Seeing Both Positive and Negative Emotions:

Perception of Mixed Emotion Across Cultures

Abstract

Previous cross-cultural comparisons of experiencing mixed emotion found that East Asians experience positive and negative emotions simultaneously more than European Americans. However, not much is known regarding differences across cultures in how people perceive mixed emotion from facial expressions. By presenting facial expressions varying in valence, race, and gender to participants, we aimed to observe whether East Asians not only experience but also perceive more mixed emotions than European Americans. Study 1 compared the mean number of opposite-valence emotions perceived across 80 facial stimuli (i.e., perceiving happiness when presented with a frowning face), and found that Japanese participants perceived more mixed emotions than European Americans. Study 2 replicated the findings with more facial stimuli, and also found that this cultural difference was mediated by the degree to which participants believe the expression of emotion was caused by his/her personality (internal attribution).In study 3, we used open-ended essay format to ask what the person in the picture is feeling and replicated the findings from study 1 and 2. The result from three studies consistently supported our hypothesis, showing that Japanese perceived more mixed emotions from facial expressions than European Americans.

Past studies have found that East Asians experience more mixed emotions than European Americans (Bagozzi, Wong, & Yi, 1999; Kitayama, Markus, & Kurokawa, 2000; Schimmack, Oishi, & Diener, 2002). However, would East Asians perceive more mixed emotion when reading others’ emotional expressions? For example, would East Asians perceive more happiness from frowning faces and more anger from smiling faces compared to European Americans?

**Mixed Emotion Across Cultures**

**There has been some debate regarding whether or not people can ‘*feel’* both positive and negative emotions.** Some researchers argue that people cannot simultaneously feel both emotions (Green, Goldman, & Salovey, 1993; Russell, 1980; Russell & Carroll, 1999), while others maintain that people can feel both emotions at the same time because positive and negative valences are independent dimensions (Cacioppo & Berntson, 1994; Diener & Iran-Nejad, 1986; Larsen, McGraw, & Cacioppo, 2001).

**The experience of mixed emotions has been studied in mainly two ways.** The first operationalizes mixed emotions in terms of the magnitude of correlation between positive and negative emotions (Bagozzi et al, 1999; Miyamoto & Ryff, 2011; Schmimack et al., 2002), while the second uses the frequency of co-occurrence of positive and negative emotions in a given situation (Larsen, McGraw, Mellers, & Cacioppo, 2004; Miyamoto, Uchida, & Ellsworth, 2010). These methodologies were used to test the nature of mixed emotions generally and cross-culturally.

**With both correlation of positive and negative emotions and frequency of co-occurrence of opposite-valenced emotions, East Asians reported experiencing more mixed emotion than European Americans.** The magnitude of correlation between positive and negative emotions was higher for European Americans, while the correlation value for East Asians ranged from weak negative relationship to positive (Bagozzi, Wong, & Yi, 1999; Kitayama, Markus, & Kurokawa, 2000; Schimmack, Oishi, & Diener, 2002). The frequency of reporting opposite-valenced emotions was also higher for East Asians, although this was only applied to the reporting negative emotions in positive situations (Miyamoto, Uchida, & Ellsworth, 2010).

What has not been theorized in-depth is whether or not people can ‘*perceive*’ both positive and negative emotions and what it is means to perceive opposite-valence emotions simultaneously.

Thus, both the dialectical tradition and interdependent way of construing the self can lead to the perception of mixed emotion. For example, when faced with a smiling face, dialectical East Asians can easily imagine how a person’s situation may change, like the flipping a coin to the other side, resulting in the perception of both positive and negative emotions. Interdependent self-construal can also lead them to perceive mixed-valence emotion, by causing East Asians to guess multiple external social factors at the same time to explain a facial expression

**General Overview of the Present Study**

Our hypothesis is that when perceiving facial expressions, East Asians recognize more opposite-valence emotions in facial expressions (i.e., seeing anger in smiling faces) than European Americans. In order to test this hypothesis, we created a set of facial expressions varying in the model’s gender, race, expressivity, and valence. Presented with facial expression stimuli, Japanese and European American participants were asked to judge the emotions of the person in each picture with scales for perception of 13 emotions.

