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Ethnic and Racial Differences in Emotion Perception

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Under the Direction of Diana L. Robins Ph.D.

ABSTRACT

This study analyzed racial differences in the way African Americans and Caucasians perceive emotion from facial expressions and tone of voice. Participants were African American (n=25) and Caucasian (n=26) college students. The study utilizes 56 images of African American and Caucasian faces balanced for race and sex from the NimStim stimulus set (Tottenham, 2006). The study also utilized visual and auditory stimuli form the DANVA2. Participants were asked to judged emotion for each stimulus in the tasks. The BFRT, the WASI, and the Seashore Rhythm test were used as exclusionary criteria. In general the study found few differences in the way African Americans and Caucasians perceived emotion, though racial differences emerged as an interaction with other factors. The results of the study supported the theory of universality of emotion perception and expression though social influences, which may affect emotion perception, is also a possibility. Areas of future research were discussed.

INDEX WORDS: Facial expressions, Tone of voice, Emotion, Emotion perception, Nonverbal, Racial differences

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To Dr. Diana Robins, whose guidance, patience, and support made this work possible and showed me all the wonderful things I never knew I was capable of.

CONTENTS

Abstract

The current study analyzed racial differences in the way African Americans and Caucasians perceive emotion from facial expressions and tone of voice. Participants were African American (n=25) and Caucasian (n=26) college students. The study utilizes 56 images of African American and Caucasian faces balanced for race and sex from the NimStim stimulus set (Tottenham, 2006). The study also utilized visual and auditory stimuli form the DANVA2. Participants were asked to judged emotion for each stimulus in the tasks. The Benton Face Recognition task, the Wechsler Abbreviated Scale of Intelligence, and the Seashore Rhythm test were used as exclusionary criteria for participants. In general the study found few differences in the way African Americans and Caucasians perceived emotion, though racial differences did emerge as an interaction with other factors. The results of the study supported the theory of universality of emotion perception and expression though social influences, which may affect emotion perception, is also a possibility. Areas of future research were discussed.

Introduction

Nonverbal communication is important in the everyday interactions between people; it has been conjectured that nonverbal cues elicited through any of the fives senses can account for over half of every message that is conveyed (Braden, 2004), which suggests that nonverbal messages may impact people more so than the actual verbal message. Facial expression and tone of voice are two prominent nonverbal forms of communication which humans use in order to convey and interpret emotion. Miscommunication occurs when people interpret nonverbal cues such as facial expression and tone of voice differently from that which the expresser is trying to convey. Thus, if there are racial or ethnic differences in the way people interpret emotions from nonverbal cues such as facial expressions and tone of voice, these differences may account for some miscommunication between people of different races.

Prior research has produced mixed findings regarding ethnicity and facial expressions. Some research suggests that there are certain basic emotions which are universal, meaning that each of these basic emotions corresponds to a specific facial expression that is exhibited and understood by all people regardless of the race and culture of the expresser or the interpreter (Ekman, 1971, 1980; Ekman & Friesen, 1971; Ekman & Scherer, 1982; Ekman, Sorenson, & Frisen, 1969; Izard, 1971). Ekman and Izard have provided the most compelling evidence thus far for the theory of universality. In one of Ekman's studies (1971), he showed photographs of six different emotions to people living in the United States, Brazil, Chile, Argentina, and Japan and found that people performed similarly in the way they judged each emotion despite cultural and racial variability. Izard (1971) conducted a very similar study involving people from nine

different countries, the United States, England, Germany, Sweden, France, Switzerland, Greece, Japan, and Africa, and produced similar results. In a later experiment, Ekman and his colleagues repeated his experiment, along with a few adjustments to the methodology, with members of a pre-literate culture in New Guinea and found that the New Guineans were also able to identify emotions from Caucasian facial expressions with a high level of accuracy; though the New Guineans had little contact with foreigners, they were still able to identify basic emotions from facial expressions (Ekman, 1971, 1980; Ekman & Friesen, 1971; Ekman & Scherer, 1982; Ekman et al., 1969). Supporters of the universality theory have argued that though there are some cultural influences in the way people communicate emotion, there are certain fundamental expressions which universally represent specific emotions (Ekman & Friesen, 1971). Ekman has argued that happiness, sadness, anger, fear, disgust, and surprise comprise the six universal emotions which correspond to specific facial expressions recognizable by people regardless of race and culture (Kilbride & Yarczower, 1983; Nowicki, Glanville, & Demertzis, 1998).

The results of some more recent research conflicts with the theory of universality of facial expressions; these studies found cultural and racial differences in the way people interpret emotion from nonverbal cues.

A study conducted by Elfenbein and Ambady (2003) found cultural differences in the way people perceive emotions; people more accurately perceive emotions from the facial expressions of others belonging to their own cultural group. They also found that increased exposure to people of a certain culture increases accuracy in judging the facial expressions of the people of that culture; the study showed significant improvements in Chinese students' abilities to recognize emotions from the facial expressions of

Americans after living in the United States for only a few years (Elfenbein & Ambady, 2003).

The results of another study conducted by Wolfgang and Cohen (1988) also suggest that increased familiarity with the faces of people of a certain culture increases one's accuracy for perceiving emotion from the faces of people from that culture. The study compared the ability of Canadians and Ethiopians living in Israel and utilized a set of 40 facial expressions, 20 Caucasian and 20 West Indian (Wolfgang & Cohen, 1988). The results showed that the Canadian sample were more accurate than the Ethiopian sample in perceiving emotion from Caucasian and West Indian faces; the study also found that the Ethiopians with less exposure to Western culture were less accurate at identifying emotion from the facial expression of Caucasians (Wolfgang & Cohen, 1988). The results of the study suggest that there are cultural factors which influence the way people perceive emotion from facial expressions; however, due to the unequal distribution of sex and academic status among the samples, the results may be subject to biases.

Another study analyzed Caucasian students from the United States and African students from Zambia and cultural differences in their ability to identify facial expressions from a combination of slides including both American and Zambian faces (Kilbride & Yarczower, 1983). The study found that American students were more accurate than Zambian students at identifying facial expressions from both American and Zambian stimuli, and there was less uncertainty when participants judged faces of their own race as opposed to faces of the other race; the results of this study suggests that there are cultural biases that influence how individuals identify emotion from facial

expressions (Kilbride & Yarczower, 1983). However, since the distribution of sex and regional background of the students in their sample were somewhat disproportionately distributed among the groups in the study, the results of the study may be biased. Also, a potential problem with administering this kind of task to compare the performance of Americans and another culturally dissimilar group is Americans may be more familiar with such tasks (Elfenbein & Ambady, 2003), creating the potential for biases in the results.

