

Although the universal recognition of facial expressions of emotion is well documented, few studies have examined how cultures differ in the degree to which they perceive the universal emotions accurately. In this study, American and Japanese judges viewed expressions of six universal emotions posed by both Caucasian and Japanese males and females. In addition, all photos met external criteria for validly and reliably portraying the emotions. Subjects judged which emotions were portrayed and how intensely they were expressed. Results indicated substantial and consistent differences according to the culture of the judges and the emotion portrayed. These findings are discussed in terms of stable cultural dimensions that may influence the perception of emotion.

AMERICAN-JAPANESE CULTURAL DIFFERENCES IN THE RECOGNITION OF UNIVERSAL FACIAL EXPRESSIONS

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The universal recognition of several facial expressions of emotion has been documented in both literate (Ekman, 1972; Izard, 1971) and preliterate (Ekman & Friesen, 1971; Ekman, Sorenson, & Friesen, 1969) cultures and replicated a number of times (e.g., see Boucher & Carlson, 1980). Typically in these studies, judges from at least two different cultures viewed the faces on slides or photos and described the emotion portrayed by selecting an appropriate emotion term from a list of alternatives. Universal recognition was usually demonstrated by two criteria: first, that the percentage of judges selecting the intended emotion term was significantly greater than chance; and second, that the percentage was greater than an arbitrary level, usually 70%, across all cultures. Most of the previous studies met both requirements, establishing the pancultural basis of the emotions.

But cultures also varied, sometimes considerably, in the degree of agreement. For example, across the nine cultures in Izard's (1969) and Ekman and Friesen's (1969) studies, the percentage of judges correctly identifying

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happiness ranged from a low of 68% (Africa) to a high of 97% (Switzerland, Brazil, and the United States). Similar ranges were found with other emotions (see Ekman, Friesen, & Ellsworth, 1982, p. 133). Cultural differences, however, were not tested, because the goal of the research was to establish universality, rather than to explore the sources of differences.

The notion that cultures may vary in their perceptions of universal emotions is theoretically plausible. Universal emotions do exist, as originally postulated by Darwin (1872) and Tomkins (1962, 1963) and as documented by previous studies. But cultures may also influence the rate of recognition. For example, cultures may exert particular sanctions against recognizing or acknowledging some emotions, such as anger or disgust. This would result in the less accurate recognition of these emotions, in relation to other cultures.

Cultures may also influence individuals in such a way that the very process of emotion recognition and labeling is discouraged, as emotions are not discussed openly. This might result in lower recognition accuracy rates across a variety of emotions, rather than for specific emotions.

Finally, cultures may influence the degree to which different individuals are accurately perceived. For example, individuals in relatively homogeneous cultures may not perceive people of a visibly different culture as accurately as people of their own culture, either because of politeness or ignorance. Individuals of heterogeneous cultures, however, are more practiced at interpreting people of different cultural backgrounds.

In order to render conclusions concerning the basis for cultural differences in the perception of universal emotions, a study must meet several methodological requirements:

- Observers from at least two cultures must view the same expressions, and their choices must be compared to each other.
- The facial expressions must meet some criteria for validly and reliably portraying the universal emotions. It is necessary that the faces contain only those muscle movements related to universal emotions, with no extraneous movements, and be consistently judged as portraying the emotions by a large percentage of judges.
- Individuals posing the expressions must appear only once in the stimulus presentation, to eliminate the effects of judging someone previously seen.
- Perhaps most importantly, the expressions must be portrayed by posers of both cultures, not just Caucasian posers, in order to assess and control for the effects of making judgments about an individual of a visibly different culture.

To date, eight studies have examined cultural differences in the recognition of emotion. Unfortunately, none of the studies met these requirements. Kilbride and Yarczower (1976) used drawings of happy and sad faces, some

of which included a picture of the rest of the body. Matsumoto (1989) examined the relationship between cultural differences in perception and three of Hofstede's (1980, 1983) dimensions of cultural variability; but he did not compare cultures directly to each other, and he used as data findings from studies that included only Caucasian faces. McAndrew (1986) tested the responses of American (Caucasian) and Malaysian judges, but included only faces of Caucasian posers as stimuli.

