Original Research Paper

A Cultural Comparison of the Facial Inference Process

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ABSTRACT

The purpose of this study was to compare emotion and personality trait attributions to facial expression between American and Indian samples. Data were collected using Amazon.com's Mechanical Turk (MTurk). Participants in this study were asked to correctly identify the emotion and make inferences from pictures of three different facial expressions (scowling, frowning, and smiling) of young white females and males in six photographs. Each picture was randomly presented for 10 seconds followed by four randomized questions about the individual in the picture. The first question asked participants to identify the emotion shown from a list of six emotions (anger, disgust, fear, happiness, sadness, surprise). The next three questions consisted of a) condensed sets of the Big Five personality traits, b) the three Self-Assessment Manikin dimensions (SAM), ands) various social perceptions. Smiling facial expressions were hypothesized to be inferred as happy and to have the following positive inferences in both cultures: attractive, not threatening, agreeable, extroverted, and pleasing to look at, positive, conscientious, and open-minded a "Halo Effect." Scowling facial expressions were hypothesized to have the following attributions: anger, unattractive, threatening, excitable, close-minded, not pleasing to look at, bad, negative, dominant, disagreeable, and unconscientiously a "Horns Effect." Frowning facial expressions were hypothesized to be perceived as: sad, unattractive, good, submissive, not threatening, not pleasing to look at, positive, and calm anin-between effect. Generally, results showed that both cultures attributed the hypothesized emotional and trait attributions to the six facial expressions for all four questions, except for the Indians on the scowling female facial expression across each of the four questions.

Keywords: Facial Inference, India, Thin Slicing, Personality Judgements

Facial expressions have conveyed a significant amount of nonverbal information throughout human evolutionary history. As an early observer of facial expressions, Charles Darwin explored whether these expressions are innate or learned in his book *The Expression of the Emotions in Man and Animals* (1872/1989). Darwin's first principle of expression origins is that inherited expressive actions gradually evolved into voluntary forms of facial

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communication in humans. Based on this principle, Darwin hypothesized that humans have the universal ability to instinctively both pose and recognize certain facial expressions.

Tompkins (1962), following Darwin, suggested that the face is a tool of affect that transmits information about the individual to the world and receives information from the world. Tompkin's research centered around the negative affects of shame, distress, and anger (Tomkins, 1963, 1991). In the 1960s, Paul Ekman, Tompkin's protégé, systematically studied the universality of emotions for the first time (Ekman & Friesen, 1969). His research supports Darwin's universality hypothesis for six core facial emotional expressions: anger, sadness, happiness, disgust, surprise, and fear (Ekman & Friesen, 1971). Ongoing research has supported the cross-cultural recognition of the six facial expressions (Ekman, 1973; Ekman & Friesen, 1986; Izard, 1971; Ekman & Heider, 1988; Matsumoto, 1992).

A very important study confirming cross-cultural universality was conducted by Scherer, Wallbott, Matsumoto, and Kudoh (1988). This study examined reactions to the core six emotions across 27 countries. There was significant cross-cultural participant agreement regarding the core expression and emotion connections. Scherer (2010) later confirmed the cross-cultural agreement regarding the six emotions. However, even though the facial recognition of emotions has been shown to be universal, there are many factors that may influence the inferences of underlying personality traits based on facial expressions, such as stereotypes.

The Halo and Horns Effects (Stereotypes)

Evidence of grouping personality traits based on people's appearances was first discovered by Edward Thorndike (1920). He named this phenomenon the "Halo Effect." This occurs when people unconsciously attribute personality traits based on a positive visible global characteristic, such as attractiveness. Nisbett and Wilson (1977) found evidence of a reverse "Halo Effect," commonly referred to as the "Horns Effect," which occurs when a negative visible global characteristic, such as unattractiveness or threat, is used to assess other personality traits a person might possess. Apparently visible attributes undermine an individual's ability to accurately assess a person's personality (Dion, Berscheid, & Walster, 1972; Nisbett& Wilson, 1977).