A study by Bailey, Nowicki, and Cole (1998) analyzed the performance of African Americans, Caucasian Americans and international students in identifying emotion from various nonverbal cues; the international sample included students from Africa and the Caribbean islands. The study found no differences in performance among the three groups in judging emotion from facial expressions. Both African American students and the international students were less accurate at perceiving emotion from tone of voice than Caucasian Americans, but when acculturation was taken into account, differences among the groups disappeared; a higher level of acculturation correlated with greater accuracy in identifying emotion from tone of voice but not facial expressions (Bailey et al., 1998). The researchers defined acculturation as the level of involvement of the student with beliefs and behaviors thought to be associated with traditional African culture (Bailey et al., 1998). The study provides evidence for cultural influences in emotion recognition from nonverbal cues. However, the study used the Diagnostic Analysis of Nonverbal Accuracy (DANVA) and the Diagnostic Analysis of Nonverbal Accuracy-2, adult paralanguage subtest (DANVA2-AP), which includes mostly

Caucasian stimuli, and thus the results of the study may be influenced by the biased stimuli.

One study by Weathers, Frank, and Spell (2002) found that, in comparing Caucasians and African Americans' ability to accurately judge facial expressions, Caucasians were more accurate than African Americans in judging emotion from facial expressions and tone of voice; Caucasians perform more accurately than African Americans in judging emotion from a predominantly Caucasian stimulus set. The results of the study suggest that there are racial and cultural influences that affect the way people interpret emotion from nonverbal cues; however, since the two tests used in the study, the DANVA-2 and the Carolina Older Adult Test of Nonverbal Communication (COAT-NC), contain mostly Caucasian stimuli, racial biases in the stimuli may have influenced the results of the study.

Some research is consistent with a social integration theory that presumes there is more social pressure for members of the minority race in society to successfully comprehend the nonverbal cues of the majority race whereas there is less pressure for members of the majority race to comprehend the nonverbal cues of members of the minority race (Jones, 1991 as cited in Nowicki et al., 1998). According to this theory, African Americans will be more accurate in identifying the nonverbal cues of Caucasians than Caucasians will be at identifying African American faces.

One study analyzed African American and Caucasians' performance on perceiving emotion from facial expressions from both African American and Caucasian stimuli (Nowicki et al., 1998). In this study, both African American and Caucasian college students viewed and labeled the emotion for 32 African American faces in the

Diagnostic analysis of Nonverbal Accuracy, African American form for adult faces (DANVA2-AAAF) and 24 Caucasian faces in the Diagnostic Analysis of Nonverbal Accuracy adult facial expression subtest (DANVA2-AF); both African Americans and Caucasians performed similarly in identifying emotion from the Caucasian stimuli whereas Caucasians performed with less accuracy in identifying emotion from the African American stimuli (Nowicki et al., 1998). The results of this study support the hypothesis that minorities are more pressured to comprehend the nonverbal cues of majority population since African Americans performed with more accuracy in identifying emotion from Caucasian faces than Caucasians' performance in identifying emotion from African American faces.

Another study that supports the social integration theory found differences in the way Caucasian and African American college students perceived emotion (Gitter, Black, & Motofsky, 1972). The study used 140 black and white photographs of both Caucasian and African Americans facial expressions, though the article did not specify how many photographs of each were used. The study found that African American students performed more accurately than Caucasian students; it also found that race of the stimuli, sex of the stimuli and sex of the participant had no significant influence on the results. The study also used all six emotions said to be universal including an additional "pain" expression (Gitter et al., 1972). It is possible that the results of this study are due to an increased social pressure for African Americans as minorities to accurately identify emotions the majority population since African Americans performed more accurately overall compared to Caucasians in judging African American and Caucasian stimuli. Unfortunately, Gitter and his colleagues (1972) did not give a very detailed description of

the methodology they used to obtain these results; thus, it is difficult to draw any further conclusions from their study.

Two studies compared African American children and Caucasian children's ability to identify emotion from facial expressions and tone of voice (Collins & Nowicki, 2001; Glanville & Nowicki, 2002). Glanville and Nowicki (2002), compared African American children and Caucasian children in the second through fourth grade; the study had each child view and label emotions for African American stimuli (DANVA-AAAF) and Caucasian stimuli (DANVA2-AF). The study found no difference in the accuracy with which African American children and Caucasian children perceived emotion from facial expressions (Glanville & Nowicki, 2002). The researchers argued that recognizing emotion in facial expressions might be a skill that is learned over time since children who were more accurate in recognizing emotion from the facial expressions of stimuli of the same race also received higher ratings of social competence from their peers; if children are socially reinforced for being able to recognize emotions from the facial expressions of others of the same race but not those of another race, it would be expected that over time children will learn to more accurately identify emotions from members of their own ethnic identity and there will be an ethnic biases in the way people perceive emotions from facial expressions (Glanville & Nowicki, 2002). The study by Collins and Nowicki (2001) provides some support for this argument. Their study examined both African American and Caucasian students around the age of 10 (Collins & Nowicki, 2001). The study used the adult and child facial expressions subtests and the adult paralanguage subtest from the DANVA2, and the child paralanguage subtest from the DANVA (Collins & Nowicki, 2001). The study found racial differences in accuracy of emotion

perception for all subtests except for the child paralanguage subtest; for all three subtests for which there were differences, Caucasians performed with more accuracy than African Americans (Collins & Nowicki, 2001). The results of the study suggest that there are racial biases in the way people perceive emotion since Caucasian children performed with more accuracy than African American children and because the study used predominantly Caucasian stimuli (Collins & Nowicki, 2001).

The results of these two studies suggest that there are ethnic and cultural factors which influence the way people perceive emotion; it seems that the ability to recognize emotion from facial expressions develops over time since there were racial differences in the accuracy of perception for older children, but no racial differences for younger children (Collins & Nowicki, 2001; Glanville & Nowicki, 2002). Also, both articles support the theory that the ability to recognize facial expressions is a learned phenomenon which is susceptible to cultural influences; a greater ability to recognize emotion from the facial expressions of members of the same race but not members of a different race is related to higher perceived social competence by peers (Glanville & Nowicki, 2002). Collins and Nowicki's study provides further support for socio-cultural influences in emotion perception; their article analyzed older children around 10 years of age (Glanville and Nowicki's study used children between the second and fourth grade) and found that Caucasian children were more accurate than African American children when perceiving emotions from facial expressions and tone of voice from the DANVA and the DANVA2, both feature predominantly Caucasian stimuli (2001). One possible explanation for the results of these two studies is as children are socialized by their peers to allot greater effort to perceiving emotion from facial expressions of members of their

own race but not other races, over time it would be expected that children will perceive emotion from the expressions of faces that share their own race more accurately than when judging faces of another race, which is exemplified in Collins and Nowicki's study (2001). Thus, it appears that social and cultural influences in a child's environment may eventually lead to racial differences in the way the child perceives emotions from facial expressions and tone of voice; furthermore, the findings of theses studies imply that a person's ability to perceive emotion from facial expression and tone of voice may change over time according to social and cultural influences.

