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and Hiroshi Yamada²

Abstract

Previous judgment studies of facial expressions of emotion in context have provided mixed results. This article clarifies and extends this literature by testing judgments across cultures and by using novel methodologies that examine both face and context effects. Two studies involving observers from three cultures provided evidence for both face and context effects in emotion judgments and cultural differences in both. Japanese and South Korean observers were more influenced by context than Americans, and these differences were mediated by personality traits. The results provided a more nuanced view of how both culture and emotion moderate judgments of faces in context and how cultural differences existed in the judgments, which were predicted using a construct known as Context Differentiation.

Keywords

culture, emotion, context, response linkage, face superiority, context superiority

Facial expressions occur in context in real life, and the relative importance of face and context in contributing to emotion messages has been debated for years (Bruner & Tagiuri, 1954; Ekman & O'Sullivan, 1988; Fernberger, 1928; Russell & Fehr, 1987). Studies in this area, which typically obtain emotion judgments of congruent and incongruent face-context combinations, have produced inconsistent results. Some have reported context superiority (Carroll & Russell, 1996; Fernberger, 1928; Russell & Fehr, 1987); others face superiority (Ekman & O'Sullivan, 1988; Ekman, O'Sullivan, & Matsumoto, 1991; Frijda, 1969; Goldberg, 1951; Nakamura, Buck, & Kenny, 1990). Some provided no support for either (Fernandez-Dols, Sierra, & Ruiz-Belda, 1993; Goodenough & Tinker, 1931; Munn, 1940; Vinacke, 1949), while some have supported an additive hypothesis (Aviezer et al., 2008; Bruner & Tagiuri, 1954; Knudsen & Muzekari, 1983; Meeren, van Heijnsbergen, & de Gelder, 2005).

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One reason for these inconsistencies may be the blending of different research paradigms. Contexts in which expressions occur have many characteristics, including the faces that occur before or after a target face, faces that occur in other people around a target person, other cues in the face or head area (e.g., hairstyle, glasses, facial hair), other cues in body postures and gestures, who else is involved, the physical setting, the nature of the emotion trigger, or words associated with the expressions.¹ Consequently, studies have varied as well; faces have been combined with knowledge about what triggered an emotion (Ekman, Friesen, & Ellsworth, 1972; Fernandez-Dols et al., 1993; Frijda, 1969; Goodenough & Tinker, 1931; Knudsen & Muzekari, 1983), other bodily responses (Aviezer et al., 2008; Meeren et al., 2005), other faces seen prior to a target emotional expression to be judged (Carroll & Russell, 1996; Ekman et al., 1991; Goldberg, 1951; Russell & Fehr, 1987), and different angle shots that include more information (Munn, 1940; Vinacke, 1949; for a more detailed description of the differences among these paradigms and their implications to real life phenomena, see Matsumoto & Hwang, 2010). This article is concerned with judgments of congruent and incongruent combinations of facial expressions of emotion with the events that triggered them, which we term *response linkage*.

Response Linkage

Response linkage refers to the connection between an emotion-eliciting event and the subsequent response to it. Emotions are linked to events because they are evolutionarily based, information-processing programs (Levenson, 1999; Tooby & Cosmides, 2008) that reliably connect an event with a behavioral response that aids in adaptation. Linking spoiled milk with disgust, growling sounds at night with fear, death with sadness, and experiences with loved ones with happiness are all important functions of emotions that aid in adaptation to the world and ultimately survival.

Response linkages may be congruent or incongruent. Congruent linkages occur when an event that elicits an emotion in most people is associated with that emotion's response components (expressive behavior, physiology) in the people experiencing the event. Congruent linkages may occur because humans come preprogrammed to have certain emotions to certain events (Mineka & Cook, 1993; Ohman & Mineka, 2003) or because of culture-constant learning. Incongruent response linkages occur when an event that elicits an emotion in most is associated with a different emotional response. These can occur either through individual or cultural differences in learning which emotions to link to which events or in the rules of modulating emotional responses (display rules; Ekman & Friesen, 1969). Thus, a smiling face in an event that elicits happiness in most people would be congruent; an angry face in that same event, however, would be incongruent.

Judgment studies of response linkages are important because they inform us of how emotions are judged in relatively more realistic contexts as opposed to the fairly acontextual way most studies have been conducted (Biehl et al., 1997; Ekman et al., 1987). When faces are presented acontextually, recognition rates are high and statistically significant, but generally never near perfect (with the exception of high-intensity smiles). Studies involving congruent response linkages would predict an additive effect on judgments because of the increased signal clarity in the overall emotion message when two different signal sources provide the same message. This is what previous mono-cultural studies have found (Bruner & Tagiuri, 1954; Knudsen & Muzekari, 1983).

Incongruent response linkage occurs because of learned emotional responding or response regulation in the first place; thus, judgment studies of them may reflect the biases associated with that learning. When viewing a happy face in a situation that normally would elicit anger, for instance, judges may infer that the happy face is a mask (learned) that hides the expresser's true feelings and may judge the person to be angry despite smiling. In this case, the judgment of anger

is made on the basis of an attribution of the smile as a learned mask, and not as a signal of true enjoyment. Still, previous studies have demonstrated a face superiority effect, indicating that the signals in the face tend to override the signals provided by the context (Ekman & O'Sullivan, 1988; Ekman et al., 1991; Frijda, 1969; Goldberg, 1951; Nakamura et al., 1990).

The Contribution of Cross-Cultural Studies and Possible Cultural Moderation of Face and Context Effects

Cross-cultural judgment studies of congruent and incongruent response linkages can make substantial contributions to this literature. Although previous research has demonstrated high cross-cultural agreement (Elfenbein & Ambady, 2002; Matsumoto, 2001), agreement is never perfect, and cultural differences in agreement levels exist (Beaupre' & Hess, 2005; Elfenbein, Beaupre', Levesque, & Hess, 2007; Lee, Chiu, & Chan, 2005; Matsumoto, 1989, 1992). The additive effect that should occur with congruent response linkages should reduce or eliminate cultural differences in absolute agreement rates, because agreement rates should approach near perfect ceilings. We test this idea for the first time.

Cultural differences, however, should be observed when incongruent response linkages are judged, because these linkages reflect cultural differences in learned biases of attributing emotions in these situations. There may be differences in direction, in which face superiority exists in one culture but context superiority exists in another. Or there may be differences in degree, where members of all cultures demonstrate face or context superiority, but to varying degrees. Although a face superiority effect has been observed until now, cultural differences in context effects may underlie and moderate the face effects. To date, no study has examined these possibilities, as the previous literature is limited to single cultures.