Facial Expressions

Smiling: Some people are born more physically attractive, but the average person can appear more attractive just by smiling. Hall, Schmidt-Mast, and West (2016) found that smiling individuals are judged as more attractive and trustworthy than individuals not smiling. The results of Xu et al. (2012) further support the association between smiling, increased attractiveness, and increased trustworthiness, across cultures. Despite some cultural differences, participants from China also rated highly attractive individuals as more trustworthy. In a similar study, Chinese participants rated smiling faces as having positive personality traits (Lau, 1982). A study from Brazil investigated whether a closed smile, upper smile, broad smile, or no smile had an effect on personality perceptions of male and female

pictures. Smiling increased ratings of attractiveness and kindness. As the degree of smiling increased to a broad smile, individuals in the pictures were rated as happier (Otta, Folladore Abrosio, & Hoshino, 1996). Different types of smiles make a difference in the attribution of personality traits. Duchenne smiles (real smiles that involves facial muscles around the eyes) compared to non-Duchenne smiles increased ratings of extroversion and generosity (Mehu, Little, & Dunbar, 2007). Clearly smiling leads to a Halo Effect. Another facial expression that has been shown to influence trait inference is scowling.

Scowling: There are significant differences in personality traits attributed to scowling (angry) facial expressions in comparison to other facial expressions. Computer generated angry male faces were rated high on extraversion, and low on conscientiousness, neuroticism, openness, and agreeableness (Tidball, Prabhala, & Gallimore, 2006). Angry facial expressions have also been associated with high dominance and low affiliation (Hess, Blairy, &Kleck, 2000; Knutson, 1996; Montepare & Dobish, 2003). Marsh, Ambady, and Kleck (2005) proposed that angry faces may have evolved to elicit reactions that powerful, mature-faced adults can command. Faces expressing anger were perceived as more 'mature' than faces expressing fear, and were rated higher on the mature personality traits of independence, strength, dominance, masculinity, coldness, and shrewdness. Scowling faces clearly trigger a Horns Effect. Frowning is a facial expression that elicits both positive and negative inferences.

Frowning: Frowning facial expressions might be associated with low dominance and moderate affiliation because the expression represents distress cues that indicate an inability to exhibit aggressive behaviors (Blair, 2001; Hess, Blairy, & Kleck, 2000; Knutson, 1996; Montepare & Dobish, 2003). A sad or fearful distress cue displayed by the individual infers emotional distress and conveys submission of the expresser instead of aggression. Frowning facial expressions that were computer generated have been associated with low extraversion, agreeableness, and openness, and high on conscientiousness and neuroticism (Tidball et al., 2006).

Culture and Emotion Interpretation

Social identity theory analyzes the emotional significance of social group belonging (Tajfel, 1972). The theory emphasizes the importance of similarities between the cultural identity of the perceived and perceiver in a group interaction context (Burke, 2006). A meta-analysis of cross-cultural studies shows cultural in-group advantage in emotion recognition (Elfenbein & Ambady, 2002a, 2002b; Mastumoto, 2002). Elfenbein and Ambady (2002a) compared American, Indian, and Japanese response biases in emotion recognition of pictures representing seven emotions (happy, sad, angry, surprise, fear, neutral, and disgust) from each culture. As hypothesized, there was a significant in-group advantage in emotion recognition of faces from the same culture. The happy and neutral facial expressions were recognized with the highest accuracy and fear and anger had the lowest recognition accuracy across cultures.

Apparently some cultures have higher in-group recognition than others. Triandis and Bhawuk (1997) found that Indian participants had higher within-group agreement on emotion perception than participants from the United States, China, and Japan. However, because India is considered a vertical collectivist culture, Indian accuracy in interpreting negative emotions from facial expressions was found to be lower than their accuracy in interpreting emotions from smiling faces. Members of vertical collectivist cultures may prefer to refrain from displays of intense negative emotions in the presence of strangers to avoid bad impressions and cultivate valued social connections, and therefore have less experience interpreting such emotions.

