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The Universality of Emotional Facial Expressions across Culture And Implications for Survival

Lindsay Trefney¹

Emotion is one of the greatest links for human interaction. Emotion allows people from culture to culture to relate to and communicate with one another when language barriers exist. Emotional facial expressions were once thought to be culture specific, much like the emotions attached to those expressions. Research exists suggesting facial expressions across culture must be universal based on Darwin's theories of evolution and survival (Ekman & Friesen, 1971; Hansen & Hansen, 1988; Hock, 2009; Pinkham, Griffin, Baron, Sasson, & Gur, 2010; Rosenberg & Ekman, 1993), and without some universal agreement about emotional facial expressions and their attached emotions, humans would not be able to make necessary communications for survival. Ekman and Friesen (1971) traveled the globe to find strong support for their theory of universal agreement while Hansen and Hansen (1988) and Pinkham et al. (2010) studied emotional links to survival by looking at the anger superiority effect. Ekman's present research with TSA involves lie detection through recognition of micro-expressions of the face that are being concealed by a deceptive emotion (Seidman, 2011). Without research supporting the theory that universal facial expressions exist across culture, such applications would be useless. The present study looked for support of this theory within Lindenwood University's diverse student population, as well as inherent survival instincts. An emotional facial expressions recognition test, anger superiority effect test, and demographic questionnaire were administered. The results indicated a universal agreement, inherent survival skills, and did not signify strong cross cultural influences.

Without a doubt, emotion is the greatest link humans have for interacting with each other. Much of human communication hinges on emotion – how people feel and react based on an emotion sways interaction between people all the time. The expression of emotion becomes very important, and much research looks at how facial expressions aid communication. Ekman (1997) explored the notion that facial expressions voluntarily or not transmit information about how a person is feeling, and what they might do. Other research looks at the ability of people from various cultures to interpret emotional facial expressions the same way (Ekman & Friesen 1971).

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Why is it important, though, that people across culture can effectively communicate with emotion, therefore requiring emotional facial expression to be universal? The answer was initially proposed by Charles Darwin, who believed survival answered “why” (as cited in Ekman & Friesen, 1971; as cited in Hansen & Hansen, 1988; as cited in Hock, 2009; as cited in Pinkham, Griffin, Baron, Sasson, & Gur, 2010; as cited in Rosenberg & Ekman, 1993). Darwin believed that emotional facial expression served adaptive purposes that aided survival, therefore these behaviors would help some species survive better than others over time. In order to have a better chance at survival, human emotional facial expressions would need to be universal across culture. After Darwin’s controversial theories on evolution were tabled, people began to accept the idea that facial expressions were culture specific (as cited in Ekman & Friesen, 1971; as cited in Hock, 2009) because many other differences existed between cultures. Cultures talked, dressed, acted, valued, and worshipped differently from each other, so why would they not express emotion differently, too (Hock, 2009).

Ekman and Friesen (1971) decided to support Darwin’s theory about universal emotional facial expressions. They conducted various studies to support, support, and support again that emotional expression was not culturally biased. One of their original studies asked college-educated participants from five countries on three different continents to identify which emotion was being expressed in still photographs of human faces. Participants were from Brazil, Chile, Argentina, the United States, and Japan. Ekman and Friesen (1971) found participants evaluated the still photographs both similarly and correctly. They did not feel this research was enough to conclude universal agreement across culture due to access and exposure to the same mass media; participants would be able to view each others’ facial behaviors and learn how to interpret them via mass media exposure. The researchers decided to take their research on the road once again.

Ekman and Friesen (1971) chose to study the Fore tribe from Papua New Guinea. The Fore tribe offered the researchers a population of pre-literate people with limited to no exposure to the Western and Eastern worlds, and mass media. Their participant pool included men, women, and children. They studied emotional evaluations on the six basic emotions: happiness, anger, sadness, disgust, surprise, and fear. In order to test members of the Fore tribe, Ekman and Friesen (1971) had to employ different techniques for administering tests and gathering data because most of their participants could not read; it was also difficult for participants to remember an answer bank of six emotions. Instead of showing participants one still photograph and asking them to choose one of the six emotions that best represent the photograph, participants were shown two to three photographs and told a story representative of one of the emotions. After hearing the story, participants were to point at the photograph that best represented the emotion from the story. Photographs were of men, women, and children belonging to literate Western and Eastern cultures.

