15 Culture and Emotional Expression

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The relationship between culture and emotional expressions has long fascinated scholars and laypersons alike. In this chapter I review the evidence concerning this relationship and describe recent studies from my laboratory that answer major gaps in this literature. This new evidence indicates that facial expressions are universally produced in real-life, naturalistic settings when emotions are elicited, and that they are are universally recognized. Other new evidence, also reviewed in this chapter, indicates that facial expressions of emotion are universally produced by congenitally blind individuals. Taken together, I believe that facial expressions of emotion are part of the response package of an evolved, biologically-based, core emotion system.

At the same time, there are many cultural differences in emotional expressions. They are produced via at least two mechanisms. The first is via cultural differences in norms of expression management and regulation as a function of social circumstances. These are known as display rules (Ekman & Friesen, 1969), which influence emotional expressions *once emotions are elicited*. This chapter reviews recent evidence from my laboratory involving a 30-country study of these rules and their implications for cultural differences in expression regulation.

The second way in which cultural differences in expressions occur involves cultural differences in the kinds of events that trigger emotions (and thus expressions) in the first place. I believe that one of the fundamental goals of enculturation is the calibration and adaptation of the universal, biologically-based, core emotion system to culturally available events, so that individuals learn to have appropriate emotional reactions to events in their cultures. Because different events occur in different cultures or have different meanings in different cultures, individuals learn to have different emotional reactions across cultures, thus producing different expressions.

Thus, the evidence suggests a theoretical perspective on facial expressions of emotion that involves a biologically-based, core emotion system with cultural influences on the front-end processing of emotions, via calibration and adaptation of the core emotion system to culturally available events, and cultural influences on the back-end processing of expressions through cultural display rules (Figure 15.1). The core emotion system, which humans are born with, serves as the central processor and is adapted for a multiplicity of uses within each culture. We begin our review of the literature supporting this view by examining evidence for the universal production of facial expressions of emotion.

EVIDENCE FOR THE UNIVERSAL PRODUCTION OF FACIAL EXPRESSIONS OF EMOTION

The study of emotional expressions across cultures has its roots in the work of Darwin (1872/1998), who claimed, in his principle of serviceable habits, that facial expressions are the residual actions of more complete behavioral responses. According to Darwin, all people, regardless of race or culture, possess the ability to express some emotions in exactly the same ways, primarily through their faces. Darwin wrote *The Expression of the Emotions in Man and Animals* to refute the claims of Sir Charles Bell, the leading facial anatomist of his time and a teacher of Darwin's, about how

God designed humans with unique facial muscles to express uniquely human emotions.* Relying on advances in photography and anatomy (Duchenne de Boulogne, 1862/1990), Darwin engaged in a detailed study of the muscle actions involved in emotion and concluded that the muscle actions are universal and that their precursors can be seen in the expressive behaviors of nonhuman primates and other mammals.

Darwin's work, however, drew heavy criticism, especially from noted anthropologists such as Margaret Mead and Ray Birdwhistell. They noted vast differences in expressive behavior across cultures and concluded the facial expressions could not be universal. Instead, they argued, emotional expressions had to be learned differently in every culture, and just as different cultures have different languages, they must have different languages of the face as well.

It wasn't until a century later when Paul Ekman conducted the first studies to provide systematic and reliable evidence for the universal expression and recognition of emotion, including his well-known studies in New Guinea (Ekman, 1972; Ekman & Friesen, 1971; Ekman, Sorenson, & Friesen, 1969). Ekman provided evidence that members of vastly different cultures could accurately and reliably recognize the emotions portrayed in a small set of facial expressions, including anger, disgust, fear, happiness, sadness, and surprise. He also demonstrated that people of very different cultures produced the same expressions spontaneously when emotions were actually elicited.†

Since Ekman's (1972) classic study, there have been at least 74 other studies that measured facial behaviors that occurred in reaction to emotionally-evocative situations, which reported that the facial configurations originally posited by Darwin (1872/1998) and verified (and somewhat modified) by Ekman (Ekman, 2003; Ekman & Friesen, 1975) actually occur (Matsumoto, Keltner, O'Sullivan, & Frank, 2008). These studies have involved a variety of emotion elicitation methodologies and participants from many different countries and cultures.

One glaring gap in this literature, however, was that all of these studies come from controlled, laboratory experiments. Critics of this literature (Feldman Barrett, 2006; Fridlund, 1997) have long questioned whether these facial expressions of emotion actually occur in real-life, naturalistic settings. These questions were entirely justified, as it is important to document that expressions occur not only in controlled, laboratory settings, but also in real-life situations.

A recent study from my laboratory closed this gap by examining the spontaneous facial expressions of emotions produced by athletes competing for a medal at the 2004 Athens Olympic Games (Matsumoto & Willingham, 2006). We examined the expressions of the 84 gold, silver, bronze,

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* To wit, Darwin penciled in the margin of Bell's book, "He never looked at a monkey" (Darwin, 1872/1998).

† Ekman's (1972) classic study involving American and Japanese participants is often misunderstood, so I describe it fully here. Participants viewed neutral and stressful films, and unbeknownst to them, their facial behaviors were recorded throughout the entire experiment. Ekman coded the last three minutes of facial behavior during the neutral films, and the entire three minutes of the last stress film clip using a modified version of Facial Affect Scoring Technique (FAST), a precursor to the FACS (Ekman & Friesen, 1978). FAST identified facial configurations of six emotions: anger, disgust, fear, happiness, sadness, and surprise. But, the facial coding procedure was modified to include *all* lower face actions, rendering the coding equivalent to FACS. (The upper and middle face FAST codes already comprehensively assessed the FACS codes in these areas.) The generated codes corresponded to the facial expressions portrayed in the stimuli used in their judgment studies (Ekman, 1972; Ekman, Friesen, & Ellsworth, 1972; Ekman et al., 1969) and subsequently in the descriptions of the universal emotions in *Unmasking the Face* (Ekman & Friesen, 1975), in their stimulus set *Pictures of Facial Affect* (Ekman & Friesen, 1976), in Matsumoto and Ekman's (1988) *Japanese and Caucasian Facial Expressions of Emotion* set, and to the facial configurations identified as emotion signals in Ekman and Friesen's EMFACS (Emotion FACS) (Levenson, 2005; Matsumoto, Ekman, & Fridlund, 1991) coding system. Two sets of analyses were performed on the facial codes, one involving separate facial areas, and one involving the whole face. The rank order correlations on the facial behavior codes from the separate areas between the American and Japanese participants ranged from .72 for the eyes-lids area to .92 on the brows-forehead area. When the codes were combined into emotion-related configurations, the correlations ranged from .86 in the brows-forehead region to .96 in the lower face. Disgust, sadness, anger, and surprise were the most frequently displayed emotions, but fear and happiness were also evident. When facial codes were combined for whole face emotions, according to the theoretical rationales of Darwin and Tomkins (1962, 1963) and the empirical findings from judgment studies (below), the correlation between the Americans and the Japanese on the frequencies of whole face emotions expressed spontaneously was .88.