There is good reason to believe that context effects exist in some cultures. Such possibilities are highlighted by a literature examining cultural differences in object-focused versus contextualized styles of thinking (Berry, 1976, 1991; Levy-Bruhl, 1923), as well as studies that have documented cultural differences in holistic versus analytic thinking vis-à-vis objects and the contexts in which the objects are located (Masuda & Nisbett, 2001; Miyamoto, Nisbett, & Masuda, 2006; Nisbett, Peng, Choi, & Norenzayan, 2001). Cultural differences in context effects are expected because some cultures encourage large differentiations among their members' behaviors across contexts, while others discourage such differentiation.

Recently, a construct termed *context differentiation* (CD) was proposed to explain cultural and individual differences in these effects (Matsumoto et al., 2009). On the cultural level, high CD cultures encourage the differentiation of behavior across contexts, and inconsistency across contexts is a norm. In low CD cultures, members differentiate their behaviors relatively less across contexts, and consistency is the norm.² The United States, for instance, is a low CD culture, where cross-context consistency is the preferred norm. Individuals who differentiate their behaviors greatly across contexts are seen as hypocrites or chameleons. East Asian cultures, however, tend to be high CD, where cross-context differentiation in behavior is natural and expected. High CD cultures facilitate the learning of the subtle and intricate meanings of context and the associated behavioral regulations that are required as a product of enculturation and a sign of maturity. Thus, chameleons in one culture may be mature adults in another.

These cultural dynamics may influence cultural differences in the size of context effects observed in the face versus context paradigm. Low CD cultures like the United States should be associated with smaller context effects (and thus greater face effects, which has been observed in the past), while high CD cultures like Japan or South Korea should be associated with larger effects (which has never been tested).

Overview and Hypotheses

We present two studies that examine cross-cultural judgments of congruent and incongruent response linkages, while making methodological improvements over previous studies. In Study 1, American and Japanese observers viewed multiple pairs of three different facial expressions of emotion combined with vignette descriptions of eliciting events of the same three emotions. Source clarity of the faces and vignettes were tested prior to their use and combinations were created ensuring equivalence in source clarity.³ Observers made fixed choice judgments of a range of emotions, and we computed confusion matrices of the judgments.⁴ We hypothesized that congruent pairs would produce an additive effect, where the agreement rates of both Americans and Japanese would be greater than for each of the single sources, and with elimination or reduction in cultural differences in absolute agreement rates. We also hypothesized that Americans would demonstrate a face superiority effect for incongruent combinations, replicating previous studies, but that the Japanese would demonstrate a context superiority effect.

Study 2 replicated and extended these findings in a United States, Japan, and South Korea comparison, hypothesizing that all cultures would demonstrate an additive effect for congruent combinations and that the Americans would demonstrate a face superiority effect for incongruent combinations but that Japanese and Koreans would produce a context superiority effect. Study 2 also involved more sophisticated data analytic strategies to quantify the degree of the face and context effects in each culture and included the measurement of personality traits as a potential mediator of the cultural differences.

Study 1

Method

Participants. The sample consisted of 246 Americans (170 females, mean age = 24.71) and 60 Japanese (30 females, mean age = 20.97). All were born and raised in their respective countries; spoke English and Japanese, respectively, as their first and primary language; and were university students participating in partial fulfillment of course requirements or for extra credit.

Facial expressions of emotion. The pool of stimuli was the Japanese and Caucasian Facial Expressions of Emotion (JACFEE; Matsumoto & Ekman, 1988). It contains 56 expressions, each expressed by a different individual. There are eight examples of seven universally recognized emotions—anger, contempt, disgust, fear, happiness, sadness, and surprise—with equal numbers of Asian and Caucasian males and females portraying each emotion. All expressions were coded using the Facial Action Coding System (FACS; Ekman & Friesen, 1978; reliability = .91), ensuring that the expressions portrayed the emotions intended. A pilot study was conducted involving 45 American university students who were asked to judge the emotions portrayed in the stimuli using a fixed choice judgment task; the judgments were comparable to the published norms of the JACFEE (Biehl et al., 1997; Matsumoto & Ekman, 1988). The agreement levels reported in Biehl et al. (1997) were averaged across the six cultures included in that report, along with the pilot data, and the averages were used as a basis for matching face and vignettes (described more fully below).⁵

Emotion-eliciting vignettes. In a previous study (Scherer, 1997; Scherer & Wallbott, 1994), 3,000 participants from 37 countries described situations that elicited anger, disgust, fear, joy, sadness, shame, and guilt in open-ended responses. These were used as a basis to produce emotion-eliciting vignettes. We focused on anger, disgust, fear, sadness, and happiness because research has documented universal recognition of facial expressions of these emotions (Elfenbein & Ambady, 2002; Matsumoto, 2001). Vignettes for each emotion were created according to themes that

Table 1. Confusion Matrix of Judgments, Separately for Each Country and Face-Vignette Pair, Study 1

Face (Norm %)	Vignette (Norm %)	Country	AN	CO	DI	FE	HA	SA	SU
Congruent									
Anger (74.69%)	Anger (75.72%)	JPN	86.67 ^a	10.00	1.67	0.00	0.00	1.67	0.00
		USA	76.63	5.29	14.64	0.61	0.00	2.85	0.00
Happiness (98.87%)	Happiness (93.20%)	JPN	0.00	0.00	0.00	0.00	100.00	0.00	0.00
		USA	0.21	0.21	0.21	0.00	96.75	0.41	2.24
Sadness (68.89%)	Sadness (68.97%)	JPN	0.00	0.00	1.67	0.00	0.00	98.34	0.00
		USA	1.02	1.63	2.24	1.02	0.61	92.89	0.61
Incongruent									
Sadness (91.31%)	Happiness (87.01%)	JPN	1.67	5.00	11.67	1.67	43.33	35.00	1.67
		USA	0.21	4.47	2.85	5.09	17.28	65.85	4.27
Happiness (98.43%)	Sadness (90.50%)	JPN	0.00	1.67	0.00	1.67	68.34	25.00	3.34
		USA	0.00	3.05	0.41	3.66	68.70	10.37	13.82
Anger (86.28%)	Happiness (84.96%)	JPN	33.33	3.33	21.67	10.00	26.67	1.67	3.34
		USA	47.16	12.81	9.76	7.12	9.96	10.98	2.24
Happiness (95.98%)	Anger (95.30%)	JPN	31.67	13.34	10.00	3.34	5.00	13.34	23.34
		USA	16.26	9.56	11.99	3.26	24.80	2.03	32.12
Anger (78.96%)	Sadness (78.46%)	JPN	18.34	6.67	23.33	5.00	0.00	46.67	0.00
		USA	38.42	13.01	11.59	10.77	0.41	24.80	1.02
Sadness (79.45%)	Anger (77.30%)	JPN	30.00	1.67	15.00	0.00	0.00	43.33	10.00
		USA	13.82	5.90	9.15	4.88	0.82	61.38	4.07

a. JPN > USA.

occurred in the responses, such as achievement (joy), loss of significant others (sadness), contamination (disgust), injustice (anger), or threats to safety (fear). Approximately 14 vignettes were created for each emotion based on the original situations described by the participants, resulting in a pool of 58 vignettes. The vignettes were used in a series of pilot studies in both the United States and Japan in which participants judged which emotion each vignette would elicit. Across the pilot studies, adjustments were made to the vignettes to maximize agreement on the target emotions associated with the vignette.

