

## CHAPTER 32

# Emotion, Biology, and Culture

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In this chapter we first review theories of emotion that are most relevant to a consideration of the roles of biology and culture. We then review the existing cross-cultural and cross-ethnic research relevant to these theories, with particular emphasis on studies that have actually measured biological responses that occur during emotional reactions. We conclude by presenting a revised version of our earlier biocultural model of emotion (Levenson, 2003) that allows for both biological and cultural influences, and that is informed by existing empirical data.

### EMOTION THEORY

Emotions are short-lived psychological-physiological phenomena that represent efficient modes of adaptation to changing environmental demands (Levenson, 1994). In humans, the emotion system is influenced by both biology (e.g., the availability of a facial musculature that can produce an array of appearance changes) and culture (e.g., the rules, traditions, and beliefs concerning how and when to use these muscles to reveal or conceal how we feel).

Emotion theorists have long struggled with how to account for both kinds of influence. In general, theories growing out of the evolutionary tradition embrace biological influences, viewing specific features of the emotion system as chosen by natural selection for their value in survival and reproduction. In contrast, theories growing out of the anthropological tradition embrace cultural influences, viewing emotion as created in ways that meet cultural traditions, beliefs, and values. Although most modern theories eschew extreme evolutionary and cultural construction positions, they differ greatly in terms of how they locate emotion between these poles.

### Evolutionary Theories

Darwin pioneered the evolutionary view of emotions in his book *The Expression of the Emotions in Man and Animals* (1872), portraying emotional expression as a hardwired, automatic response that is integrally tied to the nervous system. A large part of his research program was devoted to documenting the existence of emotional facial expressions and gestures that were common across cultures and

species—that is, to demonstrating the universality of emotional expression. Interestingly, despite recognizing the important communicative functions of emotional expression, he never focused on how individuals label their emotions. This likely reflected his commitment to a cross-species approach. Although not totally discounting the role of culture in emotion, Darwin did not afford it great importance.

### Physiological Theories

Near the turn of the century, two influential theories arose that emphasized the critical role that physiological responses played in emotion. James (1884) suggested that emotions derive from the body's patterned response to challenging situations (e.g., "I feel afraid because I am trembling"). This peripheralist view envisioned autonomic and somatic nervous system activity as antecedents rather than as consequences of emotion. Cannon (1927) took a different view, believing that emotions originate in the central nervous system, with the resulting emotional experience growing out of unconscious neurological activity. Although differing in their views as to the source of emotion and the role of conscious awareness, both approaches viewed physiological changes as primary determinants of emotion. Facial expressions were not explicitly considered by James or Cannon, and neither theory was very conducive to cultural influence.

Schachter and Singer (1962) proposed another physiologically based theory of emotion that was far more amenable to cultural influence. In their view, the physiological arousal associated with emotion is essentially undifferentiated. The individual perceives this arousal and labels it as a particular emotion based on a cognitive appraisal of the current situation. From this perspective, physiology is integral to emotion, but the appraisal process is key to determining the specific emotion that occurred. Although Schachter and Singer did not explore cultural influences in any depth, their appraisal process certainly allows for culturally determined variation in how the meaning of a given situation is understood.

### Social Construction Theories

In *Sex and Temperament in Three Primitive Societies* (1935), anthropologist Mead wrote: "We are forced to conclude that human nature

is almost unbelievably malleable, responding accurately and contrastingly to contrasting cultural conditions" (p. 289). This view represents one of the earliest social constructivist theories of emotion, envisioning emotions as arising from the dynamic interactions between individuals and cultures (Lutz & Abu-Lughod, 1990; Oatley, 1993; Saarni, 1993). To explicate this perspective, Oatley (1993) likens emotions to language:

Although there is no doubt a common basis for language in all human beings, each culture has its own vocabulary, its syntactic forms, its meanings, and its range of pragmatic effects. Comparably, it is argued, that each culture has patterns of emotions that are somewhat distinctive, that derive from social practices, and that convey meanings and effects to members of that culture. (p. 341)

In sharp contrast to the theories of Darwin, James, and Cannon, social constructivists locate the core of emotion outside of the human body and squarely within cultural processes. Although some theorists in this tradition acknowledge a few innate emotional responses, they still maintain that most aspects of emotion are socially constructed. Because cultural influences have their effect on emotion over time, social constructionists often adopt a developmental view of emotion, emphasizing that emotions are socialized from childhood on (e.g., Saarni, 1993).

### Lexical Theories

Lexical theorists highlight the role of language in emotion, believing that emotion is "created in, rather than shaped by, speech in the sense that it is postulated as an entity in language where its meaning to social actors is also elaborated" (Lutz & Abu-Lughod, 1990, p. 12). From this perspective, the essence of emotion lies in the ways that people label their subjective experience. For example, claims of universality for a given emotion would require it to have lexical equivalents in all natural languages:

If lists [of emotion terms] . . . are supposed to enumerate universal human emotions, how is it that these emotions are so neatly identified by means of English words? For example, Polish does not have a word corresponding exactly to the English word disgust. What if the psychologists working

on the "fundamental human emotions" happened to be native speakers of Polish rather than English? Would it still have occurred to them to include "disgust" on their list? (Wierzbicka, 1986, p. 584)

Lexical theorists raise important methodological caveats for emotion research. For example, to get around the problem of translation equivalents between languages, Wierzbicka (1986) has advocated using "language-independent semantic metalanguage" (e.g., replacing the term *fear* with "the experience that occurs when one thinks that something bad might happen to one"). Ascribing such a key role for language in emotion provides for profound cultural influence in the ways that emotions are labeled and experienced. Lexical theories have not envisioned a major role for biological factors such as facial expression.