Prior research suggests that there may be cultural and racial differences that influence the way people perceive emotions. However, methodological flaws in past research make it difficult to draw clear conclusions. The current study seeks to minimize methodological errors by collecting more equally distributed samples and introducing a new stimulus set which controlled for race and sex.

Some of the previous research that suggests racial differences in emotion perception compared samples that were unequally distributed (Kilbride & Yarczower, 1983; Wolfgang & Cohen, 1988). Unequal distribution among the groups in a sample may confound the data and create biased results. The current study attempts to minimize differences in the sample by collecting approximately the same number of African Americans and Caucasians and equalizing the number of males and females in each group.

Very few studies used both African American and Caucasian faces in their stimulus set (Glanville & Nowicki, 2002; Nowicki et al., 1998) and virtually no studies used a set which includes an equal number of faces from both races in the same set. In

order to investigate racial differences in emotion perception from nonverbal cues more effectively the study utilizes a new stimulus set which includes an equal number of African American and Caucasian faces and an equal number of male and female faces within each group.

All stimuli for the DANVA-2 and the DANVA-AAAF had been selected based on the consensus of the vast majority of people who viewed them, which provides construct validity for the measures, but some methodological issues still arise. The DANVA2 and the DANVA2-AAAF use a forced choice system for their stimuli, thus participants viewing the stimuli are forced to choose a specific emotion, though it may not be the best description for what the participant perceives in the stimuli. Data for a forced choice system for stimuli also suggests that the other choices that were not selected by the participant are mutually exclusive which may not necessarily be the case and using a forced choice system makes the participant aware of the researchers' expectations (Russell, 1994). Thus, using a forced choice system for responding to stimuli limits the implications that can be made from the results. Also, the visual stimuli for the DANVA2 include factors which may influence the viewers' perception of the stimuli; such factors include hair, clothing, jewelry, and background.

The current study uses a set of stimuli other than the DANVA2 and the DANVA2-AAAF as the primary stimulus set, although the DANVA2 is included and its results will be compared to the findings of the main stimulus set. The main stimulus set includes an equal number of African American and Caucasians facial stimuli as well as an equal number of male and female stimuli. The stimuli was borrowed from a larger set of stimuli called the NimStim set and cropped, with permission from Dr. Nim Tottenham

(Tottenham, 2006), to remove any other factors that may influence the participants' response such as hair and clothing. A free response system was used to record responses allowing for a more accurate and broad range of possibilities for the data. The NimStim set includes all six of the emotions theorized to be universal across cultures: happy, sad, angry, fearful, disgust, surprise. The set also includes a seventh "neutral" expression as well. The stimulus set which is comprised of the selected faces from the NimStim set is known as the Multicultural Face task in the study.

Based on the theory that the minority population in a society is more socially pressured to learn the nonverbal cues of the majority population (Jones, 1991 as cited in Nowicki et al., 1998) it is hypothesized that for the Multicultural Face task, African Americans and Caucasians will perform similarly in accuracy when judging Caucasian stimuli, but when judging African American stimuli, Caucasians will perform with less accuracy than African Americans. This hypothesis also predicts that African Americans will perform with more accuracy over all in identifying emotion from nonverbal cues from the Multicultural Face task since it is predicted that African Americans and Caucasians will perform similarly when perceiving emotion from Caucasian stimuli, but Caucasians will perform with less accuracy when perceiving African American stimuli. It is also expected that there will be no differences in performance between African Americans and Caucasians when perceiving emotion from faces in the DANVA2 since it features predominantly Caucasian stimuli.

The study conducted by Nowicki and his colleagues (1998) found similar results; African American and Caucasian adults performed similarly when perceiving Caucasian stimuli but Caucasians performed with less accuracy when viewing the African American

stimuli. Some research also suggests that people are subjected to social pressures that influence the way one perceives emotion from nonverbal cues and over time, theses influence may alter the way one perceives emotion and create racial biases in emotion perception (Collins & Nowicki, 2001; Glanville & Nowicki, 2002). If this is the case, then the unequal social pressure for African Americans to comprehend the nonverbal cues of Caucasians, which is not reciprocated to Caucasians in comprehending the nonverbal cues of African Americans, may lead to no differences in emotion perception for African Americans and Caucasians viewing Caucasian faces but when viewing African American faces, Caucasians will perform with less accuracy in the NimStim stimulus set.

Very little research examines racial differences in perceiving emotion from facial expressions compared to tone of voice. A few studies found that Caucasians performed more accurately than African Americans in identifying emotion from tone of voice (Bailey et al., 1998; Weathers et al., 2002). This suggests that Caucasians have a greater ability to perceive emotion from auditory cues than African Americans.

Method

Participants

The study included a total of 51 participants between 18 and 40 years of age (M = 21.08, SD = 4.64). The participants self-identified as African American (8 males, 17 females) or Caucasian (15 males, 11 females). At the time of the study, all participants were enrolled as undergraduate students at Georgia State University in Atlanta, Georgia. All participants were enrolled in either psyc1101 (Introduction to General Psychology) or psyc1100 (Natural Science Aspects to Psychology) at the time of the study and needed to

fulfill a six-credit quota as part of their academic requirements for the class. Participants had the option of fulfilling credits through participating in psychological research or completing an alternative written assignment. Upon completion of the stated experiment, participants received four credits.

Participants were selected through an online website where they were able to sign up for the study given a brief description of the study. The website allowed the researchers to restrict certain participants from signing up for the experiment based on the self-reported demographic information of the participant; at times, the researchers did restrict certain participants from signing up for the experiment in order to allow only participants who would not be excluded to participate; between January 16, 2007 and January 27, 2007 the researchers restricted participants to African Americans; between January 29, 2007 and February 3, 2007 the researchers restricted participants to Caucasian females; between February 5, 2007 and February 10, 2007 the researchers restricted participants to African American and Caucasian females; and between February 12, 2007 and February 17, 2007 the researchers restricted participants to African Americans. Participants' data were excluded if they showed impairment on face perception; one participant was excluded for scoring below 37 on the Benton Face Recognition Test (BFRT). All participants reported that they have lived in the United States for a minimum of 8 years. A total of 39 (76.5%) participants reported that they speak English as their only language; four (7.8%) speak English as well another language fluently; one (2.0%) participant reported that English was not his/her native language; and seven (13.7%) participants did not provide this data. it is important to note that it was necessary for all participants to be sufficiently fluent in English to attend Georgia State

University and no participants had an IQ below 70 on the verbal portion of the Wechsler Abbreviated Scale of Intelligence (WASI), which is explained below.