In order to further explore the hypothesis, Study 2 additionally observed how participants make internal and external attributions when judging facial expressions. Our aim was to observe whether the tendency to make an internal attribution (thinking the person’s emotion expression is due to one’s character or personality) or external attribution (thinking that the person’s emotion expression is due to external factors outside the person) differs across cultures, as well as to see if this tendency mediates the relationship between culture and the perception of mixed emotion.

In Study 3, we used an open-ended essay format to investigate the perception of mixed emotion across cultures. Our understanding of how emotions are recognized is easily constrained by the methods we use to ask about that process. Although simpler for the researcher, closed-ended methods limit the participants’ possible answers and explanations to those the researcher has pre-determined as possible or appropriate. In contrast, free-response methods allow participants greater freedom to explain their process of reading facial expressions. Even without utilizing closed-ended scales, we expected that the Japanese participants would report more opposite valence emotions than European Americans in these open-ended essays when asked about their perception of facial expressions.

**Study 1**

**Method**

**Participants**

Eighty-one European American undergraduate students (36 women and 45 men) at the University of Michigan (mean age = 18.95, S.D = 1.09, range from 18 to 23) and 69 Japanese undergraduate students (46 women and 23 men) who attended university in Tokyo (mean = 20.27, S.D = 1.038, range from 18 to 23), participated in the experiment to fulfill a course requirement. The European American students each self-identified as a European American who had spent at least the first 18 years of their lives in the United States.

**Materials**

*Stimuli for emotion judgment*. We selected photographs of Caucasian and East Asian, male and female faces from a pre-tested set of stimuli (Beaupre & Hess, 2005). Digital images of 16 faces were used in a 2 x 2 x 2 [gender, ethnicity (Caucasian/East Asian), and expression (smiling or frowning)] design. There were two different individuals for each category, and participants did not see the picture of the same individual twice. For each of the faces, we created a series of stimuli that gradually morphed from neutral to extreme expressions in ten steps. All photographs, showing only the head, were presented as black-and-white passport style pictures.

*Procedure*

In a within-subject study, participants were asked to answer questions in a paper-and-pencil format in their native language. Each participant observed one set of stimuli out of two sets, and each set of stimuli included only eight faces, and counterbalanced for targeted emotion display (smiling, grimacing), model’s race (Asian, White), and model’s gender (male, female). Each eight model had ten series of photos that morphed from neutral to extreme expression.

Participants were asked to rate how strongly they thought the model felt each of the 10 emotions (*0=Not At All*, *1= A Little*, *4= Somewhat*, to *8= Extremely)*: *surprise*, *amusement/enjoyment*, *contentment/satisfaction*, *happiness/pleasure*, *pride, disgust/hate*, *fear*, *contempt/scorn*, *sadness*,and *anger*.

**Results and Discussions**

**Perception of Dialectical Emotions**

To test our hypothesis about cultural difference in the perception of dialectical emotions in facial expressions, we created a variable that captured the mean number of opposite-valence emotions perceived across facial stimuli for each participant. We counted intensity ratings of 1 or higher (“a little” or more) for negative emotions in smiling faces (e.g., *disgust/hate*, *fear*, *contempt/scorn*, *sadness*,and *anger)* and for positive emotions in frowning faces (e.g., *amusement/enjoyment*, *contentment/satisfaction*, *happiness/pleasure*, and *pride).* These counts were averaged across eight faces. Using a repeated measures MANOVA, we tested for the between-subject factor of cultural group, controlling for the effects of stimuli set, and participant gender. Additionally, we controlled for the within-subject factors of valence of face (smiling versus frowning), model race (White, Asian), and model gender (female, male). As predicted (see Figure 1), we found that Japanese participants (M=1.88, SE=0.12) reported more opposite-valence emotions than European American participants (M=0.72, SE=0.11; *F(*1, 146) = 47.87, *p< .*001; partial η2= .25)**.** This finding applied to both smiling faces (*F(*1,146)=46.38, p<.001) and frowning faces (*F(*1,146)=33.67, p<.001).

