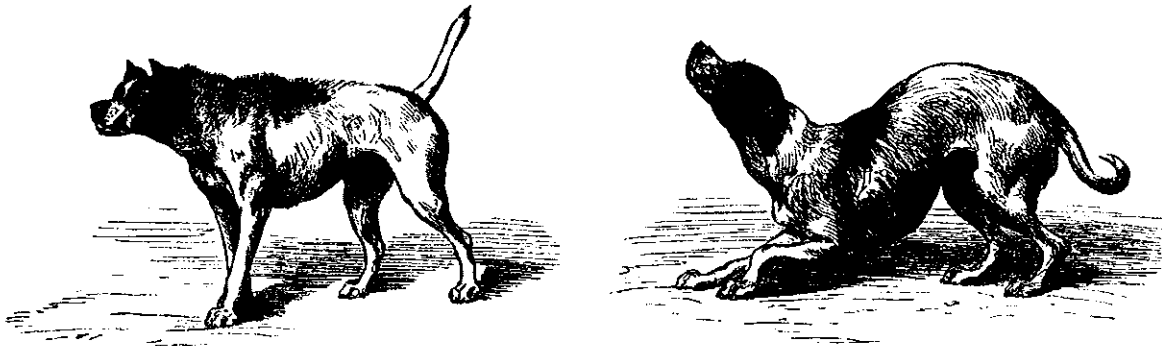
*Serviceable associated habits* are movements that become associated with particular situations because they usually help in that kind of situation. For example, when you are disgusted by something and want to avoid looking at it, you close your eyes. Darwin thought that this kind of movement was repeated so often that it became habitual—you do it without even thinking about it in that general sort of situation. This idea would explain why certain expressions are automatic, even when they don't make immediate sense. For example, first imagine watching someone do an everyday task, like reading the newspaper. Then imagine watching someone vomit. Did you close your eyes? Many people close their eyes when imagining something disgusting, even though closing your eyes doesn't actually prevent

you from “seeing” (in this case, imagining) the disgusting event.

Darwin also believed that habits developed by parents were passed on to offspring without the offspring having to learn them. It turns out that he was wrong on this point. “Acquired” or learned traits are not, in fact, passed on genetically. However, the mechanism of serviceable associated habits still goes a long way toward explaining many expressive behaviors. Behaviors can confer enough fitness advantage to spread through a species if they are frequently useful. The whole point of emotional expressions is to prompt a very rapid reaction without your having to think too hard about it. Imagine having to “decide” whether or not to pull back from a snake when it strikes! If pulling back automatically helps you stay alive when the snake would bite you, it's not a problem when you do the same thing while watching a snake strike in a movie or television show.

Finally, the *principle of antithesis* is the idea that if an expression means one thing, an opposite ex-





**FIGURE 2.2** A posture indicating threat (left), and an opposite posture indicating complete submission. Source: Darwin, Charles, *The Expression of the Emotions in Man and Animals* (1872/1998), with permission from Oxford University Press.

pression means the opposite. For example, if you shake your head from side to side to indicate “no,” then nodding it up and down means “yes.” Darwin gave the example of a dog that takes an attack posture to indicate threat. It takes an opposite posture to indicate submission, as Figure 2.2 shows. If your pet dog barks loudly, and then suddenly discovers that you, not some intruder, is behind the front door, it may take this exaggerated submissive posture to indicate the opposite of threat and anger.

Darwin recognized that if facial expressions were inherited from primate ancestors, they should be the same in all human cultures. He lived in an era, the mid 1800s, when photography was awkward and expensive, so he had to test his hypothesis by relying on written reports from missionaries and others who had traveled to other continents. Darwin wrote to anybody he knew of living in another part of the world, described “typical” facial expressions of particular emotions, and asked his correspondents if natives of that culture expressed each emotion in the same way. He, of course, had no way of checking the accuracy of their answers.

Darwin’s correspondents replied that people throughout the world show similar expressions of many feelings. When surprised or astonished, they open their eyes widely and sometimes their mouths as well. When puzzled or perplexed, they frown.

When determined, they frown and close their mouths tightly. When they feel helpless, they shrug their shoulders. Even some people who were born deaf or blind show these same expressions. When embarrassed, people use their hands to cover their face. Again, even people born blind do the same—although they have never experienced what it means to see or be seen. People throughout the world also pout, mostly in childhood. (When was the last time you saw an adult pout?) The similarity of all these expressions across cultures, and their presence in people born blind and/or deaf, suggests that they are not learned, but a product of our genetic heritage.

About a hundred years later, the Austrian biologist Irenäus Eibl-Eibesfeldt (1973) made extensive visits to remote cultures, photographing people’s facial expressions. He too reported remarkable similarities in expressions across cultures. Eibl-Eibesfeldt recorded one expression that Darwin had not considered: People often exchange a friendly greeting by raising their eyebrows and slightly opening their mouths (Figure 2.3). Symbolically, the gesture says, “I am glad to see you. I open my eyes wide to see you better.” The expression is constant in both meaning and duration. Throughout the world, the average duration of the expression, from eyelids relaxed to raised position to down again, lasts about a third of a second.



**FIGURE 2.3** People throughout the world greet one another by raising their eyebrows, sometimes also slightly opening their mouths. Source: Eibl-Eibesfeldt (1973).

### Cultural Differences in Gestures and Expressions

Darwin documented important similarities in the nonverbal gestures and expressions people use around the world. There were, however, some problems with his research strategy. First, consider the nature of the questions he asked his far-flung assistants. A question was not: "How do people's faces typically look when they are astonished?" A typical question read more like: "Is astonishment expressed by the eyes and mouth being opened wide and by the eyebrows being raised?" Darwin's correspondents simply said yes or no. Today, most researchers would avoid such a suggestive question and let the correspondents describe expressions in their own words. Alternatively, they might offer a series of choices without implying one over another. People sometimes say yes even if the description is not quite accurate, or if they are not sure, especially when it is clear what hypothesis the researcher is testing. Also, Darwin's question required that the correspondents infer people's emotions by some other means than facial expressions, and it's not clear how.