Matching face and vignette. We matched expressions and vignettes that had equivalent source clarity, defined by the percentage of judges agreeing on the target emotion intended in the face or vignette. Equivalent expressions and vignettes could not be obtained for fear and disgust, so these were dropped. Thus, angry, sad, and happy faces were matched with angry, sad, and happy vignettes in a 3 (Face) × 3 (Vignette) design that included congruent (e.g., angry face with angry vignette) and incongruent (e.g., angry face with sad vignette, angry face with happy vignette) pairs. Moreover, two pairs were selected for each of the 3 × 3 = 9 cells, resulting in a final set of 18 items, with each pair equivalent in source clarity of the intended emotion. (There were six congruent face-vignette pairs and 12 incongruent pairs; see Table 1, left columns, for source clarity data.)⁶ (See appendix for listing of the vignettes used in this study.)

Procedures. Data were collected online. After providing login and demographic information, participants were told that they would judge the emotions of people in various contexts who may be feeling an emotion. They were given a list of definitions of the emotion words used as response alternatives taken from standard, open source dictionaries. The face-vignette pairs were then shown in the following manner. First, the participant was introduced to the person in the vignette as follows: "This is NAME," where the name provided was a standard American or Japanese first name; the expresser's neutral face was shown at this time. On the next screen, the vignette was provided, along with the corresponding facial expression with the caption, "This is NAME

Table 2. Percentage of Observers Selecting the Various Emotion Categories, and the Superior Source for the Judgment, Study I

Pair Type		Country	Emotion Categories				Superior Source
Face (Norm %)	Vignette (Norm %)		AN%	SA%	HA%	NEG%	
Sadness (91.31%)	Happiness (87.01%)	JPN	1.67	35.00	43.33	55.01	
		USA	0.21	65.85	17.28	78.47 ^a	Face
Happiness (98.43%)	Sadness (90.50%)	JPN	0.00	25.00	68.34 ^b	28.34	Face
		USA	0.00	10.37	68.70 ^b	17.49	Face
Anger (86.28%)	Happiness (84.96%)	JPN	33.33	1.67	26.67	70.00 ^a	Face
		USA	47.16	10.98	9.96	87.83 ^a	Face
Happiness (95.98%)	Anger (95.30%)	JPN	31.67	13.34	5.00	71.69 ^a	Vignette
		USA	16.26	2.03	24.80	43.10 ^a	Vignette
Anger (78.96%)	Sadness (78.46%)	JPN	18.34	46.67 ^c	0.00	100.00	Vignette
		USA	38.42 ^d	24.80	0.41	98.59	Face
Sadness (79.45%)	Anger (77.30%)	JPN	30.00	43.33 ^c	0.00	90.00	Face
		USA	13.82	61.38 ^c	0.82	95.13	Face

a. NEG% > HA%.

b. HA% > NEG%.

c. SA% > AN%.

d. AN% > SA%.

as he/she ACTION DESCRIBED IN THE VIGNETTE.” Participants were asked to judge what emotion NAME was feeling in a fixed choice judgment task with these response alternatives: anger, contempt, disgust, fear, happiness, sadness, surprise, no emotion, or other. The 18 face-vignette pairs were presented in random order and were preceded by a practice item involving a face and vignette not used in the study.

Results

Face versus context superiority. We computed a confusion matrix for the 9 face-vignette pairs, averaging across the two items within each pair (Table 1). As predicted, the agreement rates for all congruent pairs were higher than the norms across both countries (NB: the happy stimuli had near-perfect agreement in the norms, producing a ceiling effect). The obtained rates were compared to the known source clarity values using difference in proportions tests (McNemar, 1949), separately for face and vignette and each country (happy combinations were not analyzed); all were significant with the exception of the agreement rates for anger by Americans. With this exception, the congruent combinations facilitated agreement in emotion judgments cross-culturally and eliminated cultural differences.

The incongruent face-vignette pairs, however, were different (Table 2). We first analyzed face-vignette pairs that included either happy faces or vignettes, examining a combined negative category because an emotion judgment of *any* negative emotion was clearly different than the smiling expression. When the face was sad but the vignette was happy, Americans selected a negative emotion over happiness, demonstrating face superiority (unless otherwise noted, all differences tested by a difference in proportions test; McNemar, 1949; all $ps < .05$). The same nonsignificant trend existed for the Japanese. When the face was happy but the vignette was sad, more observers in both countries selected happiness over negative emotions (all $ps < .001$), again demonstrating face superiority. When the face was angry but the vignette was happy, more observers in both countries selected any negative emotion than happiness, indicating face superiority (all $ps < .001$); this difference was larger for Americans, indicating a difference in the degree of difference. But

when the face was happy and the vignette was angry, more observers in both countries chose the combined negative category than happiness (all $ps < .001$), indicating context superiority. This difference was *smaller* for Americans, again indicating a difference in degree.

For angry face–sad vignettes, more Japanese selected sadness than anger, indicating context superiority, while more Americans selected anger, indicating face superiority. For sad face–angry vignettes, more Japanese and Americans selected sadness, indicating face superiority (the effect for the Japanese was marginally significant).

Discussion

Americans and Japanese had near perfect agreement when judging congruent face-context combinations. The agreement rates for the congruent pairs were significantly higher than for either the face or context singly; and with one exception cultural differences in absolute agreement rates were eliminated. Judgments of the incongruent face-context pairings indicated that the relative contribution of face and context to emotion judgments was moderated by country and emotion. As predicted, Americans appeared to have face superiority for all combinations except one. Surprisingly, the Japanese produced face superiority on three combinations, context superiority on two, and no superiority on one. The analyses also hinted at the possibility that both face and context effects occur simultaneously and that the relative contribution of these effects was different across cultures.

