The Development of a Series of Photographs of Chinese Facial Expressions of Emotion

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To create a set of Chinese faces expressing emotions, Chinese adults in Beijing were asked to think about a situation and then to pose the facial expression appropriate to that emotional state. The emotions posed were happiness, surprise, disgust, sadness, fear, and anger. The expressions were photographed and a number of the best examples of each expression were selected. In Experiment 1, raters were given six labels and were required to select the one that best fit each emotional expression. In Experiment 2, another group of raters assessed the photographs on the six labels, using a 7-point scale. Sixty-two photographs fulfilled the criteria of 70% agreement in ratings in Experiment 1 and a rank rating of at least 4 in Experiment 2. This resulted in 9 to 12 reliable examples of each emotional expression, a good set of photographs of expressions, useful to those wishing to study emotion in China and cross-cultural settings.

THE DEVELOPMENT OF A SERIES OF PHOTOGRAPHS OF CHINESE FACIAL EXPRESSIONS OF EMOTION

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There has been extensive debate about the extent to which emotional expressions and their perception are culturally variable (e.g., Ekman, 1992; Ekman, Friesen, & Ellsworth, 1982; Ekman et al., 1987; Matsumoto & Ekman, 1989; Russell, 1994). Darwin (1872/1965) proposed that emotional expressions are innate; therefore, different cultures should express all emotions in a similar way. Convincing evidence for this appeared to be demonstrated in a number of early studies that presented pictures of facial expressions of a range of emotions to both literate (e.g., Izard, 1971) and preliterate cultures (e.g., Ekman & Friesen, 1971). A high degree of consistency between the cultures in the recognition of emotional expressions was found (e.g., Ekman, 1971; Ekman et al., 1987; Izard, 1971, 1980), although it appears that cultures may differ in the degree of agreement for certain emotions (e.g., Matsumoto, 1992).

On the basis of early cross-cultural studies, a number of basic expressions have been proposed. Ekman (1971) suggested that there are six basic emotions:

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happiness, anger, fear, sadness, disgust, and surprise. These have been included in numerous later cross-cultural studies (e.g., Boucher & Brandt, 1981). Izard (1971) suggested that there are eight emotional expressions interpreted in a similar way across cultures. Six of these are similar to those identified by Ekman (1971), with the emotions of "interest" and "shame" added.

The six basic emotional expressions identified by Ekman and colleagues from cross-cultural studies are those included in Ekman's (1976) *Pictures of Facial Affect*. This set of photographs of emotional expressions, posed by adult Caucasians, has been used in a vast number of studies, including cross-cultural studies. Even when these have not been used, the emotional expressions in most cross-cultural studies of emotion have been posed by Caucasians. There are exceptions, however. For instance, Ekman and Friesen (1971) asked preliterate New Guineans who had almost no contact with Caucasians to display the expressions appropriate to a variety of situations. Their facial expressions were photographed and the emotions later identified by American raters. Boucher and Carlson (1980) asked Malaysians and Americans to judge the emotional expressions of Malaysian (Malays, Malaysian Chinese, Malaysian Indians, and Temuan) and Caucasian faces. Vinacke and Fong (1955) collected photographs of unposed facial expressions of Japanese, Chinese, Chamorros, and Koreans and presented this mixed set of faces expressing emotions, together with those of Caucasians, to students in Hawaii for judgment. Kilbride and Yarczower (1983) developed a set of expressions posed by Caucasians and Zambians to be identified by both Caucasian Americans and Zambians. Wolfgang and Cohen (1988) photographed expressions of Black West Indians and White Canadians for a study testing universality and cultural specificity of emotion. Matsumoto and Ekman (1988) developed a set of 56 photographs consisting of 8 photos of each of seven emotions. These were selected from a larger pool of posed expressions, coded using Ekman and Friesen's (1978) Facial Action Coding System. Each emotion was posed by two Japanese and two Caucasian men and women, with each person appearing only once. This set meets reliability and other methodological requirements that other sets of facial expression photographs have failed to meet (Biehl et al., 1997). Matsumoto and Ekman (1989) and Matsumoto (1992) used judges in Japan and the United States to identify the emotions expressed in these photos. They also have been used in a study that included six cultural groups (Biehl et al., 1997).