### Appraisal Theories

Appraisal theories are based on the notion that emotions result from our conscious or unconscious cognitive evaluations of events and situations. Placing the emphasis on appraisal allows for cross-cultural and within-cultural variability in the evaluative process, without precluding some universality in biological features. In these models, subjective emotional experience is largely dependent on earlier evaluative processes: Physiological and facial reactions follow as a natural response to the felt emotion. Appraisal theories readily encompass cultural influences on emotion in terms of differences in the ways particular situations are appraised. As Scherer (2000) notes:

Component theorists share the social constructivists' insistence on the powerful role of sociocultural determinants of emotional experiences by assuming, for example, that cultural values can strongly affect appraisal, that the regulation of the emotion depends on norms and social context, and that the subjective experience reflects the sociocultural context. (p. 152)

At the same time, these theorists are often quite comfortable with indications that a particular biological aspect of emotion (e.g., physical sensations) shows consistency across cultures (Scherer & Wallbott, 1994).

### Biocultural Theories

A number of emotion theorists have attempted to integrate the roles of biology and culture, seeing both as significantly influencing emotion. In a summary of biocultural approaches to emotion, Hinton (1999) outlined four kinds of integrative theories: (1) biocultural synergy, (2) embodiment, (3) systems theory, and (4) local biology. Biocultural synergy theorists argue that biology and culture are mutually dependent and continually transform each other throughout the organism's lifetime (Changeux, 1985). Embodiment represents the commingling of physiological and mental processes, and asserts that emotion cannot be understood in isolation from the social context in which it occurs. Systems theory envisions emotions as comprising multiple components, including biology and culture, that work in parallel and are all necessary for understanding emotion. Local biology highlights the interplay between biology and culture over the lifetime of the organism and allows for the creation of new variations in the emotional system that arise from this codevelopment. At the core of these anthropologically based theories is an equal partnership between culture and biology. However, they are often articulated at a very broad level and do not specify precisely how culture and biology interact to produce the various aspects of emotion, such as facial expression, subjective experience, and peripheral physiological response. An exception to this is Ekman's "neurocultural" theory (Ekman & Friesen, 1969), which describes how emotional facial expression can have both universal features (e.g., facial configurations associated with particular emotions) and culture-specific features (e.g., "display rules" concerning when these facial configurations are shown or hidden). At the end of this chapter, we present an elaboration of our own biocultural model of emotion (Levenson, 2003), which encompasses multiple aspects of emotion and allows for different "mixtures" of biological and cultural influences.

### Summary

Emotion theories run the gamut from those that view emotion as purely biological to those that envision pure cultural construction. Many theories, especially the more contemporary

ones, fall between these extremes, proposing different mixtures of biological and cultural influences, different ways that these two forces interact, and different implications for the nature of emotion.

### EMPIRICAL STUDIES

In this section, we examine the empirical evidence relevant to the question of whether emotions manifest themselves differently across cultures, concentrating on two biological systems prominent in emotion: facial expression and peripheral physiology. The focus of this review is on studies of emotion *production* (in which emotions are stimulated in some way and responses in these two biological systems are measured). We mention only in passing the literature on cultural influences on emotion *recognition* (in which subjects typically are asked to identify the emotion portrayed in photographs; see Elfenbein & Ambady, 2002, for a review) and on emotion-related *psychopathologies* (e.g., Pole, Best, Metzler, & Marmar, 2005; Tsai, Pole, Levenson, & Muñoz, 2003). This distinction among emotion production, emotion recognition, and emotion pathology reflects our view that these are quite different processes and are likely influenced by culture in different ways. Of the three processes, emotion production is arguably the most elemental stage upon which the intricate dance between biology and culture is performed.

### Facial Expression

Given the apparent differences in facial features between ethnocultural groups, one might wonder whether their facial expressions of emotions also differ. Darwin (1872) was one of the first to examine whether facial expressions of emotions were culturally invariant. Surveying former British residents living in approximately 40 regions of the world, he found that the expressions of what are often referred to as "basic" emotions (e.g., anger, disgust, fear, happiness, sadness, surprise) were observed in all. Although his methods were crude by modern standards, this work set the stage for future studies using improved methodologies. These subsequent studies also found evidence that the basic emotions are associated with similar facial expressions in different

ethnocultural groups. For example, Ekman (reviewed in 1982) presented members of a preliterate culture in New Guinea with situations thought to elicit anger, disgust, fear, happiness, sadness, and surprise, and asked them to display the appropriate facial expression. Videotapes of these expressions were later shown to American college students, who correctly identified the emotions displayed by the New Guineans. This result suggests that facial expressions associated with these emotions are sufficiently similar in these two cultures to allow for "translation" and "backtranslation." Although there has been a great deal of controversy over how definitive the evidence is for the universality of the *recognition* of emotional facial expression (Ekman, 1994; Russell, 1994), there is certainly no consistent evidence suggesting that some cultures rewrite the basic mapping between facial expression and emotion (e.g., cultures in which happiness is associated with lowered rather than raised lip corners).

Cultural differences have been found in the *amount* and *type* of emotion shown in response to a given elicitor. Comparing two cultures, Tsai and Chentsova-Dutton (2003) found that European Americans of Scandinavian descent showed less emotional facial behavior (especially during happiness and love memories) than those of Irish descent. These findings were interpreted as reflecting the cultural traditions of emotional control in Scandinavian culture and of emotional expression in Irish culture. However, not all studies have found cultural differences. Tsai, Levenson, and Carstensen (2000) found no differences in emotional facial expressions of young and elderly Chinese American and European American participants in response to film clips designed to elicit amusement or sadness.

