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Is There an Ingroup Advantage in Recognizing Spontaneously Expressed Emotions?

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Abstract Evidence for the ingroup advantage hypothesis in recognizing emotions comes from studies using specific types of posed expressions. A proposed source of this advantage has been culturally-specific ways of expressing emotions, known as cultural dialects (Elfenbein et al. Emotion 7(1):131–146, 2007). But to date, no study has used spontaneously produced expressions as stimuli in testing the hypothesis. We do so here. American and Japanese observers judged expressions produced by American and Japanese athletes immediately at the completion of a medal match from the 2004 Athens Olympic Games. The ingroup hypothesis was not supported, suggesting that it occurs when posers mime an expression, but not when they spontaneously produce it in real life.

Keywords Emotion · Culture · Ingroup advantage

One type of cultural difference in emotion judgment that has received attention recently concerns the possibility of an *ingroup advantage* in emotion recognition (Elfenbein and Ambady 2002b). This refers to the tendency for individuals to more accurately recognize emotional expressions produced by members of their own culture rather than those produced by another. Early research testing the hypothesis provided mixed results (e.g., Boucher and Carlson 1980; Kilbride and Yarczower 1983; Markham and Wang 1996). Elfenbein and Ambady (2002b) reported support for it across the studies meta-analyzed as well as separately for emotion, channel of communication, cross-cultural exposure, and other potential moderators.

A number of studies have subsequently tested the effect. In understanding this literature, it is important to distinguish between judgments of posed vs. spontaneous expressions,

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because these can differ in several ways (Ekman 1993; Ekman et al. 1981). First, posed expressions may contain extraneous facial muscle movements that do not occur in spontaneous expressions, or may lack muscle movements that actually do occur. Second, relative differences in the intensity levels of the facial muscles that are innervated in posed expressions may not be valid analogs of those that occur in spontaneous expressions. Third, spontaneous expressions have smooth timing characteristics in terms of their onset, offset, and coordination among the facial muscles; posed expressions do not. Finally, posed expressions tend to be asymmetrical, that is, stronger on one side of the face than the other (Ekman et al. 1981; Hager and Ekman 1985; Matsumoto and Lee 1993; Rinn 1984); spontaneous expressions are not (with the exception of expressions of contempt, which is depicted in unilateral or asymmetrical tightening of one of the lip corners, giving the appearance of a smirk).

The ingroup hypothesis has been supported only in studies involving certain types of posed expressions (Elfenbein and Ambady 2003a, 2003b; Elfenbein et al. 2002, 2004, 2007a).[1] In their most recent study, for example, Elfenbein and colleagues (2007a) asked participants from Canada and Gabon to pose facial expressions of emotion, and coded those expressions using the Facial Action Coding System (FACS; Ekman and Friesen 1978). Observers in both cultures judged which emotion was portrayed, and the ingroup effect was found for some posed expressions.

Elfenbein and colleagues (2007a) have argued that the ingroup effect occurs because of cultural differences in emotional expression called "emotion dialects," which are culturally derived, minor variants of emotional expressions. Presumably, people are more accurate when judging such expressions because those expressions are differentially used in their culture (Elfenbein and Ambady 2003a, 2003b; Elfenbein et al. 2002, 2007a). For instance, raising an eyebrow could be a sign of skepticism in one culture. If people of that culture judged expressions of encoders raising an eyebrow, they are likely to respond that the expression was one of skepticism. People from another culture, however, may not because the expression may not be used in that culture, or it may have a different meaning in that culture.

Unfortunately, however, there have been no studies testing the ingroup hypothesis using spontaneous expressions, and it would be important, for several reasons. As mentioned above, when expressions are voluntarily posed, they are different than expressions that are spontaneous, and it could be that the ingroup effect occurs with posed expressions because of cultural differences in the *mimes* of an expression. This has potential implications for the notion of emotion dialects, and would suggest that such dialects occur only with posed expressions.