Although universality of emotional expression has been found in these studies, cross-cultural differences have been reported in level of agreement for certain expressions. Ethnic bias, that is, the more accurate recognition of emotional expressions displayed by one's own race, has been investigated

(e.g., Boucher & Carlson, 1980; Kilbride & Yarczower, 1983; Matsumoto, 1992; Matsumoto & Ekman, 1989; McAndrew, 1986) and found in some cases, but not all. Thus, conclusions about the relative ability of different groups of people to recognize all, or specified, facial expressions of emotion need to take into account the appropriateness of the set of facial expressions used.

Ethnic bias in emotion recognition may be related to the "other race" effect—the finding that it is more difficult to recognize members of other races than of one's own (e.g., Malpass & Kravitz, 1969). The possibility that other race effects operate in the display and recognition of facial expressions of emotion makes it particularly interesting and important to develop reliable sets of photographs of emotional expressions exhibited by people of different racial and cultural groups. If the recognition of emotional expressions is to be tested within a particular group, it is important to use emotional expressions displayed by members of that culture. Performance on these may be compared to recognition of emotions displayed by other cultural groups. The importance of these issues led us to develop a set of photographs of facial expressions of emotion posed by Chinese living in Beijing. These were devised to be appropriate for use in the People's Republic of China but also to be appropriate for cross-cultural studies in the recognition of emotion. The emotional expressions posed were those included in Ekman's (1976) set of slides as the six basic emotions: happiness, surprise, disgust, sadness, fear, and anger. Poses of neutral expressions were not included.

In developing this set of facial expressions of emotion, the expressions were posed. The posers were given no coaching in posing expressions. This method was adopted to allow any variations in expression specific to that racial and cultural group to be displayed. The poser was given an emotion label and instructed to imagine a situation that would give rise to the specified emotion. This procedure is dependent on the posers all understanding the emotion words in the same way, but for people reared within the same culture, this would not seem to pose a problem. An alternative method would have been to ask the posers to display the facial expression appropriate to a described situation. Ekman and Friesen (1971) combined situation descriptions with an emotion label, for example, "You feel sad because your child died." However, the method adopted in this study overcomes possible differences between people in situation-emotion relationships arising from different real-life experiences. There may be slight differences between people in situations that give rise to various emotions, such as differences in what is considered disgusting.

Our aim was to develop a set of emotional expressions posed by Chinese people that were reliably recognized by Chinese (living in the same city).

Those judging the emotional expressions were given a list of emotion labels and either were asked to classify each photograph as representing one emotion or to rate the degree to which each photograph represented each of the emotions. The judges and raters were not instructed in coding systems that involve identification of the facial muscle configurations innervated, such as the Facial Action Coding System (e.g., Ekman & Friesen, 1975) or the Maximally Discriminative Facial Movement Coding System (Izard, 1979); we were simply interested in obtaining data about the emotion the judges and raters believed the poser was attempting to convey. The posers, judges, and raters in this study were all Chinese residing in Beijing, and none had lived outside the People's Republic of China. Whether these expressions would be recognized in the same way by people from other racial and cultural groups was not of concern in the development of the set of photographs.

EXPERIMENT 1

METHOD

Posing of Emotional Expressions

Participants. A total of 17 young adults of varying degrees of attractiveness, aged 20 to 28 years (10 men and 7 women), were used as models.

Procedure. The experiment was conducted in the Mandarin language under the auspice of the first author. For each emotional expression, participant-models were asked to think about and to feel (imagine) a special experience that had once aroused the stated emotion in their past life. The emotional expressions that participant-models were asked to pose were happiness, surprise, disgust, sadness, fear, and anger. They then were to try to show the facial expression of this emotion in as natural a manner as they could. This system had been developed by Wang and Meng (1986) and was preferred to a procedure instructing them to use particular facial muscle movements for each emotion. The models were free to practice each emotional expression but were not given feedback about the "correctness" of their pose. However, they were told if the expression they posed was "too weak" as judged by the first author, although a photograph was still taken. In some cases, several photographs were taken of the same expression posed by a model. The models were instructed to attempt to pose each of the six emotions. They were photographed outdoors with their face directed toward the

camera and without a flash, against a plain background, by a professional photographer. Between 20 and 50 photos were taken of each model. The photographs were tightly cropped in a manner similar to Ekman's (1976) slides. The 400 black-and-white photographs measured 8.8 cm × 12.2 cm.