Comparing acculturation levels in Chinese Americans and Mexican Americans, Soto, Levenson, and Ebling (2005) found that emotional facial behavior in response to an aversive, acoustical startle stimulus mirrored ethnographic norms to the extent that participants identified strongly with their culture of origin. Specifically, they found less negative emotional expression in Chinese Americans most identified with Chinese culture (which emphasizes emotion moderation) and more negative emotional expression in Mexican Americans most identified with Mexican cul-

ture (which emphasizes emotion expression). Similarly, Tsai, Chentsova-Dutton, Freire-Bebeau, and Przymus (2002) found that Hmong Americans who were most strongly identified with Hmong culture (which emphasizes emotion moderation) showed fewer "non-Duchenne" smiles while reliving happy and proud experiences than those who were less identified with Hmong culture.

Cultural differences have also been found in the extent to which emotional facial expressions can be produced voluntarily. Levenson, Ekman, Heider, and Friesen (1992) studied voluntary facial expressions in the Minangkabau of West Sumatra (a matrilineal, Muslim culture that views emotion as interpersonally situated). Levenson et al. used a directed facial action task in which participants were given muscle-by-muscle instructions to construct prototypical emotional facial expressions without mentioning the name of the target emotion. Results revealed that Minangkabau produced lower quality expressions of fear, happiness, and sadness compared to European American controls.

Emotional facial expressions are also sensitive to cultural "display rules," which can be triggered by cues, including the presence of other members of the culture. In a classic study, Ekman and Friesen (1969; Friesen, 1972) compared emotional facial expressions of American and Japanese students watching a stressful movie. The two groups did not differ in their facial expressions when watching the films. However, when later interviewed about their emotional responses by a Japanese experimenter, Japanese participants exhibited more positive emotion than their American counterparts. The authors concluded that Japanese participants masked their negative emotions in compliance with their culture's prohibitions against displaying negative emotions in social settings. More recently, Vrana and Rollock (1998) compared African American and European American subjects as they encountered confederates of both races. They found that both groups showed more positive facial expressions during the first few seconds of an encounter with a confederate of their own ethnic background, but subsequently showed greater positive facial expressions with confederates of the other ethnic background. This could reflect an initial spontaneous positive emotional response to encountering a person of one's own ethnic group, followed by a socially prescribed positive emotional display that might indicate

cooperativeness with an ethnic outgroup member.

Cultural ingroup-outgroup influences on facial expression do not require that the other person be physically present. Roberts and Levenson (2006) found that European American, Chinese American, Mexican American, and African American participants did not differ overall in the amount of emotional facial behavior they displayed when watching emotion-eliciting film clips. However, when ethnic match between the participants and the characters in the films was considered, Chinese American and African American participants displayed more facial expressions of amusement while watching amusing films featuring their own ethnic group than those featuring the other ethnic groups. Vanman, Paul, Ito, and Miller (1997) found that European American college students showed more facial muscle activity consistent with positive emotion when they imagined working with other European Americans than with African Americans. Finally, Vrana and Rollock (2002) found that African American and European American subjects showed more emotional facial responses when imagining interaction with an African American compared to a European American.

### Summary

For the "basic" emotions, we are aware of no convincing demonstration of consistent cultural differences in the particular assembly of facial muscles contracted when a given emotion is elicited. This biologically based part of the emotion system appears to be universal. Of course, subtle differences between cultures in the appearance changes that accompany these contractions are quite possible, reflecting differences in facial morphology. Cultural differences are found, however, in the amount and type of emotional expressions that occur in response to emotion elicitors. These differences often reflect cultural norms concerning emotional expression, especially in those individuals most strongly identified with that culture. In addition, the presence of a member of a culture (in person, imagined, or depicted) can result in modulation of emotional expression in culturally consistent ways. Thus, the existing research clearly indicates that the production of emotional facial behavior is influenced by both biology and culture.

### Peripheral Physiology

Peripheral nervous system activity, most notably in the autonomic nervous system, plays an important role in many emotion theories, contributing to the subjective experience of emotion, alerting the organism to significant encounters, and preparing the body for action (Levenson, 2003). As with emotional facial expression, there are several fundamental issues about the influence of culture on what is basically a biological system. First, there is the question of cultural differences in the mapping of particular features of the autonomic response onto particular emotions (e.g., are there cultures in which people's blood pressures fall and their faces blanch when they become angry?). Second, there is the question of whether cultures differ in terms of the intensity of the autonomic response overall and/or of the separate organ systems (e.g., do cultures differ in the ratio of cardiac to electrodermal activation in anger?). Despite the fundamental importance of these questions, relatively few studies of cultural influences on emotion have directly measured physiological responses during emotion production. Instead, studies have assessed subjective reports of physiological responses (e.g., beliefs about what is happening in the body), cultural differences in resting or baseline physiological levels (i.e., not measured during emotion production), and physiological reactions to stressful situations (in which a specific emotional response is not identified). These kinds of studies are reviewed below. Also important, but not directly relevant to our focus in this section, are studies of the extent to which individuals in cultures somatize emotions (e.g., Heelas, 1986; Shweder, 1993) and emotional distress (e.g., Kleinman, 1977; Pole et al., 2005).

### Subjective Reports of Physiological Response

Subjective reports of physiological responses are not proxies for actual physiological measurement. Research on visceral perceptions has shown that our estimates of physiological activity are often not very accurate (Katkin, Blascovich, & Goldband, 1981; Pennebaker, 1982). Nonetheless, visceral perceptions clearly exist, influence the way we talk about our emotions (Lakoff, 1987), and assume an important role in many emotion theories (Damasio, 1998; James, 1884; Levenson, 2003; Schachter & Singer, 1962).