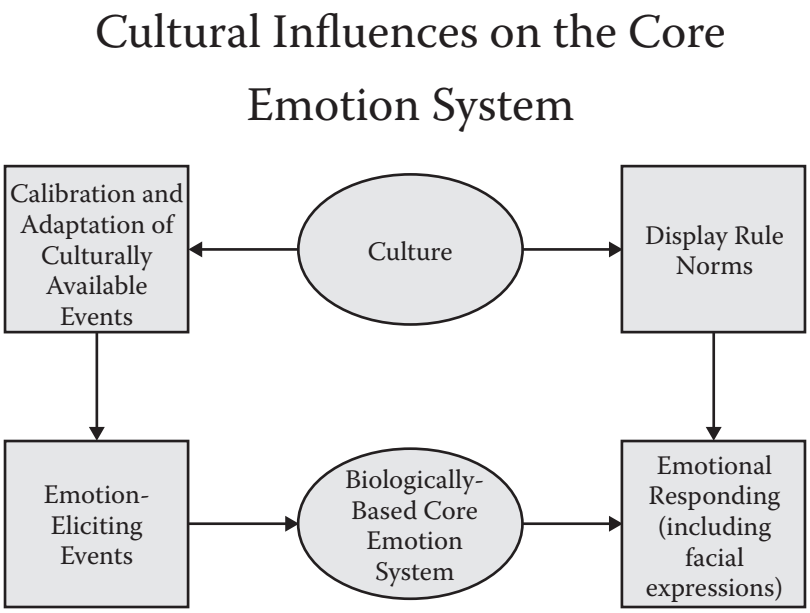

FIGURE 15.1 Cultural influences on the core emotion system.

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and 5th place winners of the judo competition at the 2004 Athens Olympic Games, who came from 35 countries and six continents. As such, they constituted a sample of the most culturally diverse individuals in whom spontaneous expressions that occurred in a highly charged, emotional event in three situations have been examined. High-speed photography was used to capture their facial reactions immediately at the end of match completion and two times during the medal ceremonies. Their expressions were coded using the Facial Action Coding System (FACS) (Ekman & Friesen, 1978), and FACS codes were then compared to the Emotion FACS (EMFACS) dictionary to obtain emotion predictions (Ekman & Friesen, 1982; Matsumoto, Ekman, & Fridlund, 1991). EMFACS identifies AUs that are theoretically related to facial expressions of emotion posited by Darwin (1872/1998) and later Tomkins (1962, 1963) and empirically verified by studies of spontaneous expression and judgments of expressions by Ekman and colleagues over 20 years (Ekman, Davidson, & Friesen, 1990; Ekman & Friesen, 1971; Ekman, Friesen, & Ancoli, 1980; Ekman, Friesen, & Ellsworth, 1972; Ekman, Friesen, & O'Sullivan, 1988; Ekman et al., 1969).

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To get a flavor of just how emotionally evocative these situations were, it's important to have a basic understanding of judo competition. A judo match is five minutes long and starts with two contestants in a standing position, vying for a grip on each other. There are throwing techniques that originate from standing, and there are grappling techniques on the ground. Points are awarded by throwing the opponent to the ground on the back or by applying a pin, choke, or arm lock. Instant wins (the equivalent of a knockout in boxing) are awarded for clean throws to the back, pinning the opponent on the ground for 25 seconds, or when an opponent submits because of a choke or arm lock. Because instant wins can occur at any time during a match, the outcome of a match is never decided until the end of competition time or when an instant win occurs. Athletes participate in a tournament system requiring them to compete in many matches in a single day; thus, judo competition at the Olympic Games requires tremendous strength and conditioning. Because the Olympic Games occur only once every four years, winning or losing a medal here is one of the most powerful emotional experiences in the lives of these athletes.

The first set of analyses focused on the athletes' expressions produced immediately at match completion, when they knew they either won a medal or they didn't, and what medal they had won. There were several theoretically important questions, the first of which was whether or not

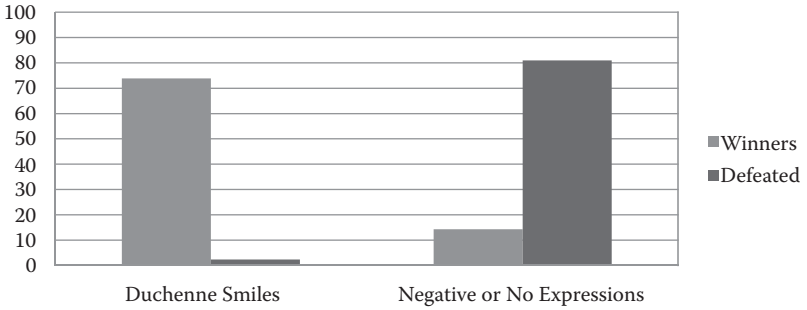

FIGURE 15.2 Proportion of athletes displaying different emotions at match completion.

emotional expressions occurred at all. Recall that no previous study had documented the existence of the universal facial expressions of emotion in a naturalistic field setting, so this very basic question was one of the primary foci of the study. In fact, of the 84 athletes photographed at match completion, there were no usable photos for six. Of the remaining 78 athletes, 67 (86%) provided at least one expression that was FACS codable. Of these, 33 (49%) provided two expressions, 13 (19%) provided three, and 5 (7%) provided four. Of the 118 expressions coded, only 4 did not produce an emotion prediction by the EMFACS dictionary. There was a considerable range of expressions, including different types of smiles and expressions of contempt, disgust, fear, and sadness. Thus, the vast majority of the athletes produced expressions at match completion, and these corresponded to emotions predicted by EMFACS.