We tested the ingroup effect using spontaneous expressions produced by members of different cultures in a naturalistic field setting. The expressions came from Matsumoto and Willingham's (2006) study of spontaneous expressions produced by athletes during the judo competition of the 2004 Athens Olympic Games. Expressions were captured using high-speed photography immediately at the end of a match determining gold, silver, bronze, or 5th place finish. American and Japanese observers judged expressions produced

[1] These were non-equivalent expressions, that is, expressions that differed in the specific facial muscles that were innervated. Studies of posed, equivalent expressions do not support the ingroup hypothesis (Beaupré and Hess 2005; Biehl et al. 1997; Elfenbein and Ambady 2002a; Lee et al. 2005; Matsumoto 1990, 1992, 1993, 2002, 2007; Matsumoto and Ekman 1989; Matsumoto et al. 1999), including Elfenbein and colleagues' (2007a) study described here. Even when American and Japanese observers are told that the Caucasian expressors in the JACFEE are Americans and the Asian expressors are Japanese, the ingroup effect does not occur with posed, equivalent expressions (Matsumoto 2007).

by American and Japanese athletes. We predicted that the interaction involving judge and expressor culture and the subsequent residualized means analysis, the statistical method that has been used to document the ingroup effect in the past, would be significant. These analyses should indicate that American observers were relatively more accurate at judging American expressers compared to Japanese expressers, while Japanese observers would be relatively more accurate at judging Japanese expressers compared to American expressers.

Methods

Participants

A total of 399 individuals participated in this study: 119 from Japan (43 female, 61 male, rest unknown; mean age = 20.81 years, $SD = 4.16$), and 280 US Americans (228 female, 52 male, mean age = 22.54 years, $SD = 5.2$). All participants were undergraduates, born and raised in their respective countries, reported Japanese and English as their primary languages, respectively, and participated in partial fulfillment of course requirements.

Facial Stimuli

The pool of facial stimuli were produced by 84 athletes representing 35 countries in the 2004 Athens Olympic Games, and were coded using FACS (Ekman and Friesen 1978; reliability = .79). The expressions were then classified according to the emotions associated with those FACS Action Unit (AU) combinations theoretically or empirically related to emotions in previous work (and published in Ekman and Friesen 1975, 1978; thus the specific AUs and AU combinations on which FACS bases its emotion classifications have been published and are available for public scrutiny). These AUs and AU combinations typically involve components of full-face, prototypic expressions, and have been associated with emotion signaling in a wide range of studies involving actual expression production by participants from all parts of the world, not just westerners (Matsumoto et al. 2008), ensuring that the facial configurations predicted to be associated with emotion are not just "western" prototypes.

For this study, we used only the expressions produced by Japanese ($N = 8$) and American athletes ($N = 1$) at the completion of a match for a medal, which were associated with an emotion classification.[2] The Japanese athletes produced 15 expressions at match completion, while the lone American produced three expressions. Because there was only a single American contributing expressions (there was only one American medalist at the 2004 Olympic Games in judo), we added 12 expressions of other athletes of Caucasian ethnicity, matching their place finishes with the Japanese sample to the best extent possible. This selection procedure was not meant to suggest that there are no differences in the cultures of these Caucasian expressers; there certainly are major cultural differences among them. But this selection is justified in this study because they all come from the

[2] Although expressions were available from the medal ceremonies, we opted not to include those because they occurred within a staged, public ceremony where athletes have had time to reflect on their performances and the results. Thus one would expect relatively greater influences of sociocultural demands on their expressions, relegating them as relatively less spontaneous. The expressions that occurred immediately at the conclusion of a medal match, however, while still in a public arena, are relatively more spontaneous. Given that the focus of this study was on spontaneous rather than posed expressions, it made more sense to study only those expressions at match completion.

same visually perceived racial category. On this level, they therefore become equivalent to any individual expresser in any of the previous studies on the ingroup effect of a Caucasian descent, because although those individuals in those studies come from different national and cultural backgrounds, judges are not told what those backgrounds are and make no explicit inferences about them. Moreover, a previous study that examined nationality attributions of Caucasian (and Asian) expressers demonstrated that observers are relatively poor at making such attributions in the first place (Matsumoto 2007). Finally, Matsumoto and Willingham (2006) tested for cultural differences in the expressions that occurred immediately at match completion and found none. Thus the use of a general "Caucasian" expresser category in this study, while of course glossing over such important underlying cultural differences, is equivalent to the previous studies on the ingroup effect, and thus appropriate. The analyses below were completed separately with just the American expressions, and with the combined American and matched Caucasian expressions.