Wallbott and Scherer (1988) surveyed respondents in 27 countries about the physiological experiences (e.g., relaxed muscles, feeling warm) they associated with anger, fear, guilt, joy, sadness and shame. They found that the amount of variance in subjective physiological responses due to the specific emotion was larger than that due to country, concluding that different cultures have similar subjective appraisals of emotion-related physiology. Other studies, however, have identified differences between cultural groups. Scherer, Wallbott, and Summerfield (1986) asked respondents from Northern and Southern Europe to indicate what bodily responses they experienced during specific emotional states (anger, fear, happiness, and sadness). Each emotion was accompanied by distinguishable bodily signs; however, sadness elicited different responses from Northern and Southern Europeans. Scherer, Wallbott, Matsumoto, and Kudoh (1988) repeated the study in a sample of U.S. and Japanese students. They found that U.S. students reported physiological states similar to those reported by European respondents in the earlier study; however, Japanese respondents reported far fewer physiological reactions. Probably the most dramatic findings of cultural variation measured by subjective physiological responses were reported by Hupka, Zbigniew, Jurgen, and Reidl (1996). Students in Mexico, Russia, Poland, Germany, and the United States rated the extent to which they felt anger, fear, jealousy, and envy in specific parts of their bodies (e.g., bones, heart). Findings suggested several cross-cultural similarities (e.g., respondents from all nations reported feeling envy and jealousy in the breath, chest, and heart) and a number of differences (e.g., only respondents from the United States reported feeling envy and jealousy in their eyes, face, stomach, and tears). Given that physiology was not directly measured in this paradigm, the authors interpreted their findings as most likely reflecting cultural stereotypes and emotion metaphors.

### Resting or Baseline Physiological Levels

A number of studies have examined cultural differences in physiological states measured in the *absence* of any specific, emotion-eliciting stimuli. Depending on the research tradition, measures obtained in this manner can be described as "tonic" (vs. "phasic"), "trait" (vs.



"state"), or "resting" (vs. "reactive"). Most of these studies have compared African Americans and European Americans, in an attempt to understand the high incidence of essential hypertension (i.e., chronic high blood pressure of unknown etiology) in African Americans (Akinkube, 1985). Findings suggest that African Americans begin life with faster resting heart rates than their European American counterparts (Lee, Rosner, Gould, Lowe, & Kass, 1976; Schachter, Kerr, Wimberly, & Lachin, 1974; Schachter, Lachin, Kerr, Wimberly, & Ratey, 1976) but achieve similar heart rates to European Americans by adolescence (Schachter, Kuller, & Perfetti, 1984; Shekelle, Liu, Raynor, & Miller, 1978; Voors, Webber, & Berenson, 1982) and that this equivalency continues into older age (Persky, Dyer, Stamler, Shekelle, & Schoenberger, 1979). In addition, compared to European Americans, African Americans have been found to have lower resting skin conductance levels (L. C. Johnson & Corah, 1963; L. C. Johnson & Landon, 1965; Juniper & Dykman, 1967; Korol, Bergfield, & McLaughlin, 1975; Liebllich, Kugelmass, & Ben-Shakhar, 1973; Morell et al., 1988) and higher resting blood pressure levels (Levinson et al., 1985; Morell et al., 1988; Roberts & Rowlands, 1981). The reasons for these differences are not fully understood. For example, differences in skin conductance have been attributed to darker skin pigmentation and differences in the number of active sweat glands (Boucsein, 1992). However, these assertions have not always been supported empirically (L. C. Johnson & Landon, 1965; Korol et al., 1975).

Ethnocultural differences in resting physiological levels are not readily interpreted in terms of emotions but may reflect more enduring factors such as mood, styles of emotion regulation, and sensitivity to contextual cues. Brownley, Light, and Anderson (1996) found that high hostility levels were associated with higher blood pressure in European Americans, but lower blood pressure in African Americans. E. H. Johnson (1989) found that African American adolescents suppressed anger more frequently and had higher blood pressure than their European American counterparts. Lazarus, Tomita, Opton, and Kodoma (1966) found that Japanese participants showed higher skin conductance levels than U.S. participants, despite reporting similar levels of distress. Closer analysis of the

skin conductance data revealed that the higher skin conductance levels in the Japanese participants occurred throughout the experiment, and not just in response to the film stimuli, arguably reflecting their greater concern about the experimental situation.

### *Stressful Situations*

In these studies, cultural groups are exposed to challenging situations. The situations are generically stressful; thus, it is difficult to know exactly which emotion(s) are being produced. Because emotion is not the primary focus of these studies, researchers typically do not query subjects about their emotional experience or measure emotional expressive behavior. As in the previous section on resting levels, the majority of these studies have compared African Americans and European Americans. Anderson, Lane, Muranaka, Williams, and Houseworth (1988) found African Americans to have greater increases in blood pressure and forearm vascular resistance, but no differences in heart rate reactivity in response to a cold stressor (ice pack applied to forehead) compared to European Americans. Alpert et al. (1981) found African Americans to have higher blood pressure reactivity than European Americans to an exercise stressor, but found no ethnic differences in heart rate reactivity. Hohn et al. (1983) found that among participants with a family history of hypertension, African American children had larger blood pressure responses than European American children to an exercise stressor. Murphy, Alpert, Moes, and Simes (1986) found that African American children had greater blood pressure reactivity than European American children to a video game. Finally, Jackson, Treiber, Turner, Davis, and Strong (1999) found that African Americans showed greater reactivity in systolic and diastolic blood pressure to a range of physical and psychological stressors, but European Americans showed greater reactivity in heart rate. Consistent with these findings, this literature is often summarized as indicating that African Americans have greater cardiovascular reactivity to stress than do European Americans. However, it is important to note the sizable number of contrary results (e.g., Anderson et al., 1988; Anderson, Lane, Taguchi, & Williams, 1989; Delehanty, Dimsdale, & Mills, 1991; Falkner & Kushner, 1989; Morell et al., 1988; Saab et al., 1997).