Materials

Different measures were used to assess the participants' ability to recognize emotions from facial expressions and tone of voice and a few measures were also used as exclusionary criteria in order to obtain a sample that most accurately represented the average population. The current study was integrated into an already running larger study; the Multicultural Face task and a demographics questionnaire was introduced to the study. Also, because the study was a part of a larger study, there were a few measures administrated to each participant that were a part of the larger study but did not contribute to the results of the current study.

The Diagnostic Analysis of Nonverbal Accuracy-2 (DANVA2) was created by Stephen Nowicki and Marshall Duke and distributed by Dyssemia, Inc. (2000). It is composed of a total of 48 vocal stimuli and 48 visual stimuli; each set is divided into an equal subset of child and adult stimuli making four subtests total. The computer program displays each visual stimulus for approximately three seconds and the audio clips for the auditory stimuli lasts between three and five seconds each. There are four different emotions that are depicted both in the vocal and visual sets: happy, sad, angry, and fearful; participants categorized each image or sound file in one of those four categories with a fixed-response system on the computer. The computer program presents each stimulus and then the participant selects one of the four emotions as a response. The vocal stimuli are presented without any visual stimuli; the participant only sees an icon for a sound file while it is played. Different actors state the same sentence in one of the

four tones of voice: “I am going out of the room now and I will be back later”. The visual stimuli are presented without any sound and are not cropped; hair, ears, jewelry, clothing, and the background, which appears to be a classroom, are all visible. The visual stimuli are predominantly Caucasian with 23 Caucasian faces and one Asian face in the children’s subset and 19 Caucasian faces with three African American faces and two Asian faces in the adult subset. The order of the subtests in the DANVA-2 was randomized using an online number randomizer (Urbaniak & Plous, 2007) so that each participant viewed the four subtests in a randomized order.

The Benton Face Recognition Test (BFRT) was created by A.L. Benton, A.B. Sivan, K. deS. Hamsher, N.R. Varney, and O. Spreen (1983) and published through Psychological Assessment Resources, Inc. The BFRT involves having participants view a black and white photograph of a face and identify and match the person pictured in the photograph with either one or three other similar photographs of the same person, depicted in different angles or shadows. The photos are cropped; each face is set against a black background and hair and clothing are excluded from the picture. The BFRT assessed participants’ ability to identify faces. There are a total of 54 possible correct answers for this task. Participants with a score below 37, which indicates severe impairment in facial identification, were excluded from the study (N=1). Participants viewed the stimuli from a book and indicated their responses verbally or by pointing, while the researcher recorded the responses.

The Wechsler Abbreviated Scale of Intelligence (WASI) assessed the intelligence and cognitive reasoning abilities of the participants: verbal IQ, performance IQ, and overall IQ is assessed through the WASI. This task was developed and published by

PsychCorp, which is a brand of Harcourt Assessment, Inc ("Wechsler Abbreviated Scale of Intelligence," 1999). The WASI included verbal tasks as well as non-verbal (performance) tasks. Participants who had an IQ of 70 or below for either verbal, performance, or overall were excluded from the study; no participants met the criteria for exclusion on the WASI. The researcher recorded the performance of the participant for each task, which involved answering questions about words, solving puzzles and creating designs. All tasks included in the WASI were administered according to the guidelines in the WASI manual.

The Seashore Rhythm Test was used to assess the participants' ability to distinguish different and similar auditory rhythm patterns (Seashore, Lewis, & Saetveit, 1960). Participants listened to a tape that played two consecutive sets of tones, and then stated whether the rhythms of the tones were the same or different. There is a total of 30 items for this task. The z-scores for the Seashore Rhythm Test were calculated for each participants and participants were considered for exclusion if their z-score varied more than two standard deviations from the mean for their age group; since the statistics for the Seashore Rhythm Test that was used for exclusionary purposes was relatively old and possibly out-dated, participants were only excluded if their z-scores for the Seashore task was two or greater and their BFRT scores that indicated moderate impairment for the BFRT (37-38). One participant was excluded from the study based on these criteria. A total of three participants scored two standard deviations or lower below the norms for their age group on the Seashore task but were not excluded since they did not indicate moderate impairment for the BFRT.

The Multicultural Face task included 56 images of an equal number of African American and Caucasian faces as well as an equal number of male and female faces within both groups. The images were taken from a larger stimulus set known as the NimStim stimulus set; the images were borrowed and cropped with permission from Dr. Nim Tottenham who developed the set (Tottenham, 2006). The images were cropped using Adobe Photoshop by blacking out all surrounding stimuli around the face such as hair, ears, clothing and background; only the face, from the forehead to the chin, was exposed to the participants. The images displayed either a happy, angry, sad, fearful, surprised, disgusted, or neutral face. Each expression was depicted twice within each group, equally distributed across sex. The computer program Direct RT was also used to display the stimuli and record the participants' responses and reaction times. Each image appeared on the screen for three seconds and the participants were instructed to give any response that they felt best described the emotion on the face. The 56 images were divided into two runs with 28 images each; each run included the same number of African American and Caucasian stimuli as well as male and female stimuli within both groups. Images within each group were randomized with an online number randomizer (Urbaniak & Plous, 2007) and shown in that set order each time. Since the Multicultural Face Task only had two runs, the researchers alternated the order of the runs for each participant; all odd-numbered participants viewed one run first and all even-numbered participants viewed the other run first.

The Behavioral Assessment System for Children (BASC-2; Reynolds & Kamphaus, 2002) was used to assess the behavioral tendencies of the participants including any clinically significant abnormalities. The BASC-2 is a questionnaire

containing 185 items that the participant filled out; the questionnaire asks questions related to the participant's moods and cognitions. The BASC-2 is published by AGS Publishing. Since the BASC-2 was designed to measure patterns and behaviors of young adults between the ages of 18 and 25, the researchers did not administer the BASC-2 to participants over the age of 25. Three of the participants that completed the BASC-2 received clinically significant scores for depression, anxiety, or attention problems, but they were not excluded from the analysis.

The Multicultural Face task and the DANVA-2 were used to assess the participants' ability to accurately perceive emotion. The Multicultural Face task was used to compare how accurately African Americans and Caucasians perceived emotion from static photos. Since the Multicultural Face task contains an equal number of African American faces and Caucasian faces, it was also used to evaluate how participants perceived emotions from African American faces compared with Caucasian faces. The DANVA-2 was used to compare how accurately African Americans and Caucasians perceived emotion from facial expressions and tone of voice. All other tasks were used as exclusionary criteria for participants.