Selection of Photographs

Seventy-five photographs were selected by four judges as the best representations of the emotions. Using nominal categories, there was complete concordance among the four judges on the emotion expressed in each of these photographs. The number of photographs selected for each emotional expression were as follows: 11 for happiness; 13 for surprise; 12 for disgust; 11 for sadness; 18 for fear; and 10 for anger. More photographs of fear than of other emotions were selected for inclusion in the next part of the study because, although there was agreement among the judges about the emotion expressed, they had some reservations about the adequacy of the exemplars of this emotion. The number of photographs posed by each person varied markedly (range = 1-17). The photographs were randomly assigned the numbers 1 to 75.

Rating Task

The photographs were shown one at a time to each of 110 Beijing college students (age range = 18-22; $N = 52$ men, 58 women). Half of the participant-raters received them in the order 1 to 75, and half received them in the reverse order. They were given an answer sheet providing a choice of the six emotion categories and were instructed to select the one word that best described the emotion expressed in each photograph.

RESULTS

The percentage of raters judging each of the six emotion categories for each photograph was calculated. Percentages are listed in Table 1, together with the percentage responses to the alternative emotion categories. The emotions are represented as follows: 1-happiness; 2-surprise; 3-disgust; 4-sadness; 5-fear; 6-anger. The number of photographs rated by 70% or more of the judges as portraying the emotion the model was instructed to portray was as follows: happiness (11); surprise (12); disgust (9); sadness (11); fear (9); and anger (10). Overall chi-square tests on number of raters selecting each emotion were significant, $df(5) = 15.09$, $p < .01$. Chi-square tests showed that, for each emotion, the selection of the target emotion was

TABLE 1
Percentage Judgments of Each Emotion for Each Photograph

P-Number	*E-Number*	*1*	*2*	*3*	*4*	*5*	*6*
1 01	68	100					
1 02	3	100					
1 03	69	100					
1 04	52	95	2				2
1 05	2	100					
1 06	20	100					
1 07	59	100					
1 08	45	94	2	2		2	
1 09	16	98	2				
1 10	25	98					2
1 11	44	96		4			
2 01	43	20	78				2
2 02	58		84			16	
2 03	67	4	92			2	2
2 04	17	14	86				
2 05	29		80		4	16	
2 06	57		76			22	2
2 07	47		74			26	
2 08	28		61			39	
2 09	62	3	91			2	4
2 10	61		71			23	6
2 11	27		100				
2 12	75	13	87				
2 13	23		98	2			
3 01	22			76	6	2	16
3 02	5		2	88	6		4
3 03	71	2	35	4	2		57
3 04	70			50	16		34
3 05	39	2	2	77	15	2	2
3 06	37		2	74	12	2	10
3 07	36	6	4	78			12
3 08	12			84			16
3 09	33	2		76	14		8
3 10	54	12	6	82			
3 11	32	2		72	4	2	20
3 12	13			65	4		31
4 01	24		4	18	78		
4 02	7	2	4	12	80		2
4 03	73		16	4	78		2
4 04	35			2	86	10	2
4 05	31			10	84	6	
4 06	10				90	8	2
4 07	30			8	84	4	4
4 08	15				98	2	

TABLE 1 Continued

P-Number	*E-Number*	*1*	*2*	*3*	*4*	*5*	*6*
4 09	51	2	4	8	72	12	2
4 10	63				100		
4 11	18			2	80	16	2
5 01	6	2	27	10	31	12	18
5 02	72		4		9	82	5
5 03	40		13	6		87	
5 04	50		4		47	35	8
5 05	14		12			88	
5 06	38		16		2	82	
5 08	1		8		6	82	4
5 09	48		4		53	37	6
5 10	49		12		16	70	2
5 11	55	2	4		16	71	6
5 12	19		25	12	22	17	24
5 13	42					100	
5 14	66	2	2	4	8	78	6
5 15	8	4	38	2	8	38	10
5 17	53		39	2	31	14	14
5 18	65	12	33	2	12	39	2
5 19	11		26	6	14	25	29
5 20	41		25	6	36	25	8
6 01	26						100
6 02	60		2	2	2		94
6 03	46			2	2		96
6 04	34			2	6	8	84
6 05	56			2	2	6	90
6 06	74						100
6 07	4		4	2			84
6 08	64						90
6 09	9						100
6 10	21						98

significantly higher at the .01 level than selection of any other emotion (critical level for $p < .01$ for $df(1) = 6.63$).

EXPERIMENT 2

This experiment was conducted in an attempt to validate the results of the first rating task, and it used a slightly different procedure. Participant-raters were required to judge the degree to which each photograph exhibited each of the six emotions. This procedure has been adopted in the development of a

number of sets of photographs of facial expressions of emotion (e.g., Mazurski & Bond, 1993).