Table 1 lists the FACS codes and emotion classifications for the expressions used. The FACS codes make it clear that the expressions were not exactly the same, rendering them non-equivalent. At the same time, although there was a range of emotions represented in the entire pool of expressions from all athletes, the expressions included here exclusively involved only happiness or sadness. This occurred because these were the only expressions (and emotion classifications) that the Japanese and American/Caucasians produced (and were thus *not* a selection of the researchers). The findings in this study, therefore, are limited to these expressions and emotions, and readers should interpret the findings with this caveat.

Judgment Tasks and Procedures

Data were collected individually using a website. Data collection was conducted in English for the Americans. For the Japanese, the research protocols were translated into Japanese, and accuracy of the translation was verified using back-translation procedures. There were no problems in the translation or back-translation. Observers were told that the individuals they were about to see were athletes who had just completed a match for a medal at the Athens Olympic Games. For each expression, they judged the emotion portrayed using a fixed-choice response task with the alternatives anger, contempt, disgust, fear, happiness, sadness, surprise, neutral, and other. They also judged whether the athlete had won or lost their match by checking a corresponding box. All observers were shown three expressions not in the actual sets for practice with the response alternatives. They were also asked if they had seen any of the expressers before, and all observers included in this study stated that they had not. There were no questions concerning the procedures or responses. All expressions were shown for 15 s each in one of three random orders prepared for both sets.

Results

The nominal judgment data were recoded into accuracy scores, giving 1 when the judged emotion was the same as the classified emotion, and 0 for all other judgments. When the classified emotion was a blend of two emotions, the selection of either emotion was considered correct. The scores were then averaged separately for Japanese and American expressers. We computed a two-way mixed ANOVA using judge and expressor cultures as factors. The two-way interaction was significant, $F(1, 387) = 7.18$, $p < .01$, $\eta_p^2 = .02$. Analysis of residualized means, however, indicated that the American observers judged

Table 1 FACS codes and emotion classifications for the expressions used in the study

Country	Place	FACS codes	Emotion
Japan	Gold	6C 12C	Happiness
Belarus	Gold	6A 12B 25C	Happiness
Japan	Gold	6E 12E 25C	Happiness
		6C 12C 14B 17B 28C	Happiness
		6E 12E 25C	Happiness
Georgia	Gold	1A 2A 12B	Happiness/Surprise
		12B	Happiness
		12C	Happiness
Japan	Gold	6B 12B 26B	Happiness
USA	Bronze	6E 12E 26B	Happiness
		6D 12C 26E	Happiness
		1B 12B 16B 26C	Happiness/Sadness
Japan	Gold	6B 12B	Happiness
		1B 4B 6C 12B 15B 17B	Happiness/Sadness
Germany	Gold	6B 12B 26B	Happiness
Japan	Silver	1B 4B 17A 43 54	Sadness
		1B 4A 43	Sadness
The Netherlands	Silver	1D 4D 6B L15A 26B 64	Sadness
		1C 4C 6A 25C 43 54	Sadness
Japan	Gold	6D 12D 26C	Happiness
		6D 12D 26C	Happiness
Germany	Bronze	1B 4B 6B 12C 26B	Happiness/Sadness
Japan	Gold	1B 4B 7C 17A	Sadness
Belgium	Bronze	6D 12D 26B	Happiness
Japan	Gold	6D 12D 26B	Happiness
		6C 12B 15B 17B 26B	Happiness/Sadness
		1B 6B 14B 15B 17D	Sadness
Germany	Bronze	6D 12D 26C	Happiness
		1B 4B 6D 12D 26B 43 44	Happiness/Sadness
Slovenia	Bronze	1C 4C 6B 15A 26C 64	Sadness