In the early twentieth century, the prevailing theories in psychology and anthropology favored strong environmental influences, and Darwin's conclusions about emotion fell into disregard. Several influential anthropologists described cultural differences in the expression of emotions (Birdwhistell, 1970; LaBarre, 1947). For example, whereas clapping the hands usually indicates joy or delight in the

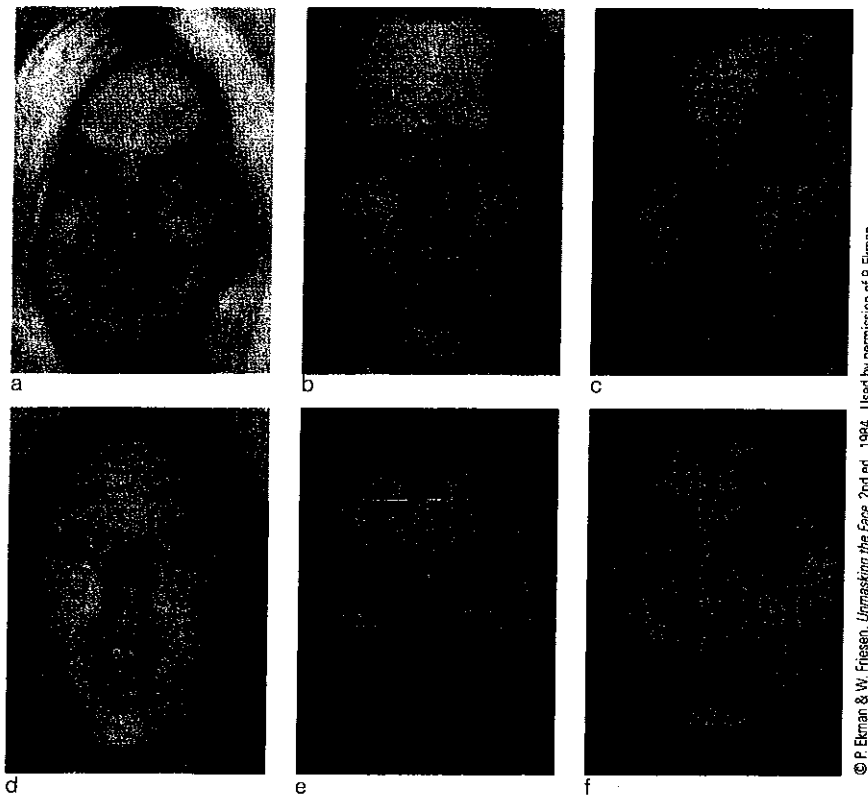
United States, it often suggests worry or disappointment in Chinese culture (Klineberg, 1938). In most cultures, people indicate "no" by shaking their heads back and forth, and "yes" by nodding it up and down. In Greece and Turkey, however, people typically indicate "yes" by tilting their heads back, and in Sri Lanka, they express approval by shaking their heads back and forth.

In the United States, a common gesture joins the tip of the thumb with the tip of the index finger to make a circle, as shown here, to indicate "we're in agreement," or "everything is going well." In many other cultures, however, that gesture is meaningless, and in some it is considered a rude invitation to have sex!



Other ethnographic work documented expressive reactions that made no sense to Westerners. For example, people in some parts of Southeast Asia bite their tongues when they feel shame, and according to some reports, Japanese wives of Samurai warriors smiled when they learned their husbands had died in battle.

By the middle of the twentieth century, ethnographic reports of differences in emotion expression had persuaded most social scientists that the whole concept of emotion must be socially constructed. Beginning in the 1960s, however, new research focusing on facial expressions rather than hand gestures revolutionized the field of emotion and revived the search for universal, innate, basic emotions.



**FIGURE 2.4** People in many cultures have been asked to identify which face goes with which emotion: anger, disgust, fear, happiness, sadness, and surprise. Source: Ekman and Friesen (1984).

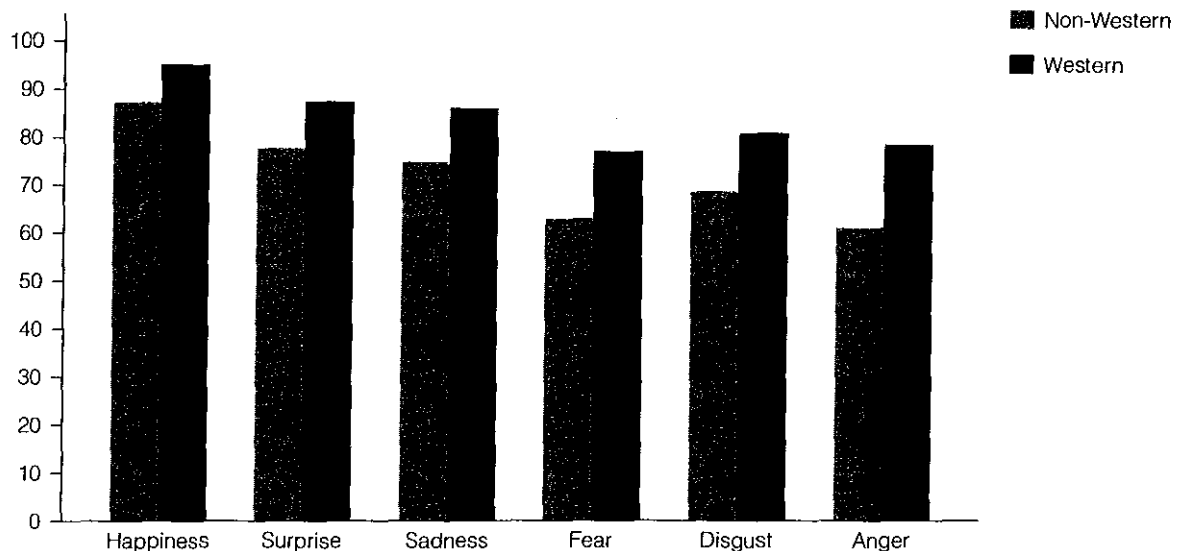
### Interpreting Facial Expressions

Recall that two major criteria for a basic human emotion is that it should occur in all cultures and should have its own facial expression. Darwin and Eibl-Eibesfeldt reported that the same facial expressions occur throughout the world, but what they meant was that the expressions looked the same to them and seemed to be occurring in the same situations. Do people in other cultures agree about the meaning of facial expressions? If they see a smile, do they assume the person smiling is happy? If they see wide eyes and an open mouth, do they infer surprise? In the 1960s, Paul Ekman and Carroll Izard both hypothesized that yes, people from different cultures should agree on the interpretations of a

few, simple facial expressions of emotion, and they went out to test this hypothesis.