Another important theoretical question was whether or not the expressions differentiated between victors and the defeated. The results indicated that this was indeed the case; winners (gold and bronze medalists) were much more likely to smile than the defeated, while the latter (silver medalists and 5th placers) were much more likely to display sadness, contempt, disgust, or no expressions (Figure 15.2; for illustrative purposes only, these latter expressions were classified together).

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We then examined whether the distribution of expressions differed according to culture. Because of small sample sizes for individual countries, we combined them into three categories: North America/Western Europe, East Asia, and all others. No analysis, however, produced a significant cultural difference, providing evidence for the universality of the expressions.

An additional merit to the focus on medal matches is the fact that the medalists participated in the medal ceremony. Medal ceremonies occurred in the middle of the competition area, generally about 30 minutes after the completion of the last match of the day. Athletes were marched in single file, stood behind the podium, stood up onto the podium when their names were called, and received their medal and wreath from a dignitary. After all athletes had received their medals, they stood for the playing of the national anthem of the gold medalist and then gathered on the gold medal podium for a group photo. They then marched around all four sides of the field of play, stopping to greet fans and allow their photos to be taken. While the medal matches are likely to lead to relatively uninhibited expressions because of the nature of the situation and competition, the medal ceremonies are clearly a social event, produced for the purpose of a viewing audience both in the arena and on television. By focusing on the athletes in the medal matches, we had a chance to observe and measure their spontaneous behavior in two very different situations.

Despite the fact that none of the silver medalists smiled when they lost their medal match, almost all (54 of 56) of the athletes who participated in the medal ceremonies smiled when they received their medal. This finding spoke to the power of the social situation to change the nature of the expressions produced. When the specific type of smile was differentiated, however, differences emerged according to place finish. Gold and bronze medalists (i.e., those who had won their last match to take a medal) were much more likely to display Duchenne smiles, and especially uncon-

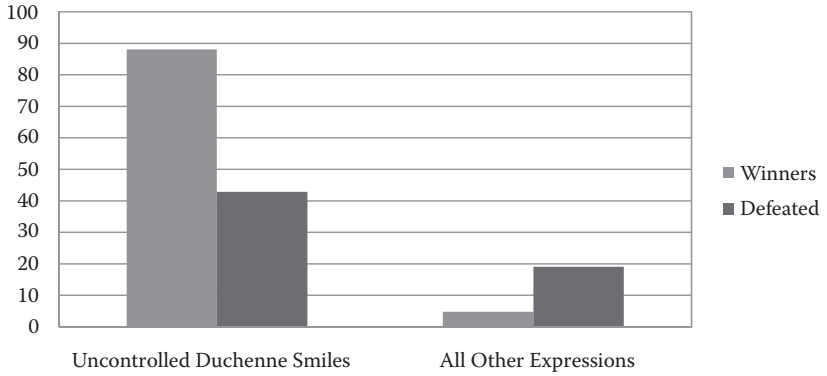

FIGURE 15.3 Proportion of athletes displaying different emotions during the medal ceremonies.

trolled Duchenne smiles,* than were the silver medalists (who lost their medal match). The silver medalists indeed did not display felt, enjoyable emotions as much as either the gold or bronze medalists (Figure 15.3).

We tested for cultural differences in these expressions using the country classification described above. No analysis, however, produced a significant result. Thus there were no cultural differences in smiling behavior when athletes received their medals. Essentially the same results were found when athletes' expressions were examined at the second point in the medal ceremonies, when they posed on the podium after the playing of the national anthem of the gold medalist.

This study produced strong evidence that the facial expressions of emotion previously reported in laboratory studies to be universal also occur in emotionally-charged, naturalistic situations. The expressions corresponded to those reported previously by Ekman (Ekman, 1972; Ekman & Friesen, 1971; Ekman et al., 1972; Ekman et al., 1969) and others (reviewed above), in Ekman and Friesen's (1975) *Unmasking the Face*, in their stimulus set *Pictures of Facial Affect* (Ekman & Friesen, 1976), and in Matsumoto and Ekman's (1988) *Japanese and Caucasian Facial Expressions of Emotion* (JACFEE) set. That there were no cultural differences in the first expressions at match completion is supportive of the universality of these expressions to occur when emotion is aroused.

The expressions also clearly differentiated between victors and the defeated. The facial signs of victory were Duchenne smiles, and in particular, its open-mouth version. These data provided further support for the view that Duchenne smiles are associated with enjoyable emotions (Ekman et al., 1990; Frank, Ekman, & Friesen, 1993; Hess, Banse, & Kappas, 1995; Keltner & Bonanno, 1997; Smith, 1995). Because no other expression was as dominant among the victors, the data also suggest that the Duchenne smile may be the only facial marker of different types of enjoyable emotions (Ekman, 2003), including *fiero*—the joy of victory. The expressions of the defeated athletes were strikingly different. Of the 42 athletes who lost their medal match, only one smiled; the others showed a variety of negative emotions, including sadness, contempt, disgust, and fear. Moreover, a not insubstantial number of them also displayed no emotion. That they did not simply show less smiling strongly suggests that their emotional experiences were substantially different than the

* Controlled smiles were those that co-occurred with buccinator (AU 14), sometimes in combination with mentalis and/or orbicularis oris (AUs 17 and 24). These lower face actions give the appearance that the expressor is making a conscious effort to control their facial behaviors and/or words, as if they are "biting their lip." That they often occurred with both Duchenne and non-Duchenne smiles suggested that these facial actions qualified the meaning of the smile, adding information to the message of the smile beyond the signal of enjoyment.

gold and bronze medalists; thus there is not a linear decrease in smiling from gold, silver, and bronze medalists. These findings also suggest that there is no unique face of defeat. Instead, athletes appraise losses in individual ways, some eliciting sadness from the loss, others being superior over their opponents, others being disgusted at the opponent or the result, and others still being fearful of the consequences of having lost. Differences in the meaning and thus appraisals of the loss for each of the athletes, therefore, bring about different emotional reactions, which elicit different expressions (Brown & Dutton, 1995).