In Study 2, we aim to replicate the result from study 1 while improving the experimental method by creating more gradation in the series of faces morphed from neutral to extreme displays. We further improved our methods by randomly presenting the photographs in a computer-based study rather than paper-and-pencil study. Due to time constraints, we only presented female faces and recruited female participants from both cultural groups.

**Study 2**

**Participants**

Fifty-two female European American (M=19.12, SD=1.00) and 58 female international Japanese (M=23.17, SD=3.78) students at the University of Michigan were recruited for the study. As in previous studies, European American participants self-identified as European American and had lived in the United States for at least 18 years (average number of years outside the United States was M=0.67, SD=1.12). Qualified Japanese participants reported that they had spent no more than five years of their life outside Japan (average number of years outside Japan was M=1.28, SD=1.23). All European American participants had two parents and at least 2 grandparents who were US-born; Japanese participants’ generational background was similar, with 95% having two Japan-born parents and 97% having at least two Japan-born grandparents. European American students participated in the experiment to receive extra credit for an introductory psychology course; Japanese participants received either a 10-dollar gift certificate as compensation or extra course credit.

**Procedure**

We used the same procedures and photographs (Beaupre & Hess, 2005) from Study 1. For Study 2, however, four faces were presented in random order rather than eight faces. Faces were morphed from neutral to extreme emotion displays in twenty steps to create greater nuance than in Study 1, in which only ten steps were used (see Figure x).

Participants completed a one-hour, computer-based (MediaLab) study in their native language. In addition to the emotion intensity scales described in Study 1, participants additionally completed a scale of internal and external attributions of emotions. Otherwise, the procedure was the same as in Study 1.

**Results and Discussions**

**Descriptive Statistics**

Targeted emotion frequency. We compared the count data between European American and Japanese female participants to see who rated the target emotion (happy or angry) as “1 (a little)” or above. Over 86% of European Americans and 83% of Japanese recognized at least a little happiness in all extreme smiling facial displays they viewed. Eighty-one percent (81%) of European Americans and 85% of Japanese recognized at least a little anger in all extreme frowning facial displays they viewed. The percentage of participants that recognized at least a little happiness or anger in one or more frowning faces did not differ by cultural group, χhappiness2(1, *N* = 110) =.46, *p* = .79; χanger2(1, *N* = 110) = .55, *p* = .76.

Perception of Dialectical Emotions. To test our hypothesis about cultural difference in the perception of dialectical emotions in facial expressions, we created the same variable as in Study 1, which captured the mean number of opposite-valence emotions perceived across facial stimuli for each participant. These counts were averaged across four faces. Using a repeated measures MANOVA, we tested for the between-subject factor of cultural group and controlling for the within-subject factors of stimulus set, valence (smiling or frowning), and model race (White or Asian). Replicating the results from Study 1, we found that Japanese participants (M=1.39, SE=0.15) reported more opposite-valence emotions than European American participants (M=0.92, SE=0.16; *F* (1, 107) = 4.88, *p = .*03; partial **η2**= .04). There were no significant effects of stimulus, race of the model, or emotional display.

In Study 3, we aimed to make further methodological advancement. Not only increasing sample size, we also wanted to further explore attributions of emotions to investigate the reason for cultural difference on the perception of dialectical emotions. To do so, we used an open-ended method in addition to a closed-ended format, and content-coded participants’ essays.

Developing an unbiased coding system to accurately capture participant response patterns is challenging because the experimenter is not blind to the research hypotheses while the coding system is created. We addressed this challenge by having the majority of the coders blind to the research hypotheses.

Russell and colleagues (1993) refer to Woodworth and Schlosberg (1954) who describe facial expressions as having emotion labels that belong to “broad, overlapping cluster[s]...rather than specific, discrete basic emotions” (348). Using the emotion terms described by participants, we created a set of emotion clusters to better capture participants’ descriptions of emotions. These emotion clusters are based on Ekman’s (1997) categories that group similar/related emotion labels into groups to represent the basic and universal emotion clusters.

**Study 3**

**Participants**

Participants were 304 (172 women) undergraduate students from a large Midwestern university and two universities in Japan. 178 identified as European American (112 women), and 83 were either international students at University of Washington or Japanese nationals from two universities in Tokyo (60 women). European American students volunteered in exchange for extra credit for an introduction to psychology course, and Japanese students participated in exchange for either a 10-dollar or a 1000-yen gift certificate (equivalent to 10-dollar) as compensation.