The basic test was this. Imagine that you are one of the research participants. Someone shows you the six photos shown in Figure 2.4 and asks you to identify which one represents each of the following emotions: anger, disgust, fear, happiness, sadness, and surprise (Ekman & Friesen, 1984). If you speak a language other than English, then the researchers would first get someone to translate those six words into your language.

Versions of this basic study have been conducted dozens of times, in countries all over the world. In some of the studies, participants lived in small, isolated agricultural villages where they seldom



**FIGURE 2.5** Mean accuracies for pairing the expressions in Figure 2.4 with their labels.  
Source: Based on data of Russell (1994).

encountered people from the Western world and did not watch television or movies. In one case, the participants had never even seen Caucasians before the researchers arrived in their village. Figure 2.5 shows the results, averaged across several studies and almost two thousand people (Russell, 1994). In the graph, one bar represents how often non-Western observers matched the facial expression of an emotion to the “correct” emotion word. Another bar represents the corresponding statistic for Western participants. Random guessing would produce one sixth to one third correct for each emotion (depending upon the exact version of the study), and clearly people did better than that. Even though the photographs were of Caucasians (people of European ancestry), people from other societies throughout the world identified most of the expressions correctly. So, from the standpoint of our original question about basic emotions, one major question is answered: Yes, certain emotions do have facial expressions that people throughout the world can recognize.

In general, Western participants have been a little more accurate than non-Western ones. How can we explain this difference? Given that the people in

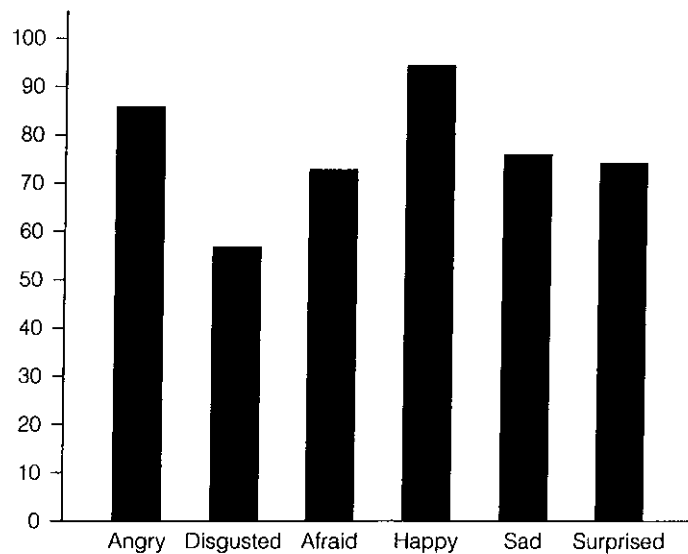
the photos were Caucasian, the difference in accuracy could mean that it is easier to recognize expressions posed by someone from your own culture, just as it is easier to understand someone who speaks with your accent or dialect (Elfenbein & Ambady, 2003). However, the following alternative explanations are possible as well (Matsumoto, 2002):

- Perhaps when the researchers attempted to translate words such as anger, surprise, or disgust into other languages, something got lost along the way. This discrepancy would make the matching task more difficult.
- The Americans and Europeans were probably more experienced at looking at displays on a piece of paper and answering a researcher’s questions about them. People in some non-Western cultures become nervous when talking to outsiders.
- Americans and Europeans might be better at recognizing facial expressions in general, not just those from their own culture. This hypothesis seems less likely, but we can test it only by collecting data.

The best way to get around these problems is to use more than one set of photos (Matsumoto, 2002). For example, researchers might show photos of Americans and Africans to both American and African observers. If Americans identify the American photos better, and Africans identify the African photos better, then we could conclude that it is easier to recognize expressions from your own culture. The limited research done so far of this type has shown a small tendency for people to recognize emotions better for their own culture. Also, if people look at faces from other cultures, it is easier to recognize expressions from a familiar culture, one with which the observers have had some contact (Elfenbein & Ambady, 2002a, 2002b).

An additional problem with all these studies is that the matching procedure could overestimate people's accuracy (Russell, 1994). For example, when you look at Figure 2.4, presumably you identify face (a) as happy. Almost everyone does. Now you are left with five faces to pair with five labels. Suppose you are unsure whether face (d) represents surprise or fear. If you decide that face (f) is a better expression of fear, you choose (d) for surprise. Suppose you have no idea what to call face (e). If you identify (b) as anger and (c) as sadness, you label (e) as disgust just by process of elimination.

One way to get around this limitation is to present photos one at a time and ask which emotion (if any) it expresses. The difficulty of this method is that people sometimes give answers that are not exactly what the researchers expect (Ekman, 1994a). For face (f), the intended answer is "fear." Various people call this expression terror, horror, panic, or "she looks like she just saw a ghost." Presumably, we would count all those answers as correct, treating them as synonyms for fear. But what if someone called the expression distress or worry? Are those answers close enough to fear that we should consider them correct? Indeed, what if someone called



**FIGURE 2.6** Accuracy of one group of college students in correctly labeling six emotional expressions. The students were not given the labels or any other suggestions about their answers. Source: Based on data of Ekman (1994a).

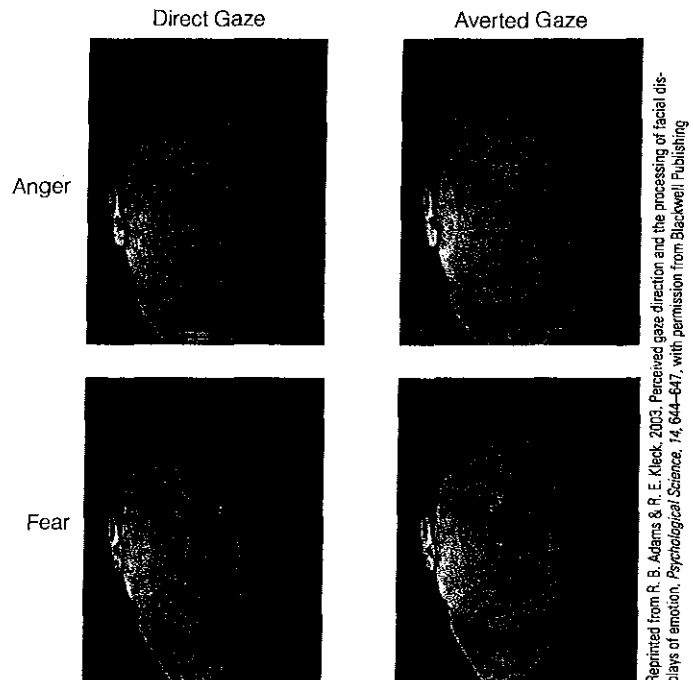
the expression surprise? We probably would count that answer wrong, because a different expression was intended to represent surprise, but fear and surprise often go together, so this "wrong" answer is not entirely incorrect.