The remaining five studies included at least a two-culture comparison, involving stimuli portrayed by members of both cultures (Eiland & Richardson, 1976; Kilbride & Yarczower, 1980, 1983; Shimoda, Argyle, & Ricci Bitti, 1978; Wolfgang & Cohen, 1988). None, however, reported data concerning their stimuli that ensured the valid expression of universal emotion (cf. Ekman & Friesen, 1975), with no extraneous muscle movements. Wolfgang and Cohen (1988) did report that the stimuli met an empirical criterion of reliability, as there was at least 70% agreement by judges in all cultures tested, but no study reported that posers appeared only once in the entire stimulus set.

This study was designed to test cultural differences in the recognition of universal emotions while meeting the methodological requirements outlined above. Judges in the United States and Japan viewed facial stimuli portraying the universal emotions. Each expression contained only those facial muscle movements theoretically related to that emotion (cf. Ekman & Friesen, 1975), ascertained by coding the actual facial muscle movements involved in producing the expression. In addition, each expression was reliably judged by members of a number of different cultures. The stimuli included an equal number of Caucasian and Japanese posers, with an equal number of males and females. Finally, each poser appeared only once in the entire stimulus set.

Observers judged the emotion portrayed in the expressions by selecting a single emotion term from a list of alternatives. In addition, judges also rated the overall intensity of the expressions, in order to control for the possible influence of perceived intensity on their recognition of the emotions. These procedures allowed us to examine three separate issues:

1. Judge culture and sex differences: Does the perception of facial expressions differ as a function of the culture and/or sex of the judge, and are differences, if any, evident regardless of culture or sex of the poser?
2. Poser culture and sex differences: Does the perception of facial expressions differ as a function of the culture and/or sex of the poser, and does this differ according to the judge's culture?
3. Emotion differences: Are some emotions more readily identified than others, and are these different for the two cultures?

METHOD

SUBJECTS

Subjects were 41 Americans and 44 Japanese college undergraduates participating in partial fulfillment of class requirements. The American sample was recruited from a major university in the San Francisco Bay area and included 18 males (mean age 22.17) and 23 females (mean age 24.70). All were born and raised in United States, as were their parents. None were of Asian descent. The Japanese sample was recruited from a major university in Osaka, Japan, and included 22 males (mean age 21.09) and 22 females (mean age 20.18). All were born and raised in Japan, as were their parents.

FACIAL STIMULI

The facial stimuli included 48 posed photos of six universal emotions (eight photos each of anger, disgust, fear, happiness, sadness, and surprise). For each emotion, there were two males and two females of both Asian (Japanese) and American (Caucasian) descent. The posers were all college students, of the same general age as the subjects. Each poser appeared only once in the entire stimulus set. More details on the development of this stimulus set can be found in Matsumoto (1986) and Matsumoto and Ekman (1989).

All expressions were coded independently by two raters, using Ekman and Friesen's (1978) Facial Action Coding System (FACS). Reliability was .91. FACS coding ensured that both the type and intensity of the facial muscle movements of all expressions corresponded to those of the universal emotions (cf. Ekman & Friesen, 1975). Other studies using these photos have reported high agreement in subjects' interpretations of which emotion is portrayed (Matsumoto, Ekman, & Heider, 1989; Matsumoto, 1989; Matsumoto & Ekman, 1989).

JUDGMENT TASKS AND PROCEDURES

The procedures for collecting the judgment data were the same in both cultures. Translation accuracy of all protocols and instructions was verified using a back-translation procedure. Subjects were tested in groups and were shown the stimuli twice. On both viewings, subjects saw all 48 photos, one at a time, for 10 seconds each, in a random order. During the first viewing, subjects were asked to choose a single term from a list of seven (anger,

contempt, disgust, fear, happiness, sadness, and surprise) which best described the emotion portrayed in the photo.¹ The Japanese terms used were *ikari*, *keibetsu*, *iyake*, *shiawase*, *kanashimi*, and *odoroki*, respectively. After all photos were judged, subjects saw the stimuli again and were asked to judge the intensity of each expression, using a 9-point scale (0-8) labeled *not at all* (0), *a little* (1), *a moderate amount* (4), and *a lot* (8).