There were three limitations of Study 1 that led to Study 2. First, the analyses presented above were insufficient to tease out the relative contributions of context and face effects. Second, Study 1 could not address the question of what individual-level variables accounted for the observed country differences. And third, recognition rates might not have been the best measure in showing how much each channel contributed to the judgment of the combined message.

Study 2 addressed these issues in a three-country comparison involving the United States, Japan, and South Korea. The inclusion of Korea allowed for the addition of a country that might have stronger context effects than the United States (Matsumoto, 2007). We conducted more sophisticated analyses to tease out the face and context effects and included a standard personality measure as a potential mediator in order to unpack the expected country differences. Research involving the NEO-Personality Inventory Revised (NEO-PI-R; Costa & McCrae, 1992), a measure of the Five Factor Model, has demonstrated reliable cross-country differences in aggregate levels of traits (Allik & McCrae, 2004; McCrae, 2002; McCrae, Terracciano, Houry et al., 2005; McCrae, Terracciano, Lebovich et al., 2005). If traits are a relatively stable aspect of personality, if reliable cross-cultural differences on them have been found, and if reliable cross-cultural measurement tools exist to assess them, then it makes sense that they are one of the first places to look for potential mediators of cultural differences. Finally, we asked observers not only to judge which emotion the expressor was feeling but also how strongly they were feeling it.

Study 2

Method

Participants. The samples were 242 Americans (171 females, 5 missing; mean age = 22.50), 122 Japanese (77 females, 2 missing; mean age = 19.06), and 98 South Koreans (49 females, 1 missing; mean age = 2.24). All were born and raised in their respective countries; spoke English, Japanese, and Korean, respectively, as their first and primary language; and were university students participating in partial fulfillment of course requirements or for extra credit.

Personality traits. Personality traits were assessed by the NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1992), a 60-item test assessing Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. Participants responded to each item using a 5-point scale (0 = *strongly disagree*, 4 = *strongly agree*). There is ample evidence for the cross-cultural equivalence in the factor structure and within-country validity of the NEO-FFI, including in Japan and Korea (McCrae, Terracciano, Lebovich et al., 2005; Shimonaka, Nakazato, Gondo, & Takayama, 1999). Cronbach's α s were acceptable in the United States (.85, .61, .74, .68, and .82), Japan (.80, .69, .57, .73, and .80), and Korea (.84, .77, .61, .73, and .83) for Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness, respectively.

Face-vignette pairs and procedures. Data were collected online, and exactly the same face-vignette pairs and procedures used in Study 1 were used here. After providing login and demographic information, participants either completed the face-vignette judgment task or the NEO-FFI. During the judgment task, after judging the emotion the expresser was feeling, participants were also asked to rate the intensity of the emotion being felt, using a 7-point scale anchored 1 (*very little*) and 7 (*a lot*), for all 18 vignette/expression combinations. Average time for completion of the entire experiment was approximately 45 minutes.

Results

Country differences on emotion judgments. A confusion matrix was computed (Table 3). Again, when the face and vignette were congruent with each other, there was near perfect agreement in judgments across all three countries for happy and sad pairs. As in Study 1, anger was associated with less-than-perfect agreement. The obtained agreement rates were compared to the known source clarity values, separately for face and vignette and each country (happy combinations were not analyzed due to ceiling effects); all ps were $< .001$, except for American judgments of angry faces and vignettes. Also, there were no cultural differences in the proportion of observers selecting the target emotion labels for happiness or sadness; there was a cultural difference, however, on anger, with Koreans having significantly higher agreement rates than Japanese and Americans. With this one exception, the congruent combinations facilitated agreement in emotion judgments cross-culturally, and cultural differences were eliminated.

The incongruent face-vignette pairs were different (Table 4). When the face was sad but the vignette was happy, more observers in all three countries selected a negative emotion over happiness, demonstrating face superiority ($ps < .001$). This difference was largest for the Americans, indicating a difference in degree. When the face was happy but the vignette was sad, more observers in all countries selected happiness over negative emotions (all $ps < .001$), again demonstrating face superiority; the difference was largest for Americans, indicating a difference in the degree of difference. When the face was angry but the vignette was happy, more observers in all three countries selected any negative emotion than happiness, indicating face superiority (all $ps < .001$); this difference was largest for Americans, indicating a difference in the degree of difference. But when the face was happy and the vignette was angry, more observers in all countries chose the combined negative category than happiness (all $ps < .001$), indicating context superiority; this difference was *smallest* for Americans, again indicating a difference in degree.

When the face was angry but the vignette was sad, more Americans selected anger than sadness, indicating face superiority; there were no differences for Japanese or Koreans. Interestingly, when the face was sad but the vignette was angry, more Japanese and American observers selected sadness than anger, indicating face superiority; more Koreans selected anger over sadness, indicating context superiority.⁷

Scaling face and context effects. For each face-vignette pair, we recoded the nominal judgments into binary selected–not selected categories for each of the seven response alternatives. For example,

Table 3. Confusion Matrix of Judgments, Separately for Each Country and Face-Vignette Pair, Study 2