METHOD

Participants. Thirty college students in Beijing, with an equal number of men and women (age range = 18-22), participated in the study.

Procedure. The students were given the same 75 photographs to rate as in Experiment 1. They were provided with answer sheets that listed the six emotion words, but each emotion word was presented with a 7-point scale, with neutral or no emotion at one end (0) and the maximal degree of emotion at the other (6). The raters were shown the photographs one at a time and were required to judge each photograph on each of the emotion category scales, for example, they might rate a photograph as showing a maximal degree of happiness and neutral on all other emotion categories, or as showing a high degree of happiness and a high degree of a number of other emotions, or some other combination. The photographs were presented in a different random order from that used in the first rating task.

RESULTS

The average ratings given for each of the six emotion categories for each photograph are listed in Table 2. A mean score of 4 or more was set as the criterion for acceptability. This score exceeded the halfway point on the rating scale.

For happiness, surprise, sadness, and anger, all photographs were given the highest emotion category score for the emotion that the model had been instructed to portray. For disgust, one photograph was rated higher on an emotion other than disgust; for fear, four photographs were rated higher or equally highly on a different emotion. Assuming that each judgment made by a rater was independent of his or her other judgments, the probability of the designated emotion of happiness, surprise, sadness, and anger receiving the highest rating (over all photographs for that emotion) is, according to binomial theory, extremely small ($p < .01$). For disgust and fear, in which not all photographs were given the highest rating for the designated emotion, the probabilities of obtaining the ratings shown in Table 2 are also extremely small ($p < .01$). It can be seen from Table 2 that no photographs received an average rank of 4 or above (66.7% ranking) on more than one emotion category. The number of photographs given an average rank of 4 or above for the "correct" emotion was as follows: happiness (11); surprise (13); disgust (10);

TABLE 2
Rank Ratings for Each Photograph on Each Emotion

P-Number	*E-Number*	*1*	*2*	*3*	*4*	*5*	*6*	N
1 01	68	5.4*	0.1	0.1	0.0	0.0	0.0	30
1 02	3	5.6*	0.0	0.0	0.0	0.0	0.0	30
1 03	69	5.5*	0.0	0.0	0.0	0.0	0.0	30
1 04	52	5.6*	0.3	0.0	0.0	0.0		30
1 05	2	5.6*	0.5	0.0	0.0	0.0	0.0	30
1 06	20	5.5*	0.1	0.2	0.1	0.1	0.1	30
1 07	59	5.2*	0.4	0.0	0.2	0.1	0.1	30
1 08	45	5.0*	0.6	0.1	0.1	0.5	0.2	30
1 09	16	5.4*	0.0	0.1	0.2	0.0	0.0	30
1 10	25	5.2*	0.0	0.0	0.2	0.1	0.0	30
1 11	44	5.6*	0.3	0.0	0.1	0.0	0.2	30
2 01	43	1.9	4.3*	0.0	0.0	0.5	0.0	30
2 02	58	0.1	5.0*	0.1	0.4	2.0	0.2	30
2 03	67	1.2	5.0*	0.2	0.1	0.6	0.1	30
2 04	17	2.7	5.0*	0.0	0.1	0.1	0.0	30
2 05	29	0.2	4.4*	0.3	0.7	1.8	0.4	30
2 06	57	0.2	5.0*	0.4	0.0	1.8	0.4	30
2 07	47	0.1	4.6*	0.3	0.4	3.1	0.1	30
2 08	28	0.0	5.6*	0.1	0.2	3.3	0.6	30
2 09	62	3.3	4.2*	0.5	0.3	0.4	0.4	30
2 10	61	0.0	4.0*	0.5	0.5	2.0	0.7	30
2 11	27	0.6	4.9*	0.3	0.2	1.0	0.5	30
2 12	75	0.8	5.3*					30
2 13	23	0.1	5.2*	0.4	0.1	0.7	0.4	30
3 01	22	0.0	0.2	4.5*	0.9	0.3	2.2	30
3 02	5	0.4	0.4	5.0*	0.6	0.2	0.9	30
3 03	71	0.0	0.1	2.9	1.3	0.8	3.8	30
3 04	70	0.0	0.3	3.4	1.7	0.8	3.0	30
3 05	39	0.6	0.4	4.6*	2.3	0.6	0.9	30
3 06	37	0.1	0.6	4.2*	1.0	0.7	2.2	30
3 07	36	0.6	0.3	4.0*	0.9	0.0	1.4	30
3 08	12	0.4	0.4	4.2*	0.5	0.1	1.6	30
3 09	33	0.0	0.5	4.1*	0.6	0.1	0.7	30
3 10	54	1.1	0.5	4.3*	0.0	0.0	0.5	30
3 11	32	0.0	0.6	4.0*	0.7	0.3	2.1	30
3 12	13	0.2	0.2	4.0*	0.8	0.1	2.0	30
4 01	24	0.1	0.6	1.0	4.2*	0.5	0.6	30
4 02	7	0.1	0.3	1.4	4.4*	0.5	0.2	30
4 03	73	0.1	0.9	0.5	4.8*	0.3	0.1	30
4 04	35	0.0	0.2	0.4	5.2*	0.7	0.5	30
4 05	31	0.1	0.3	0.9	5.4*	1.1	0.4	30
4 06	10	0.1	0.4	0.4	5.2*	1.4	1.6	30