Finally, nearly all athletes spontaneously smiled during both periods of the medal ceremonies, probably due to the highly staged and public nature of the ceremonies. Here, athletes have had time to process the results of their performance, need to interact with dignitaries, and are pressured to put on a good face for the crowd and television. That this was true for the silver medalists, especially given the fact that *none* of them had smiled at match completion and nearly all had displayed a negative expression or no expression, demonstrating the powerful influence of social context on expressive behavior.

But, the smiles of the silver medalists were differentiated from the smiles of the gold and bronze medalists. Gold and bronze medalists displayed Duchenne smiles, while silver medalists were more likely to display controlled Duchenne smiles, non-Duchenne smiles, or smiles blended with sadness. On the podium, after receiving the medal and the national anthem of the gold medalist was played, some silver medalists did not smile at all, instead displaying contempt, sadness, or uninterpretable expressions. These data suggested that, although the silver medalists attempted to be socially appropriate by smiling during the medal ceremonies, they probably did not experience solely enjoyable emotions. Instead they were probably either experiencing negative emotions and masking or qualifying them with smiles, or were experiencing blends of enjoyable and negative emotions. One of these might be regret, which would be commensurate with the findings of Medvec, Madey, & Gilovich, (1995).

Thus, this study was able to address a major limitation in the literature, demonstrating that spontaneous facial expressions of emotion are produced universally in naturalistic field settings when emotions are evoked. But do observers around the world judge these spontaneous expressions as the emotions intended and predicted by EMFACS? This question was addressed in a subsequent study.

EVIDENCE FOR THE UNIVERSAL RECOGNITION OF SPONTANEOUS FACIAL EXPRESSIONS OF EMOTION

As mentioned earlier, judgment studies of facial expressions serve as the backbone for evidence concerning the universality of emotional expressions and their recognition. Since Ekman's original universality studies, there have been many subsequent studies that have documented the universal recognition of facial expressions of emotion across different stimulus sets, investigators, expressor ethnicities and sex, and response formats (Elfenbein & Ambady, 2002; Matsumoto, 2001), as well as cross-cultural similarity in the relative agreement across expressions (Ekman et al., 1987; Matsumoto & Ekman, 1989). These findings suggest that members of different cultures judge emotional expressions on a similar basis, despite differences in facial physiognomy, expressor ethnicity or sex, or culturally prescribed rules governing the expression and perception of faces.

As with facial expression production studies, one major limitation of this area of research is that the vast bulk of judgment studies have not utilized spontaneously produced faces, a criticism levied years ago (Russell, 1994) and which is still true today. Even in monocultural studies, to date only a handful of studies have examined judgments of spontaneous expressions (Hess & Blairy, 2001; Naab & Russell, 2007; Wagner, 1990; Wagner, Lewis, Ramsay, & Krediet, 1992;

Wagner, MacDonald, & Manstead, 1986),* demonstrating that recognition rates for spontaneously produced expressions are lower than for posed expressions. This is understandable; the posed, prototypical expressions used in judgment studies (Ekman & Friesen, 1976; Matsumoto & Ekman, 1988) were created under optimal, controlled conditions involving only critical facial muscle movements theories suggested (Darwin, 1872/1998) and previous research documented (Ekman, 1993; Ekman & Friesen, 1975) to be associated with emotion signaling. In real life, however, heads are moving, decreasing the area of the face that can be judged. And because emotion signaling is just one function of facial behaviors (Ekman, 1979), facial muscles not associated with emotion are produced as well, including those related to talking, illustrating speech, regulating conversation, or conveying emblematic information. These functions can affect *signal clarity*, which should affect emotion recognition. Clearer signals should produce greater agreement in emotion recognition; less clear signals should not. And spontaneously produced facial expressions are likely to be lower in signal clarity than posed expressions because of the use of facial muscles not involved in emotion signaling and/or the use of emotion-relevant muscles in non-emotional ways.† If this is true, one explanation for the lower recognition rates of spontaneously produced expressions is not that emotion signaling is not universal or not occurring but that spontaneous expressions include muscle movements extraneous to emotion that occur above and beyond emotion signals. The concept of signal clarity is not new in research on nonverbal behaviors (O'Sullivan, 1982). But to our knowledge there has been no published study that operationalizes it and demonstrates its relationship to emotion judgments. We did so in this study.

Further, although one recent study involved spontaneous expressions produced by members of one cultural group judged by observers of another culture (Naab & Russell, 2007), to date there is no *cross-cultural* study involving spontaneous facial expressions of emotion judged by observers from multiple cultures. A cross-cultural comparison can serve several purposes. It can document if emotions can be recognized from spontaneous expressions at above-chance rates, and whether the range of agreement rates that previous research involving spontaneous expressions has produced occur across cultures as well. Also, if signal clarity is related to recognition rates, a cross-cultural comparison can determine if signal clarity is positively correlated with recognition rates across cultures. That is, if posed, full-face, prototypical facial expressions garner the highest recognition rates across cultures, and if emotion recognition is universal, then deviations from the prototypes should decrease signal clarity in all cultures, thereby producing cross-culturally consistent positive relationships between signal clarity and emotion recognition accuracy rates. These types of evidence can further knowledge about the boundaries of the universality of emotional expression and recognition and have important implications for theories of emotion and expression.

One of the reasons for the lack of judgment studies of spontaneous expressions is the lack of studies examining the *production* of spontaneous facial expressions of emotion by individuals of different cultures that could be used as stimuli. The study described earlier involving Olympic athletes, however, addresses this problem. In one of our latest studies (Matsumoto, Olide, Schug, Willingham, & Callan, 2007), therefore, 548 observers from four cultural groups—U.S.-born and -raised Americans, immigrants to the U.S., Japanese, and British—judged the expressions originally reported in Matsumoto and Willingham's (2006) study (the British sample judged only the expressions from Match Completion). Observers judged the emotion portrayed in each expression using a fixed-choice response task with the alternatives anger, contempt, disgust, fear, happiness, sadness, surprise, neutral, and other. We examined whether observers in all four cultural groups

* For the purpose of this review, we consider only those studies involving adult expressions. There have been studies involving judgments of spontaneous expressions of infants (Camras, Chen, Bakeman, Norris, & Cain, 2006; Yik, Meng, & Russell, 1998), but debates concerning when expressions emerge in development (Izard et al., 1995; Oster, 2005) render these data incomparable to adult data.