Face (Norm %)	Vignette (Norm %)	Country	AN%	CO%	DI%	FE%	HA%	SA%	SU%
Congruent									
Anger (74.69%)	Anger (75.72%)	Japan	84.84	4.51	8.61	0.00	0.00	1.23	0.82
		Korea	93.88 ^a	4.59	0.51	0.00	0.00	1.02	0.00
		USA	79.13	10.54	8.26	0.62	0.00	1.45	0.00
Happiness (98.87%)	Happiness (93.20%)	Japan	0.00	0.41	0.00	0.00	98.77	0.41	0.41
		Korea	0.00	0.00	0.00	0.51	97.96	1.02	0.51
		USA	0.00	0.62	0.21	0.41	96.07	0.62	2.07
Sadness (68.89%)	Sadness (68.97%)	Japan	0.00	1.64	2.87	0.00	0.41	95.08	0.00
		Korea	1.02	1.02	1.02	2.04	0.00	93.37	1.53
		USA	0.62	0.62	0.62	0.83	0.41	96.69	0.21
Incongruent									
Sadness (91.31%)	Happiness (87.01%)	Japan	1.64	0.41	8.61	5.74	33.61	49.18	0.82
		Korea	1.53	2.04	9.69	0.00	30.10	54.59	2.04
		USA	0.00	4.77	3.32	4.36	14.32	68.05	5.19
Happiness (98.43%)	Sadness (90.50%)	Korea	0.42	2.28	0.42	1.86	63.33	17.77	13.93
		Japan	0.41	0.83	0.00	3.10	71.07	13.84	10.74
		USA	0.21	1.03	1.02	0.21	86.04	10.87	0.62
Anger (86.28%)	Happiness (84.96%)	Japan	42.21	3.69	17.62	6.15	21.31	6.97	2.05
		Korea	23.98	12.24	25.00	4.59	20.92	5.61	7.65
		USA	52.07	11.16	9.71	2.48	12.60	9.30	2.69
Happiness (95.98%)	Anger (95.30%)	Japan	30.01	16.92	9.06	1.23	8.66	19.30	14.82
		Korea	44.39	17.35	6.12	0.51	8.67	6.63	16.33
		USA	21.07	11.16	7.44	3.93	30.17	3.31	22.93
Anger (78.96%)	Sadness (78.46%)	Japan	17.62	5.74	40.57	10.25	0.00	25.00	0.82
		Korea	35.20	11.22	8.16	3.57	0.00	39.29	2.55
		USA	40.91	13.22	6.82	9.92	0.41	28.72	0.00
Sadness (79.45%)	Anger (77.30%)	Japan	23.47	14.36	16.47	3.70	0.00	35.80	6.19
		Korea	44.10	10.25	3.60	0.52	0.00	31.25	10.29
		USA	12.22	4.14	4.35	5.38	0.62	69.56	3.73

a. KOR > USA and JPN.

a judgment of happiness was recoded as 0s for anger, contempt, disgust, fear, sadness, and surprise, and 1 for happiness. We summed the scores in each of the recoded judgment categories across the two items for each face-vignette pair and computed a four-way mixed ANOVA with country as a between-subjects factor, and face emotion, vignette emotion, and response alternative as within-subjects variables. The Face Emotion \times Vignette Emotion \times Scale interaction was significant, $F(24, 11,016) = 130.70, p < .001, \eta_p^2 = .222$, as was the four-way interaction, $F(48, 11,016) = 12.17, p < .001, \eta_p^2 = .050$.

Keeping face emotion constant and varying vignette emotion allowed us to examine the effects of the vignettes on the ratings. We computed the simple effects of vignette, separately for each country and the three face emotions, using the summed emotion response scale corresponding to the face emotion as dependents (Table 5). Effect sizes for each of these comparisons (η_p^2) indicated that vignette effects were large for Japan and Korea for all three face emotions, while the effect size was of moderate value for the United States. Thus, context effects existed for all three countries, but the size of the context effects differed across countries.⁸

Likewise, keeping the vignette emotion constant and varying the face emotion allowed us to examine the effects of the face on the ratings. Effect sizes for the simple effects of face, separately

Table 4. Percentage of Observers Selecting the Various Emotion Categories, and the Superior Source for the Judgment, Study 2

Pair Type		Country	Emotion Categories				Superior Source
Face (Norm %)	Vignette (Norm %)		AN%	SA%	HA%	NEG%	
Sadness (91.31%)	Happiness (87.01%)	Japan	1.64	49.18	33.61	65.58 ^a	Face
		Korea	1.53	54.59	30.10	67.85 ^a	Face
		USA	0.00	68.05	14.32	80.50 ^a	Face
Happiness (98.43%)	Sadness (90.50%)	Korea	0.42	17.77	63.33 ^b	22.75	Face
		Japan	0.41	13.84	71.07 ^b	18.18	Face
		USA	0.21	10.87	86.04 ^b	13.34	Face
Anger (86.28%)	Happiness (84.96%)	Japan	42.21	6.97	21.31	76.64 ^a	Face
		Korea	23.98	5.61	20.92	71.42 ^a	Face
		USA	52.07	9.30	12.60	84.72 ^a	Face
Happiness (95.98%)	Anger (95.30%)	Japan	30.01	19.30	8.66	76.52 ^a	Vignette
		Korea	44.39	6.63	8.67	75.00 ^a	Vignette
		USA	21.07	3.31	30.17	46.91 ^a	Vignette
Anger (78.96%)	Sadness (78.46%)	Japan	17.62	25.00	0.00	99.18	
		Korea	35.20	39.29	0.00	97.44	
		USA	40.91 ^c	28.72	0.41	99.59	Face
Sadness (79.45%)	Anger (77.30%)	Japan	23.47	35.80 ^d	0.00	93.80	Face
		Korea	44.10 ^c	31.25	0.00	89.72	Vignette
		USA	12.22	69.56 ^d	0.62	95.65	Face

a. NEG% > HA%.

b. HA% > NEG%.

c. AN% > "SA%"

d. SA% > AN%.

for each country and the three vignette emotions (Table 5), indicated that the face effect size was consistently large for all three countries.

We then computed the number of times each observer selected the face or vignette emotion across all incongruent face-vignette pairs, producing Face Bias and Vignette Bias scores. One-way ANOVAs indicated that the Face Bias score was significantly higher than the Vignette Bias score in the United States and Japan, and in the same direction (but not significant) for Korea. The effect size was largest for the United States, of moderate value for Japan, and small for Korea (Table 6).

Mediation of country differences in Face and Context Bias by personality. We then examined whether personality traits could mediate the country differences on the Face and Vignette Bias scores. Documenting country differences on these scores immediately above addressed the first condition of mediation (Baron & Kenny, 1986). Next, we examined whether country differences existed on the personality traits by regressing country onto each of the personality traits. Country was contrast coded to compare Japan versus Korea and the United States versus a combined Japan and Korea. All Multiple Rs were significant, and all regression coefficients were associated with significant effects, with the exception of the comparison of the United States versus Japan and Korea on Openness (Table 7). These differences replicated previous findings (Matsumoto, 2006; McCrae, Terracciano, Khoury et al., 2005; McCrae, Terracciano, Lebovich et al., 2005) and addressed a second condition of mediation.