RESULTS

TESTING THE UNIVERSALITY OF THE FACIAL EXPRESSIONS

The single choice data were first analyzed in the same manner as in previous studies, by calculating the percentage of judges selecting each emotion term for each photo. For all emotions, the percentage of judges in both cultures selecting the intended emotion term was significantly greater than what would be expected by chance. Across all eight photos for each emotion, the averaged percentages for American judges were 89.58, 91.07, 81.85, 97.62, 92.56, and 91.96; for Japanese judges they were 64.20, 74.72, 54.55, 98.30, 71.88, and 92.05 (for anger, disgust, fear, happiness, sadness, and surprise, respectively). These results confirm the universality of these emotions. Although the percentages for Japanese judgments of anger and fear are low, they are consistent with similar findings in previous studies (cf. Ekman, 1972).

DIFFERENCES IN ACCURACY AS A FUNCTION OF JUDGE CULTURE AND SEX, POSER CULTURE AND SEX, AND EMOTION

Judge culture differences were first tested using a 2 (Judge Culture) \times 2 (intended emotion term vs. others) chi-square, computed separately for each photo. A significantly greater number of American judges correctly identified all 32 photos of anger, disgust, fear, and sadness, indicating that cultural differences in the recognition of these emotions exist regardless of poser culture or sex. Neither culture had a significantly greater percentage of judges identifying happiness or surprise.

The design of this study, however, allowed for a fuller analysis of the effects of judge sex, poser culture, poser sex, and emotion, in addition to judge culture effects. First, the number of times each judge selected the intended emotion term for each of the four poser types (Caucasian males and females, Japanese males and females) was computed. Because there were two photos for each of the four poser types, scores ranged from 0 (did not

TABLE 1
Results of Five-Factor Analysis of Variance

<i>Effects</i>	<i>df</i>	<i>F Ratio</i>	<i>p</i>
Judge Culture (A)	1, 82	64.13	< .001
Judge Sex (B)	1, 82	3.00	ns
Emotion (C)	5, 410	34.86	< .001
Poser Culture (D)	1, 82	.00	ns
Poser Sex (E)	1, 82	3.24	ns
A × B	1, 82	.65	ns
A × C	5, 410	11.74	< .001
A × D	1, 82	.70	ns
A × E	1, 82	14.09	< .001
B × C	5, 410	2.94	< .05
B × D	1, 82	1.27	ns
B × E	1, 82	2.87	ns
C × D	5, 410	10.42	< .001
C × E	5, 410	.96	ns
D × E	1, 82	1.08	ns
A × B × C	5, 410	2.49	< .05
A × B × D	1, 82	.30	ns
A × B × E	1, 82	.01	ns
A × C × D	5, 410	4.70	< .001
A × C × E	5, 410	2.19	ns
A × D × E	1, 82	2.53	ns
B × C × D	5, 410	1.12	ns
B × C × E	5, 410	1.51	ns
B × D × E	1, 82	2.24	ns
C × D × E	5, 410	.60	ns
A × B × C × D	5, 410	.92	ns
A × B × C × E	5, 410	2.74	< .05
A × B × D × E	1, 82	1.28	ns
A × C × D × E	5, 410	.33	ns
B × C × D × E	5, 410	1.00	ns
A × B × C × D × E	5, 410	.99	ns

NOTE: ns = not significant.

select the intended emotion term for either of the two photos) to 2. A five-factor analysis of variance (ANOVA) was computed on these scores, using Judge Culture (2) and Judge Sex (2) as between-subjects factors, and Poser Culture (2), Poser Sex (2), and Emotion (6) as within-subjects factors (see Table 1).

TABLE 2
Summary of Judge Culture Differences

		United States	Japan	df	F	p
Anger	<i>M</i>	7.167	5.136	1,84	32.776	< .001
	<i>SD</i>	1.124	2.018			
Disgust	<i>M</i>	7.286	5.977	1,84	12.793	< .001
	<i>SD</i>	.995	2.162			
Fear	<i>M</i>	6.548	4.364	1,84	29.834	< .001
	<i>SD</i>	1.468	2.158			
Happy	<i>M</i>	7.810	7.864	1,84	.387	ns
	<i>SD</i>	.455	.347			
Sad	<i>M</i>	7.405	5.750	1,84	30.440	< .001
	<i>SD</i>	.939	1.713			
Surprise	<i>M</i>	7.357	7.364	1,84	.001	ns
	<i>SD</i>	1.122	.865			

NOTE: ns = not significant.

The significant interaction between Judge Culture, Emotion, and Poser Culture allowed us to focus on specific hypotheses concerning the effects of these factors.