A similar problem arises with the anger expression: Is the description "frustrated" right or wrong? Frustration strongly overlaps anger, although the terms are not synonyms. When observers name facial expressions, researchers do their best about assessing the answers. (Assessment is especially difficult when researchers and participants speak different languages.) Researchers find that people are reasonably accurate at recognizing facial expressions, even of faces from other cultures, but they can match faces to given labels more accurately and more confidently (Frank & Stennett, 2001). Figure 2.6 shows the accuracy of one group of college students in labeling the emotions portrayed by six faces (Ekman, 1994a).

In real life, of course, we do not try to read someone's emotions entirely from static facial

expressions. We notice changes over time, such as eyeblinks, trembling, and direction of gaze. Notice that the researchers posed all the faces in Figure 2.4 to look directly at the viewer. In real life, happy people look straight at you and so do angry people, especially if they are angry at *you*. However, sad people seldom look straight at you; they mostly gaze down and to the side, and you recognize the expression of sadness partly from the fact that someone is looking down. (We sometimes call a sad expression “downcast.”) Frightened people look at whatever is frightening them. Unless you are personally threatening someone, you would be puzzled to see the person looking at you with an expression of fear. Although people recognize an angry expression about equally well for a face looking at them or looking away, most people identify a fearful expression more easily for a face looking to the side, as Figure 2.7 shows (Adams & Kleck, 2003).

We also notice body movements outside the face, such as shoulder shrugging, head turns, slouching, standing erect, speed and direction of walking, and hand gestures (Edwards, 1998). You might not recognize an expression of “pride” from facial expression alone, but with the addition of body posture, most people can (Tracy & Robins, 2004). We also consider tone of voice, including laughs and shrieks. People can assess someone’s emotion moderately well from just hearing the tone of voice (Adolphs, Damasio, & Tranel, 2002), and they gauge emotions much faster and more accurately if they see and hear the person than if they only see or only hear (de Gelder, 2000). Even when people listen to someone speaking an unfamiliar foreign language, they are quite accurate at identifying anger or sadness in the voice and moderately accurate at detecting happiness, fear, and tenderness (Juslin & Laukka, 2003). Our ability to detect emotions from tone of voice may even be what enables music to convey emotion (Scherer & Zentner, 2001).



**FIGURE 2.7** How quickly can you identify these expressions? Most people identify fearful expressions more easily when the person is looking away than straight ahead. However, people recognize expressions of anger about equally well in either direction.

We also infer emotions from people’s posture and speed of walking. Sometimes even smells influence our perceptions of someone’s emotion. For example, the presence of an unpleasant smell interferes with our ability to recognize that other people are smiling and happy (Leppänen & Hietanen, 2003). (It’s as if we were thinking, “How could anyone be happy in a room that stinks like this one?”) In summary, people in everyday life recognize emotional expressions from a wide variety of cues that go beyond what photographs provide. Therefore, the results that Figures 2.6 and 2.7 present probably *underestimate* people’s true abilities to recognize emotions.

However, despite the difficulties of accurately measuring people’s ability to interpret emotional

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expressions, the research to date does make a persuasive case that several facial expressions convey roughly the same meaning from culture to culture. How does this conclusion address the question of basic emotions? Many psychologists conclude that universal human nature includes an “affect program,” consisting of innate emotional reactions to some situations, standard displays of those emotions, and the ability to recognize displays by other people. In sum, they regard the emotions in question as “basic emotions.”

We can identify these six emotions by facial expression, but are these the only emotions we can recognize and therefore the only basic emotions? In addition to the six emotions depicted in Figure 2.4, many psychologists list contempt as a seventh basic emotion. (See Figure 2.8.) Pride is another candidate, as are guilt, interest, hope, relief, frustration, love, awe, boredom, jealousy, regret, and embarrassment (Ekman, 1992; Fredrickson, 2001; Keltner & Buswell, 1997; Shaver, Morgan, & Wu, 1996). Hindus regard heroism, amusement, peace, and wonder as additional emotions (Hejmadi, Davidson, & Rozin, 2000). Although none of us could reliably recognize all of these emotions from still photographs, most people do fairly well when watching videotapes, which are closer to what we experience in everyday life (Hejmadi et al., 2000).

Finally, one of the easiest facial expressions to identify is sleepiness. Should we therefore count sleepiness as an emotion? If not, then we concede that having a recognizable facial expression for something does not necessarily make it an emotion. What about surprise? Is surprise really an emotion, or is it a cognitive state? The fact that we recognize its facial expression does not necessarily make it an

emotion. Before we can decide what is and is not an emotion, we need more evidence than just facial expressions.

## Physiological Studies

Where has all this research on facial expression led us so far? Most psychologists conclude that at least a few facial expressions are universal, in the sense that they convey approximately the same information to people of all cultures. People in any culture recognize a smile as a sign of pleasure. Frowns are also universal signals of displeasure, although they do not distinguish one kind of displeasure from another.

However, the research on facial expressions has not answered the question of how many basic emotions we have or indeed whether there is such a thing as a basic emotion. Potentially more decisive evidence comes from physiological studies. Does any emotion produce a pattern of brain activity that sets it apart from all others? Could any kind of brain damage impair one emotion without affecting others?

