

# Research Report

## NONVERBAL “ACCENTS”: Cultural Differences in Facial Expressions of Emotion

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**Abstract**—We report evidence for nonverbal “accents,” subtle differences in the appearance of facial expressions of emotion across cultures. Participants viewed photographs of Japanese nationals and Japanese Americans in which posers’ muscle movements were standardized to eliminate differences in expressions, cultural or otherwise. Participants guessed the nationality of posers displaying emotional expressions at above-chance levels, and with greater accuracy than they judged the nationality of the same posers displaying neutral expressions. These findings indicate that facial expressions of emotion can contain nonverbal accents that identify the expresser’s nationality or culture. Cultural differences are intensified during the act of expressing emotion, rather than residing only in facial features or other static elements of appearance. This evidence suggests that extreme positions regarding the universality of emotional expressions are incomplete.

Do facial expressions of emotion constitute a universal “language,” or are there unique ways of expressing emotions within different cultures? This question has become a running debate among psychologists (e.g., Ekman, 1972, 1997; Elfenbein & Ambady, 2002a, 2002b; Matsumoto, 2002; Mesquita, Frijda, & Scherer, 1997; Russell, 1994). Frequently, when two psychological theories compete, the answer lies somewhere in the middle. Seminal studies on facial expression of emotion have supported the universality hypothesis, demonstrating that people of different cultural backgrounds can display similar expressions in response to similar stimuli (e.g., Camras, Oster, Campos, Miyake, & Bradshaw, 1997; Ekman, 1972; Ekman & Rosenberg, 1997). However, although there may exist basic commonalities, it would be reasonable to expect local variations in emotional expression across cultures. Emotional expression may function as a universal language, but one with regional accents. In the present research, we investigated the existence of nonverbal “accents,” or variations in facial expressions across cultures.

In linguistics, the word *accent* denotes the characteristic differences in pronunciation used by subsets of speakers of a single language. People come to speak in the accent of speakers around them (Baron-Cohen & Staunton, 1994; Munro, Derwing, & Flege, 1999). This may occur not only because similarities in accents help to identify members of a group, but also because similar spoken accents improve the understanding of verbal communication. Listeners have more difficulty in understanding speakers using unfamiliar accents (Munro & Derwing, 1995).

Research on the judgment of emotions across cultures suggests that people also have more difficulty understanding nonverbal communication of individuals from foreign cultures. Classic judgment studies demonstrated that facial expressions of the basic emotions of

anger, disgust, fear, happiness, sadness, and surprise can be accurately recognized across cultural groups, which implies the existence of a universal schema for the appearance of basic emotions (Ekman, 1972, 1997; Ekman et al., 1987; Ekman, Sorensen, & Friesen, 1969; Izard, 1971). However, when viewing American stimuli, non-Americans generally do not recognize emotions as accurately as Americans do. For example, in Izard’s (1971) large-scale study, Americans correctly identified the emotions in 83% of the facial photographs of Americans, and Europeans scored between 75% and 83%, whereas Japanese scored 65% and Africans only 50%.

Along these lines, a recent meta-analysis of cross-cultural emotion recognition has provided support for an in-group advantage (Elfenbein & Ambady, 2002a, 2002b), whereby people more accurately recognize emotional expressions of members of their own cultural in-group than those of members of a cultural out-group. This effect was consistent across a range of emotions, experimental methods, and nonverbal channels of communication, and was smaller for cultural groups who were physically closer to one another or had greater cross-cultural exposure. Interestingly, this meta-analysis found a significant in-group advantage in many studies with designs in which the expressers’ background was not obvious from the stimulus materials. In Izard’s (1971) study, Caucasian groups from European nations identified Caucasian Americans’ expressions less accurately than did Americans.