Ekman and Friesen (1971) found that participants were able to identify the correct facial expressions significantly better than chance for all photo sets *except* when fear expressions were shown with surprise expressions in the same set of photos. They decided fear and surprise elicited very similar feelings, and are more likely to be expressed together than any other combination of the six basic emotions; furthermore, their stories for fear and surprise were also hard to distinguish. The final portion of Ekman and Friesen's (1971) visit with the Fore tribe concluded with video recordings of Fore members posing expressions of the six basic emotions. The researchers used these videos to test U.S. college students and again supported their theory: emotional facial expressions are universal across culture.

While researchers like Ekman and Friesen (1971) were able to support Darwin's theory about universal emotional facial expressions, they were not able to link their research to survival yet. Research that explored the survival value of emotional transmission and interpretation studied the anger superiority effect (sometimes referred to as the face in the crowd effect). The anger superiority effect states that an angry face in a crowd of happy faces would be discovered quicker than a happy face in a crowd of angry faces (Hansen & Hansen, 1988; Pinkham et al., 2010). The anger superiority effect is strong; in fact, that infants are able to discriminate between angry and non-angry expressions; for infants early in development, anger is so distracting and attention grabbing (Hansen & Hansen, 1988).

Several researchers tested the anger superiority effect by showing participants various photographs of crowds (Hansen & Hansen, 1988) or 3×3 matrices (Pinkham et al., 2010). Combinations and compositions of all photographs in both studies included neutral, happy, and angry faces; some photos depicted "crowds" with no target faces. These crowds were either filled with neutral, happy, or angry faces. Other photographs required participants to find discrepant happy or angry faces in neutral crowds. Last, the most important photos were comprised of discrepant happy or angry faces in crowds of angry and happy faces respectively. Participants had to study each photograph and respond when they discovered a discrepant face; their response times were recorded. Participants were given several photographs to evaluate. The results revealed participants were significantly quicker at identifying angry discrepant faces in all conditions than happy discrepant faces (Hansen & Hansen, 1988; Pinkham et al., 2010). Discovering happy discrepant faces among angry crowds was particularly more difficult because it's hard to remove focus and attention from all the distracting, angry faces in order to locate that one happy face (Hansen & Hansen, 1988).

A strong interaction between the brain and body exists to express emotions through facial features; signals are sent to many different facial muscles that are told to pull in this direction or that, producing unique combinations that produce each specific emotion (Ekman & Friesen, 1971; Pinkham, et al., 2010; Rosenberg & Ekman, 1993). For an expression to be recognized as anger, for example, it does not need to utilize all possible muscle responses; a minimum combination can be used (Pinkham et al., 2010). Ekman coined the muscle responses under the term “Facial Action Coding System,” and his extensive research with facial muscles and expressions is being applied today in criminal justice and security settings (Hock, 2009). Ekman’s research about emotional facial expressions evolved into other theories about lie detection and deception. Facial micro-expressions are a person’s true emotions being expressed within 1/25th of a second, but quickly fade to be concealed by a deceptive expression. Micro-expressions pull on the same muscles that full expressions do, therefore their detection could aid survival. Airport security at Boston’s Logan Airport is being trained in Ekman’s SPOT program in order to detect concealed emotions from airport guests. Rather than scan crowds, these TSA agents are being instructed to engage guests in small conversation as they go through security checkpoints. These conversations are intended to draw lies out of dishonest, potentially dangerous and criminal passengers (Seidman, 2011).