Several studies have measured brain activity while people examined emotion-generating photos or recalled highly emotional personal experiences (Damasio et al., 2000; Kawasaki et al., 2001; Royet et al., 2000). Although these studies usually were not designed to distinguish one emotion from another, they did show that happy emotions excite different patterns of brain activity than do sad, angry, or frightened emotions. In fact, one study found that sadness increased activity in several brain areas whereas happiness *decreased* activity in many of those same areas (George et al., 1995).

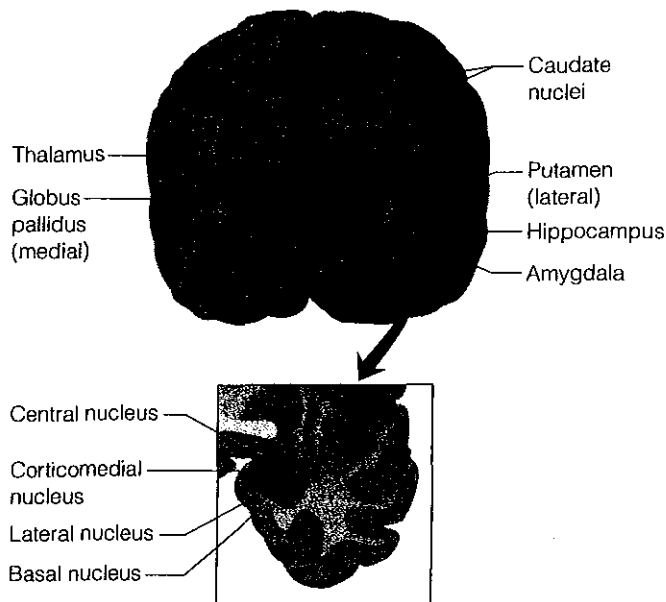
As discussed in Chapter 1 (see Figure 1.5), the patterns of brain activity elicited by different emotions apparently overlap more than they differ. Much of the difference in brain activity from one study to another depends on the experimental procedures rather than on the type of emotion studied. However, many of these studies have concentrated on activity in the cerebral cortex. As Panksepp (2003) has noted, focusing on the cerebral cortex



**FIGURE 2.8** An expression of contempt. Many psychologists regard contempt as an additional basic emotion.

Photo courtesy of Dr. Paul Rozin





**FIGURE 2.9** The amygdala, a small structure in the temporal lobe of the cortex, is important for emotions, perhaps especially for fear. The top view shows positions of the amygdala and several other internal brain structures as if the outer surface were transparent. The bottom view shows part of a cross-section through the brain, parallel to the plane of the forehead.

overlooks the subcortical areas, which may respond more specifically to one emotion or another.

Several kinds of evidence at one time suggested a specific physiological basis for fear, linking it to a brain area called the amygdala, which Figure 2.9 depicts. A later chapter will review this research in more detail, but here let's consider a few highlights.

Many studies on rats and other laboratory animals reported that damage to the amygdala impairs the ability to learn new fears. An animal with this damage would still give a startle response to a loud noise, showing a built-in fear, but it would not readily learn that some other event (such as a blinking light) predicted an electrical shock. As a result, it would not learn to fear the blinking light (Hitchcock & Davis, 1991).

A rare genetic disorder called Urbach-Wiethe disease causes skin lesions and sometimes also

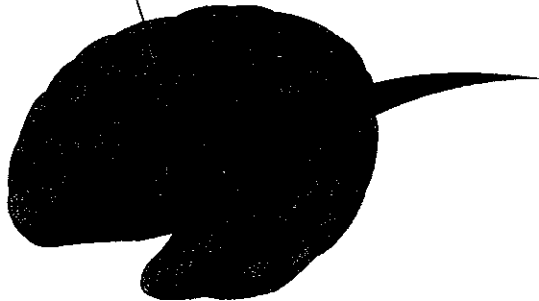
causes a gradual loss of neurons in the amygdala because of calcium accumulation. People with this disease have trouble recognizing other people's emotions, especially expressions of fear, from their facial expressions (Anderson & Phelps, 2000) or tone of voice (Scott et al., 1997). When they need assistance, they approach people on the street haphazardly, instead of looking for people who look friendly or trustworthy (Adolphs, Tranel, & Damasio, 1998). However, that behavioral oddity does not necessarily indicate lack of fear; it might be better described as difficulty interpreting other people's expressions. One man with extensive damage to the amygdala and surrounding areas could not recognize any expression other than happiness from photos, but he could identify almost any emotion from a story about events that would elicit emotions (Adolphs, Tranel, & Damasio, 2003). So amygdala damage does not necessarily impair emotions themselves; indeed, most people with amygdala damage report that they continue to experience both pleasant and unpleasant

emotions (Anderson & Phelps, 2002). Rather, amygdala damage impairs attention to certain kinds of emotional information or the processing of information related to emotions (Whalen, 1998). For example, when words are flashed briefly on a screen under conditions that make them difficult to read, most people report seeing more of the emotionally loaded words (such as RAPE) than neutral words (such as RAKE). People with amygdala damage see and remember as many of the neutral words as the emotional words (Anderson & Phelps, 2001).

Furthermore, the problem is not limited entirely to fear. People with amygdala damage also have difficulty recognizing expressions of anger, disgust, and surprise. Brain scan studies have found that when people look at photographs of facial expressions, the amygdala responds most strongly to fearful and unhappy faces, but it also responds somewhat to other faces, including happy faces



Insula (primary taste cortex)



**FIGURE 2.10** The insula (or insular cortex) is the primary area of the cortex for taste information and apparently also critical for the emotion of disgust.

(Hamann, Ely, Hoffman, & Kilts, 2002; Iidaka et al., 2001). Damage to the amygdala impairs the processing of information about reward as well as information about fear (Baxter & Murray, 2002). In short, the amygdala is not specifically a fear center.

Another emotion with possible neurological specificity is disgust. One study using brain scans found that when people looked at disgusting photos (such as mutilated bodies), they showed increased activity in a brain area called the anterior insular cortex (M. L. Phillips et al., 1997). That finding is especially interesting because this brain area is also critical for the sense of taste. (See Figure 2.10.) Disgust is literally bad-taste, and disgust is essentially a sense of wanting to spit something out. Damage to just the insular cortex is uncommon, but it does sometimes occur. Two patients with damage to the insular cortex could recognize expressions of other emotions but not disgust, either from facial expressions or retching sounds (Adolphs et al., 2003; Calder, Keane, Manes, Antoun, & Young, 2000). One of these patients heard a story about someone vomiting and then was asked how the person must have felt. He replied that the person would feel “hungry” and “delighted” (Adolphs et al., 2003). The other patient did describe a filthy toilet as disgusting, but it is possible to “know” that something is disgusting (because one has been told so) without actually feeling

the disgust. In short, disgust may indeed depend on the insular cortex.