Current Study Hypotheses

This study is based on previous research by Radeke and Stahelski (2015). In their study based on Ekman's research, American participants significantly connected the "correct" emotion to the appropriate facial expression, with the highest mean answer choice accuracy occurring in the smiling-happiness association, while the scowling-angry association had the least accuracy. Specific personality traits were significantly attributed to photographed models with either smiling, frowning, or scowling expressions. The current study made culture an independent variable byincluding Indian and American participant. Based on the Radeke and Stahelski results and using the same dependent variables, the majority of both American and Indian participants in this study were hypothesized to accurately (correctly) connect smiling to happiness, scowling to anger, and frowning to sadness.

Second, facial expressions were hypothesized to lead to significant differences in personality trait attribution across all trait and perception questions, in both cultures. For the smiling faces, participants were expected to attribute the following characteristics: attractive, pleasing to look at, good, not threatening, positive, agreeable, conscientious, extroverted, and open-minded. Scowling face attributions were hypothesized to be unattractive, not pleasing to look at, bad, threatening, negative, dominant, excitable, disagreeable, unconscientious, and close-mind. For frowning faces, participants were expected to make the following attributions: unattractive, not pleasing to look at, good, not threatening, positive, submissive, and calm.

The third hypothesis was that Americans will show significantly higher accuracy in attributing the correct emotion and trait attributions to the appropriate facial expressions than the Indian sample, due to the use of Caucasian faces for the three facial expressions. Fourth, Indian participants were hypothesized to especially show significantly lower accuracy for the scowling facial expressions across all attribution questions compared to Americans, especially for the female scowling face.

METHODOLOGY

The study is a 2 (picture gender) x 3 (facial expression) x 2 (culture) mixed design. There are four dependent variables consisting of the four questions listed below that were asked after each of the six pictures were presented. Table 1 specifies the dependent variables.

Table 1: The four questions presented for each of the six pictures and the hypothesized response choices for each facial expression.

The Question	Expected Response Groupings		
	Smiling (1)	Frowning (2)	Scowling (3)
Question 1: Expression *"As quickly as possible, please choose ONE emotion that best describes the emotion of the individual in the photograph"*	Happiness (1)	Sadness (3)	Anger (6)
Question 2: SAM Temperament Dimensions *"Which of the three following groups of personality traits is the BEST fit for the picture above?"*	Positive, Neither Dominant Nor Submissive, Neither Calm Nor Excitable (1)	Negative, Submissive, Calm (2)	Negative, Dominant, Excitable (3)
Question 3: Attractiveness, Pleasingness, & Threat *"Which of the three following groups of social perceptions is the BEST fit for the picture above?"*	Pleasing To Look At, Attractive, Not Threatening, Good (1)	Not Pleasing To Look At, Unattractive, Not Threatening, Good (2)	Not Pleasing To Look At, Not Attractive, Threatening, Bad (3)
Question 4: Big Five Personality Traits *"Which of the three following groups of personality traits is the BEST fit for the picture above?"*	Extroverted, Conscientious, Emotionally Stable, Open-Minded (1)	Introverted, Conscientious, Emotionally Stable (2)	Disagreeable, Unconscientious, Not Emotionally Stable, Close-Minded (3)

Note: The expected response groupings and the associated scaling are organized from positive to negative.

Participants

There were 1,097 primarily white American and 892Indian female and male participants 18-65 years old from a large variety of careers and educational backgrounds. Participants were required to be 18 years or older and from the United States or India to take part in the survey. Compensation for participating was $0.50. The survey was in English, and although English is probably not the primary language for most Indian participants, English is the second official language of India according India's Ministry of Law and Justice (Part XVII, Chapter I.—Official Language of The Union).