Research like Hansen and Hansen’s (1988), Pinkham et al.’s (2010), and Ekman’s recent applications for emotional expression (Seidman, 2011) would be useless if facial expressions were not universal across culture. Such danger detection methods like those angry faces in the crowd or other’s concealed emotions could only be applied to members of that culture, and research would have to be conducted and established for every culture that wished to employ these survival techniques. Ekman’s applied research to detect terrorists, especially, would be

nonexistent if the threat was foreign rather than domestic. Therefore, Ekman and Friesen's (1971) research opened the doors to explore emotional facial expression alongside survival based on interpretation and evaluation of another's emotion.

The purpose of the present study was to determine if Lindenwood University's diverse student population as represented by the Lindenwood Participant Pool could agree about which emotional facial expressions represented the six basic emotions: happiness, anger, sadness, disgust, surprise, and fear. The study also aimed to determine if these same students had the survival instinct to discover an angry discrepant face more quickly than a happy discrepant face. The researcher predicts participants will both agree and find angry discrepant faces faster. The present study tested these hypotheses by giving participants an emotional facial expressions recognition test, an anger superiority effect test, and a demographic questionnaire to determine cross cultural diversity and exposure.

Method

Participants

Members of Lindenwood University's Lindenwood Participant Pool (LPP) volunteered to participate in this study. The LPP is a program that allows students in LPP approved courses the opportunity to earn extra credit by participating in research projects. Classes that belong to the LPP include introductory behavioral science courses as well as a few more advanced courses. The LPP aids student researchers in learning how to conduct ethical research with human participants, as well as provide researchers with readily available samples for study. In order to recruit participants, a description of the study was posted on the LPP board along with a sign-up sheet. The study description included an experiment title, brief description of the study, and the

time commitment. Sign-up sheets had specific times and dates for participants to choose the most convenient time to participate. The LPP is a convenience sample.

The present study included 54 participants, 17 men and 37 women. These men and women were between the ages of 18 and 47, with a mean age of 20.07 ($SD = 3.91$). Twenty two freshman, 16 sophomores, 14 juniors, and 2 seniors participated in the study. Participants were seeking various degrees, the mode being exercise science majors (14 participants, 26%). The majority of participants were from the United States (41, 76%). Other participants came from Brazil (2), England (1), Germany (2), Japan (2), Mongolia (1), New Zealand (1), Panama (1), Paraguay (1), Turkey (1), and Venezuela (1).

Materials

Participants viewed 20 photographs (see Appendices A and B) for the study, 18 for an emotional facial expression recognition test, and two for an anger superiority effect test. Each of the 18 images represented one of the six basic emotions (happiness, anger, sadness, disgust, surprise and fear), each emotion being represented three times during the tests. Each image showed only one person in the photograph, and all 18 photos represented men and women of various ages and ethnicities. Images for this test were viewed on a computer using Microsoft PowerPoint. The researcher also created three versions of this test; each version included all 18 images, but showed them in three different orders. These images were retrieved from the internet. The last two images were used for an anger superiority effect test. Each image depicted 16 faces in a 4×4 matrix. Fifteen faces expressed the same emotion, happiness or anger, while one face expressed the opposite emotion, anger or happiness. The image consisting of 15-Happy/1-Angry became known as Image 2A while the image consisting of 15-Angry/1-Happy became known as Image 2B. Each image was printed on paper for participants to mark with pen

or marker which image/expression did not match the others, and placed inside separate manila file folders to hide the photo's contents until testing time. These images were retrieved from Pinkham, et al. (2010) and edited from their original 3×3 matrix.

The testing materials included an 18-item answer sheet (see Appendix C) that allowed participants to indicate which emotion they thought was being expressed, and to rate their confidence in their answer on a six-anchor Likert Scale. Another answer sheet was used to record the time it took for participants to complete each search task for the anger superiority effect test. A cell phone was used as a stopwatch to measure time. Participants also completed a demographic questionnaire (see Appendix D). Participants were asked questions like which country they were born in and how much time they've spent away from their birth country. Questions like those were asked to give a rough illustration about how much cross-cultural exposure participants had experienced. The researcher created all three forms.