**Measures and Procedure**

Participants from both cultural groups completed a paper-and-pencil survey individually in their native language. Each participant observed eight faces varying by the model’s cultural background (White, Asian), gender (male, female), and emotional display (smiling, frowning). The stimulus set was the same one used in Study 1, 2 (Beaupre & Hess, 2005). As in Study 2, we used only female faces. Participants were asked to describe in their own words what each model was feeling (e.g., “For each face, please indicate the feeling(s) of the person in the picture. You may list more than one feeling. What is Person X feeling?”), as well as their reasons for their choice of emotion (e.g., “Why do you think this person is feeling this way?”) using an open-ended essay format. Lastly, participants completed a series of demographic questions, including their gender, age, and number of years they had lived outside the United States (for European American participants) or Japan (for Japanese participants).

**Content Coding of Data**

The coding team consisted of five research assistants (Japanese or European American). All coders were blind to the demographic information while they coded, and four of them were also blind to the research hypotheses. All five coders were trained to code open-ended data until the value of the inter-rater reliability Cronbach alpha reached an acceptable level (α range from .91 to 1.00).

*Perceived emotions coding*

For emotions, we coded participants’ answers to the question, ‘What do you think this person is feeling?’ Responses were coded when the participant attributed a feeling or motivational state to the model in the picture (i.e., “She is happy”); attributions to the situation of the model, however, were not coded for this measure (i.e., “She is in a great situation”).

We coded the total number of reported emotions and coded them as positive (high arousal positive/low arousal positive/pride/amusement), negative (anger/sadness/disgust/contempt/fear), and neutral emotions (surprise/in thought/unemotional/confusion/neutral) (see Table 1). We added ‘generically bad emotion’ (e.g., unhappy) and ‘other positive’ (e.g., carefree) emotion categories because participants mentioned emotions that were hard to categorize within the previous categories. The final set of emotions, therefore, included four categories of positive emotions (high arousal positive/low arousal positive/amusement, pride, other positive), four categories of neutral emotions (surprise, in thought/unemotional, confusion, neutral), and negative emotions (anger/sadness/disgust/contempt/fear). This scheme was developed on the basis of the emotions subjects actually reported.

*Appraisal coding*

We also coded participants’ answer to the question ‘Why do you think this person is feeling that way?’ Internal attributions were coded as present if a participant responded that a model was feeling a certain emotion because of her personality (e.g., “She is a happy and congenial person”). External attributions were coded as present when a participant’s response described any situational cause of a model’s emotion. We found two types of situational attributions: “Non-social” which referred to an external cause which did not involve other people (e.g., “She is frustrated that she cannot solve a difficult math problem”); and “Social” which referred to an external cause involving other people (e.g., “She looks angry and stern because she is a teacher disciplining her students” or “She is feeling happy and accomplished because she has a good family resulting in her smiling”).

Results and Discussions

Number of emotion labels. European Americans (M=1.72, SE=.04) used more emotion labels than Japanese (M=1.50, SE=.04), *t*(290)=3.98, p<.001.

Target emotion recognition. Both European American and Japanese participants reported the targeted emotions (*happiness*, *anger*) more than any other emotion labels (see Table X). European American participants more frequently listed the target emotion *happiness* for smiling displays compared to Japanese participants, χ2(4, *N* = 292) = 126.09, *p<* .001; a similar trend emerged for anger mentions in frowning displays, χ2(4, *N* = 292) = 8.32, *p=*.07.

Perception of Dialectical Emotions We computed a percentage score for each participant of how many opposite-valence emotions they recognized in a face, divided by the total number of emotions they observed. For example, for smiling faces, a participant’s score would be the number of negative emotions they listed, divided by sum of the number of negative, positive, and neutral emotions they listed for that particular stimulus. Using a repeated measure MANOVA, we tested for the between-subject factor of cultural group and controlling for the effects of participant gender; we additionally controlled for the within-subject factors of display type (smiling versus frowning) and model race (White, Asian). Replicating the results from Studies 1 and 2, we found that Japanese participants (M=0.20, SE=0.01) reported a greater percentage of opposite-valence emotions than European American participants (M=0.14, SE=0.01; *F(*1, 281) = 17.39, *p< .*001; partial η2= .06). Although not a factor in our hypotheses, we also found a greater percentage of dialectical emotions observed in Asian (M=.29, SE=.01) than White faces (M=.05, SE=.01), *F(*1, 281)=47.69, p<.001).