Materials

Pictures: There was one young white female and one young white male picture expressing each of the three facial expressions (scowling, smiling, and frowning). The pictures were taken from the FACES collections of the Max Planck Institute for Human Development, Center for Lifespan Psychology, Berlin, Germany (Ebner, Riediger, & Lindenberger, 2009).

Qualtrics and Amazon Mechanical Turk: A web link to the survey created in Qualtrics was provided in the MTurk platform. According to Amazon.com, MTurk was created to allow businesses and researchers to make use of a diverse and readily available participants to perform human intelligence and research tasks.

Dependent variables: The dependent variables are the responses to the four questions. As shown in Table 1, the first question asks, "*As quickly as possible, please choose ONE emotion that best describes the emotion of the individual in the photograph.*" There were six answer choices to select from (happy (1), surprise (2), sad (3), fearful (4), disgust (5), and angry (6)) The second question, "*Which of the three following groups of personality traits is the BEST fit for the picture above?*" assessed the three Self-Assessment Manikin personality dimensions (excited-calm, subordinate-dominant, and positive-negative) in the three groupings indicated in Table 1 (Bradley & Lang, 1994). The third question, "*Which of the three following groups of personality traits is the BEST fit for the picture above?*" measured the various social perceptions mentioned in Table 1.Similar to the second question, the three answer choices were grouped according to results from Radeke and Stahelski (2015). The fourth question, "*Which of the three following groups of personality traits is the BEST fit for the picture above?*" measured the Big-Five personality traits (agreeableness, openness, conscientiousness, extraversion, and neuroticism), based on a condensed subset of 40 validated adjectives assessing the Big-Five personality traits, called the Mini-Markers (MM; Saucier, 1994; Goldberg, 1992). Like questions two and three, there were three grouped personality trait answer choices based on previous results, as shown in Table 1.

Procedure

Participants were either American or Indian members of Amazon.com who were interested in taking part in the study. They selected the survey from a list provided by MTurk. As mentioned, a weblink included in the MTurk list redirected participants to the actual survey in Qualtrics. The redirected participants answered demographic questions after they agreed to take part in the study. Next, participants were asked to view the first picture presented in random order for 10 seconds and then answer four questions that were presented randomly about that picture as quickly as possible. The same procedure was followed for the remaining five pictures. Participants were textually debriefed after finishing the survey and paid within the next few days.

RESULTS

Participants' data were removed if their IP address appeared more than once, if they spent more than 30 minutes responding to the survey, if the country of residence was neither Indian nor the United States, and if their survey was less than 65% complete. As shown in Table 1, each of the answer choices for the four questions used interval scaling from the most positive (happiness) emotion perceptions or grouped personality traits to the most negative (anger). The emotional inference question was categorically scaled as 1 = Happy, 2 = Surprise, 3 = Sad, 4 = Fear, 5 = Disgusted, and 6 = Angry.

Four 2 (gender) X 3 (facial expression) X 2 (culture) mixed factorial MANOVAs were conducted in SPSS to analyze differences in the responses to each of the four questions, based on the independent variables of picture gender, facial expression, and culture. A Bonferroni correction was implemented to adjust the α level for each mixed factorial MANOVA to p = 0.0125.[3]

Emotion Question
The first mixed factorial MANOVA, shown in Table 2, assessed differences across culture, facial expression, and picture gender on the emotion question. Using Pillai's trace, there was a significant main effect of culture on the perception of emotional expression, $V = 0.07$, $F(6, 1980) = 23.26$, $p< .001$, however with a very small effect size, $\eta_p^2 = 0.07$. Additionally, based on a separate ANOVA, picture gender showed a significant main effect, $V = 0.05$, $F(1, 1986) = 108.03$, $p < .001$, and additionally had a very small effect size, $\eta_p^2 = 0.05$. In comparison, a separate ANOVA of facial expression only had a very large effect size, $\eta_p^2 = 0.97$ for the emotion question, and the main effect of facial expression was significant, $V = 0.99$, $F(2, 1985) = 67677.21$, $p < .001$. The effect size differences indicate that the mean differences shown in Table 1 are due primarily to the facial expression differences, with both Americans and Indians attaching the correct emotion to each facial expression, supporting the first hypothesis. Separate univariate ANOVAs found significant cultural effects for the frowning female model, $F(1, 1985) = 26.55$, $p< .001$; the scowling female model, $F(1, 1985) = 88.52$, $p< .001$; and the scowling facial expression of the male model, $F(1, 1985) = 44.28$, $p< .001$. An examination of the mean differences in the Table 1 negative expressions indicates that Americans were more accurate than Indians, partially supporting the third hypothesis.