In order to ensure anonymity, participants were assigned a participant ID number by the researcher. Identification numbers were drawn at random from a jar, and were numbered ES001 to ES100. ID numbers were assigned randomly, rather than in order, so that the numbers could not be matched up with the order participants signed up for the study. Participants' ID numbers were recorded at the top of both answer sheets, images 2A and 2B, and the demographic questionnaire.

Other general forms used during the study included informed consent forms, feedback letters, signup sheets, participant receipts, and a list of the experimenter's participants. The informed consent form outlined the basic tasks to be performed during the study, potential risks, the right to withdraw from the study, and the right to the final study results. The feedback letter described the purpose of the study and thanked participants for participating. Both participant

receipts and experimenter's list of participants are forms required by the LPP office in order to award extra credit for participation. The receipts required information like participant's name, student ID number, the name of the professor of the course they're receiving credit for, and when that course meets. Receipts were given to participants and supposed to be turned in to the LPP office. The experimenter's list of participants required the same information. This list was a sign-in sheet kept by the researcher to be turned in to the LPP office.

The study took place at Lindenwood University's psychology lab. The lab is located in the basement of Young Hall and is divided into separate lab "rooms" with tables, desks, chairs, and in two rooms, computers. The computers provided by the labs were not used in the study because the researcher preferred to use her own.

Procedure

Experiment preparation and procedure. The researcher initially created three versions of the emotional facial expression recognition test. Three versions were created to counterbalance the order in which images appeared, but because there were 18 images consisting of 3 of each emotion, counterbalancing all potential orders would have been too time consuming and confusing to keep organized. Therefore the researcher used a TI-83 Plus calculator to randomly assign three separate image orders. The images were coded 1-18 and appear in that order in the Appendices. The researcher used the calculator's random integer function to select one image at a time based on its number. Images were chosen as soon as their number appeared in the list. Repeats were ignored, and the procedure was repeated until all 18 images had appeared. This entire process was repeated two more times to create the second and third versions of the test. Versions were named A, B, and C. The researcher also initially edited the anger superiority effect test images from their source material. The original images were

arranged on a 3×3 matrix. The computer program, Paint, was used to edit the photos. Faces from the image were copied and pasted into a new position on an outside edge and then transformed into a reflection of the original face it was copied from. This was repeated until two outer edges of the matrix were filled in order to create the final 4×4. None of the faces were repeated more than once, and were reflected to disguise the fact that they were repeats. Also, the face with the opposing expression was not repeated. The fill-color function was used for final touch ups to create a more fluid looking image very similar to the original. The researcher also decided version A for the anger superiority effect test would show image 2A first, and version B would show image 2B first.

Prior to arrival, the researcher randomly selected a participant ID number and recorded this number in the allotted space on both answer sheets, images 2A and 2B, and the demographic questionnaire. The researcher also prepared image 2A and 2B's folders with their respective test images and recorded the test version for each test at the top of their respective answer sheets. Test versions were assigned based on the order participants came in. The first participant received version A of the emotional facial expression test, and version A of the anger superiority effect test. The next would be given versions B and B, then C and A, and so on. All tests were respectively counterbalanced to control for order, practice, and fatigue effects.

Upon arrival, participants filled out the experimenter's list of participants and the participant receipt. Participants also read and signed two copies of the informed consent form. Both the participant and experimenter retained a copy for their records.

The researcher then administered the emotional facial expression recognition test first. Verbal and written instructions were provided to each participant. Participants viewed the test on the computer as the researcher scrolled through images one at a time. The images were viewed

long enough for participants to choose an emotion from the list given and rate their confidence on the scale provided. The researcher controlled scrolling through the images to prevent participants from returning to previous images to compare.

The anger superiority effect test was conducted next. Participants were given the folders/images one at a time and instructed not to open them. The researcher provided written and verbal instructions to each participant; however the researcher relied on verbal instruction more because the written ones were not clear. The researcher started recording participants' times once they opened the folder and began their search. Once it was clear the participant had discovered the opposing face, time was stopped and recorded on both the image and the answer sheet to control for recording mistakes. The researcher interpreted participants' movements to mark their answer as an indication the face had been discovered.