Other emotional states have not been linked to any specific physiology, although so far no one has tried very hard. Future research may identify different physiologies for different emotions.

## ■ Alternatives to the “Basic Emotions” Approach

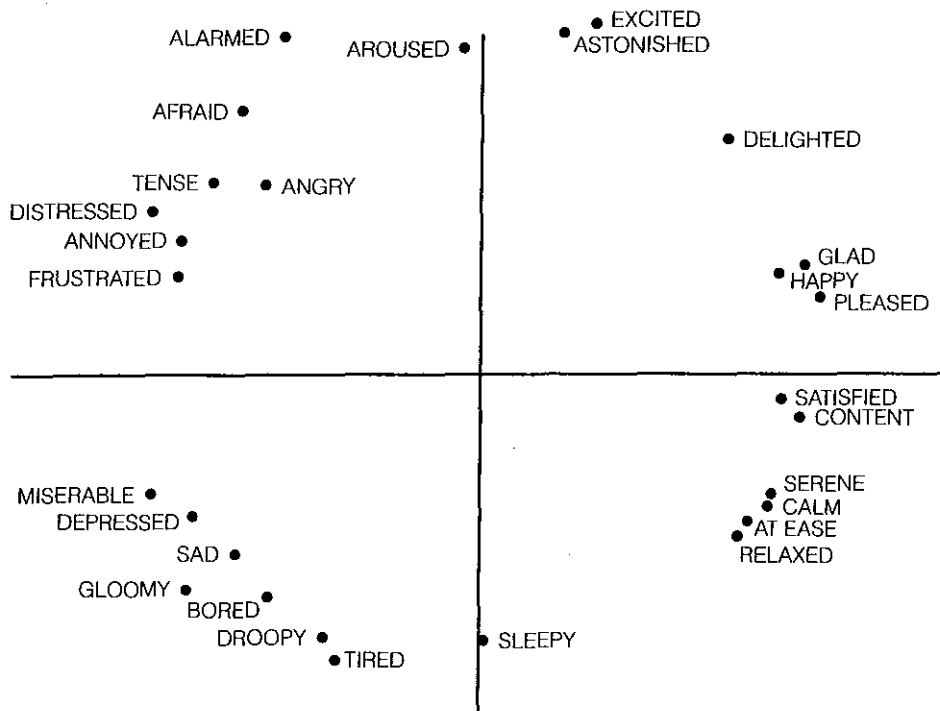
The case for “basic” or primary emotions is growing but hardly overwhelming. At the very least, we should consider alternatives. Several related theories describe emotions as points on a continuous plane, rather than a few discrete units; another theory describes emotion as compounds made up of even smaller units (analogous to protons, neutrons, and electrons). Let’s consider these views.

### Dimensional Approaches to Emotional Feelings

Instead of listing items separately, an alternative is to arrange them along dimensions. For example, if you were displaying diamonds at a store, you might arrange them in columns from largest to smallest and in rows from most to least sparkling. You could describe brightness in terms of a continuous dimension from white to dark.

Perhaps we could also describe emotions in some similar way, as positions along some small number of continuous dimensions (Russell, 1980, 1997, 2003). One way to derive these dimensions is to start with a theory. For example, we might propose that all emotional experiences vary along a continuum from pleasant to unpleasant or from approach to avoidance. Another way is to collect results and then analyze them with a method called multidimensional scaling that allows us to see what dimensions emerge from peoples’ ratings of their experience.

Without discussing the mathematics of multidimensional scaling, let’s illustrate the idea with an



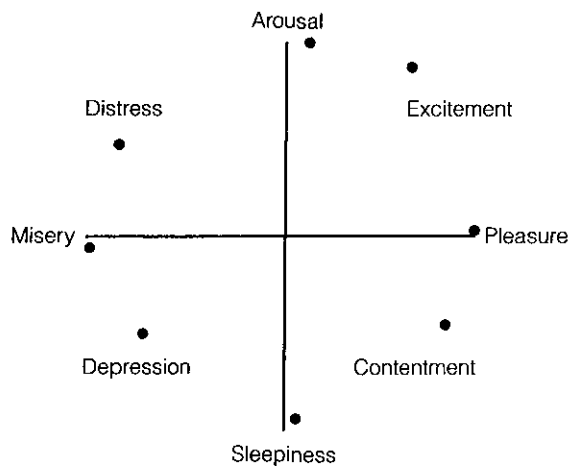
**FIGURE 2.11** The terms that people rated as similar to each other appear close together, whereas those rated as dissimilar appear far apart. Source: From “A Circumplex Model of an Affect” by James A. Russell in *Journal of Personality and Social Psychology*, 39, pp. 1161–1178. © 1980 American Psychological Association. Reprinted with permission from the author.

example. Consider color. Suppose we show people various pairs of colors and ask them to rate how similar or different they look. For example, someone might rate two shades of purple as very similar, purple and blue as somewhat similar, but purple and green as less similar. A mathematical model would therefore put the first two colors close together, the second pair intermediate, and the third pair far apart. After collecting ratings on many pairs of colors, we might present the results graphically, putting purple near blue, then bluish green, then green, and so forth.

Applying this approach to emotion, researchers offer people various emotion-related words and ask them to rate the degree of similarity among various pairs. Or they ask people to report how strong their emotions are at various moments and then note which pairs of emotions tend to occur together. For

example, when people report they are afraid, they usually also report they are tense, whereas they virtually never report being excited and bored at the same time. So *afraid* and *tense* should be represented close together, whereas *excited* and *bored* should be far apart.