The Three SAM Dimensions
The results of the second mixed factorial MANOVA, found in Table 3, compared differences between American and Indian participants on the perception of the three SAM temperament traits. Using Pillai's trace, there was a significant effect of culture on the SAM dimensions, $V = 0.10$, $F(6, 1982) = 34.87$, $p< .001$, with small effect sizes for culture, $\eta_p^2 = 0.10$, and gender, $\eta_p^2 = 0.05$, while facial expression had a very large effect size, $\eta_p^2 = 0.78$, again indicating support

Table 2: Emotional inference univariate culture only ANOVA results
Note: The emotion scale is as follows: Happy (Smiling) = 1; Surprise = 2; Sad (Frowning) = 3; Fear = 4; Disgusted = 5; and Angry (Scowling) = 6.

for the second hypothesis. Separate ANOVAs focusing on only picture gender and only facial expression, showed that the main effect of picture gender $V = 0.05$, $F(1, 1988) = 104.37$, $p <$

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[3]For each MANOVA, Box's test of the assumption of equality of covariance matrices was significant ($p< .001$), violating the assumption of homogeneity of variance. Levene's test of equality of error variances for each of the dependent variables was significant for all four MANOVAs ($p< .05$) violating the assumption that error is equally distributed across groups.

.001, and facial expression $V = 0.88$, $F(2, 1987) = 7254.37$, $p < .001$, were both significant. Separate univariate ANOVAs assessing cultural differences across the SAM dependent variable showed significant effects of culture on the perception of SAM dimensions for the smiling female facial expression, $F(1, 1987) = 22.60$, $p < .05$; the smiling male facial expression, $F(1, 1987) = 12.50$, $p < .001$; the frowning female facial expression, $F(1, 1987) = 4.80$, $p < .05$; the scowling female facial expression, $F(1, 1987) = 123.46$, $p < .001$; and the scowling male facial expression, $F(1, 1987) = 119.31$, $p < .001$. The mean differences in these analyses indicate support for the third hypothesis.

Stimulus Condition	Culture	M	SD	*df*	*F*	*P*
Smiling Female	**American** n = 1097	1.04	0.32	**(1, 1985)**	0.51	$p = .447$ (NS)
	Indian n = 890	1.05	0.32			
Smiling Male	**American** n = 1097	1.03	0.30	**(1, 1985)**	1.21	$p = .271$ (NS)
	Indian n = 890	1.05	0.32			
Frowning Female	**American** n = 1097	3.09	0.36	**(1, 1985)**	26.55	$p < .001$
	Indian n = 890	3.19	0.55			
Frowning Male	**American** n = 1097	3.24	0.55	**(1, 1985)**	3.24	$p = .072$ (NS)
	Indian n = 890	3.29	0.62			
Scowling Female	**American** n = 1097	5.73	0.68	**(1, 1985)**	88.52	$p < .001$
	Indian n = 890	5.37	1.04			
Scowling Male	**American** n = 1097	5.80	0.48	**(1, 1985)**	44.28	$p < .001$
	Indian n = 890	5.64	0.63			

Social Perceptions

The third mixed factorial MANOVA, shown in Table 4, analyzed differences in perceived attractiveness, pleasingness, threat, and goodness across American and Indian participants. Using Phillai's trace, there was a significant effect of culture on these variables, $V = 0.09$, $F(6, 1982)$