Note: Each row represents a different expression, and each country represents a different expresser; thus some expressers have multiple expressions. FACS AU codes involve a number corresponding to a muscle unit, and the intensity of innervation (A–E). The muscles or actions corresponding to the AUs that occurred in the expressions in this study were as follows: 1—inner frontalis; 2—outer frontalis; 4—corrugator; 6—orbicularis oculi; 7—eyelid tightening; 12—zygomatic major; 14—buccinator; 15—triangularis; 16—lower lip depress; 17—mentalis; 25—lip part; 26—jaw drop; 28—lip suck; 43—eyes closed; 44—squint; 54—head down; 64—eyes down

Japanese expressers ($M = .48$) more accurately compared to American expressers ($M = .41$), which is *opposite* to what would be predicted by the ingroup effect. Also, Japanese observers judged American expressers ($M = .45$) relatively more accurately than Japanese expressers ($M = .42$) (Fig. 1). Thus the ingroup hypothesis was not supported. The judge culture main effect was significant, $F(1, 387) = 3.78$, $p < .05$, $\eta_p = .01$, indicating that the American judges ($M = .47$) were overall better judges of emotion than were the Japanese ($M = .43$), replicating previous findings (Matsumoto 1992).

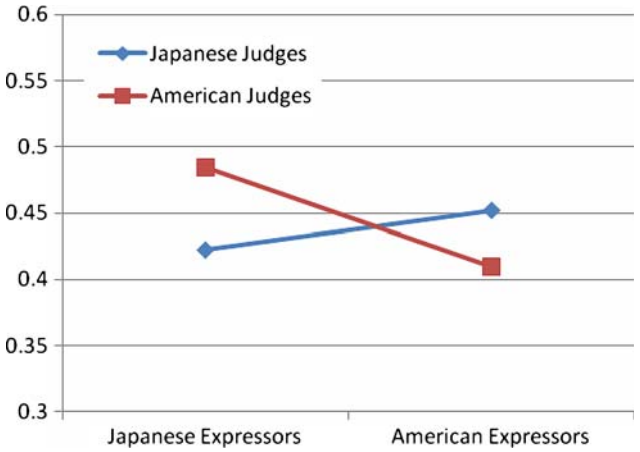

Fig. 1 Emotion recognition accuracy scores for American and Japanese observers judging American and Japanese expressions

Because judo is a very popular spectator sport in Japan, and some of the Japanese athletes have celebrity status and are well recognized by the general public, it is entirely possible that the Japanese observers recognized the athletes and remembered whether they won or lost in the Games, and thus made inferences about their emotions (despite the fact that all observers included in this study reported they had not seen any of the expressers previously). Thus we recomputed the analyses eliminating expressions by Tani, Nomura, and Suzuki, three Japanese athletes who have celebrity status. This was not a problem for the American athlete, because judo does not enjoy the same status in the public. The two-way interaction was still significant, $F(1, 387) = 6.01$, $p < .01$, $\eta_p^2 = .02$, and residualized means analysis again indicated a pattern opposite to that predicted by the ingroup effect. The judge culture main effect marginally survived, $F(1, 387) = 2.70$, $p < .10$, $\eta_p = .01$.

We then recomputed the analyses using the American and matched Caucasian expressions. In this case, the two-way interaction was not significant, $F(1, 387) = 1.68$, *ns*, $\eta_p^2 = .004$. The interaction was also not significant when the three Japanese celebrity athletes were excluded from the analysis, $F(1, 387) = 0.13$, *ns*, $\eta_p^2 = .00$. Once again, however, the judge culture main effect was significant, $F(1, 387) = 4.23$, $p < .05$, $\eta_p = .01$, indicating that the American judges were more accurate than the Japanese.

We also examined if observers differed in their judgments of whether the athletes had won or lost their matches. This is interesting because it examines the possibility that there may be differences in the eliciting event information related to emotion signaling that may be differentially perceived by the Americans and Japanese. The Japanese observers (mean percentage correct = 66.01%) were slightly more accurate than the American observers (59.95%) when judging Japanese expressers, but this difference was not significant. The Japanese were also more accurate than Americans when judging the American expressions (76.63% vs. 67.30%, $p < .05$). Thus, if anything, the findings were again opposite that which would be expected by the ingroup hypothesis.