Attribution Style Difference

European American participants were more likely to make an internal attribution compared to Japanese participants (Table 3). When separately analyzed by the valence of facial expression, smiling displays produced more internal attribution than did frowning displays (Table 3). Consistent with previous literature, Japanese made more external attributions compared to European Americans for both non-social external attribution and social external attributions (Table 3).

**Discussion**

**This research is novel in two ways.** First, there is almost no research investigating the perception of mixed emotion. This cross-cultural investigation will fill in the gap in the mixed emotion literature. Secondly, this research used both an open-ended and closed-ended format, a more flexible method that allows experimenters to explore various research questions while maintain the same variable across different formats..However, there remains a crucial question we should consider for future studies.

**There are a number of mechanisms which can explain higher emotion complexity of East Asians compare to European Americans.** One possibility is the East Asians' dialectical thinking tradition, compared to the European Americans' analytical thinking tradition. Dialectical thinking refers to the traditional teachings of East Asia about the complementarity of opposites (i.e. the ying-yang principle) and the view that life is full of contradictions and change (Nisbett, Peng, Choi, & Norenzayan, 2001; Peng & Nisbett, 1999). This is juxtaposed to European Americans' analytical way of thinking, which is reflected in linear thinking (Ji) and a greater focus on features of an object than its gestalt (Norenzayan). A number of scholars have suggested that the greater prevalence of dialectical thinking among East Asians leads them to perceive positive and negative emotions together more often than Westerners (Schimmack et al.; Spencer-Rogers et al).

**The other possibility might stem from a difference in the construal of self (Markus & Kitayama, 1991)**. European American socialization contexts have traditionally embraced independence. The independent self-construal manifests in the emotional world as considering one’s emotions to reflect the authentic self (Uchida, Townsend, Markus, & Bergsieker, 2009). East Asian traditions, on the other hand, have emphasized interdependence. Parallel to European Americans, East Asians showed a tendency to seeing one's emotions as the outcome of interactions with other people (Uchida et al., 2009; Greenfield, 2013; Kashima et al., 1992). A recent analysis by Grossman et al (2015) showed that interdependence accounted for more cross-cultural difference than did dialecticism.

**We should further think about what it means to perceive both emotions at the same time.** People from a certain culture might have a tendency to experience more mixed emotion and use the experience of having mixed feelings to infer mixed emotions from others’ facial expressions. Participants also might have analyzed the facial expressions in a way that perceive both sides of emotions, for example, interpreting the face as neither fully happy nor sad. East Asians’ tradition of dialectical thinking (Peng & Nisbett, 1999) might play a role in perceiving emotions in a contradictory way. Alternatively, perception of opposite-valance emotion can be due to the fact that participants did not believe the facial expressions as it is expressed and second-guessed what the person is truly feeling. Although the result was consistent and straightforward to support cross-cultural difference of mixed emotion perception, we should continue to think why this cultural difference occurs.