Table 3: Self-Assessment Manikin Dimensions univariate culture only ANOVA results

Stimulus Condition	Culture	*M*	*SD*	*df*	*F*	*p*
Smiling Female	American n = 1097	1.04	0.26	(1, 1987)	22.60	*p* = .029
	Indian n = 892	1.12	0.43			
Smiling Male	American n = 1097	1.07	0.33	(1, 1987)	12.50	*p* < .001
	Indian n = 892	1.13	0.44			
Frowning Female	American n = 1097	2.07	0.57	(1, 1987)	4.80	*p* = .029
	Indian n = 892	2.01	0.66			
Frowning Male	American n = 1097	2.03	0.54	(1, 1987)	0.29	*p* = .591 (NS)
	Indian n = 892	2.04	0.63			
Scowling Female	American n = 1097	2.70	0.56	(1, 1987)	123.46	*p* < .001
	Indian n = 892	2.37	0.77			
Scowling Male	American n = 1097	2.91	0.34	(1, 1987)	119.31	*p* < .001
	Indian n = 892	2.67	0.62			

Note: The response scale is as follows: Smiling is Positive, Neither Dominant Nor Submissive, and Neither Calm Nor Excitable = 1; Frowning is Negative, Submissive, and Calm = 2; and Scowling is Negative, Dominant, and Excitable = 3.31.83, *p*< .001, with a very small effect size, η_p^2 = 0.09. Gender had the smallest effect size, η_p^2 = 0.06, while facial expression had the largest effect size, η_p^2 = 0.78, supporting the second hypothesis. Separate ANOVAs analyzing only picture gender and only facial expression showed that the main effects of picture gender, *V* = 0.06, *F*(1, 1988) = 122.04, *p* < .001, and facial expression, *V* = 0.88, *F*(2, 1987) = 7369.72, *p* < .001, were both significant.Separate univariate ANOVAs assessing the effects of culture on each dependent variable separately revealed significant cultural effects on perceived social perceptions of the smiling female facial expression, *F*(1, 1987) = 15.36, *p*< .001; the smiling male, *F*(1, 1987) = 12.46, *p*< .001; the frowning male, *F*(1, 1987) = 9.30, *p* = .002; the scowling female, *F*(1, 1987) = 95.57, *p*< .001; and the scowling male, *F*(1, 1987) = 110.82, p < .001. The mean differences used in these analyses all indicated that Americans were more accurate than Indians, supporting the third hypothesis.

Table 4: Social perceptions univariate culture only ANOVA results

Stimulus Condition	Culture	M	SD	df	F	p
Smiling Female	American n = 1097	1.05	0.27	(1, 1987)	15.63	*p* < .001
	Indian n = 892	1.11	0.40			
Smiling Male	American N = 1097	1.07	0.30	(1, 1987)	12.46	*p*< .001
	Indian n = 892	1.13	0.43			
Frowning Female	American n = 1097	2.00	0.59	(1, 1987)	0.67	*p* = .408 (NS)
	Indian n = 892	2.02	0.74			
Frowning Male	American n = 1097	1.99	0.59	(1, 1987)	9.30	*p* = .002
	Indian n = 892	2.08	0.71			
Scowling Female	American n = 1097	2.66	0.57	(1, 1987)	95.57	*p*< .001
	Indian n = 892	2.37	0.74			
Scowling Male	American n = 1097	2.87	0.38	(1, 1987)	110.82	*p* < .001
	Indian n = 892	2.64	0.60			

Note: The response is as follows: Smiling is Pleasing To Look At, Attractive, Not Threatening, and Good = 1; Frowning is Not Pleasing To Look At, Unattractive, Not Threatening, and Good = 2; and Scowling is Not Pleasing To Look At, Not Attractive, Threatening, and Bad = 3.