To address a third condition of mediation—that personality is correlated with Face or Context Bias above and beyond country—we computed hierarchical regressions on both scores, entering the contrast coded country variables on the first step and the five personality dimensions on the second. Neuroticism was marginally correlated with Vignette and Face Bias, $B(461) = .030, p < .07$,

Table 5. Effect Sizes Associated With Vignette and Face Effects, Separately for Each Country

		Vignette Effects				
Face Emotion	Vignette Emotion	Rating	Country code	USA	Japan	Korea
Anger	Anger	Anger	M	1.583	1.697	1.878
			SD	0.586	0.479	0.329
	Happiness		M	1.041	0.844	0.480
			SD	0.783	0.656	0.596
	Sadness		M	0.818	0.353	0.704
			SD	0.590	0.497	0.707
		Effect size (η_p^2)		0.288	0.634	0.647
Happiness	Anger	Happiness	M	0.603	0.172	0.174
			SD	0.745	0.440	0.498
	Happiness		M	1.913	1.967	1.959
			SD	0.282	0.179	0.199
	Sadness		M	1.417	1.459	1.510
			SD	0.684	0.657	0.646
		Effect size (η_p^2)		0.589	0.816	0.805
Sadness	Anger	Sadness	M	1.388	0.713	0.622
			SD	0.750	0.710	0.806
	Happiness		M	1.355	0.984	1.092
			SD	0.721	0.668	0.747
	Sadness		M	1.930	1.902	1.867
			SD	0.301	0.299	0.397
		Effect size (η_p^2)		0.343	0.580	0.521
Face Effects						
Anger	Anger	Anger	M	1.583	1.697	1.878
			SD	0.586	0.479	0.329
Happiness			M	0.422	0.598	0.888
			SD	0.666	0.651	0.758
Sadness			M	0.244	0.467	0.878
			SD	0.549	0.592	0.816
		Effect size (η_p^2)		0.681	0.600	0.492
Anger	Happiness	Happiness	M	0.252	0.426	0.418
			SD	0.522	0.629	0.641
Happiness			M	1.913	1.967	1.959
			SD	0.282	0.179	0.199
Sadness			M	0.285	0.672	0.602
			SD	0.552	0.674	0.654
		Effect size (η_p^2)		0.841	0.756	0.749
Anger	Sadness	Sadness	M	0.574	0.500	0.786
			SD	0.587	0.564	0.662
Happiness			M	0.256	0.262	0.327
			SD	0.555	0.511	0.552
Sadness			M	1.930	1.902	1.867
			SD	0.301	0.299	0.397
		Effect size (η_p^2)		0.780	0.789	0.692

and $B(461) = -.026$, $p < .10$, respectively; Extraversion was correlated with both, $B(461) = .058$, $p < .05$, and $B(461) = -.064$, $p < .05$, respectively; and Openness was marginally correlated with Face Bias, $B(461) = .040$, $p < .06$.

To test for mediation, we computed Sobel tests on each of these five effects, separately for the two contrast coded country variables. All effects except one were significant or marginally

Table 6. One-Way ANOVAs Comparing Face Bias Versus Vignette Bias Scores, Separately for Each Country

Country	Face Bias	Context Bias	One-way ANOVA
USA	6.62 (2.73)	2.03 (2.47)	$F(1, 241) = 218.57, p < .001, \eta_p^2 = .475$
JPN	4.52 (2.02)	2.93 (2.13)	$F(1, 121) = 2.22, p < .001, \eta_p^2 = .155$
KOR	4.58 (2.05)	3.90 (2.51)	$F(1, 97) = 2.61, ns, \eta_p^2 = .026$

Table 7. Descriptive Statistics for the NEO-FFI in Each Country, and Results of Multiple Regressions Comparing Countries on Each Trait

Personality Trait	US	Japan	South Korea	R	$\beta_{\text{JPN V KOR}}$	$\beta_{\text{USA Versus JPN/KOR}}$
Neuroticism	22.78 (7.80)	32.93 (6.74)	23.80 (7.02)	.511***	.368***	-.326***
Extraversion	30.53 (4.86)	28.22 (4.86)	30.03 (5.53)	.185***	-.118*	.133**
Openness	29.99 (6.00)	31.49 (4.84)	28.66 (5.01)	.175***	.174***	-.008
Agreeableness	30.67 (5.30)	30.00 (5.36)	27.15 (5.29)	.251***	.179***	.191***
Conscientiousness	30.28 (6.40)	23.98 (6.43)	28.94 (6.28)	.386***	-.247***	.277***

** $p < .01$. *** $p < .001$.

Table 8. Summary of Sobel Tests of the Mediation of Country Differences in Vignette and Face Bias

Country Variable	Context Bias		Face Bias	
	JPN Versus KOR	US Versus JPN and KOR	JPN Versus KOR	US Versus JPN and KOR
Neuroticism	1.84*	1.83*	1.60†	1.59†
Extraversion	1.72*	1.81*	1.81*	1.92*
Openness			1.70*	0.17

† $p < .10$. * $p < .05$.

significant (Table 8). Because the country variables were still significant when personality traits were entered into the hierarchical regressions, Neuroticism, Extraversion, and Openness partially mediated the country differences on Context and Face Bias.

Intensity ratings. We then examined whether intensity rating differences occurred as a function of congruence in face-vignette or country. For each of the congruent face-vignette pairs, we computed a one-way ANOVA on the intensity ratings using country as an independent variable. These were followed by Tukey tests comparing the countries. No effects were significant on both the ANOVA and Tukeys; thus, there were no differences among the countries on their intensity ratings for congruent face-vignette pairs.

For the incongruent pairs, we did the same analyses, separately for participants who selected the emotion corresponding to the face, and then to the vignette. For those who selected the emotion

corresponding to the face, the one-way ANOVAs were statistically significant 7 times (of the 12 comparisons). Tukey tests indicated that for all but one, the United States had significantly higher intensity ratings than Japan and Korea. Moreover, the same (nonsignificant) trend was found for four of the five effects with nonsignificant ANOVAs. (Several of these were due to very small sample sizes because of the selection of the participants who judged specific emotions.) These findings replicated previous reports of American-Japanese differences in intensity ratings of faces (Matsumoto, 1992; Matsumoto et al., 2002; Matsumoto, Kasri, & Kookan, 1999) and suggested that the relatively greater face superiority effect for Americans is associated with a greater attribution of intensity to the experience of the emotion corresponding to the face.

For participants who selected the emotion corresponding to the vignette, only three of the 12 comparisons produced a significant ANOVA. Tukey tests revealed that Japan had higher ratings than United States and Korea for one happiness-anger pair and for one sadness-anger pair, while the United States had significantly higher ratings than Japan and Korea on one sadness-anger pair. These findings suggested that there were no reliable country differences on the intensity ratings when the emotion corresponding to the vignette was selected.

Discussion

Congruent face-context pairs produced an additive effect for all countries (with one exception), replicating Study 1. Incongruent face-context pairings produced either face or context superiority in all cultures, but the strength of the effects was moderated by culture. Subsequent analyses suggested that both face and context effects existed in all cultures. As expected, the context effects were larger for Japan and Korea; these underlying context effects contributed to differences in the degree of the difference between face and vignette emotions for virtually all pairs of face-vignette combinations.