### *Emotion Production*

Studies in which the influence of culture is assessed by physiological responses measured directly during emotion production are critical for understanding the interplay between culture and biology. The simplest emotional stimulus for which cultural differences have been studied in this way is the acoustic startle. Although the initial response to the startle (i.e., in approximately the first 500 milliseconds) is arguably more a reflexive defensive reaction than an emotion, it is often followed by a rich emotional response (Ekman, Friesen, & Simons, 1985). Korol et al. (1975) found that African Americans had smaller skin conductance responses to an acoustical startle than did European Americans, a finding they interpreted as related to the lower resting skin conductance levels commonly found among individuals with darker skin. Soto et al. (2005) found no physiological differences in responses to an acoustical startle between Mexican Americans and Chinese Americans. When King and Levenson (2004) expanded this study to include African Americans and European Americans, they also found no ethnic group differences in physiological response.

Studies of prejudice (see Guglielmi, 1999, for a review) often examine the emotional reaction of a person from one race to encountering someone from another race. Rankin and Campbell (1955) found that European American males had larger skin conductance responses when interacting with African American than did their European American confederates. Vrana and Rollock (1998) found that African American and European American males had larger increases in heart rate when encountering African American confederates compared to European American confederates.

Social interaction between partners in committed, intimate relationships is an extremely rich source of emotion (Gottman & Levenson, 1986). Tsai and Levenson (1997) examined physiological responses of Chinese American and European American couples in committed dating relationships as they engaged in a 15-minute discussion of an area of relationship conflict. Levels of physiological arousal provoked by the conflict did not differ between the two ethnic groups.

Only a handful of studies of cultural influences in emotion have directly measured physiology in response to well-defined stimuli de-

signed to elicit specific emotions. All of the studies on emotional facial expressions from our laboratory and from the Tsai laboratory, reviewed in an earlier section, also included an extensive set of autonomic measures (typically including measures of cardiovascular, electrodermal, respiratory, and somatic activity), and most found no significant cultural differences in measures of peripheral physiological response. Levenson et al. (1992) found that physiological responses to emotional facial configurations using the directed facial action task were the same in Minangkabau participants living in West Sumatra and in European American controls. Tsai et al. (2000) found no differences in physiological response to sad and amusing films in Chinese American and European American participants. Roberts and Levenson (2006) found no overall differences in the physiological responses of African American, Chinese American, European American, and Mexican American participants in response to amusing, disgusting, and sad films. Tsai et al. (2003) found no ethnic differences in physiological response to imagined emotional scenarios in Scandinavian Americans and Irish Americans.

There are two exceptions to this general trend of no cultural differences. Tsai et al. (2002) found that Hmong Americans had smaller skin conductance responses than their European American counterparts while reliving a "love" memory. Vrana and Rollock (2002) found that African Americans had larger blood pressure responses than European Americans when imagining emotional scenarios.

### *Summary*

The literature on cultural influences on peripheral physiological response suggests that culture may have an influence on subjective reports of physiological response, resting physiological levels, and physiological responses to generalized stress. However, in the realm of directly measured physiological response to well-defined emotional stimuli, the impact of culture appears to be relatively minimal. Nonetheless, within this scant literature, with contributions by only a few laboratories, caveats abound. Still, it does seem to be the case that for the two biological systems being considered in this review, cultural influence on peripheral physiological response is less pro-

found that that on facial expression. This notion that cultural "penetrance" or influence varies for different aspects of emotion plays a central role in the theoretical formulation presented in the next section.

### TOWARD AN EMPIRICALLY INFORMED BIOCULTURAL THEORY

One failing of most theories of emotion that have considered cultural influences is that they have treated emotion as a monolith. Thus, culture is viewed as having an effect on emotion in its entirety rather than as having more variable levels of influence depending on features of the emotion, context, and person. Viewed in this more differentiated way, cultural influences may vary for aspects of emotion (e.g., subjective experience, language, expressive behavior, peripheral physiology), type of emotion (e.g., negative emotion, positive emotion, self-conscious emotion), context (e.g., presence of culturally salient cues), and the individual (e.g., extent of identification with cultural traditions). As the body of cross-cultural and cross-ethnic empirical research on emotion has increased, it has become increasingly clear to us that the impact of culture on emotion is anything but uniform.

#### Components of Emotion: Differential Susceptibility to Cultural Influence

Although this chapter focuses on the impact of culture on two biological systems, facial expression and peripheral physiology, a number of studies from our laboratory and others have examined self-reported subjective emotional experience as well. Upon examination of this work in its entirety, a clear pattern emerges: (1) Self-reported subjective emotional experience is *highly* susceptible to cultural influence—often mirroring ethnographic descriptions of cultural values and mores; (2) emotional expressive behavior is *somewhat* susceptible to cultural influence; and (3) autonomic nervous system response is *minimally* susceptible to cultural influence.