The Big Five Personality Traits

The results of the fourth mixed factorial MANOVA, shown in Table 5, assessed cultural differences of perceived traits based on the Big Five personality factors. Using Phillai's trace, there was a significant effect of culture on the Big Five factors (agreeableness, conscientiousness, emotional stability, extroversion, and openness), V = 0.16, $F(6, 1982)$ = 64.53, p < .001, with a small effect size, η_p^2 = 0.16, compared to the large effect size of facial expression, η_p^2 = 0.67, and gender showed the smallest effect size, η_p^2 = 0.02, supporting the second hypothesis.Separate ANOVAs analyzing the main effects of only picture gender V = 0.02, $F(1, 1988)$ = 31.52, p < .001, and only facial expression V = 0.80, $F(2, 1987)$ = 3912.58, p < .001, showed that both were significant. Separate univariate ANOVAs analyzing cultural differences across each of the variables separately revealed significant effects of culture on the perceived personality traits of the smiling female facial expression, $F(1, 1987)$ = 124.22, *p*< .001; the smiling male, $F(1, 1987)$ = 141.89, *p*< .001; the scowling

female, $F(1, 1987) = 172.08$, $p < .001$; and the scowling male, $F(1, 1987) = 117.81$, $p < .001$, supporting the fourth hypothesis.

Table 5: The Big 5 Factors univariate culture only ANOVA Results

Stimulus Condition	Culture	M	SD	df	F	p
Smiling Female	American n = 1097	1.12	0.37	(1, 1987)	124.22	*p* < .001
	Indian n = 892	1.36	0.56			
Smiling Male	American n = 1097	1.13	0.37	(1, 1987)	141.89	*p* < .001
	Indian n = 892	1.38	0.58			
Frowning Female	American n = 1097	2.17	0.68	(1, 1987)	0.20	*p* = .654 (NS)
	Indian n = 892	2.15	0.82			
Frowning Male	American n = 1097	2.16	0.66	(1, 1987)	0.78	*p* = .377 (NS)
	Indian n = 892	2.19	0.79			
Scowling Female	American n = 1097	2.78	0.54	(1, 1987)	172.08	*p* < .001
	Indian n = 892	2.38	0.80			
Scowling Male	American n = 1097	2.87	0.46	(1, 1987)	117.81	*p* < .001
	Indian n = 892	2.58	0.72			

Note: The response scale is as follows: Smiling is Extroverted, Conscientious, Emotionally Stable, and Open-Minded = 1; Frowning is Introverted, Conscientious, and Emotionally Stable = 2; and Scowling is Disagreeable, Unconscientious, Emotionally Stable, and Close-Minded = 3.

DISCUSSION

The effect size differences between the three independent variables of facial expression, culture, and picture gender clearly indicates that facial expression differences had by far the greatest influence on all participant responses. This finding is generally supportive of the first hypothesis, which proposed that the majority of participants, both Americans and Indians, would accurately connect smiling to happiness, scowling to anger, and frowning to sadness, with one exception – Indians connected the scowling female face primarily to disgust. The results mainly supported the second hypothesis, that facial expressions were hypothesized to make the correct trait attribution across all three trait questions. Again, Indian participants had less accurate answers for the scowling female facial expression on each of the three personality trait questions, in each case selecting the answer that was appropriate to frowning.

The third hypothesis was mainly, but not fully supported, which was that Americans will show significantly higher accuracy in attributing the predetermined (correct) emotion, SAM dimensions, social perceptions, and personality traits to the accurate facial expressions than Indians. Although Americans showed significantly higher accuracy for the correct attributions on all four questions for the smiling and scowling female and male facial expressions and for the frowning male expression, Indian participants had slightly more accurate attributions for the frowning female facial expression in two of the four questions. The fourth hypothesis; that Indian participants were hypothesized to show significantly lower accuracy answer choices for the scowling facial expression across all four questions compared to Americans, was supported. Indians did show significantly lower accuracy in attributing the correct answers to the scowling male and especially the scowling female facial expressions.