The cultural differences were partially mediated by Neuroticism and Extraversion and to a lesser extent Openness. We speculate that cultures with members relatively higher in Neuroticism and lower in Extraversion foster less reliance on direct expressive behaviors from others in judging emotion and thus place greater weight on contextual information. This may occur because of greater anxiety or a lack of confidence that is associated with Neuroticism or lack of trust in others. Cultures with members relatively higher in Extraversion and lower in Neuroticism, however, may place greater importance on expressivity and thus rely relatively more on such cues for emotion judgments.⁹

The fact that there were no cultural differences on the intensity ratings for congruent face-vignette pairs was especially interesting because previous research has well documented differences in such intensity ratings not only for faces (Matsumoto, 1992; Matsumoto et al., 2002; Matsumoto et al., 1999) but also for subjective experience (Scherer & Wallbott, 1994). This finding further suggested that when multiple signals concerning emotion elicitation are combined, cultural differences in the judgments of the produced emotion are minimized or eliminated. For incongruent face-vignette pairs, Americans tended to rate the intensity of the emotion experience higher than the Japanese or Koreans but only when they selected the emotion corresponding to the face. Thus, it may be the case that Americans attributed greater emotional experience because they perceived greater intensity in the expressions. That there were no cultural differences in intensity ratings when only participants who selected the vignette emotion were analyzed further bolsters this interpretation.

General Discussion

Although the studies reported here are a methodological improvement over other studies, they were not conducted without limitations, including a relatively small range of emotions (three),

number of items within each congruent and incongruent face-context pair (two), and the inclusion of only a single Western culture (the United States). Future studies will need to examine whether the effects reported here extend to other emotions tested with larger item pools and other cultures. In particular, anger, happiness, and sadness are relatively unambiguous from each other and may have optimized the clarity of the differences that existed. Inclusion of emotions that are commonly confused, or that have overlap in their eliciting circumstances, semantics, or facial muscles, may produce different findings.

Another important limitation concerned the lack of exact equivalence in the signal clarities of some of the stimuli across cultures (see Note 5). These differences suggest that the Americans may have been less influenced by context because the face was simply less ambiguous to them, both in terms of signal clarity of emotion as well as intensity of the expression. The origin of this possible effect belies a chicken-and-egg problem, because the face may be less ambiguous to Americans precisely because of the ways in which they have learned to rely more on facial expressions than context. Regardless, future research will need to replicate these findings with stimuli that are more exactly equivalent across all cultures tested.

We can only speculate as to the reasons why observers made the judgments they did, and future studies need to address that. Hopefully, these studies will involve the analysis of confusion matrices, as done here, as much of the findings could not have been generated without such analysis. Such studies may also examine boundary conditions in the recognition of inconsistent messages, testing when face superiority switches to a context superiority effect, and cultural differences that explain such boundary conditions.

Nevertheless, the findings generated from both studies suggest that when congruent face and context information are paired, agreement rates of judgments about not only which emotions are aroused but also how strongly are very high and cultural differences are minimized or eliminated. This is impressive given the wealth of findings documenting cultural differences in absolute levels of agreement in recognition of facial expressions of emotion (Matsumoto, 1989, 1992), emotion labeling to vignettes (Scherer, 1997), and intensity ratings of faces (Biehl et al., 1997; Matsumoto & Ekman, 1989). Congruent response linkage is commensurate with the notion that emotions evolved to facilitate whole-body adaptations to events, and the fact that agreement levels were as high as they were across three very different cultures speaks to the power of converging information on emotion messages.

Judgments of incongruent response linkages reflected cultural biases in judgments. Both Americans and East Asians surprisingly produced a face superiority effect for a number of the incongruent face-context pairs. But there were cultural differences in the degree of difference, with context effects underlying the face superiority effects and larger for the East Asians. The cultural differences in the influence of context were predicted on the basis of the construct known as Context Differentiation (Matsumoto et al., 2009). Japan and South Korea are high CD cultures, in which tacit communication is more of a norm than in the United States, and messages are inferred from context relatively more greatly than from direct expressive behavior or words (Hall, 1966, 1973). The United States is a low CD culture, in which context exerts less influence on individual behavior. Cultural differences in this construct can explain why Japanese and Koreans were more influenced by the vignettes, while Americans were more influenced by the face. Cultural differences on CD also explain cultural differences in previous studies documenting context effects as well (Masuda et al., 2008).

The context effect for the happy faces and angry vignettes may have occurred because smiles are commonly used to mask feelings of anger, and members of all three cultures inferred that the smiles were such a mask of the expresser's true feelings of anger. In fact, these data are the first to demonstrate such a masking effect using smiles across cultures. This masking interpretation may not have been at work for happy face and sad vignette pairs; members of all cultures may have interpreted the smiles to be qualifying the sad vignettes, giving the message that although

the vignette was clearly sadness producing, they were OK (much like the miserable smiles noted by Ekman & Friesen, 1982). Future research should test these speculations and can examine the typical meanings of smiles when sad and angry, examining if they indeed qualify sadness and mask anger across cultures. Future studies may also request observers to verbalize the reasons for their judgments, providing insights into at least explicit reasons for their judgments.

Although personality traits partially mediated the cultural differences observed, they probably were not the optimal variable to include. Given that we made theoretical predictions about cultural differences on the basis of the construct of Context Differentiation, it would have been optimal to include individual-level measures of it as a potential mediator. Unfortunately, such measures do not exist; thus, future research efforts may be directed at developing and validating such measures and incorporating them in studies predicting differences across contexts and cultures. Future research can also examine the relationship between CD and the Big Five. Nevertheless, the findings involving personality traits provided hints that such an approach may be useful.

Appendix

Listing of All Vignettes Used in Both Studies

Anger

_____ is in his last year of graduate school and has done quite well. All that is left is polishing his thesis and the final paperwork. He contacts the school, 2 months before graduation, to see why he has not received the invitations to graduation for his family. He is told that they lost his paperwork and will not let him graduate with the rest of his class.

_____ has been away on a study abroad program for a semester. His best friend, who has been living at home, says he will look after his apartment while he is gone. _____ returns home alone and finds out that his friend had a large, out-of-control party just before he got back. Furniture has been ruined and his landlord has served him with an eviction notice.

_____ has a date. Her car is being repaired, and she asks her brother for a ride to her date's house. _____'s brother says he will pick her up at 8:00. At 8:30, _____ calls his house and finds he's watching the ball game with his buddies. Half an hour later, he's still not there, so she calls and finds out the game is over but they are still talking about the plays.