The cultural malleability of self-reported emotional experience is dramatically demonstrated in our work with the directed facial action task conducted in West Sumatra with the Minangkabau (Levenson et al., 1992). When Minangkabau and European American con-

trols produced emotional facial configurations, they activated the same patterns of autonomic nervous system activity. However, the Minangkabau were *much* less likely than European Americans to report feeling the associated emotion. Even after taking into account cultural differences in the ability to produce the facial configurations, this difference in self-reported subjective experience remained. Moreover, our careful translation-backtranslation work and testing of how emotion terms were used with other emotion-eliciting tasks (not reported in the published work) indicated that translation inequivalencies were not responsible for this finding. Thus, we found members of two different cultures could produce the same emotional configurations on their faces and have the same attendant autonomic nervous system activity but report very different subjective emotional states. Our speculation as to the basis of this difference was that emotion is viewed as more of an internal state in European American culture, and as more of an interpersonal condition in Minangkabau culture. Thus, a situation in which facial and physiological aspects were activated (along with the attendant somatic and visceral sensations) would be sufficient for labeling the state as "emotion" for European Americans, but not for Minangkabau, for whom it lacked the appropriate interpersonal grounding.

The previously described research by Soto et al. (2005) also illustrates this pattern using a more "conventional" emotional elicitor. In this study, Chinese Americans reported experiencing significantly less emotion than did Mexican Americans in response to an aversive acoustical startle stimulus. This is consistent with ethnographic descriptions of Chinese culture as a culture of emotional moderation and of Mexican culture as a culture of emotional expression. However, in the realm of emotional behavior, evidence for greater emotional expression in Mexican Americans than in Chinese Americans was only found when participants who most strongly identified with their culture of origin were compared. Physiological differences among the groups were minimal. Why would this differential susceptibility to cultural influence exist? We believe it primarily reflects the extent to which these different aspects of the emotional response are amenable to voluntary control and, to some extent, the social visibility of those components.

#### Self-Reported Emotional Experience

We do not view the ways we label our emotional states as being predetermined by biological "hardwiring," but rather as quite malleable, reflecting factors such as situational cues, visceral sensations, cultural values and mores, and "feeling rules" (Hochschild, 1979). In most situations we are able to exert a great deal of voluntary control over what we *say* we are feeling. These emotion labels are highly socially visible events; thus, there is a strong incentive to modulate this aspect of our emotional response in culturally sanctioned ways. Arguably, when emotions are extremely intense, or when we are dealing with immediate utterances rather than retrospective reports, this modulation becomes more difficult.

#### Emotional Facial Expressions

We believe that the set of facial muscles that contracts for particular "basic" emotions such as anger, disgust, fear, happiness, sadness, and surprise is determined by hardwired, involuntary neural circuitry. However, the innervation of the facial muscles is such that voluntary pathways can, under some conditions, alter and override these expressions (Rinn, 1984). For example, in a series of emotional suppression studies, we found that participants can dramatically decrease and increase the amount of facial behavior produced by emotion-eliciting films and acoustic startle stimuli (Gross & Levenson, 1993; Hagemann, Levenson, & Gross, 2006; Kunzmann, Kupperbusch, & Levenson, 2005). Thus, in theory, people should be able to comply with cultural "display rules." However, the empirical evidence suggests that modulation of facial displays in culturally proscribed ways is *much less* likely to be observed than modulation of self-reported emotional experience. It is important to note that despite the huge theoretical impact the display rule notion has had on the field of emotion research, empirical tests have been quite limited. The original research on display rules (Friesen, 1972) did not find cultural difference when participants viewed films, only when they discussed them afterwards. In more contemporary studies with bicultural participants, cultural differences have often been limited to those participants with the strongest identification with their culture of origin (Soto et al., 2005; Tsai et al.,

2002). Facial expressions are clearly socially visible; nonetheless, the importance of controlling them may be lessened by several factors. For example, although people have proved to be quite good at identifying the emotional meaning of static photographs of high-intensity expressions, they may be less accurate at identifying the emotional meaning of low-intensity and brief facial expressions (Ambadar, Schooler, & Cohn, 2005). In addition, cultural conventions may place limits on attending to and labeling the facial expressions of others (e.g., Goffman, 1971). These inaccuracies, coupled with culturally proscribed neglect, may make it relatively "safer" to allow true feelings to show on the face.

#### Autonomic Nervous System Response

The autonomic nervous system is designed to function automatically and in general is not subject to direct voluntary control (Levenson, 1979). Although a great deal of autonomic activity is socially invisible (e.g., regulation of core temperature), the autonomic nervous system is also responsible for producing a number of highly visible, emotionally relevant appearance changes (e.g., blushing, blanching; for a comprehensive listing, see Levenson, 2003). Thus, there clearly are good reasons to try to modulate autonomic activity to conform to social norms. Nature, however, has wisely *not* provided us with the tools to override easily the essential biological functions the autonomic nervous system serves. Consistent with this, in our own work, we have found few physiological differences between cultural groups relative to those found in emotional facial expression and self-reported emotional experience. Several caveats, however, must accompany this observation. First, interpretations of failure to find differences between cultural groups must be tempered by considerations of sample size/power and the impossibility of proving null hypotheses. Second, when cultural groups appraise the eliciting situation in ways that result in different emotional states, we would expect physiological differences consistent with those states to occur (e.g., when an epithet caused Southerners to feel insulted but had little effect on Northerners, Southerners showed a larger endocrine response; Cohen, Nisbett, Bowdle, & Schwarz, 1996). These caveats notwithstanding, the lack of consistent findings of cultural differences in autonomic activity is impressive.

### A Revised Biocultural Model of Emotion

The growing body of empirical data on cultural influences on emotion reviewed in this chapter suggests several revisions to our original biocultural model of emotion (Levenson, 2003). In the revised model, presented in Figure 32.1, a core system (inside the large rectangle) continuously scans incoming information in search of patterns that match one of a limited set of configurations that match prototypical challenges and opportunities (e.g., loss of support, presence of attachment object). When a match occurs, a hardwired organized set of response tendencies (i.e., an emotion) is activated. This set of response tendencies has been selected by evolution for having the highest probability of dealing successfully with that kind of situation most of the time. For simplicity, in this version, we have omitted some of the additional response systems that are recruited (e.g., perception, attention, purposeful behavior, vocalization, gross motor activity, gating of higher mental processes—see Levenson, 1999, for a more complete set). The different patterns of activation of these systems, especially the visceral and somatic sensations and proprioceptive feedback, contribute to the subjective

experience of different emotions. All of this occurs automatically, without conscious intervention. As such, it does not allow for a great deal of learned cultural influence.