Last, participants were asked to complete a short demographic questionnaire. They were then verbally debriefed, given a feedback letter, and thanked for their time.

Procedures for coding tests and questionnaires. After all data was collected from participants, the emotional facial expression recognition answer sheets had to be carefully coded and recorded. Because the images were arranged in random orders, the researcher had to code each item by their true image number. For example, version A question 1 could have been image 7. This number was written directly left of the question in the margin. Under this number, the researcher recorded which emotion was picked using its letter code. Happiness=H, Anger=A, Sadness=SD, Disgust=D, Surprise=SP, and Fear=F. The researcher recorded the confidence score next to this. The information was now ready to be transferred to a data table.

Information collected from the anger superiority effect test could be directly transferred to a data table without any additional coding data transformations.

Responses to questions 7, 8, and 9 on the demographic questionnaire had to be evaluated and converted. Question 7 asked participants who had been born in the United States if they had traveled outside the country. Only two responses were allowed: YES and NOT APPLICABLE. However, it came to the researcher's attention too late that participants from the United States should answer NO rather than NOT APPLICABLE if they had not been outside the country. NOT APPLICABLE was actually meant for participants not from the United States since the question did not pertain to them. The researcher evaluated NOT APPLICABLE responses from United States' participants as NO and recorded them as such on the data table. Information from questions 8 and 9 had to be converted to a uniform measurement of time. Question 8 asked participants how long they had been in the United States. The response asked for participants to list how many years and months they have been here, and also included a checkbox for those who have been there since birth. Question 9 asked participants how much total time they've been away from their country of origin. Again, participants could answer in years and months. It was this information that had to be converted into a uniform measurement of time because statistical software programs will not be able to mathematically evaluate these responses. The researcher chose to convert these measurements to days. One year equaled 365 days while 1 month equaled 30 days. The researcher calculated participants who had been in the U.S. since birth by multiplying their age by the number of days in a year. While this information did not provide an exact measurement of age by birthday, it generated an estimated number of days in the United States. United States citizens who had been in the U.S. since birth but also travelled out of the country had this number calculated differently. In order to calculate their number of days spent in the United States, the researcher multiplied their age by 365, and then subtracted the total number of days spent outside the United States.

Results

The researcher hypothesized participants would agree more often than not about which expressions represented the six basic emotions: happiness, anger, sadness, disgust, surprise, and anger. Agreement was measured with a Pearson r correlation to determine if a significant relationship existed between response accuracy on the emotional facial expressions recognition test, and cross cultural exposure based on days spent within the United States and abroad from participants' originating country. Independent t tests were also conducted to determine if significant differences existed between students born in or outside the United States; and to determine if significant differences existed between students born in the United States who had or had not traveled outside the United States.

A Pearson r reporting on the relationship between days spent in the United States and accuracy did not reveal a significant relationship, $r(52) = .16, p > .05$. Another Pearson r reporting on the relationship between days spent traveling or living in a country other than where the participant was born did not reveal a significant relationship, $r(52) = -.07, p > .05$, as well. An independent t test evaluating differences between participants born in or outside the United States did not reveal any significant differences, $t(52) = .61, p > .05$. A second independent t test evaluating differences between only the participants born in the United States who had or had not traveled abroad also did not reveal significant differences, $t(39) = .81, p > .05$. These results lead the researcher to conclude Lindenwood University students represented by the LPP were able to agree about which expressions are represented by the six basic emotions, without being significantly impacted by cross cultural exposure. Participants also revealed a mean accuracy of 15.44 correct ($SD = 1.97$); scores ranged between 9 and 18 correct out of 18 total images.

Pearson r correlations also looked for significance between confidence and days spent in the United States, $r(52) = .20, p > .05$; and between confidence and days spent traveling or living in a country other than where the participant was born, $r(52) = .003, p > .05$. The previous independent t tests also replaced accuracy with confidence and revealed no significant differences between participants born in or out of the United states ($t(52) = .965, p > .05$), or between participants born in the United States who travelled out ($t(39) = .127, p > .05$). The results of a Pearson r correlation showed a weak, positive relationship existed between accuracy and confidence, $r(52) = .28$; and the relationship was statistically significant, $p < .05$.