In such studies, for participants’ accuracy to differ across cultural groups implies the existence of cultural variants in the emotional expressions themselves. Such variants could serve to mark expressers’ nationality. If emotional communication is a universal language, the coding for the basic muscle movements of certain expressions may be inherited, but finer-grained elements of expressions may be further shaped by the expressive styles of the people in one’s environment. Thus, specific appearances of facial expressions may differ among cultures, as is the case for other forms of nonverbal behavior (Halberstadt, 1985). The existence of nonverbal accents could render the facial expressions of persons in cultures outside one’s own less easily interpretable. Just as there is an in-group advantage for understanding people’s speech, cultural differences could lead to an in-group advantage in emotion recognition.

In the current study, we aimed to test for nonverbal accents in emotional expressions. The strongest test for cultural variations in expression would be to use stimuli already pretested for “stimulus equivalence” (Matsumoto, 2002) in terms of identical facial muscle movement across members of different cultural groups. For this reason, we used photographs of Japanese and Japanese Americans in Matsumoto and Ekman’s (1988) Japanese and Caucasian Facial Expressions of Emotion (JACFEE) and Japanese and Caucasian Neutral Faces (JACNeuF) sets. These photographs were coded according to the Facial Affect Coding System (FACS; Ekman & Friesen, 1978), a version of the same systems used by Ekman (1972) and Camras et al. (1997) in their studies providing evidence for the universality of facial expressions. “The muscles innervated in the expressions corresponded to the universal signals of emotion,” Matsumoto (2002) wrote of these photo-

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graphs, and they "are equivalent in emotion signaling properties across encoder cultures" (p. 238). Given that exacting facial coding systems have found these photographs to be identical in all measurable respects, use of these stimuli constitutes a conservative test of the hypothesis that there are subtle differences in expressive style across cultural groups.

Because the purpose of our study was to test whether the style of facial expressions differs across cultures, we wanted to exclude alternative explanations for participants' ability to identify the nationality of the individuals in the photographs. A crucial consideration was that a person might be able to identify shared nationality from the physiognomy of facial features, apparel, or other features. Thus, it was important to demonstrate that nonverbal accents arise in the expression of emotion itself, rather than only in features of the static face. We used JACFEE and JACNeuF photographs for this reason also, because they control for lighting, background color, and clothing. Furthermore, the sets of nonexpressive and expressive photographs include the same individuals, allowing us to control for differences in static facial features across individual posers. Thus, it would provide strong evidence for nonverbal accents if participants were able to discern the nationality of posers in these emotional photographs. It would also provide evidence against alternative hypotheses concerning permanent facial differences if participants were substantially less able to discern the nationality of the same posers with neutral expressions. Such a finding would allow us to conclude that cross-cultural differences in the appearance of facial expressions emerge in the act of expressing emotion.

## METHOD

### Participants

Seventy-nine adults (40 females and 39 males) identifying themselves as native to the United States or Canada were recruited to participate either for course credit or for \$5 in compensation. Sixty-one (77.2%) identified themselves as Caucasian, 6 (7.6%) as Black or African American, and 5 (6.3%) as Asian American; 7 (8.9%) did not identify their ethnic background.

### Stimulus Materials

The JACFEE and JACNeuF sets provided all the stimulus photographs (Matsumoto & Ekman, 1988). We used photographs of 18 posers, 9 Japanese nationals (i.e., individuals of Japanese citizenship and ancestry) and 9 Japanese Americans (i.e., American citizens of Japanese ancestry). For each individual, we selected both an emotional expression (anger, disgust, fear, sadness, or surprise) and a neutral expression, for a total of 36 photos.<sup>1</sup> Happy expressions were omitted, as no Japanese nationals pose happiness in the JACFEE set. Each participant judged the nationality of all 18 posers, viewing one of two sets of the 18 posers' photographs. The assignment of stimulus set to each participant was random. Each set contained some of the posers displaying emotional expressions and some displaying neutral expres-

sions; expressions were balanced across nationality, and photographs were presented in a different random order for each participant. All participants thus judged a mix of neutral and emotional expressions displayed by the 18 Japanese-national and Japanese American posers.