† For example, people raise their brows to illustrate their speech, often animating the verbal contents. Raised brows are also components of surprise or fear.

recognized the emotions displayed in the spontaneous expressions at above-chance levels, the existence of cultural similarities or differences in agreement rates, and the relationship between signal clarity and recognition.

First, we calculated the percentage of judges in the four samples selecting each of the emotion labels to describe each expression. To examine if observers recognized the emotions at above-chance levels, we tested the proportion of observers selecting the intended emotion label against chance using a difference in proportions test, separately for each expression; chance was set at 11.11 percent (1/9 response alternatives). When the EMFACS dictionary predicted two emotions (blends), the intended emotion labels were combined into a single category. Of the 110 expressions from match completion, 97, 96, 98, and 89 of them produced significant effects for U.S., U.S. immigrants, Japan, and the U.K., respectively. Of the 103 expressions from medal ceremonies, 91, 88, and 88 of them produced significant effects for the U.S., U.S. immigrants, and Japan, respectively. Thus, observers in all countries recognized the emotions portrayed in the expressions at above-chance levels most of the time. Moreover, when an expression was not judged at significantly greater than chance levels in one culture, it was generally not significant in all cultures.

Another way to investigate if observers judged the expressions reliably is to examine the number of times the intended emotion labels were the modal response across the expressions. We tallied the number of times the emotion predicted by the EMFACS dictionary was the modal emotion label. When the EMFACS dictionary predicted two emotions (blends), the intended emotion labels were combined into a single category. Across the 110 expressions from Match Completion, the U.S., U.S. immigrants, Japanese, and British samples selected the intended emotion label 84, 87, 91, and 80 times, respectively. The proportion of times each sample selected the intended emotion label was tested using a binomial test, with chance set at 50 percent (which was conservative, given the nine response alternatives provided). Each was statistically significant. The same analyses were conducted on the 103 Medal Ceremonies expressions. The number of times the selected emotion label was the mode was 87, 86, and 82 for the Americans, U.S. immigrants, and Japanese, respectively. Each of these was also tested by binomial tests and was found statistically significant. These findings cumulatively indicated that observers in all four groups reliably judged the expressions to portray the emotions predicted by the facial expression.

In order to examine cultural similarities or differences in relative agreement rates across expressions, we then correlated the percentage of observers in the different countries selecting the intended emotion label across all expressions. These correlations were statistically significant for all pairs of samples (Table 15.1), indicating a very high level of cross-cultural agreement in emotion judgments.

Consistent with previous studies involving spontaneous expressions, percentage agreement rates for the intended emotions were lower than those reported for posed, prototypical expressions. We hypothesized that agreement rates would covary with signal clarity. To our knowledge no measure of signal clarity in facial expressions existed; thus, we created one for use in this study, using this formula:

of *observed* Aus associated with predicted emotion
of critical Aus in the *prototypical* expression of that emotion + total # of *observed* Aus not associated with predicted emotion

AU: Can you clarify/ specify the term Aus?

The mean signal clarity across all 110 Match Completion expressions was .53 (SD = .19); for Medal Ceremonies it was .65 (SD = .19), indicating substantial decrement in signal clarity from the prototypic expressions used in judgment studies. We computed correlations across expressions between each expression's signal clarity value and the percentage of observers in each of the four samples who selected the predicted emotion label, separately for Match Completion and Medal Ceremonies. Signal clarity was significantly correlated with these percentages for each of the four samples, $r(108) = .55$, $p < .001$; $r(110) = .53$, $p < .001$; $r(110) = .48$, $p < .001$; and $r(110) = .44$, $p < .001$; for Americans, U.S. immigrants, Japanese, and British samples, respectively, for Match Completion. The same was found for Medal Ceremonies: $r(103) = .36$, $p < .001$; $r(103) = .39$, $p < .001$; and $r(103)$

TABLE 15.1
Correlations between the Percentage of Observers in Each Country Selecting the Intended Emotion Label across All Expressions

		US Immigrants	Japanese	British
Match Completion	Americans	.97[1]	.84[1]	.88[1]
	US Immigrants		.87[1]	.87[1]
	Japanese			.74[1]
Medal Ceremonies	Americans	.95[1]	.91[1]	
	US Immigrants		.92[1]	

[1] $p < .001$

= .36, $p < .001$; for Americans, U.S. immigrants, and Japanese, respectively. Thus the differences in percentage agreement in judgments were related to the signal clarity of the expressions for each of the samples in both conditions, and similarly for each culture.

These findings are the first to document cross-cultural agreement in emotion judgments from facial expressions of emotion spontaneously produced by individuals of different cultures. Observers in all groups recognized the emotions portrayed at above-chance levels; there was high cross-cultural agreement in the relative recognition rates across expressions; and signal clarity was associated with recognition rates across cultures. These data address a major gap in the literature concerning emotion judgments and provide additional evidence for the universality of emotion recognition in faces.

As expected, agreement rates for all four cultural groups were still generally less than that typically reported in previous judgment studies involving prototypical facial expressions (Matsumoto, 2001) and are commensurate with other studies involving spontaneous expressions (Hess & Blairy, 2001; Naab & Russell, 2007; Wagner, 1990; Wagner et al., 1992; Wagner et al., 1986). Still, they were substantially above that expected by chance, which is remarkable given the amount of noise in their signals (as evidenced by the signal clarity measures). As mentioned earlier, this noise is inevitable when studying spontaneous facial expressions, and signal clarity was significantly correlated with agreement rates to a similar degree in all four cultures. These data suggest that the lower recognition accuracy rates for spontaneous expressions reported in previous research occurred not because emotions and their expressions are not universal, but because spontaneous expressions include extraneous muscle movements that reduce the clarity of the emotion signals. If emotional expressions were not universal, or if they were expressed in some culturally-unique ways (e.g., dialects), then one would expect the relationship between signal clarity and emotion recognition rates to differ across cultures; they did not. Also, the very high cross-cultural agreement in relative recognition rates across expressions argues against this interpretation.