The researcher hypothesized participants would be able to find an angry face among 15 happy faces more quickly than a happy face among 15 angry faces. As predicted, a two-tailed paired t test revealed participants were significantly more likely to find an angry discrepant face ($M = 5.18, SD = 3.93$) sooner than a happy one ($M = 7.45, SD = 4.59$), $t(53) = -2.84, p < .01$. The t statistic revealed a direction in favor of finding the angry discrepant face more quickly; t was calculated by subtracting Image 2B times from Image 2A times.

Discussion

The researcher was able to determine an agreement among Lindenwood University's diverse student population as represented by the LPP about which emotional facial expressions represent the six basic emotions. The researcher was also able to support the anger superiority effect hypothesis – participants were significantly faster at identifying an expression of anger in a crowd of happy faces than an expression of happiness in a crowd of angry faces.

These results are very positive. With a large proportion of students (41/54) from the United States, it was almost surprising to see this hypothesis supported. When comparing the amount of days students born in the United States vs. those who were not, the researcher worried

a significant relationship would exist. Such research aligns with Ekman and Friesen's (1971) study because results from the present study offer further support to their theory about universal facial expressions across culture. Due to the strengths of their research, it's also almost unsurprising that this hypothesis was supported.

The results of the anger superiority effect test were also positive and unsurprising. Much research already exists supporting the theory that anger commands more attention than happiness when evaluating images of crowds (Hansen & Hansen, 1988; Pinkham et al., 2010). Hansen & Hansen (1988) discussed several reasons about why anger is more commanding, such as the emotion itself does not have an effect, rather the intensity of an expression of anger commands the attention instead. If this is the case, future research could explore equally intense expressions compared to anger as well as less intense expressions like happiness. Results from this study in regards to the anger superiority effect cannot be generalized to non-contrived settings. Participants in my study were already primed to look for discrepant faces. In a real world setting, they will most likely not know someone within the crowd is angry and poses a threat, and therefore would not know to look for him. Future research should also find ways to study the anger superiority effect in more natural settings.

Future research should also explore the differences between children and adults about emotional facial expression recognition. A pilot study revealed interesting differences between adults and children about which expressions both groups are likely to get confused. Adults were more likely to confuse surprise and fear, while the child tested confused anger and disgust. The present study also revealed participants were far more likely to evaluate the three images of fear wrong than those of surprise. A two-tailed paired *t* test evaluating surprise image accuracy ($M = 2.78, SD = .54$) and fear image accuracy ($M = 1.68, SD = 1.04$) revealed significant differences

between them, $t(53) = 7.39, p < .01$. A result like this suggests researching differences between children and adults could yield more interesting results. It should, however, be noted that this result could have also been influenced by the response order on the answer sheet; surprise appeared before fear, therefore participants may have been more likely to pick surprise over fear because they saw it first on the answer sheet.

Future studies continuing the present study should recruit more participants, and possibly expand the population outside Lindenwood University. More international students should also be recruited to strengthen the results of this study. Last, future studies should find more accurate ways to measure response time for the anger superiority effect test. A computer program should be looked into to record response, and measure and record time. The results from this study, while, significant, could also have been affected by the researcher's expectancy bias: the researcher knew which image should take participants faster to complete and could bias when the researcher stopped recording time.

References

- Ekman, P. (1997). Should we call it expression or communication? *Innovation, 10*(4), 333-344.
- Ekman, P. & Friesen, W.V. (1971). Constants across cultures in the face and emotion. *Journal of Personality and Social Psychology, 17*(2), 124-129.
- Hansen, C.H. & Hansen, R.D. (1988). Finding the face in the crowd: An anger superiority effect. *Journal of Personality and Social Psychology, 54*, 917-924.
- Hock, R.R. (2009). *Forty studies that changed psychology: Explorations into the history of psychological research* (6th ed.). Upper Saddle River, NJ: Pearson/Prentice Hall.