_____ works downtown and because parking is so expensive he has to take the bus when he goes to and from work. _____ finished a hard day at work and waited at the bus stop to get a bus home; however, he waited for over an hour and a bus did not come. When a bus finally came, it was too full and didn't stop.

_____ has a special dinner catered for a friend, and he wants everything to go perfectly. When he realizes the food is late, he calls the caterer, who has lost the order.

_____ has an appointment in a part of town where it is difficult to find parking. She finally finds a parking spot several blocks away from her appointment. The block is posted with a 2 hour parking limit except during street cleaning, which is not scheduled for another hour. She comes out of her appointment 55 minutes later and finds she has been towed even though she still had 5 minutes.

Happiness

_____ is alone looking at pictures, reminiscing about her vacation to the Caribbean. She spent one weekend in the Caribbean scuba diving in a crystal clear sea and sunbathing on white sand beaches with her current romantic partner.

Appendix (continued)

_____ and his close friend from high school had not had a chance to see each other in 1 year. His friend called him to make plans to meet, since she was coming to his city for a business conference. Steve and his friend had a leisurely dinner together and reminisced about old times. Two days later, Steve is alone remembering the time they had together.

For a year, _____ has been working hard for a promotion at work, when his manager decides to leave the company. He interviews for the position, a promotion with a large salary increase, and is told by the director that he is the most qualified person for the position. _____ is alone when he calls to tell him that he has received the position.

_____ and her tennis partner are in the All-City doubles tennis finals. They have been practicing for 6 months to reach this point. The match was harder than she expected, but they win the tournament. She is alone in the locker room after the game.

_____ has been keeping in touch with his long-time colleague through letters since she went abroad to study. Recently, she wrote _____ that she would be coming back home for vacation. She has not been home for several months. _____ is alone at home looking forward to seeing his friend.

Last night, _____ and her friends go to a party to celebrate the end of midterms. _____ is having a very busy semester and has not had a lot of time to spend with her friends. The party lasted for a few hours and she and her friends celebrated. The next day, she is alone remembering the time they spent together.

Sadness

_____ is alone, looking out the window in her new apartment. She and her former partner split up 4 weeks ago. She sees a couple from the window and watches as they embrace.

_____ is sitting alone in her bedroom, looking at old pictures of her and her father from summertime some years ago. It has been 3 months since he died.

_____ is at home alone. He has just been visiting his childhood friend who has just been diagnosed with an eye disease, which will eventually blind him.

_____ is sitting on the couch at home alone having just returned from visiting her mother. As a young woman she was very bright and articulate; however, at the age of 75, while she seems normal in every other respect, she has difficulty recognizing familiar people and places.

_____ is at home, alone, watching an important international soccer match on TV. He and his team would have been playing in that game except they couldn't raise the funds to fly there.

_____ is sitting at home when he sees his best friend from the front window. He motions to him and he comes in. The two of them talk about different things and then begin to discuss the death of an old friend from high school who died 5 years ago.

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Notes

1. Research comparing verbal and nonverbal behavior is a type of face-context comparison. But it addresses a different question than research examining face-context combinations and will not be addressed in this article.
2. The construct of CD maps onto existing theoretical orientations. For example, many years ago, Hall (1966, 1973) introduced the concept of high versus low context cultures in relation to communication style. Our construct of CD is different in that it refers to the *differentiation* of thoughts, feelings, and actions across context, and not to differences in communication styles. CD appears related to individualism versus collectivism (Hofstede, 2001) or independence versus interdependence (Triandis, 1995), in that one of the characteristics of individualism and independence is consistency of behavior across situations, whereas one of the characteristics of collectivism and interdependence is the malleability of behavior across contexts. And CD taps into the person-situation debates that have been part of personality psychology for years.
3. In examining the relative contribution of face and context, source clarities from the face and context need to be equivalent (Ekman et al., 1972), especially in a cross-cultural design (Matsumoto & Yoo, 2006), unless the study was designed a priori to examine incongruent messages that were nonequivalent in clarity.
4. Most judgment studies of response linkages to date did not report a confusion matrix of the data involving all response alternatives. This strategy does not provide an optimal view of the data. For example, observers may be presented with an incongruent happy face + angry context combination. Examining the percentage of observers who selected the terms happy or angry is clearly informative. But an analysis of a combined negative category is also informative, because in this example the selection of *any* negative emotion may be indicative of a context effect, given that the face displayed happiness.
5. The optimal strategy would have been to use facial stimuli that were exactly equivalent in their signaling properties across all cultures tested. Unfortunately, cultural differences in emotion recognition agreement rates using these same stimuli have been well documented (Biehl et al., 1997; Matsumoto, 1992). Although there are considerable expressor differences in these differences (some expressions produce cultural differences and some do not), it was impossible to obtain enough stimuli that were equivalent that filled all the cells in this design. Moreover, judgment data for all potential cultures that could be tested do not exist; to wit, judgment data from South Korea on these stimuli did not exist, and thus such an equilibration could not occur in Study 2. For these reasons, we opted for what we considered the next best solution, which was to take the average recognition rates for each expression across all countries tested to date as a world average and to use these cross-cultural averages as the norm data. Of course, specific cultural differences in recognition rates may still exist for each specific facial stimulus (and vignette) used in these studies; in particular, the Japanese have been shown to have lower recognition agreement rates for some of the anger and sad stimuli used in this study (but not for any of the happy expressions). The findings presented below should be interpreted with this caveat.
6. The averaged source clarity data for happy faces and sad vignettes were the only pair that were not entirely equivalent, and the findings from both studies should be interpreted with this caveat. The agreement rates for both, however, were very high, which should mitigate this degree of nonequivalence.
7. The results for the Japanese on anger-sadness pairs in Study 2 differed from those obtained in Study 1. The Japanese observers in Study 1 saw relatively more sadness in the stimuli, whereas their counterparts in Study 2 saw relatively more contempt and disgust (but not anger). Part of this difference may be attributable to differences in sample sizes ($N = 60$ in Study 1, 120 in Study 2) or in stimuli specific

sampling error. We have no other explanations for the differences in these findings, especially given the amount of replicated findings.

8. To our knowledge, there is no procedure available to test whether these differences among effect sizes are statistically significant.
9. In fact, it's curious that the means for the United States and Korea on the personality traits were not that different from each other but that they were different from the mean for Japan. We believe that our interpretations are consistent with the nature of the contrast coding, but clearly other variables are likely to be at work as well and should be followed in future research.

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