Procedure

Data collection began in mid-October of 2006 and ended in early March of 2007. Though data collection for this particular study began in October 2006, the larger study that this study had integrated with had begun in the spring of 2005. Data was gathered only when classes were in session at Georgia State University. After the participant signed up for an appointment with the study on SONA, they were instructed to wait in the lobby of the Psychology Department at their appointed time where a researcher meet

them and direct them to a room where the experiment took place. The researchers ran one participant at a time, and the experiment was conducted in one of two private rooms on Georgia State University's campus.

Before beginning the experiment, the researcher summarized to the participant what would happen during the experiment. The researcher explained that participation in the study was voluntary and that the participant would not be penalized for refusing to participate, but they would not receive the four credits for their class unless they completed the study. The researcher verbally summarized the contents of the informed consent form to the participant and also gave the participant a chance to read the informed consent form. The participant was then asked to sign the informed consent form when they felt they understood the contents. Participants were treated according to the APA code of ethics. Before the tests were administered, the participant was asked to complete a short two-question demographics questionnaire; the first question asks what ethnic/racial background the participant identifies him/herself with and the second question asks how long the participant has lived in the United States. The second question was included to ensure that the participant has had enough exposure to American culture so that the cultural background of the participant will be controlled. A third question was later added in early January 2007 which asked whether the participant spoke another language besides English and if English was not their native language. Prior to adding this question to the demographics questionnaire, data for this question was colleted through SONA, the website where participants reviewed and signed up for the study. Before signing up for a study on SONA, participants filled out an online questionnaire from which this third question was derived. Because participants

sometimes did not complete the online questionnaire, this third question was added to the demographics questionnaire in the study. The question and its answer choices are worded exactly the same in both the online questionnaire and the questionnaire administered in the study.

The tasks were administered in a different randomized order for each participant. Randomization was accomplished through an online number randomizer (Urbaniak & Plous, 2007). Researchers followed run-sheets, which were prepared in advance, that presented the order for which to administer the tasks for that particular session. The subtests for the DANVA-2 were also randomized in this fashion. The BASC was presented to the participant as written questionnaires for the participant to complete. The Multicultural Face task and the DANVA-2 were administered with a computer; researchers recorded the free-responses of the Multicultural Face task by hand as a back up.

For the DANVA-2, participants were instructed to pay attention to the tone of voice or the facial expression depending on which set of stimuli they were observing. The computer program gave participants the choice of choosing happy, sad, angry or fearful as their response for each stimulus.

For the Multicultural Face task, participants were asked to pay attention to the facial expression of each image and describe in one word what emotion they felt was displayed in the image.

All other tasks were administered verbally by the researcher with the corresponding stimuli, the BFRT and WASI both have a corresponding stimulus book,

the Seashore Rhythm tests has a corresponding audio tape recording, and the WASI also has a task which involves blocks.

At the end of the experiment, the researcher debriefed the participant by explaining the study in greater detail, provided the participant with a printed copy of the debriefing and consent form, and answered any questions the participant had about the study.

In order to avoid errors through miscalculations or wrongful entry of data, all scores for each participant were calculated then checked for accuracy by another person. Each score was then entered into a database spreadsheet and then entered a second time by another person; the two sets of entries were then checked for consistency. Afterward, the database was then transferred to SPSS (Statistical Program for the Social Sciences) for analysis.

Results

For the Multicultural Face task each response was categorized as either a correct or incorrect response for each of the 56 stimuli in the Multicultural Face task viewed by the participants. The number of correct responses was totaled for each participant. In some cases, the participant did not give a response for an image; these responses were accounted for as “missing” variables. In total five responses were accounted for as “missing”; two participants were missing two responses and one participant was missing one response. This resulted in three missing scores when calculating totals for all participants. An independent samples t-test compared the accuracy of emotion perception between African Americans and Caucasians. The results showed that African Americans

(M = 44.00, SD = 5.79) performed similarly to Caucasians (M = 45.23, SD = 4.01) in correctly identifying emotions from facial expressions, $t(46) = -0.866$, $p = 0.391$. Caucasians appeared to have performed with slightly more accuracy than African Americans, however, since the results were not significant, any differences are assumed to be due to chance. Effect size was calculated to be $\eta^2 = 0.016$, suggesting that the nonsignificant result is not due to small sample size.

A two-factor analysis of variance was conducted to analyze differences in the way people portrayed emotion in faces of their own race compared with faces of the other race. The number of correct responses for African American stimuli and Caucasian stimuli were totaled separately. Based on the stimuli for which the three participants did not respond to, a total of three scores for the African American stimuli totals and one score for the Caucasian stimuli totals are accounted for as “missing”. The race of the participant was used as the between-subjects variable and the race of the stimuli was used as the within-subjects variable. The number of correct responses was used as the dependent variable. The means and standard deviations of each group viewing the different types of stimuli are shown in Table 1. The results of the analysis of variance showed no main effect for the race of the participant, $F(1,46) = 0.750$, $p = 0.391$, partial $\eta^2 = 0.016$; a significant main effect for the race of the stimuli shown, $F(1,46) = 4.422$, $p = 0.041$, partial $\eta^2 = 0.088$; and no interaction between the race of the participant and the race of the stimuli, $F(1,46) = 0.031$, $p = 0.862$, partial $\eta^2 = 0.001$. Participants judged emotion more accurately when viewing the African American stimuli. Also, Caucasian participants performed with more accuracy on both types of stimuli, but since the analysis

indicated no main effect for race of the participant, it is assumed that the difference is due to chance.

Two additional analyses compared Caucasians and African Americans' accuracy in perceiving emotion for each individual emotion. The total number of correct responses was calculated for emotion for each participant. The first ANOVA examined whether the race of the participant (between-subjects factor) had any effect on performance of perception for each of the seven emotions (within-subjects factor). The means and standard deviations of African American participants and Caucasian participants' performance for each emotion are shown in Table 2. The analysis found no main effect for the race of the participant, $F(1,49) = 1.484$, $p = 0.229$, partial $\eta^2 = 0.029$; a significant main effect for the emotion shown, $F(6,294) = 18.371$, $p = 0.000$, partial $\eta^2 = 0.273$; and no interaction between the race of the participant and the emotion shown, $F(6,294) = 0.446$, $p = 0.848$, partial $\eta^2 = 0.009$. The emotions that participants found easiest were happy and sad and the emotions participants found most difficult were disgust and fear.