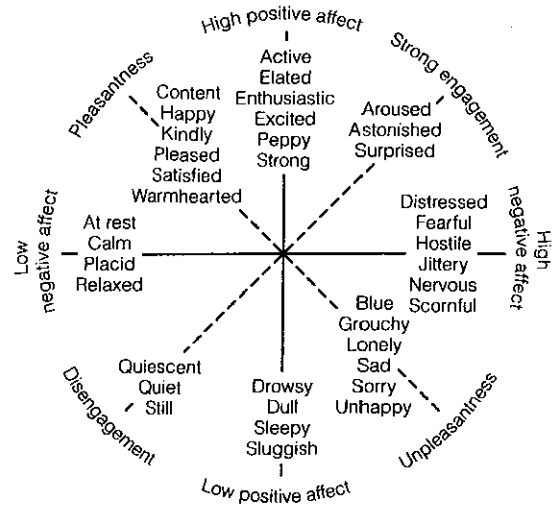
Using this method, Russell (1980) reported the arrangement of emotional terms shown in Figure 2.11. Studies in other countries, using other languages, have produced reasonably similar outcomes (Yik & Russell, 2003). From such results, James Russell proposed what he called a **circumplex model** (Figure 2.12), in which the emotions form a circle. Emotions close to each other on the circle are very similar and are likely to be confused with each other or experienced at the same time. Emotions on opposite sides of the circle are likely to be perceived as opposites or at least as very different. In this model,



**FIGURE 2.12** According to Russell's circumplex model of emotions, emotional experiences depend on two major dimensions, the degree of arousal and the degree of pleasure. Source: From "A Circumplex Model of an Affect" by James A. Russell in *Journal of Personality and Social Psychology*, 39, pp. 1161–1178. © 1980 American Psychological Association. Reprinted with permission from the author.

one major dimension ranges from arousal to lack of arousal (sleepiness), and the other ranges from pleasure to displeasure (or misery). Using this model, we can describe excitement as a combination of pleasure and arousal, contentment as a combination of pleasure and inactivity, and so forth.

Other researchers, starting from a different theoretical basis and using slightly different procedures, have proposed a somewhat different arrangement. Examine Watson and Tellegen's (1985) model in Figure 2.13. At first glance, this model looks much like Russell's circumplex model, but the dimensions are described in different terms. In Russell's model, you might feel neutral, but you could not feel strong positive emotion and strong negative emotion at the same time. Watson and Tellegen's model allows for this possibility. The vertical axis, called positive affect, asks how much positive emotion someone is feeling; the horizontal dimension, called negative affect, reflects distress (fear and hostility) versus lack of distress. However, "pos-



**FIGURE 2.13** In this model, the main dimensions are positive affect (arousal) and negative affect (fear and hostility). Source: From "Toward a Consensual Structure of Mood," by D. Watson and A. Tellegen, *Psychological Bulletin*, 98, pp. 219–235. © 1985 American Psychological Association. Reprinted by permission of D. Watson.

itive affect" in their sense is not the same as happiness; it is closer to the concept of arousal.

The most controversial point about this model is its claim that positive affect and negative affect are independent. (Their lines cross at a right angle.) Because of a variety of complicated measurement problems, different sets of researchers get different results on the relationship between positive affect and negative affect. Some find them to be nearly independent of each other, meaning that it should be possible to feel both positive and negative affect at the same time (Tellegen, Watson, & Clark, 1999; Watson, Clark, & Tellegen, 1984, 1988). Other researchers have found that positive and negative affect are polar opposites—you can only feel one or the other but not both (Remington, Fabrigar, & Visser, 2000; Russell, 1980). A few researchers have even found a positive correlation; that is, Negative Affect (fear/hostility) overlaps with Positive Affect in the sense of excitement (Green & Salovey, 1999). Still other researchers have found multiple kinds of

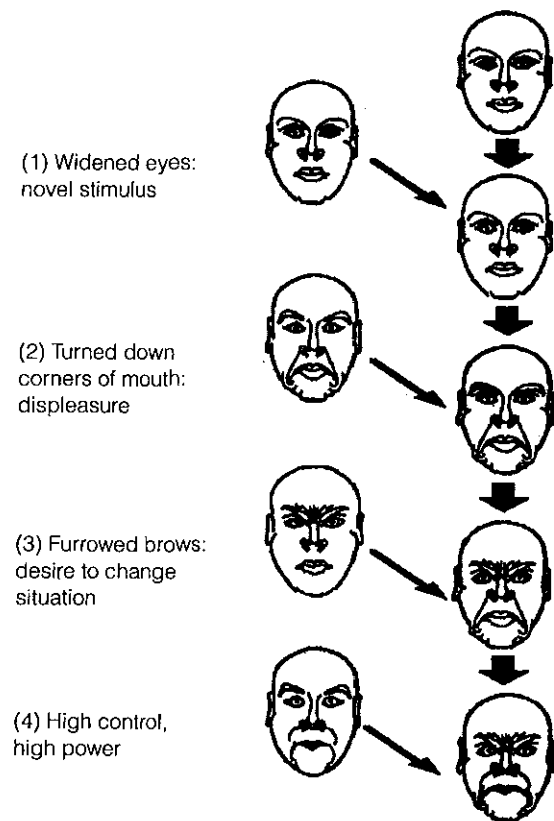
relationships between positive and negative affect. According to one study, positive and negative affect are opposites in most situations, but in a few bitter-sweet situations (such as graduating from college), people do feel a lot of both (Larsen, McGraw, & Cacioppo, 2001).

Let's not get too embroiled in that controversy. For the purposes of this discussion on classifying emotions, what's most important is what these different approaches have in common. Here are three major points of agreement among the theories that describe emotions as points on a few continuous dimensions:

1. It is possible to describe emotional experience in terms of a small number of dimensions, such as arousal and pleasantness, or positive and negative affect.
2. These models characterize the feeling aspect of emotions, not the cognitive aspect. Several emotions might *feel* nearly the same, even though we distinguish among them in other ways. For example, disgust, guilt, and embarrassment arise in different situations with different cognitions and different associated behaviors, but they might feel about equally unpleasant and produce about equal degrees of arousal.
3. Because these models describe only the feeling aspect of emotion, they are not necessarily an alternative to the idea of basic emotions. For example, someone could accept one of these models and nevertheless maintain that fear and anger are separate, primary emotions that happen to have very similar feelings. However, the dimensions models do contradict any theory that requires each basic emotion to have a distinct feeling.