The agreement between the observers' judged emotion labels and the emotions predicted by the EMFACS dictionary also provides some degree of independent validation of the meaning of the expressions. Given the nature of the event, Matsumoto and Willingham (2006) could not obtain self-reports of the athletes' emotional experiences during or immediately after the expressions were captured. Subsequent interviews with many of these same athletes, however, did corroborate their subjective experiences with their expressions (Willingham & Matsumoto, 2007). Also, the expressions highly differentiated between winners and losers of the medal matches, and among gold, silver, and bronze medalists (Matsumoto & Willingham, 2006). The expression differences reported by Matsumoto and Willingham (2006) corresponded to self-reports of medalists reported by others (Medvec et al., 1995). And, the agreement rates in the judgments of the expressions by observers from four cultural groups in this study now provide another layer of independent validation of the

universal meaning of the expressions. We believe, therefore, that the expressions were spontaneous signs of an underlying emotional state that were accurately and reliably judged by observers.

THE SOURCE OF UNIVERSAL FACIAL EXPRESSIONS OF EMOTION

The above studies address important gaps in the literature on culture and emotional expression, documenting that facial expressions of emotion are produced spontaneously in naturalistic field settings by people of different cultures and are reliably judged as portraying the emotions intended and predicted across cultures, even though spontaneous expressions contain additional noise because of the introduction of nonemotion-relevant facial behavior.

Universality in facial expressions of emotion, however, cannot inform us about the source of that universality. There are at least two potential such sources. One is culture constant learning, which would suggest that people all around the world learn to produce spontaneously the same facial configurations for the same emotions. To be sure, it is highly unlikely that people all around the world learn to produce on their faces the exact same muscle configurations for the same emotions; but it is at least a theoretical possibility. The second potential source is rooted in biology and evolution and suggests that the facial configurations for emotions are biologically innate and thus the same for everyone.

Several bodies of evidence strongly implicate the biological basis of this linkage. The facial expressions considered to be universal among humans have been observed in nonhuman primates (de Waal, 2003). Chimpanzees have a fully functional facial musculature that, while not as differentiated as that of humans, includes the same muscles that are used in emotional expressions (Bard, 2003; Burrows, Waller, Parr, & Bonar, 2006). (The additional facial muscles for humans are related to speech and articulation, speech illustration, conversation regulation, and the ability to eat while talking; Ekman & Friesen, 1969). Moreover, the chimpanzee facial musculature produces many of the same appearance changes in the face as does the human musculature, according to a comparison of the human and chimpanzee versions of the FACS (Vick, Waller, Parr, Pasqualini, & Bard, 2007).

Another source of evidence for possible biological sources of emotion-expression linkages comes from studies of twins and family relatives. For example, facial behaviors of blind individuals are more concordant with their kin than with strangers (Peleg et al., 2006). And some facial expressions to emotionally provocative stimuli are more concordant among monozygotic twin pairs than dizygotic twins (Kendler et al., 2007).

A strong source of evidence for the biological basis of emotion-expression linkages comes from studies of congenitally blind individuals. Early case and anecdotal studies (Dumas, 1932; Eibl-Eibesfeldt, 1973; Freedman, 1964; Fulcher, 1942; Goodenough, 1932; Thompson, 1941) reported many similarities between blind and sighted individuals in their spontaneous facial expressions of emotion. The findings from these studies have been bolstered more recently by studies that have actually measured the spontaneous facial behaviors of blind individuals when emotions were aroused, showing similarities with the facial behaviors of sighted individuals in children (Cole, Jenkins, & Shott, 1989) and adults of many different cultures (Galati, Miceli, & Sini, 2001; Galati, Sini, Schmidt, & Tinti, 2003).

One of our most recent studies contributed to this literature by comparing the spontaneous facial expressions of congenitally blind and non-congenitally blind judo athletes at the 2004 Athens Paralympic Games with the sighted athletes reported above (Matsumoto & Willingham, 2007). The athletes in this study came from 23 cultures. If congenitally blind individuals from vastly different countries and cultures produce exactly the same facial configurations of emotion in the same emotionally-evocative situations, this is strong evidence for the biological basis of their source, because these individuals could not have possibly learned to produce these expressions through visual observation. Some may argue that these individuals may have learned to produce those expressions tactilely, but one would have to argue that they are able to feel different expressions

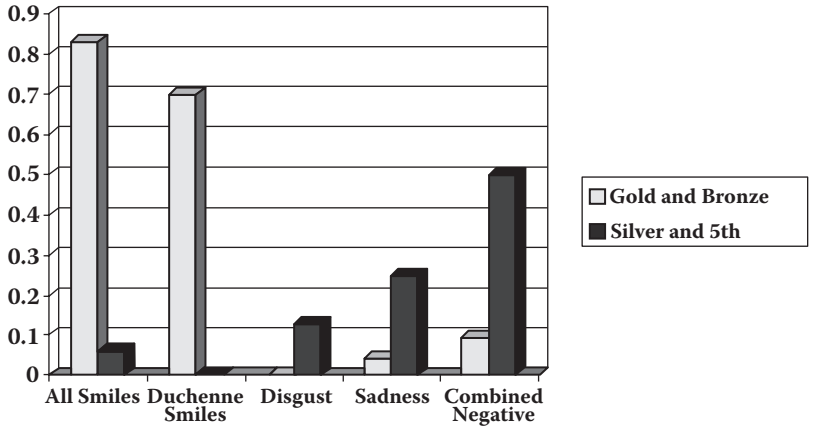

FIGURE 15.4 Proportion of occurrence of specific facial expressions at match completion.

that occur spontaneously—rapidly, automatically, and unconsciously—on themselves or others, and then be able to spontaneously produce them, and that this occurs across all cultures studied. This proposition is hardly defensible.*

This study was conducted in exactly the same manner as the study of sighted athletes reported earlier, and it found near-perfect concordance between the two studies. For example, correlations between the blind and sighted athletes individual FACS codes were $r(32) = .94$, $p < .01$; $r(32) = .98$, $p < .01$; and $r(32) = .96$, $p < .01$ for match completion, receiving medal, and on the podium, respectively. Moreover, the expressions of the blind athletes functioned in exactly the same ways as the sighted athletes. For example, winners displayed all types of smiles, especially Duchenne smiles, more frequently than the defeated athletes, who displayed more disgust, sadness, and combined negative emotions (Figure 15.4). When receiving the medal, winners (gold and bronze) displayed all types of smiles and Duchenne smiles more frequently than did the defeated (silver medalists), who displayed more non-Duchenne smiles (Figure 15.5).