Judge culture differences. Judge culture differences were tested by comparing the mean number of correct identifications across all eight photos, separately for each emotion (Table 2).² The findings essentially were the same as those reported above using chi-squares: Americans were better than Japanese at identifying anger, disgust, fear, and sadness. There were no differences in scores for happiness or surprise.

Emotion differences. Two one-way repeated-measures ANOVAs, one each for American and Japanese judges, were computed on the average number of correct identifications across all eight photos for each emotion, using emotion as the independent variable. Both were significant (American judges: $F[5, 205] = 6.99, p < .01$; Japanese judges: $F[5, 215] = 29.19, p < .001$). Specific follow-up comparisons indicated that the order of the emotions, in terms of least easily identified to most easily identified, was

$$\text{Fear} < \text{Anger} = \text{Disgust} = \text{Surprise} = \text{Sadness} < \text{Happiness}$$

for the American judges ($F[1, 205] = 16.76, p < .001$; and $8.79, p < .01$), and

Fear < Anger < Sadness = Disgust < Surprise < Happiness

for the Japanese judges ($F[1, 215] = 3.31, p < .05$; $7.13, p < .01$; $15.76, p < .001$; and $15.29, p < .001$).

Poser culture and sex differences. The mean number of correct identifications was computed separately for each of the four poser types, collapsed across the six emotions.³ Two two-way ANOVAs were computed on these scores, one each for American and Japanese judges, using poser culture and poser sex as the independent variables. None of the effects for American judges was significant, indicating that the Americans' ratings did not differ as a function of poser culture or sex. The poser sex main effect was significant, however, for the Japanese judges ($F[1, 43] = 10.65, p < .01$), indicating that the Japanese more readily identified female photos than male photos. None of the other effects was significant.

THE RELATIONSHIP BETWEEN ACCURACY AND JUDGMENTS OF INTENSITY

In order to test whether the degree of accuracy was related to judgments of intensity, each subject's intensity ratings were averaged across both photos of each of the four poser types, for each emotion separately. This resulted in an averaged intensity score for Caucasian and Japanese male and female photos for each of the six emotions. Product-moment correlations were computed between the intensity rating for each poser type and the corresponding accuracy score (0-2), separately for each emotion and judge culture. Of the 48 correlations (2 Judge Cultures \times 6 Emotions \times 4 Poser Types), only 9 were statistically significant (average correlation across all 48 computed = 0.084), evenly distributed across the emotions. These findings indicate that the differences observed above concerning single choice effects were not related to differences in the perceived intensity of the expressions.

DISCUSSION

The findings suggest that

1. Americans are more accurate than the Japanese at recognizing four of the six emotions, regardless of the culture or sex of the poser being judged.
2. Neither the culture nor sex of the poser affected Americans' judgments of the photos, whereas females were more easily identified than males by the Japanese.

3. The Americans and Japanese agreed that happiness was the easiest to identify and that fear was the hardest.

These findings are particularly impressive considering that the photos used met both external, objective criteria for validly portraying each of the universal emotions and empirical criteria for being reliably judged as those emotions. The overall intensity of the expressions themselves was controlled by FACS coding, and the perceived intensity levels were found not to correlate with the accuracy scores.

The cultural differences observed in this study have several interpretations. First, ambiguities in the actual expressions may have produced the differences. One may argue, for example, that American and Japanese judgments on happiness and surprise did not differ because the stimuli were simply better than those used to portray the other four emotions. If the stimuli for the other emotions were as clear as those for happiness and surprise, no judge culture differences would have been produced.

This interpretation, however, is untenable. If judge-culture differences were artifacts of stimulus quality, it is unlikely that cultural differences were observed on all 32 photos of anger, disgust, fear, and sadness. There would most likely be one or two photos that clearly portrayed these emotions, where the judge-culture differences were not evident; this was not the case. In addition, the percentages obtained in this study are similar to results in previous universality research testing these two cultures. If judge culture differences were artifacts of stimulus quality, then it would be necessary to argue that the same defects of the stimuli existed in previous research as well.

The findings may also have been related to cultural differences in possible sanctions for the use of each of the emotion terms provided as response alternatives. If the Japanese had a stronger sanction than the Americans against use of their terms for anger, disgust, fear, or sadness, then cultural differences in recognition might result from these sanctions rather than from actual differences in recognition of the expressions. Previous judgment studies examining the second most frequent response given by Japanese observers (Ekman et al., 1987), however, have shown that the Japanese do not hesitate to use all of the response alternatives, which would argue against this interpretation. Data concerning the frequency of usage of each of the emotion terms in both cultures would address this possibility further.