The results generally supported the universalist position. Although there was variability in answer choices for American and Indian participants, the average answers of both groups for each of the four questions were primarily determined by facial expression differences, not by culture or gender. Although facial expression differences had the greatest impact on participant inference, culture and gender did have some effect. In the twenty-four comparisons of Americans and Indians across the four questions, Americans made more "correct" inferences in twenty-two of the comparisons. And, although the effect size and most of the mean differences were very small, seventeen of the twenty-two comparisons were significant. The fact that Americans were generally more correct should not be surprising given that most of the American respondents were Caucasian looking at Caucasian faces. These results support the in-group advantage discussed by Elfenbein & Ambady (2002a, 2002b) and Matsumoto (2002).

The effect of culture and picture gender was primarily shown with the Indian participants' incorrect answers for the scowling female facial expression condition across all four questions. As indicated by the mean emotion responses, Indian participants incorrectly attributed disgust to the scowling female facial expression. The incorrect SAM traits, negative, submissive, and calm were attributed by the Indian participants to the scowling female face, and Indian participants also attributed incorrect (frowning) perceptions for the social perceptions question (not pleasing to look at, unattractive, not threatening, and good) to the scowling female face. And, on the Big Five question, the Indian participants chose the frowning personality traits (introverted, conscientious, and emotionally stable) for the scowling female facial expression. Although we assumed that this grouping of answers would be associated with sadness, Indian participants in this study associated these responses with disgust for this particular picture.

This inability of Indians to correctly judge anger in female faces could be due to the cultural variation in anger display rules. Body language, including facial expression, is based on the situational context in collectivist cultures such as India. In a study by Kapoor et al. (2003), Indians valued interdependent self-construal which align with collectivism. Results from

Verma and Triandis (1999) supported the importance of collectivist values to Indians, such as preserving harmony in hierarchal groups. Indians may refrain from displaying anger to cultivate valued social relationships and avoid disturbing the harmony of groups (Matsumoto, 1989, 1992; Schimmack, 1996). As a result of not displaying facial anger, there could be difficulty in identifying facial anger (Matsumoto, 1989, 1992; Schimmack, 1996). Furthermore, in vertical collectivist cultures males may have greater freedom to express facial anger than females, indicating that Indians will more likely misidentify scowling female expressions as something other than anger.

Limitations, Future Directions, and Summary

The limitations of this study include: a lack of control over the events occurring when participants filled out the survey, the settings where the survey was taken and how participants filled out the survey. These conditions can create larger variability in answers. If participants took longer than average (more than 30 minutes), then they were potentially not following the directions to view the pictures for 10 seconds and answer the questions quickly, which could influence their responses. Additionally, the facial structure of the real females and males in the photographs could not be specifically controlled to the same degree as the 3D computer-generated faces used in studies by Todorov and his colleagues (2013). Furthermore, only one set of photographs was used and the models in the photographs were all Caucasian. Also, English was presumably a second language for most of the Indian participants, which may have led to confusion about the wording in the responses. Finally, even though the face is such an important nonverbal communication tool for judging personality traits, it is still unclear which facial factor (age, attractiveness, expression, gender, culture, or structure) is focused on most when people make trait inferences. Three of these factors, expression, gender, and culture, were investigated in this study. Future research intends to address the remaining four factors, age, attractiveness, culture, and facial structure. Additionally, the culture of the perceivers will continue to be studied. Future studies could replicate this study with more countries. Other future changes will be the separation of answer choices, and Likert scales will be used as the scaling for answer choices.

The results of this study reflect the complexity of the facial expression process. Three important facial inference factors were examined in this study: facial expressions, culture, and gender, and facial expression was clearly the most important factor. Facial expression is the only one of the factors that represents a choice. That is, a person does not usually choose his or her gender or early cultural background. However, people do choose, consciously or unconsciously, their facial expressions. Based on this study's results, observers making inferences from faces apparently assume that facial expressions are more reflective of emotional states and personality traits than non-choice factors.

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