Pinkham, A.E., Griffin, M., Baron, R., Sasson, N.J., & Gur, R.C. (2010). The face in the crowd effect: Anger superiority when using real faces and multiple identities. *Emotion, 10*(1), 141-146.

Rosenberg, E.L. & Ekman, P. (1993). Facial Expression and Emotion. In B.H. Smith & G. Adelman (Eds.), *Neuroscience year: Supplement 3 to the Encyclopedia of Neuroscience* (pp. 51-52). Boston: Birkhauser.

Seidman, A. (2011, August 17). TSA launching behavior-detection program at Boston airport. *Los Angeles Times*. Retrieved from <http://articles.latimes.com/2011/aug/17/nation/la-na-tsa-logan-20110818>.

Appendix A

Emotional Facial Expression Test Images (Actual Sizes Vary)



Appendix B

Anger Superiority Effect Test Images

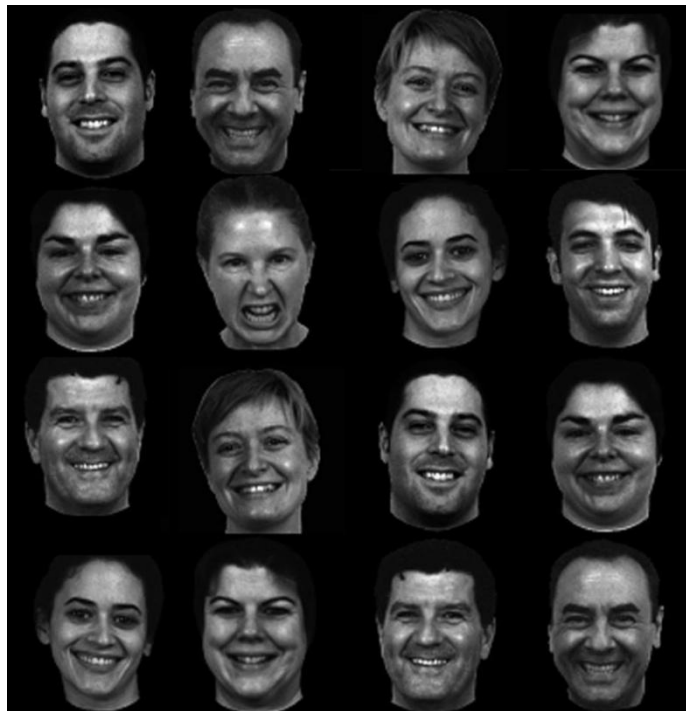


Image 2A



Image 2B

Appendix C

Sample Question from the Emotional Facial Expression Answer Sheet

Participant ID#: _____

Test Form: _____

TEST 1 ANSWER SHEET

For each image, please circle the emotion you think is being expressed.

1) **Happiness** **Anger** **Sadness** **Disgust** **Surprise** **Fear**

How confident are you that you chose correctly? (Please circle one).

1-----2-----3-----4-----5-----6

| | | | | | |
|-------------------------|-----------------------|-----------------------|-----------|-------------------|-------------------------|
| Not At All Confident | Not Very Confident | Somewhat Confident | Confident | Very Confident | Completely Confident |
|-------------------------|-----------------------|-----------------------|-----------|-------------------|-------------------------|

Appendix D

Demographic Questionnaire

Participant ID#: _____

DEMOGRAPHIC QUESTIONNAIRE

1) Sex (circle one): MALE FEMALE

2) Age: _____ years

3) Class Standing (circle one):

 FRESHMAN SOPHOMORE JUNIOR SENIOR OTHER

5) What is your major? _____

6) Which country were you born in? _____

7) If you were born in the United states, have you traveled to another country before?

___ YES

___ NOT APPLICABLE

8) How long have you been in the United States?

Since birth

Other: _____ years, _____ months

9) How much TOTAL time have you spent traveling or living in a country besides the one where you were born?

_____ years, _____ months

NOT APPLICABLE