In humans, the core system is encapsulated by a control system (outside the large rectangle) that influences both the input to and output from the core system. On the input side, an appraisal system can alter the extent to which an event matches a prototype, thus influencing whether an emotion is elicited by a particular event, and if so, which emotion. For example, a sudden loss of support experienced during a roller-coaster ride may be appraised in a way that makes it less life threatening; thus, it is less likely to produce fear and more likely to produce amusement or excitement. On the output side, another part of the control system alters the likelihood that a response tendency activated in the core will lead to its usual, observable response (e.g., whether a tendency to show a facial expression of disgust when viewing a decaying body results in an observable disgust expression or a neutral face; whether a particular configuration of visceral sensations is labeled as disgust or not). It should be noted that the control system can both increase and decrease the likelihood of a given event resulting

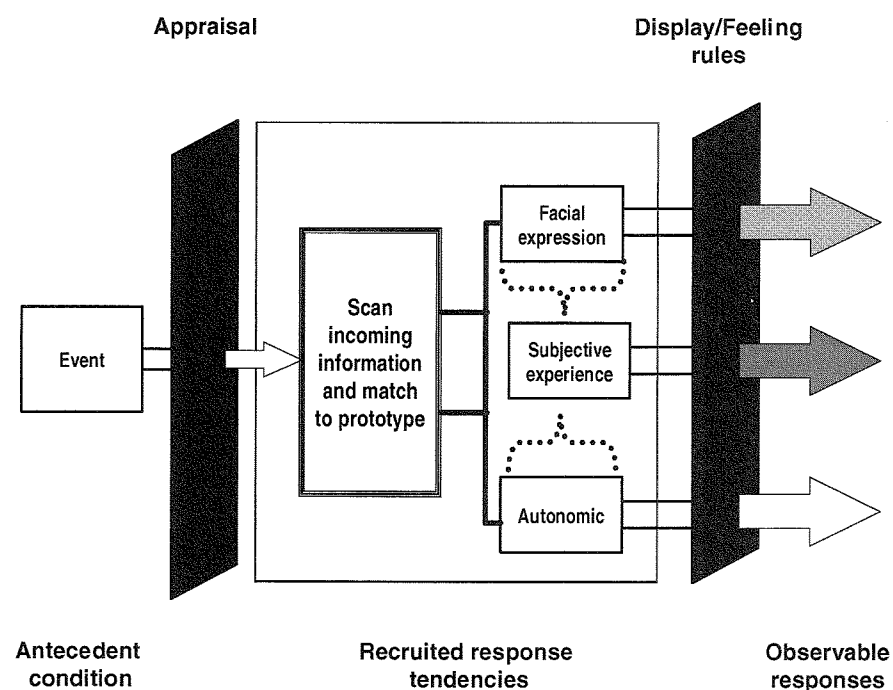


FIGURE 32.1. Revised biocultural model of emotion.

in an emotion and its typical, associated responses. Cultural influences on emotion occur in both aspects of the control system, in the ways that the world is appraised (e.g., what is dangerous, what is safe) and in the extent to which emotional response tendencies are expressed (e.g., conventions and values concerning emotional expression and experience, such as display rules and feeling rules).

In this revised model (Figure 32.1) the differential susceptibility of emotion response systems to cultural influence is depicted in the shading of the observable responses—with darker arrows indicating greater cultural influence. Thus, autonomic response tendencies pass through the control system relatively unin-

fluenced, facial expression tendencies are somewhat influenced, and self-reports of subjective emotional experience are highly susceptible to cultural conventions.

### Modulating Cultural Influence

We believe that the extent of influence culture has on the various components of emotion is not fixed, but rather is modulated dynamically by a number of features of the emotion, context, and person. We present our ideas about modulators in Table 32.1 below along with empirical support where available. Should these hypotheses about the modulating influences of culture prove to be correct, they will indicate

TABLE 32.1. Moderators of Cultural Influence on Emotion

Modulator	Greater cultural influence on emotion associated with	Rationale
Acculturation/stage of ethnic identity	Stronger immersion in and identification with cultural beliefs and mores about emotion	Familiarity with cultural norms and reinforcement history of rewards for conforming to these norms increases likelihood of future conformity (Soto et al., 2005; Tsai et al., 2002).
Intensity	Less intense emotion	Strong emotion "floods" system, making voluntary control more difficult.
Timing	More gradual onset of emotion	Rapid onset cuts off opportunity to reappraise situations and to "brace" against the natural expression of the emotion.
Match to prototypical elicitor	Antecedent condition more distal from a prototypical elicitor	Species-relevant prototypical elicitors (e.g., loss of support as prototypical fear elicitor in humans) have strong evolved hardwired circuitry that is extremely difficult to modulate. Antecedents that diverge from prototypes produce weaker response tendencies that are easier to override and alter.
Class of emotion	Emotions that are more self-referential than survival-oriented	Self-referential emotions (e.g., pride, shame, guilt) are more culturally constructed (Kitayama, Markus, & Matsumoto, 1995), more directly embody cultural norms, and have less strongly evolved hardwired circuitry than survival-oriented negative emotions (e.g., fear, anger). Positive emotions likely fall somewhere in between. Emotions, such as disgust, that have not only hardwired origins but also "moral" extensions (Rozin, Lowery, Imada, & Haidt, 1999) could provide particularly interesting tests.
Social context	Presence (real or imagined) of other members of ethnic group or cultural cues	Ethnic ingroup members and other culturally relevant symbols (language, food, etc.) can cue cultural norms, making them more salient and more likely to influence emotion (Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; N. A. Roberts & Levenson, in press; Vanman, Paul, Ito, & Miller, 1997; Vrana & Rollock, 2002).



important issues for researchers to consider and control for when attempting to evaluate, compare, and aggregate findings concerning cultural influences on emotion.