### Procedure

Participants completed the study in a private, sound-attenuated room, using the software program SuperLab™ on an IBM-compatible desktop computer. Photographs appeared on the monitor in gray scale at  $433 \times 289$  pixels. As is commonly done in such judgment studies (e.g., Matsumoto, 1993), we first familiarized participants with the set of photographs while asking them to make a different set of judgments, unrelated to the nationality of the posers. During the familiarization trials, participants judged six personality traits (efficient, independent, ignorant, open, likable, and rude) for the 18 faces. After the familiarization trials, the instructions presented on the computer informed participants that half of the faces they had seen were Japanese and the other half were Japanese American. This information ensured that participants understood that each individual shown had an equal chance of being Japanese or Japanese American, which encouraged similar base rates in responses and limited test bias. Participants then viewed the 18 photographs again and judged the nationality of each individual poser.

## RESULTS

The analyses we report use Wagner's (1993) unbiased hit rate, calculated as  $\arcsin[\text{hit rate} * (1 - \text{false alarm rate})]$ . Although we minimized response biases by informing participants that half of the photos depicted Japanese and half depicted Japanese Americans, the unbiased hit rate corrects for any lingering response biases across participants, such as bias in the level of false alarms. Wagner (1993) also provided a procedure to calculate the accuracy level expected due to chance guessing, which is analogous to calculating expected values for a chi-square analysis. All scores reported refer to the degree of accuracy above that expected due to chance. Thus, a score of 0 would indicate the participant was unable to distinguish Japanese from Japanese American faces.

Participants could identify the nationality of emotional expressions at above-chance levels, single-sample  $t(78) = 5.18, p < .000001$ , two-tailed,  $r = .51$ . Participants could also identify the nationality of neutral expressions at above-chance levels, single-sample  $t(78) = 2.41, p < .05$ , two-tailed,  $r = .26$ . A comparison of the effect sizes for accuracy judging nationality from emotional and neutral expressions, however, indicated significantly greater accuracy for photographs showing emotional expressions,  $Z = 1.77, p < .05$ . A 2 (expression type: emotional, neutral)  $\times$  2 (participant's sex: male, female) repeated measures analysis of variance (ANOVA) with stimulus set as a covariate similarly showed a main effect for expression type. Nationality judgments were significantly more accurate for emotional expressions than neutral expressions,  $F(1, 76) = 10.34, p < .005, \eta = .34$ . The main effect of participants' gender and the interaction of expression type and participants' gender were not significant,  $F(1, 76) = 0.76$  and  $F(1, 76) = 0.20$ , respectively.

The results of a one-way repeated measures ANOVA by expression (fear, disgust, sadness, surprise) indicated that accuracy in judgments of nationality differed among the four expressions,  $F(3, 234) = 6.28$ ,

1. From the JACFEE set, we used Photographs 05, 21, 23, 30, 31, 45, 47, 53, and 56 (Japanese nationals) and Photographs 06, 22, 24, 29, 32, 46, 48, 54, and 55 (Japanese Americans). From the JACNeuF set, we used Photographs 30, 31, 32, 33, 38, 49, 50, 54, and 56 (Japanese nationals) and Photographs 29, 34, 35, 36, 39, 43, 46, 48, and 51 (Japanese Americans).