The judge-culture differences are better interpreted as suggesting a differential bias in the perception of these emotions resulting from consistent differences in dimensions of cultural variability, such as those postulated by Hofstede (1980, 1983). The fact that the Japanese were worse at perceiving

the negative emotions highlights the importance of group and collectivist issues in the vertical society of Japan. In Japan, the display of negative emotions is discouraged, as they disrupt the social and cultural rubric that underlies all social interactions. The lower accuracy scores for the Japanese suggest that not only is the display of negative emotions discouraged, but so is the perception of these emotions. In this model, display and perception go hand in hand in maintaining social order.

The American culture, on the other hand, is based on horizontal relationships that stress individualism. The expression of negative emotions is more tolerated, and perhaps even encouraged, as this affirms the essence of the individual within a society. The open or freer display of emotions is coupled with the unrestricted perception of these emotions, resulting in higher accuracy scores from the Americans.

The fact that neither the culture nor the sex of the poser affected the accuracy scores for the Americans can also be interpreted in terms of the differences in individualism versus collectivism. As the United States is a pluralistic society, the focus on individualism helps ensure that individuals of different racial or ethnic backgrounds will not be perceived differently.

That the accuracy scores for the Japanese did not vary as a function of the culture of the person being judged is perplexing. Because of the closed and guarded nature of the Japanese culture, one would expect to find that the accuracy scores for the Japanese would differ according to whether they were judging a Caucasian or a Japanese person. Perhaps the universal nature of the expressions, coupled with the learning and reinforcement of the meaning of emotional expressions through the mass media, has eliminated such effects. Nevertheless, conclusions concerning poser culture effects on the Japanese rates of identification remain premature.

The data were clear, however, in indicating that the Japanese more accurately identified female photos than male photos. This finding points to the differences in the acceptability of emotional display for males and females in Japan. The display of emotion is strongly discouraged for Japanese males, in comparison to Japanese females. The lower accuracy scores for male photos by the Japanese judges may be the result of politeness in not attributing such emotions to males or ignorance on the part of some Japanese as to how to label emotional displays when shown. Whichever of these psychological phenomena account for these differences, it is important to remember that these differences occurred even though the stimuli are equivalent in measured and perceived intensity levels.

The Americans and Japanese did agree that happiness was the easiest to identify, while fear was the most difficult. These findings point to universal

similarities in the nature of either these expressions or these emotions. The simplicity of the happy expressions, for example, may make them easy to identify, while the more complex nature of the fear expression allows for greater ambiguity (seven independent muscle movements in fear, two in happiness). The differences between the two cultures on anger, disgust, sadness, and surprise are difficult to interpret.

It is now time to go beyond the well-established universal recognition of facial emotions and focus our attention on the ways in which cultures may differ in the perception or interpretation of the emotions. The findings from this study clearly show that cultures can systematically differ in the perception of the emotions, and that these differences may be interpretable according to meaningful dimensions of cultural variability (Hofstede, 1980, 1983). Differences in the perception of emotion also appear to be linked to differences in the cultural display rules governing the emotions. It is hoped that the findings from this study, and the procedures employed, will provide a sound basis for uncovering similar differences in other cultures, enabling a further understanding of the expression and perception of emotion and the influence of cultures.

NOTES

1. Although contempt and disgust were given as a single response alternative in early cross-cultural research (e.g., see Ekman, 1972; Izard, 1971), there are several reasons why we treat these as separate and independent emotion categories. Ekman and Friesen (1986) have reported that contempt may have its own universal facial signal, suggesting the independence of contempt from other emotions. Contempt has also been theoretically distinguished from disgust (see Tomkins, 1982). Work from our laboratory with the methodology used in this study has suggested that contempt and disgust do indeed provide valuable, independent information concerning emotion judgments. These responses are treated as separate categories in the analyses, as well.

2. These analyses, as well as the analyses presented below for differences as a function of emotion, were also computed separately for each of the four poser types. The findings were essentially the same as when the data were collapsed across poser type.

3. These analyses were also computed separately for each of the six emotions and essentially replicated the results as presented.

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