The second ANOVA examined the race of the participant as the between-subjects factor and the individual emotions and race of the stimuli as the within-subjects factors, with the total number of correct responses as the dependent variable. Since the between-subjects factor and both within-subjects factors have already been examined independently, this ANOVA examined the two-way interaction between race of stimuli and the individual emotion and the three-way interaction among race of participant, race of stimuli and the individual emotions. A list of the means and standard deviations is listed under Table 3. The analysis revealed a significant interaction between race of the stimulus and the individual emotions, $F(6,294) = 10.561$, $p = 0.000$, partial $\eta^2 = 0.177$;

and a significant interaction among race of the participant, race of the stimulus and the individual emotions, $F(6,294) = 3.049$, $p = 0.007$, partial $\eta^2 = 0.059$. For the interaction between the race of the stimulus and the individual emotions, the most discrepancy between the mean number of correct responses for African American and Caucasian stimuli occurs in the "fear" emotion; participants were more accurate in judging emotion from African American fearful faces than Caucasian fearful faces (see Figure 1). For the three-way interaction African American participants showed the most discrepancy when judging fearful and neutral faces; for both emotions, African American participants judged African American faces with greater accuracy. Caucasian participants showed the most discrepancy with fearful and disgusted faces; Caucasian participants judged African American fearful faces with more accuracy but judged Caucasian disgusted faces with more accuracy. The results of the three-way interaction are shown in Figures 2.1 and 2.2.

For the DANVA2 task two repeated measures ANOVAs were conducted to compare how accurately participants perceived emotion from facial expressions and tone of voice from the DANVA2. The total number of correct responses was totaled for all the subtests for each participant. Due to the way the DANVA2 task was administered, if a participant did not respond to a given stimulus in any of the four subtests on the DANVA2, that response was accounted for as an incorrect response. Both ANOVAs compared the race of the participant (between-subjects factor) and the type of stimuli: visual versus auditory (within-subjects). For the first analysis the number of correct responses for the children faces subtests and the adults faces subtests were added together for each participant to create an overall score for visual stimuli. The children and adult paralanguage subtests were also totaled for each participant in a similar manner to create

an overall score for the vocal stimuli. The means and standard deviations are displayed in Table 4. The first analysis found no main effect for race of the participant, $F(1,49) = 3.437$, $p = 0.070$, partial $\eta^2 = 0.660$; a significant main effect for the type of stimuli, $F(1,49) = 39.920$, $p = 0.000$, partial $\eta^2 = 0.430$; and no interaction, $F(1,49) = 0.188$, $p = 0.666$, partial $\eta^2 = 0.004$. Participants performed with more accuracy in perceiving emotion facial expressions rather than tone of voice for the DANVA2.

The second analysis compared race of the participant (between-subjects factor) to they type of stimuli (within-subjects), visual versus auditory, for the adult subtests only (see Table 5). Analyzing the adult stimuli independently allows for a closer comparison of the DANVA2 visual stimuli with the stimuli from the Multicultural face task, which contains only adult stimuli. The analysis found a significant main effect for race of participant, $F(1,49) = 4.243$, $p = 0.045$, partial $\eta^2 = 0.080$; a significant main effect for the type of stimuli, $F(1,49) = 15.513$, $p = 0.000$, partial $\eta^2 = 0.240$; and no interaction, $F(1,49) = 1.312$, $p = 0.258$, partial $\eta^2 = 0.026$. Caucasian participants performed with more accuracy than African American participants on both tasks and both African American and Caucasian participants performed with more accuracy when perceiving emotion from faces rather than tone of voice on the DANVA2.

Discussion

The results of the study did not support the hypotheses African Americans would perform with more accuracy overall and when viewing the African American stimuli whereas performances between the two African Americans and Caucasians would be similar when viewing Caucasian stimuli. The results from the Multicultural Face task

analysis were not consistent with the predicted outcome for that task; African Americans did not perform with more accuracy than Caucasians. Rather, both groups performed similarly, suggesting universality in emotion perception from facial expressions. Part of the DANVA2 results was consistent with the hypothesis; however, when analyzed in conjunction with the results of the Multicultural Face task, it is difficult to conclude that the results support the hypothesis. These data support the universality of emotion perception.

The results from the Multicultural Face task support the theory of universality of emotion since there were no differences in emotion perception between African Americans and Caucasians; it would seem that despite the unequal distribution of power that often occurs between members of the majority race and members of the minority race in society, there are certain fundamental emotions that are identifiable among all people regardless of race and culture. However, the possibility of social influences that affect emotion perception should not be ruled out by the results of this study. Prior research found that increased exposure to a culture over time increases one's ability to accurately perceive emotion from the facial expressions of the people within that culture (Elfenbein & Ambady, 2003; Wolfgang & Cohen, 1988). Thus, one possible explanation for the outcome of the study is since Georgia State University features a very diverse student population, regular exposure to both African Americans and Caucasians may account for the lack of differences in performance of both groups in the sample.

Part of the results of participants' performance on the DANVA2 task supported the hypothesis. For the overall DANVA2 task, which includes both adult and child stimuli, African Americans and Caucasians performed similarly. This is consistent with

the hypothesis that African Americans and Caucasians would perform similarly on the DANVA2 task; however, because the results of the Multicultural face task were not consistent with the hypothesis it is difficult to conclude that the differences were due to social influences rather than universality. Significant differences emerged when analyzing only the adult subtests of the DANVA2; Caucasians were more accurate than African-Americans in perceiving emotion from both facial expressions and tone of voice. This result was not consistent with the hypothesis, which stated that there should be no differences between groups when perceiving emotion from the DANVA2 task since it contains predominantly Caucasian stimuli. Since Caucasians performed more accurately in judging emotion from both facial expressions and tone of voice, it is possible that there are other social influences that affect emotion perception aside from those caused by differences in social status and power, which was the rationale behind the hypothesis.

According to the results of the DANVA2 analyses, there is a larger tendency for racial biases in adult stimuli. However, when comparing these results to the results of the Multicultural Face task, it is unlikely that this is the case since the Multicultural Face task also contains adult stimuli but produced no differences in performance between the two groups in the sample. It is more likely that the inconsistent results produced by the DANVA2 task and the Multicultural Face task were due to differences in the administration of the two tasks or differences in the specific stimuli used in each task.

Unlike the Multicultural Face task, the DANVA2 visual stimuli are not cropped; the images of faces also show hair, ears, clothing, jewelry, and background. It is possible that these features of the images that were not cropped in the DANVA2 visual stimuli may have influenced the way that people perceived emotion and may account for the

results that differ from the Multicultural Face task which uses cropped images. If this is the case then there may be racial differences in how the features of an image other than the facial expression affect emotion perception.

The DANVA2 task also uses a fixed response format to record the responses of the participants whereas the Multicultural face task used a free response format to record the responses of the participants. It is possible that there are racial differences in the way participants respond to a fixed response system; if so, the different results between the DANVA2 and the Multicultural Face task may be due to the different methods used to record the responses of the participants.