For all of these reasons we believe that there is a biologically-based emotion-expression linkage that is universal to all people of all cultures.

CULTURAL DIFFERENCES IN EMOTIONAL DISPLAYS

Display Rules

Although the research reviewed above strongly suggests that humans are born with an innate ability to spontaneously produce the same facial configurations when emotions are elicited, it is also equally clear that there are cultural differences in those displays. One of the most popular ways to characterize cultural differences in emotional displays is via the mechanism known as *display rules*. Display rules are rules learned early in life that govern how to manage or modify emotional displays depending on social circumstances (Ekman & Friesen, 1969). Depending on the situations, individuals may learn to express emotions as they are with no modification; to deamplify the

* Interestingly, there have been a number of studies that have examined the ability of congenitally blind individuals to voluntarily pose facial expressions of emotion, all of them reporting difficulties in doing so and inconsistencies between what is voluntarily posed and what spontaneously occurs on the face. This difficulty is congruent with the necessity of having to see the expressions on oneself (in a mirror) or on others in spontaneous situations in order to mimic the expression when requested.

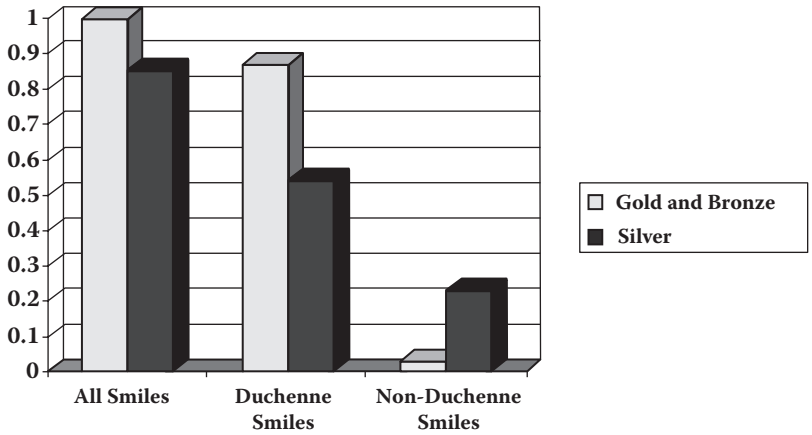

FIGURE 15.5 Proportion of occurrence of specific facial expressions when receiving medal.

expression, showing less than is felt; to amplify the expression, showing more than is felt; to neutralize the expression, showing nothing; to qualify the expression, displaying it with other emotions that comment on it; and to mask the expression, concealing it and showing another in its place.

The existence of display rules was originally documented in Ekman's (1972) classic study of Americans and Japanese students viewing stressful films when alone and subsequently with an experimenter; this study was also the first to document cultural differences in expressive displays as a function of context. In this study, the Japanese tended to smile more than the Americans when with the experimenter, despite the fact that they had showed the same negative expressions as the Americans when they were alone. The Japanese presumably did so because they had a display rule to mask their negative feelings when with higher-status individuals, whereas the Americans did not.

Over the years there has been surprisingly little research examining the actual expressive displays of individuals of different cultures in two different situational contexts (although there have been many studies examining the expressions of participants in different cultures in a single condition). Matsumoto and Kupperbusch (2001) showed that collectivistic participants masked their negative feelings to a higher status experimenter, while individualistic individuals did not, replicating Ekman's (1972) previous findings. Moreover, they extended the original display rule study by showing that collectivistic participants also masked positive feelings when with a higher status experimenter, suggesting the existence of display rules that prescribed the suppression of all emotions, not just negative ones.

The studies described earlier involving athletes at the Olympic (Matsumoto & Willingham, 2006) and Paralympic (Matsumoto & Willingham, 2007) Games also demonstrate the powerful influence of cultural display rules. In both of those studies, silver medalists did not smile at all immediately at the completion of their final match for the gold medal (because they lost that match and had to settle for silver) and instead displayed expressions of sadness, contempt, or nothing. Yet, they smiled during the subsequent medal ceremonies. The fact that almost all of the athletes smiled during the ceremonies, despite some of them having strong feelings to the contrary just minutes before, speaks to the power of the situational context to regulate behaviors and of the universal nature of that particular context (medal ceremonies in the Olympic Games). Presumably, these expressive differences occurred to regulate social behavior in a highly visible, highly emotional social context and because of the display rule to be a good loser. An interesting side note to this finding is that it was an example of the possible existence of culture-constant display rules that produce universal cultural effects. Thus, culture need not always be equated with differences in expression.

Research over a decade ago began to actually measure display rules across cultures and ethnicities (Matsumoto, 1990, 1993), and our more recent studies have surveyed display rules across a wide

range of cultures (Matsumoto, Takeuchi, Andayani, Kouznetsova, & Krupp, 1998; Matsumoto et al., in press; Matsumoto, Yoo, Hirayama, & Petrova, 2005). Our most recent studies in this area (Matsumoto et al., in press) have mapped display rules in over 30 cultures of the world and have demonstrated that collectivistic cultures are associated with a display rule norm of less expressivity overall than individualistic cultures, suggesting that overall expressive regulation for all emotions is central to the preservation of social order in these cultures (Figure 15.6). This finding is commensurate with the findings from both Ekman's (1972) original display rule study and Matsumoto and Kupperbusch's (2001) study described above. Americans and Japanese also differ on their display rules when interacting with others of higher status (Yoo et al., 2007), confirming the behavioral difference reported by Ekman (1972).