(continued)

TABLE 2 Continued

P-Number	*E-Number*	*1*	*2*	*3*	*4*	*5*	*6*	N
4 07	30	0.0	0.3	1.5	4.1*	0.3	1.0	30
4 08	15	0.0	0.6	0.6	4.6*	0.4	0.7	30
4 09	51	0.0	1.0	1.6	4.0*	0.8	0.3	30
4 10	63	0.0	0.0	0.7	5.0*	0.2	0.3	30
4 11	18	0.3	1.1	1.3	4.0*	1.3	2.2	30
5 01	6	0.2	1.8	1.8	1.5	1.8	1.0	30
5 02	72	0.0	1.9	0.6	2.2	4.1*	1.8	30
5 03	40	0.0	2.5	0.3	0.5	4.0*	0.3	30
5 04	50	0.2	0.7	1.8	3.0	2.3	1.2	30
5 05	14	0.5	2.5	0.1	0.4	4.0*	0.3	30
5 06	38	0.0	2.4	0.3	0.3	5.9*	0.2	30
5 08	1	0.0	2.4	1.0	1.8	4.6*	1.1	30
5 09	48	0.0	0.5	0.9	3.8	3.4	0.7	30
5 10	49	0.3	1.3	0.4	3.0	4.2*	0.5	30
5 11	55	0.0	2.4	0.4	2.0	4.5*	1.0	30
5 12	19	0.0	0.8	2.2	1.7	1.8	2.8	30
5 13	42	0.7	1.8	0.4	0.8	4.3*	0.4	30
5 14	66	0.0	0.7	1.4	3.4	4.1*	1.4	30
5 15	8	0.5	1.8	0.5	0.8	4.1	1.4	30
5 17	53	0.3	1.3	1.5	1.3	2.2	1.6	30
5 18	65	0.7	1.8	0.6	1.1	3.8	0.6	30
5 19	11	0.1	1.0	1.3	1.9	2.2	1.9	30
5 20	41	0.1	1.0	1.5	2.0	2.5	1.2	30
6 01	26	0.2	0.7	1.5	0.6	0.9	4.1*	30
6 02	60	0.2	0.5	1.6	0.8	0.9	4.7*	30
6 03	46	0.2	0.5	1.8	1.0	0.7	4.6*	30
6 04	34	0.0	0.8	2.2	1.2	0.4	4.5*	30
6 05	56	0.0	0.6	0.8	1.1	1.2	5.7*	30
6 06	74	0.0	0.2	1.3	0.4	0.5	5.3*	30
6 07	4	0.0	1.6	1.9	0.5	1.8	5.0*	30
6 08	64	0.0	0.2	1.4	0.8	0.8	5.7*	30
6 09	9	0.0	0.4	1.5	0.5	0.4	5.7*	30
6 10	21	0.2	0.4	1.5	0.4	0.3	5.4*	30

NOTE: *indicates photographs that had a judgment of above 70% in Experiment 1.

sadness (11); fear (10); anger (10). Satisfactory criteria for identification of emotion for a photograph were accepted as a judgment of 70% or above on the first rating task and a rank of 4 or above on the second rating task. Photographs that met these criteria are asterisked in Table 2. This set of reliable photographs consists of 11 for happiness, 12 for surprise, 9 for disgust, 11 for sadness, 9 for fear, and 10 for anger.