### FUTURE DIRECTIONS

Studying the influences that culture has on actual emotion production provides a rich and fertile direction for future research. Such research arguably provides the third essential leg of a modern empirical science of culture and emotion consisting of emotional ethnography (critical for hypothesis generation and interpretation of results); studies of emotion perception, understanding, and values (critical for understanding the ways that culture influences our thinking about emotion); and studies of emotion production (critical for discovering the influences of culture on different emotion systems as emotions unfold over time). Studies of culture and emotion production lend themselves readily to experimental designs in which cultural variables are carefully manipulated (e.g., presence of culture-salient cues) and their influence on emotional responding precisely measured. Because cultural influences on emotion production likely accumulate over time, longitudinal designs could be particularly useful in documenting how people become culturally competent in the emotional realm. Greater use of experimental and longitudinal designs in research on culture and emotion production could be quite helpful in moving this highly important area of inquiry more prominently into the scientific mainstream.

In the previous section, we suggested a number of possible modulators of the influence of culture on emotional responding, and provided some hypotheses about the nature of these modulating influences. These hypotheses are outgrowths of our notions about the nature of emotion and culture, and about their interactions. Of course, other theoretical starting points could lead to quite different predictions. What is important is that the portfolio of research on the influence of culture on emotion, which has traditionally had a strong investment in using descriptive and qualitative methods, and in measuring emotional judgments, should also have a strong investment in using experimental and quasi-experimental methods

to test falsifiable hypotheses and to explore causal, mediating, and moderating influences on actual emotion production.

### CONCLUSION

In this chapter we have reviewed the literature that has considered cultural influences on two of the primary biological systems in emotion—facial expression and peripheral physiological response. Many of these studies include self-report measures of emotional experience, and these data have also been considered. Although there have been a large number of studies of cultural influences on the ability to recognize the emotions being expressed by others, we have given primary consideration to studies of emotion production in which these biological systems have been directly measured during actual emotions. Based on this body of research, we conclude that cultural influences in emotion vary depending on which aspect of emotion is being considered, with the strongest influence on self-reported emotional experience, somewhat weaker influence on emotional facial expression, and relatively minimal influence on autonomic nervous system response. These findings led us to present a revision of our earlier biocultural model of emotion (Levenson, 2003) that now explicitly reflects varying cultural influence on different aspects of emotion. We have also articulated some testable, but admittedly speculative, hypotheses about characteristics of emotion, context, and person that modulate the extent of cultural influence. These modulatory influences extend our general conclusion that the influence of culture on emotion is neither monotonic nor constant, but rather is nuanced and variable.

We recognize that some of these conclusions are based on a relatively small number of studies that met our criteria for directly measuring biological response during actual emotional episodes. We hope that additional studies of this nature will enable us to test and refine these notions. It is important that studies of cultural influences on the biology of emotion be held to the same high standards of methodology necessary for any study of cultural influence. For example, sample selection criteria are particularly important when working with “domestic” samples to ensure that they are truly represen-

tative of the cultural traditions of interest. Bicultural college students are often quite capable of “code-switching” (i.e., shifting between their culture of origin and their adopted “mainstream” culture); thus, it is important to be sensitive to the extent that the laboratory environment is providing cues as to what behavior is “appropriate” (e.g., the ethnic match between experimenters and participants). Studies assessing multiple aspects of emotion present special analytical challenges in attempts to apportion cultural influences among the measured systems (e.g., is the found cultural influence on facial expression more or less than would be expected given the found cultural influence on peripheral physiology?). Moreover, researchers need to consider factors that could modulate the impact of culture on emotion (e.g., intensity of stimuli, type of emotion, acculturation level of participants) when attempting to aggregate findings across different studies.

Emotion provides an ideal stage for studying the interplay of culture and biology, nature and nurture, and contexts and individuals. We are still at a relatively early stage in the study of cultural influences on the biology of emotion. As this research area continues to mature, we expect the theoretical and practical yield for understanding culture, emotion, and their interaction to be considerable.

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## CHAPTER 33

# Culture and Psychopathology

## *Foundations, Issues, and Directions*

ANTHONY J. MARSELLA  
ANN MARIE YAMADA

Shall we write about the things  
not to be spoken of?  
Shall we divulge the things  
not to be divulged?  
Shall we pronounce the things  
not to be pronounced?  
—JULIAN THE APOSTATE (332–363 C.E.)  
*Hymn to the Mother of the Gods*

After decades of relative neglect and marginalization within psychiatry, the study of the relationship between culture and psychopathology has emerged as topic of considerable interest and influence. In 1994, under pressure from ethnic minority and international psychiatric professionals, the American Psychiatric Association included new sections in the fourth edition of *Diagnostic and Statistical Manual of*

*Mental Disorders* (DSM-IV) under the titles “Glossary of Culture-Bound Syndromes” and “Outline for the Cultural Formulation of Case.” Though these sections appeared at the very ends of the book (pp. 843–849), they nevertheless signaled a new era in psychiatry, in which cultural factors would now be given increased attention in our understanding of the etiology, expression, assessment, diagnosis, and