Cultural Calibration and Adaptation of the Emotion System

As mentioned above, a second way that cultures influence emotional displays is via the calibration and adaptation of the core, biologically-based emotion system to culturally available events (Matsumoto, O'Sullivan, & Keltner, 20[illegible]). As people develop, they learn to have emotions associated with events in their lives, many of which are specific to their cultures (producing cultural differences) and to themselves (producing interesting individual differences). That is, although the core emotion system that produces universal facial configurations is biologically-based, we view it as an entirely flexible system that is adaptable to many different contexts and events, allowing humans to have emotional reactions that color life and serve as a motivational basis for behavior.

The cultural calibration of the emotion system allows for a multiplicity of uses. One of the functions of culture, for instance, is to ascribe meaning to the various events that occur in our lives that are not part of our evolutionary past. Driving a car, operating a computer, and watching videos, for example, are not part of our evolutionary history because cars, computers, and videos did not exist

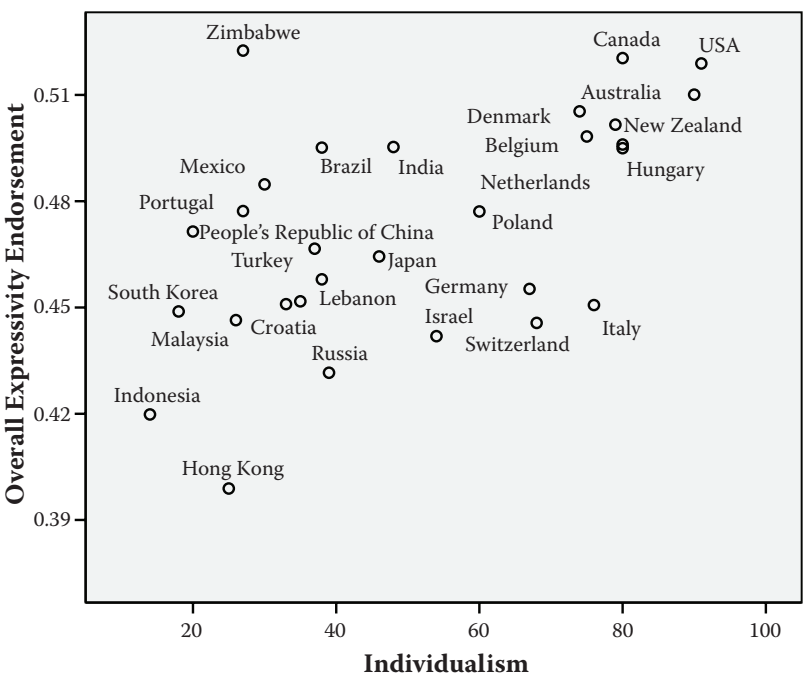

FIGURE 15.6 Graphical representation of the relationship between individualism and overall expressivity endorsement.

until very recently. Yet each of these kinds of events and situations can elicit emotions because cultures ascribe specific, emotion-laden meanings to them. Driving a car, for instance, is often associated with independence, freedom, mobility, and affluence. These are culturally-ascribed meanings, that is, meanings not inherently part of the car and driving itself, but ones that members of a group have come to associate with driving.

If driving a car is associated with cultural connotations of independence and freedom, and such connotations are "good," then individuals in cultures with such meanings will have the goal to attain the ability to drive, and if they achieve the goal, will be happy. In this case, the emotion of happiness could not have occurred without the culturally-ascribed meanings of driving, its positive connotations, and the attainment of the goal to achieve that ability. Conversely, one's mobility being restricted by being cut off in a lane can be associated with anger, because one's goals are obstructed. Yet such anger-producing goal obstruction could not occur without having learned the culturally-derived meanings of movement, cars, driving, obeying the law, and so forth. Interestingly, restricting movement is a technique that has been used to elicit angry responses in infants in different cultures (Camras, Oster, Campos, Miyake, & Bradshaw, 1992).

Thus, cultural differences in emotional expressions are produced because members of different cultures learn to have different emotional reactions to different culturally available events in the first place. Members of a culture with no cars or with different meanings associated with driving would have different emotional reactions, and thus expressions, to members of a culture with cars that have the meanings described above. Cultural calibration and adaptation of the core, biologically-based emotion system, therefore, refers to front-end cultural influence on the core emotion system, while display rules refer to back-end influences. Both are cultural and involve the coordination and calibration of a biologically innate system.

CONCLUSION

Much has been learned about the nature of facial expressions of emotion across cultures, but so much more is still left to be done, especially about cultural differences in actual emotional displays. While there are many studies of the expressive behaviors of individuals in different cultures in a single context (e.g., laboratory situation), there are no cross-cultural studies other than those reported in this chapter that examine the actual expressive behavior of individuals from different cultures in two or more different contexts. These sorely need to be done for us to determine the degree to which context produces universal or culture-specific effects on emotional displays, and why. Both are possible, and we have just begun to do such work.

There is much more to do on display rules as well. Our multi-culture studies described above are just a start. They demonstrate gross management differences across cultures. But which cultures deamplify while other cultures neutralize or mask? In which situations? And why? And what is the degree of concordance between cultural display rules and individual differences in expressive behavior? All of these interesting yet basic questions are yet to be addressed.

And there is much to do on testing and refining the ideas described above concerning the cultural calibration and adaptation of the core emotion system. Which events are cultural, and which are not? How do they come to be associated with the emotion system, and are the linkages between them and the response system, including expressions, the same or different for different events? These are all basic yet exciting questions about the nature of emotion and culture that are yet to be explored.

Fortunately, we now have the tools and technologies to address these, and other, questions in the future. To be sure, doing behavioral research across cultures is incredibly difficult, much more so than administering questionnaires. Behavior coding is also labor intensive, and all of the caveats that are associated with cross-cultural research are magnified in the world of behavioral studies (Van de Vijver & Matsumoto, in preparation). Thus, there are incredible challenges to this area of research in the future. But these challenges bring with them incredible opportunities and have the potential to make strong contributions to our knowledge of this very basic area of psychological science.

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