### Emotions as Compounds of Underlying Processes

Another view unambiguously denies the existence of basic emotions. Recall from Chapter 1 the idea that it is possible to experience just parts of an emo-



**FIGURE 2.14** The expression we describe as anger could be a compound of several elements. Source: Reprinted from K. R. Scherer (1992), What does facial expression express? In K. T. Strongman (Ed.), *International Review of Studies on Emotion*, Vol. 2 (pp. 139–165). Chichester: Wiley.

tion—for example, cognition and feeling without action tendency, or feeling and action tendency without cognition. **Component Process Theory** takes this idea a step further, holding that what we typically consider to be an emotion consists of underlying, more elementary units. Consider, for example, the display of anger in the last face in Figure 2.14. Instead of calling this a single expression, we could analyze it as a combination of at least four components (Ortony & Turner, 1990; Scherer, 1992). First, the widened eyes could indicate that the

stimulus is novel or unexpected. This part of the anger expression is also a component of surprise and fear.

A second element is turning down the corners of the mouth. According to component process theorists, this expression indicates displeasure, which also occurs in sadness and disgust.

Third, the furrowed brows might indicate a desire to change the situation. People often furrow their brows when they are frustrated or concentrating, as well as when they're angry.

Fourth, the compressed lips are a sign that one feels powerful or in control.

In many cases of anger, though not particularly in Figure 2.14, angry people have compressed lips. Component process theorists of emotion have proposed that this is a sign that one feels powerful in the situation or in control. Compressed lips might be associated with determination as well. Recent research suggests that compressed lips are also part of the display of pride—another emotion that involves feelings of power and control (Shiota, Campos, & Keltner, 2003).

The key point is that what we call anger could be described as a compound of several components, each a reaction to a different aspect of the situation. A given situation might arouse just one or two of these units or all of them. When all occur, we recognize a clear example of anger, but “parts” of anger can arise without the full expression. For example, anger at your neighbor, anger at your dog, anger at your government, and anger at yourself differ in many ways and not just as a matter of degree. Furthermore, some of the components of anger could combine with other components to make different emotions, which we might describe as frustration, determination, surprise, and so forth. Similarly, we could describe fear as a compound of several components and describe any of the other emotions similarly.

The “component” approach to emotion may seem unfamiliar because we are in the habit of thinking about prototypical examples of fear or anger, where all the components are present. However, from a research standpoint, the component approach has

much potential. For example, instead of studying what causes “anger” in general, we could analyze the causes of different components: What causes the element of novelty? What leads to the feeling of displeasure? What influences the desire to change the situation? What controls the probability of threatening to strike? If different components of anger have different causes, we will understand them better by studying them separately.

## ■ Summary

At this point you should feel a little confused. “So, what is the answer? Are there basic emotions or not?”

Emotion researchers are far from agreement on this point, and as you can see, the evidence is inconclusive. We can identify a few emotions that have well-defined facial expressions with approximately the same meaning in all human cultures, so those expressions are evidently part of human nature and not something arbitrary or culture specific. However, they may or may not be the “basic” units out of which every other emotional experience is built.

If we do have a large number of distinct emotions, the differences among them may not be in the feelings they generate. Researchers have argued persuasively that emotional feelings can be described in terms of continuous dimensions such as arousal. So the feelings associated with one emotion may largely overlap those of another. The overlap is particularly strong for fear and anger.

An alternative to basic emotions is smaller behavioral components, such as those described for anger. This approach certainly deserves more research and consideration. Give the matter some thought. What kinds of additional evidence would be more decisive? If you had the opportunity, what research would you do? What would be convincing evidence that sadness and fear are biologically distinct, fundamental units of emotion?

In the meantime, however, psychologists continue to find it useful to use terms such as sadness, anger, and fear, at least until we have something better to take their place. Whether they are actually “basic” is undecided, but studying them separately is at

least a productive way to organize research. You might think of the basic-emotion idea as the dominant hypothesis or the working hypothesis, the one that guides most researchers until and unless they settle on a better hypothesis.

Emotion researchers often describe the “basic emotion” and “social construction” perspectives as though they were mutually exclusive. Surely, though, it is possible that emotional experience is determined partly by evolution and partly by culture. In this chapter, you have seen that cross-cultural studies are theoretically essential to establishing any conclusion about human nature. It may also be that ideas regarding the evolutionary functions of emotions can help us to understand differences in the ways cultures experience emotions. We shall return repeatedly to issues of how cultural influences combine with biology to influence our behavior and experience, and the role of culture in emotion is the focus of the next chapter.

## ■ Key Terms

**basic emotions:** emotions that are fundamentally distinct from one another, as chemical elements are from one another (p. 29)

**circumplex model:** theory that arranges the emotions to form a circle; emotions close to each other on the circle are very similar and are likely to be confused with each other or experienced at the same time (p. 44)

**Component Process Theory:** view that what we typically consider an emotion consists of underlying, more elementary units (p. 46)

## ■ Thought Questions

1. If people’s “basic” emotions are analogous to chemical elements, there must be “compound” emotions that combine two or more of the basics. If so, what would you propose as a “compound” emotion?
2. According to the “components” view, a situation can evoke certain emotional components

without evoking fear, anger, or any other identifiable emotion as a whole. Do you, and if so how often do you, recognize yourself as experiencing just one or two components or aspects of some emotion?

## ■ Suggestions for Research Projects

1. Here is an idea for a simple observational study: Watch people unobtrusively while they are eating, walking across campus, or engaged in other activities. How many people who are in groups are smiling or frowning? How many who are by themselves are smiling or frowning?
2. It would also be interesting to measure how long smiles and frowns typically last. Might the durations of the expressions relate to how long someone would want to advertise a happy, frightened, or aggressive tendency? (For example, a person might want to show anger for a longer time to make sure an opponent gets the message.)
3. To test people’s ability to recognize emotional displays across cultures, rent a film from a different culture, in a language you do not speak (preferably without subtitles). Then ask several people to watch it and record what emotion, if any, they detect at particular times. How closely do they agree? Does someone from that culture, who speaks the language, also agree?

## ■ Suggestion for Further Reading

Ekman, P., & Davidson, R. J. (1994). *The nature of emotion: Fundamental questions*. New York: Oxford University Press. In this book, the editors ask several fundamental questions about emotion—including questions about how to classify emotions—and many of the top emotion researchers in the world provide their answers.