There may also be differences in the specific stimuli used for each task. In other words, there may be specific characteristics in the faces of the stimuli that account for the differences in the results of the two tasks. More research utilizing the two tasks is required to obtain a general tendency for responses from participants when viewing each set of stimuli.

The study in general supports the theory of universality since all but one of the analyses produced no differences between African Americans and Caucasians' ability to accurately interpret emotion from facial expression and/or tone of voice, and the one analysis that was consistent with the hypotheses provides very weak evidence for differences due to social constructs. However, the analyses of both the Multicultural Face task and the DANVA2 suggest differences in accuracy in viewing different types of stimuli.

In the Multicultural Face task, significant main effects were found for the race of the stimuli and the individual emotions and significant interactions between the race of

the stimuli the individual emotions and among race of the stimuli, individual emotions, and the race of the participant. Participants were more accurate at perceiving emotion from African American faces. This suggests that people more accurately perceive emotions from African American faces than Caucasian faces. However, it is also possible that the African American faces in the stimuli may have depicted emotion more clearly than the Caucasian faces; more research using the Multicultural Face task is required to investigate this possibility. Participants perceived sad, happy, and surprised faces with the most accuracy and disgusted, fearful, and neutral faces least accurately; this suggests that some emotions are more easily distinguishable than others. The analysis also revealed a significant interaction between the race of the stimuli and the individual emotions shown in the Multicultural Face task. The most discrepancy in accuracy between African American and Caucasian stimuli occurred in the "fear" expression, African American fearful faces received more correct responses. This implies that the fear expression is more distinct or easier to interpret in African American faces than Caucasian faces although it is important to note that the difference may be due to the individual differences in the faces of the stimulus set. Also racial differences in emotion perception from facial expressions between African American and Caucasian participants emerged only when considered within the context of the race of the stimuli and the emotion that is being perceived. African Americans showed the most discrepancies with fearful and neutral faces; for both emotions African American participants perceived African American faces with more accuracy. Caucasian participants showed more discrepancies with the "fear" and "disgust" emotions; they viewed African American fearful faces with more accuracy but viewed Caucasian disgusted faces with more accuracy. These results

suggest that there are some in-group biases among African Americans and Caucasians since they viewed some emotions with more accuracy in faces of their own race than faces of the other race. However, it is difficult to conclude that there are definite in-group biases in the two groups since the biases only occur for specific emotions rather than occurring consistently across all seven emotions. It is more likely that certain emotions are less distinguishable than others and when combined with possible individual differences in the faces of the stimulus set, specific racial differences in the stimuli emerge. It is also important to note that Caucasians showed more variability when judging African American and Caucasian faces specifically with the "fear" emotion. This suggests that Caucasians' ability to interpret emotion is more subjective to racial differences in the stimuli, though it is again difficult to conclude this since this trend is not consistent across all the emotions. More research with the Multicultural Face task is needed to understand the tendencies of responses when viewing the stimulus set. Also, the goal of future research will be investigating which individual differences in faces may affect the way people perceive emotion. The results of the analyses exemplify the complex relationship of the different factors that contribute to how accurately one perceives emotions from facial expressions.

Both of the DANVA2 analyses found a significant main effect for the type of stimuli; in both the analysis of combined children and adult stimuli and the adult only stimuli, participants perceived emotion from facial expressions more accurately than from tone of voice.

Overall the results from this study provide evidence for universality of fundamental facial expressions. It would seem that despite any potential social or cultural

influences participants from both groups performed similarly in identifying emotion from facial expression and nonverbal cues. Though the results of the study did not support the hypotheses, social influences on emotion perception from facial expressions and tone of voice may still exist. Because of Georgia State University's diverse student population, regular exposure to both African Americans and Caucasians may account for the lack of differences in the study's findings. Thus, future research should use a multiethnic stimulus set, such as the one used in this study, to analyze emotion perception abilities of people from areas with an ethnically diverse population as well as areas that harbor a much more homogeneous ethnic population; such a study would provide information about whether exposure to people of a certain ethnicity increases the ability to accurately interpret emotion from stimuli of that ethnicity.

Because the study utilized college students enrolled in a few select classes from Georgia State University, it is difficult to generalize the findings of this study to other groups in society. Thus, another focus of future research should be analyzing the performances of groups other than college students from a university located in a major city in the Southeast. Analyzing people from other regions and people of different age groups such as children should be the focus of future research efforts.

As mentioned earlier, the differences in the results of the Multicultural Face task and the DANVA2 task may have been due the use of cropped images in the Multicultural Face task and not cropped images in the DANVA2 task. To test whether the other features of an image, such as the background, hair, ears, and jewelry, affect emotion perception from facial expressions, futures studies should examine differences in

performance using a cropped and uncropped version of the same stimulus set to test if and how the existence of these features affects emotion perception.

It is often the case that several nonverbal cues are utilized in unison by the communicator, and the recipient of the message is required to integrate and interpret all these cues to form a general translation of the sender's message. Thus, though it is beneficial to analyze different nonverbal cues, such as facial expressions and tone of voice independently, it is also essential to analyze the integration of these nonverbal cues as well. Future research should include stimuli that integrate two or more types of nonverbal cues together, such as facial expressions and tone of voice. Analyzing how these types of stimuli affect emotion perception and how people integrate the combination of nonverbal cues will be beneficial.

One other area of future research is examining differences in emotion perception for other races as well as African Americans and Caucasians. Other minorities such as Asians and Hispanics are a growing population in the United States and thus research on these groups is essential in understanding how ethnically different people communicate with each other. As this study has shown, the type of stimuli and how it is presented may affect emotion perception and so different multiethnic stimuli which incorporates these different minorities is essential for studying these groups.