GENERAL DISCUSSION

Our results demonstrate that we have developed a good set of photographs of Chinese people expressing six basic emotions. The procedure adopted here for the posing of these expressions (Wang & Meng, 1986) appears to have been successful. The final set of 62 photographs has reliabilities of 70% or more as assessed by Chinese from the same city and has been rated relatively highly as expressing the primary emotion and relatively low as expressing secondary emotions. It is interesting that the two rating tasks included in this study occasionally gave slightly different results: Photographs that were judged in Experiment 2 as indicating the display of some secondary emotion might be categorized reliably in Experiment 1, and vice versa. Although different groups of participant-judges were involved in the two experiments, the discrepancies for some photographs are more likely to result from the somewhat different nature of the tasks. The second experiment should be viewed as providing additional reliability data to that provided by the first. As in most other studies of this type, we did not collect test-retest reliability data with the same group of participant-judges and the same tasks.

The results of the experiments are discussed for each emotion separately and in terms of the 75 photographs included in the rating tasks and the 62 finally selected as good exemplars of the six basic emotions.

Anger. This was categorized very consistently in Experiment 1, although anger expressions were rated as demonstrating some disgust as a secondary emotion in Experiment 2. Of the 10 anger photographs included in the rating tasks, all fulfilled our criteria for acceptance in the final set and all had a high level of correct classification. It is of interest that Chan (1985) found superior recognition of anger by Hong Kong Chinese with Caucasian faces expressing the emotions. This suggests that Chinese differ from Japanese (e.g., Matsumoto, 1992) in their ability to pose or recognize anger.

Disgust. Of the 12 photographs posing disgust that were selected for inclusion in the rating tasks, 9 fulfilled the criteria for inclusion in the final set of 62 photographs. Disgust had the lowest mean percentage agreement of all the emotions in the final set of photographs, and none received very high ratings. This suggests that the disgust expression may be difficult both to pose and recognize. Disgust was sometimes classified as anger in this study, and anger was rated as a secondary emotion for some of the disgust photographs in Experiment 2. A number of studies have reported low recognition rates for disgust expressions (e.g., Gosselin, Kirouac, & Dore, 1995; Lewis, Sullivan, &

Vasen, 1987), so our set of faces would appear to fit in with a general pattern of difficulty with either posing or recognizing disgust.

Surprise. This had a moderately high percentage agreement, although there was a tendency to label these photographs as fearful expressions in Experiment 1. Fear also was rated as a secondary emotion in some of the expressions correctly labeled as displaying surprise in Experiment 2.

Fear. A similarity in the expressions of fear and surprise is suggested by the finding that, not only was surprise sometimes rated as fear but that fear sometimes was classified as surprise. It was difficult to obtain satisfactory expressions of the emotion of fear from the posers. The pool of 18 fear expressions included in the rating tasks of Experiments 1 and 2 was reduced to 9 that satisfied our criteria for inclusion in the final set. Fear has been found difficult to pose in other studies and is often misidentified as surprise (e.g., Boucher & Carlson, 1980; Ekman et al., 1987). It should be noted, however, that our percentage agreement ratings for fear varied markedly from photograph to photograph, with one photograph showing 100% agreement between raters; even this photograph was rated as indicating some secondary emotion of surprise in Experiment 2.

Happiness and sadness. Happiness was the emotion with the highest agreement rating, consistent with the findings of emotion recognition tasks in general (e.g., Ekman et al., 1987; Matsumoto, 1992). Sadness had reasonable ratings, with disgust and fear sometimes selected as labels for poses attempting to display this emotion.

In summary, this set of Chinese facial expressions of emotion provides numerous examples of reliable photographs of six basic emotions. On the basis of the reliability data reported here, various photographs from the set of 62 expressions already have been used in a cross-cultural study of emotion recognition involving Chinese and Australian children (Markham & Wang, 1996). In that study, we included two sets of photographs, with an equal number of representatives of the six emotions in each set. These consisted of photographs selected from the Chinese set and a selection of photographs made from the Ekman (1976) slides. In contrast to our set of 62 photographs, Ekman's (1976) set has 110 slides of Caucasian faces, with 14 to 18 slides of each emotion. We selected photographs from both sets on the basis of their high reliability scores. Although we obtained some ethnic bias effect under certain conditions, the Chinese faces resulted in better overall performance than the Caucasian, suggesting that the Chinese photographs portray good representations of the six emotions. These photographs of Chinese facial

expressions of emotion, therefore, are likely to prove useful in studies conducted to investigate emotion recognition in China and also in cross-cultural studies of emotion recognition. It would be interesting to see whether Caucasian adults who have had little exposure to Chinese people expressing emotions could identify the emotions in these photographs accurately.

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