$p < .001$ ,  $\eta = .27$ . Note that only two anger exemplars from the JACFEE could be used, so that each subject saw only the neutral expressions or the anger expressions of the anger expressers, and thus anger was excluded from these analyses. Accuracy in judging nationality was highest for sad expressions ( $M = 0.38$ ,  $SE = 0.05$ ), followed by surprised expressions ( $M = 0.24$ ,  $SE = 0.05$ ), then fear expressions ( $M = 0.15$ ,  $SE = 0.05$ ) and then disgust expressions ( $M = 0.12$ ,  $SE = 0.04$ ). Post hoc paired  $t$  tests showed that the nationality of individuals expressing sadness was recognized more accurately than that of individuals expressing the three other emotions:  $t(78) = 4.20$ ,  $p < .001$ , for disgust;  $t(78) = 3.16$ ,  $p < .01$ , for fear; and  $t(78) = 2.05$ ,  $p < .05$ , for surprise (all two-tailed). No other differences among emotions were significant. The evidence suggests that expressive information carries information about individuals' nationality that is detectable to naive observers. By contrast, observers are less able to determine the nationality of the same individuals' neutral expressions.

## DISCUSSION

This study provides evidence for the existence of nonverbal accents—cultural variations in the appearance of basic facial expressions of emotion. These findings suggest that extreme positions regarding the universality of emotion are incomplete. That is, across cultures, emotions may be expressed in a manner largely consistent with universal prototypes, but there can still exist subtle cultural differences in the appearance of these universal emotions. Participants less accurately distinguished the cultural background of posers when they judged neutral rather than emotional expressions of the same posers. This result indicates that emotional expressions carry information about nationality or culture beyond the information conveyed by permanent differences between cultural groups in their members' physiognomy of facial features, apparel, or other static features. Differences may exist in the extent to which various emotional expressions convey evidence of cultural origins. However, because expresser and emotion were confounded in the photo set we used, the results of this analysis are difficult to interpret.

It is possible that nonverbal accents differentially shape even the appearance of static facial features of members of different cultures. Zajonc, Adelman, Murphy, and Niedenthal (1987) showed that the physical appearances of people in prolonged social contact converge over time. They explained this finding in terms of permanent changes in the structure of facial musculature, as a result of people who are in contact with one another tending to develop common habits in using certain muscles. This phenomenon might similarly entail permanent changes in the facial appearance of members of an ethnic or national group, and would make it possible to identify members of a particular national or ethnic group on the basis of their neutral facial expressions.

Our test for nonverbal accents in this study was conservative and stringent. Participants accurately identified posers' cultural backgrounds in emotional expressions expressly designed for stimulus equivalence. That is, the photograph set we used was designed with the explicit purpose of eliminating all possible cultural differences in the appearance of emotional expressions. Using the FACS (Camras et al., 1997; Ekman, 1972; Matsumoto, 2002), Matsumoto and Ekman (1988) validated these emotional expressions by identifying muscle movement patterns that corresponded to their prototypes for universal emotions. Thus, the current findings suggest that cultural differences in the appearance of facial expressions are so robust that they are

nearly impossible to eliminate. These cultural differences also seem not to be explicitly detectable using the FACS. They likely consist of very slight variants in the muscle movements, or in the relative intensity of these movements. This assumption is supported by the variation in the accuracy of nationality judgments across emotional expressions. The expressions are, by definition, composed of different sets of muscle movements. It therefore would be expected that different emotional expressions would convey cultural differences to different extents. More detailed analysis of the specific components of expression carrying the implicitly detectable nonverbal accents is needed.

The current study demonstrated people's sensitivity to subtle differences in the appearance of facial expressions across cultures. It would be worthwhile for further work to examine how people use this information in naturalistic situations. Nonverbal accents may provide a mechanism underlying well-known social phenomena such as attraction to that which is familiar (Byrne, 1997) and xenophobia, the fear or dislike of foreigners or strangers (Hall, 1959; Warnecke, Masters, & Kempter, 1992). Attractiveness, familiarity, and similarity to self may be mutually reinforcing qualities (Moreland & Zajonc, 1982). If people from one's own culture look familiar when expressing emotion, this may help one to form favorable attitudes about individuals with similar cultural backgrounds. Our findings suggest that people can judge cultural background through nonverbal accents, just as they can judge the geographic backgrounds of people speaking a common language—for example, a Texan versus a Scot—through verbal accents.

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