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Figure 1

Table 1

*Emotion Labels by Category*

|  |  |
| --- | --- |
| **Emotion Category** | **Additional Emotion Labels in Category** |
| *Positive Emotions* |  |
| High Arousal | Happy, Cheerful, Delighted, Eager, Ecstatic, Elated, Gleeful, Joy, Pleased |
| Pride | Accomplish, Confident, Prideful, Proud |
| Amusement | Funny, Goofy, Light-hearted |
| Low Arousal | Content, Calm, Comfortable, Glad, Peaceful, Placid, Pleasant, Relaxed |
| Other Positive | Curious, Carefree, Energetic, Enthusiastic, Excited, Expectant, Fantastic, Hopeful, Humble, Inquisitive, Interested, Intrigued, Love, Optimistic, Quizzical, Thrilled, Unafraid |
| *Negative emotions* |  |
| Anger | Irritated, Aggressive, Annoyed, Defiant, Enraged, Frustrated, Furious, Grumpy, Hostile, Infuriated, Irate, Mad, Outraged, Pissed, Ticked |
| Fear | Anxious, Afraid, Alarmed, Apprehensive, Fight/Flight, Frightened, Nervous, Scared, Worried |
| Sadness | Depressed, Disappointed, Lonely, Melancholy, Morose, Solemn, Somber |
| Contempt | Bitter, Condescending, Dislike, Distain, Distaste, Resentment, Scornful |
| Disgust | Grossed out |
| Generically bad | Agitated, Affronted, Appalled, Awkward, Betrayed, Bored, Bothered, Concerned, Defensive, Disapproval, Discomfort, Disconnected, Discontent, Disgruntled, Disillusioned, Displeased, Dissatisfied, Distraught, Distressed, Disturbed, Embarrassed, Frazzled, Grim, Horrible, Hurt, Impatient, Insulted, Jealous, Offended, Overwhelmed, Stressed, Suspicious, Tired, Uncomfortable, Unhappy, Upset |
| *Other Emotions* |  |
| Surprise | Astonished, Amazed, Disbelief, Dumbfounded, Incredulous, Shocked, Startled |
| Confusion | Baffled, Bewildered, Nonplussed, Perplexed, Perturbed, Puzzled, Uncertain, Vexed |
| Neutral | Conflicted, Complacent, Distant, Distracted, Hesitant, Indifferent, Lazy, Numb, Reserved, Alert, Dazed, Focused, Preoccupied |
|  |  |
| In thought/Unemotional | No emotion, Contemplative, Serious, Thinking, Unemotional |

Table 2

*Frequency of reported primary emotions by expression type (data from Study 3)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Smiling Displays** | | **Frowning Displays** | |
| **Emotion Category** | **European American** | **Japanese** | **European American** | **Japanese** |
| *Positive Emotions* |  |  |  |  |
| High Arousal Positive | 69.6% | 32.3% | 0.3% | 0% |
| Pride | 1.9% | 0.5% | 0.9% | 0.2% |
| Amusement | 1.5% | 12.8% | 0.3% | 0.7% |
| Low Arousal Positive | 9.3% | 14.4% | 1.6% | 0% |
| Other Positive | 8.5% | 12.1% | 0.7% | 0.2% |
| *Negative emotions* |  |  |  |  |
| Anger | 0.6% | 0.5% | 43.0% | 46.6% |
| Fear | 1.2% | 3.7% | 2.3% | 2.4% |
| Sadness | 0.1% | 0.7% | 5.2% | 2.2% |
| Contempt | 0% | 3.0% | 1.1% | 4.1% |
| Disgust | 0% | 0.2% | 1.0% | 7.5% |
| Generic Bad | 3.6% | 8.6% | 20.4% | 21.1% |
| *Neutral Emotions* |  |  |  |  |
| Surprise | 1.0% | 1.9% | 2.4% | 2.9% |
| Confusion | 0.9% | 1.2% | 12.8% | 7.0% |
| Neutral (low arousal) | 1.1% | 4.4% | 3.9% | 1.4% |
| In Thought/Unemotional | 0.6% | 3.9% | 4.2% | 3.4% |

Table 3

*Main effects (group means, standard errors, p-values) from Study 3*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Participant Ethnicity** | |  |
| **Dependent Variable** | **European American** | **Japanese** | **p-value\*** |
| *Attributions* |  |  |  |
| Non-social attributions | .07 (.01) | .17 (.01) | < .001 |
| Social attributions | .21 (.02) | .50 (.03) | < .001 |
| Internal attributions | .03 (.01) | .01 (.004) | .023 |
|  |  |  |  |
|  | **Expression Type** | |  |
| **Dependent Variable** | **Smiling** | **Frowning** | **p-value\*** |
| *Attributions* |  |  |  |
| Non-social attributions | .14 (.01) | .09 (.01) | .001 |
| Social attributions | .31 (.02) | .34 (.02) | .071 |
| Dispositional attributions | .04 (.01) | .01 (.003) | < .001 |
| *Facial features* |  |  |  |
| \* paired sample t-test |  |  |  |