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Table 1

Means and Standard Deviations for two-factor ANOVA: Race of Participant x Race of Stimuli

Race of Stimuli	African American Participants		Caucasian Participants	
	Mean	Standard Dev.	Mean	Standard Dev.
African American	22.41	2.77	22.96	2.27
Caucasian	21.59	3.54	22.27	2.38

Table 2

Means and Standard Deviations ANOVA: Race of Participant x Individual Emotions

	African American Participants		Caucasian Participants	
Emotion	Mean	Standard Dev.	Mean	Standard Dev.
Happy	7.120	1.269	7.654	0.745
Sad	7.240	1.128	7.692	0.679
Angry	6.720	1.021	7.000	1.386
Surprise	5.120	2.205	5.231	1.904
Fearful	6.640	1.977	7.115	1.177
Disgust	4.920	2.040	5.154	2.412
Neutral	5.800	2.769	5.385	2.228

Table 3

Means and Standard Deviations ANOVA: Race of Participant x Individual Emotions x Race of stimuli

		African American Participants		Caucasian Participants	
Emotion	Race of Stimuli	Mean	Standard Dev.	Mean	Standard Dev.
Happy	A. Amer.	3.600	0.707	3.846	0.368
	Caucasian	3.520	0.770	3.808	0.491
Sad	A. Amer.	3.480	0.822	3.885	0.431
	Caucasian	3.760	0.523	3.808	0.402
Angry	A. Amer.	3.200	0.707	3.500	0.812
	Caucasian	3.520	0.714	3.500	0.762
Fear	A. Amer.	2.800	1.041	3.154	1.046
	Caucasian	2.320	1.406	2.077	1.093
Surprise	A. Amer.	3.480	0.963	3.615	0.637
	Caucasian	3.160	1.143	3.500	0.707
Disgust	A. Amer.	2.360	1.114	2.269	1.218
	Caucasian	2.560	1.193	2.885	1.306
Neutral	A. Amer.	3.120	1.333	2.692	1.158
	Caucasian	2.680	1.574	2.692	1.320

Table 4

Means and Standard Deviations two-factor ANOVA: Race of Participant x Overall DANVA2 Visual and Auditory Stimuli

	African American Participants		Caucasian Participants	
Type of Stimuli	Mean	Standard Dev.	Mean	Standard Dev.
Overall Tone of Voice	36.200	4.528	37.808	4.436
Overall Faces	39.200	4.378	41.500	2.874

Table 5

Means and Standard Deviations two-factor ANOVA: Race of Participant x Adult DANVA2 Visual and Auditory Stimuli

	African American Participants		Caucasian Participants	
Type of Stimuli	Mean	Standard Dev.	Mean	Standard Dev.
Adult Tone of Voice	17.20	3.069	17.92	2.279
Adult Faces	18.32	2.495	19.96	2.029

Figure 1

Descriptive Data for 2-way Interaction: Race of Stimuli x Individual Emotions for the Multicultural Face Task

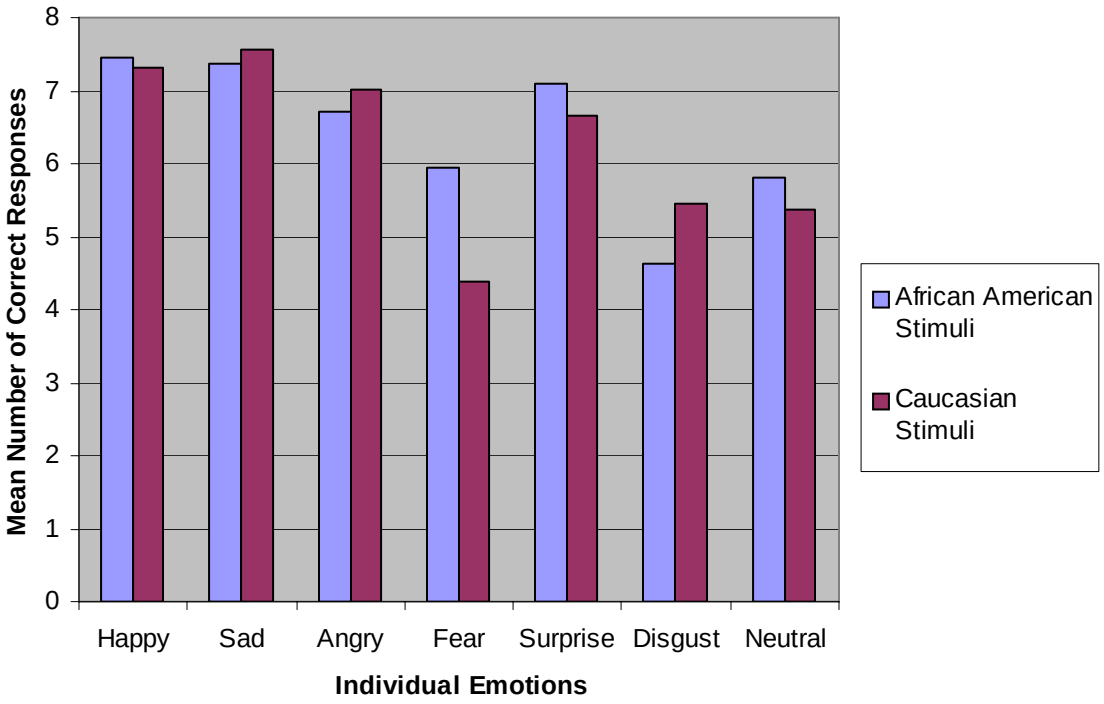

Figure 2.1-2.2

Descriptive Data for 3-way Interaction: Race of Participant x Race of Stimuli x Individual Emotions for the Multicultural Face Task

Figure 2.1

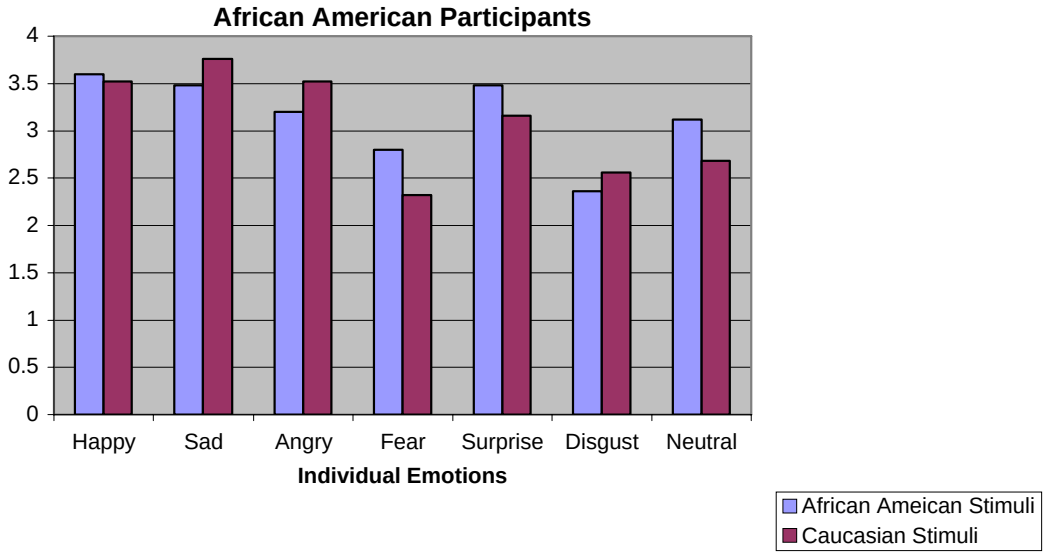

Figure 2.2