It was possible that actual differences among the expressions contributed to the findings reported above. Thus, we summed the intensities of each expression according to the FACS AU intensity coding (A = 1, B = 2, C = 5, D = 8, and E = 10). This recoding procedure was selected because the differences in ranges corresponded to the original intent and

scaling of the FACS AUs. That is, the difference between A and B AU intensities is relatively small compared to the difference between B and C. C level intensity according to FACS coding criteria cover a rather large range of moderate sized muscle innervations. We then averaged the intensities for the various expresser ethnicities. The average expression intensity for the Japanese expressers was 14.47; for Americans it was 17.67; and for the combined American/Caucasian expressers it was 14.60. Thus, overall expression intensity differences among the expresser ethnicities could not have contributed to the findings above.

We also examined whether there were differences in expressions that were more representative of prototypical emotions among the Japanese, American and combined American/Caucasian expressers by computing a signal clarity value for each expression (Matsumoto et al. in press), using this formula: # of *observed* AUs associated with FACS-generated emotion category/(# of critical AUs in the *prototypical* expression of that emotion + total # of *observed* AUs not associated with predicted emotion). The signal clarity value for the Japanese expressions was .38; for Americans it was .35; and for the combined American and Caucasian expressions it was .35. Thus, the above findings could not have been influenced by differential degrees to which the expressions were more or less representative of the prototypical emotions.

Finally, we note that the sample sizes were respectable, allowing us to conclude that the non-findings on the ingroup effect were not an artifact of small sample sizes.

Discussion

The ingroup advantage hypothesis was not supported in this study, suggesting that the effect reported in previous studies may be localized to non-equivalent, posed expressions. That is, the cultural ingroup advantage hypothesis may not be ecologically valid because they have occurred only with mimes. As suggested above, mimed expressions may not be valid analogs of actually occurring expressions when emotions are aroused because they may include extraneous muscle movements, or not include muscle movements that spontaneously would be. Innervated muscles may also be at different intensity levels or symmetries from spontaneous expressions. Any of these possible characteristics of posed, voluntarily expressions may be sufficient to produce the dialects proposed by Elfenbein and colleagues (2007a) that in turn produced the ingroup effect in the past.

There were also some counter-intuitive findings. For example, the American observers were better at judging the emotions of Japanese expressers, while Japanese observers were better at judging American expressers. Also, the Japanese observers were better at judging match outcomes than the American observers, despite the fact that the Americans were slightly better at judging emotions overall. (This is counterintuitive because one may speculate that emotion judgments serve as the basis for judgments of match outcomes.) To be sure, the restricted range in the number and type of expressions, especially for the lone American, precludes any definitive conclusions (note that the interaction effects did not survive when the combined American/Caucasian expressions were analyzed). But, these findings may be related to an interaction between signal clarity in the face and the relative contribution of emotion, non-emotion, and other facial cues in judgments of match outcomes. Some research has suggested that, when judging emotions, Americans are more influenced by facial cues than contextual cues, whereas Japanese incorporate context more (Masuda et al. 2008). This effect may extend to emotional vs. non-emotional cues in the face. If Americans are more influenced by non-emotional cues (that reduce signal clarity),

whereas the Japanese are less influenced by these, the slightly higher signal clarity in the Japanese expressions may have facilitated Americans' emotion judgments. By the same token, the relatively lower signal clarity in the American expressions would not have affected Japanese judgments as much, which may account for the fact that Japanese judged the American expressions relatively better than Japanese expressions. This effect might have also influenced the judgments of match outcomes. Note, for example, in Table 1 that expressions with lower signal clarity (i.e., expressions with facial controls, i.e., AUs 14 and 17, with or without 15) occurred more in athletes who won their match. If Americans are more influenced by these non-emotion cues and the Japanese are not, then it makes sense that the Japanese could more readily judge outcomes. Still, all of this remains speculative until future research can formally test these effects.

The findings of this study were generated with several notable limitations. First, as mentioned above, the number and type of expressions were limited. It could be that a larger number of expressions, across a wider range of emotions, is required to produce the ingroup effect. Or, it could be that the particular evocative context utilized in this study—winning or losing medal matches in the Olympic Games—was not conducive to expressions of the type that would produce an ingroup effect. Or it could be that comparison of different cultures may produce the effect. Certainly these are all valid possibilities that should be addressed in future research.

Additionally, future studies of the ingroup effect should examine other potential sources of the effect. Ekman (1979) delineated the potential effects of static, fast, slow, and cosmetic cues in contributing to emotion judgments. Facial expressions, which involve rapid movements of the facial musculature, are fast cues. Facial physiognomies—the physical features of the face—provide static cues, and ethnic/cultural differences in physiognomy may contribute differentially to emotion-related signals independent of the expressions themselves. Individuals with protruding eyebrows, for instance, may be perceived as staring more, and individuals with double eyelids may produce more sclera—the whites above the eyes—than individuals with single eyelids for the same degree of innervation. In fact one study did indeed find differences in judgments of fear and anger between Americans and Japanese as a function of the degree of white above the eyes shown in these emotions (Matsumoto 1989). Rounder faces with larger eyes give baby-face features, while longer faces with thinner eyes may portray a harsher message.

Slow cues, such as wrinkle patterns and pigmentation, as well as cosmetic cues involving hair style and length, type and length of facial hair, may also contribute to emotion signaling. Other cues in everyday life additionally compound the picture, such as cosmetics, eyeglasses, jewelry, and the like. All of these physical features associated with the face may contribute to emotion messages, and these may contribute to ingroup effects. If expressions used as stimuli are different across encoder cultures, and the encoders differ in non-morphological aspects of their faces, then judgment differences across encoder cultures are inherently confounded by the non-expressive aspects of the face. Future studies should investigate these possibilities.

It is also possible that decoder sources contribute to the effect. For instance judges may be more motivated to recognize the emotions of members of their own culture, or their judgments may be affected by stereotype-based biases. Stereotypes concerning people and emotions in other cultures may affect judgments (Hess et al. 2000), as well as display and decoding rules concerning emotions (Buck 1984; Ekman and Friesen 1969; Matsumoto and Ekman 1989). Or, judges may have differential degrees of emotion recognition abilities (Elfenbein et al. 2007b; Foo et al. 2004). Alternatively observers may be more anxious when judging emotions expressed by people with facial physiognomies or morphologies

that they are not familiar with, despite similarities in the expressions themselves, and this anxiety may interfere with judgments. This anxiety may result because of the uncertainty concerning the expressions or the context of judgment. Uncertainty is a major component of intercultural interactions, and research has demonstrated that people in such interactions engage in a number of strategies to reduce it (Gudykunst and Nishida 1984; Gudykunst et al. 1985, 1986). A recent study (Mullins and Duke 2004), however, indicated that social anxiety, while correlated with increased response times in judging expressions, was *not* correlated with accuracy rates, arguing against this possible explanation.

Finally, the ingroup advantage hypothesis, which is based on the match between a judge culture group and the physical characteristics of expressers supposedly from their own culture, and how it was tested in this study as well, is probably not the most fruitful way to examine possible ingroup advantage effects. Ingroups can be defined not as much by the physical similarities between people based on their ethnic, racial or gender compositions but more by social psychological characteristics (Tajfel 1982). Ingroup members share familiarity, intimacy, trust, and commitment to future relationships, and these can transcend racial/ethnic/cultural boundaries. There is no such sharing between a participant and stimulus person in any study to date. A better examination of any possible ingroup effects would be studies that manipulated these social psychological parameters between judge and expressor all the while ensuring that stimuli and study are balanced and that the stimuli are equivalent. Research has demonstrated a relationship between acquaintanceship and judgment accuracy of personality (Funder and Colvin 1988; Funder et al. 1995). Similar studies should be done across cultures for emotion recognition as well.

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