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**Emotion Recognition Skills in College Students: Do Gender, Skin Tone, and College
Major Affect Emotion Recognition?**

An Honors Thesis submitted in partial fulfillment of the requirements for Honors in
Psychology

By
Kaylee McCook

Under the mentorship of Dr. Virginia Wickline

Abstract

Humans constantly express emotions both consciously and unconsciously; these emotions are constantly being perceived by those around us. The ability to understand nonverbal expressions and body language is key for successful social interactions in private and professional life. This research assessed 174 students on their ability to perceive emotions from nonverbal cues in faces and postures. The first hypothesis stated there would be a difference in the ability to perceive nonverbal language based on the gender of the viewer was partially supported. I found that women made fewer mistakes than men when observing sets of facial stimuli. A non-significant difference was found between the errors of men and women regarding postural stimuli. The second hypothesis tested whether there was a difference in how individuals perceive the facial emotions of those with different skin tones as compared to that of their own. It was found that participants with a lighter skin tone had higher rates of accuracy than participants with medium or dark skin tones, and that participants were least accurate at recognizing emotions from medium skin tone stimuli. The final hypothesis predicted there would be a difference in how business, psychology, and STEM majors perceived nonverbal cues based on body posture and facial expression, which was partially supported. I found the most significant differences across majors were in the African American faces subset. All of the tested factors had varying levels of significance, and further research should be done to investigate how these factors may affect emotion recognition.

Keywords: Emotion Recognition, Gender, Skin Tone, Major

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How Different Demographic Factors Affect Emotion Recognition

As humans, we are constantly expressing emotions, and this is done both consciously and unconsciously. These emotions are constantly being perceived by those around us, as it is an innate function of the human brain. Many researchers in the field of nonverbal studies have learned how to decipher these emotions and teach others how to do so as well. The ability to understand the emotions of others allows one to relate to and understand the feelings of those around them and can help determine the best course of action in any given scenario. As stated in Elfenbein (2007), any contact between an individual and their environment can cause an emotion-based reaction, especially when that environment includes other people. Every interaction one has can cause an affective event, and the results of these events can be seen in nonverbal displays of emotion through facial expressions and body language. In the current study I am investigating how different factors (specifically, gender, skin tone, and college major) can play a role in emotion recognition.

How Do We Learn to Recognize Emotion?

In 1967, Mehrabian was one of the first researchers to draw attention to the significance of nonverbal communication. He concluded that nonverbal channels such as facial expression, body movement, and voice tone contribute 93% of the "attitudinal" message to the receiver. This is experienced in everyday life. It can be seen in every conversation and social interaction that occurs throughout the day. Many do not actively recognize or take note of the occurrences of these behaviors as they are typically learned through social interaction; however, nonverbal communication is not a skill that comes easily to all. Many colleges and universities offer classes that discuss these nonverbal

behaviors, but these classes are not required for many disciplines. Additionally, how an individual learns to identify and express these nonverbal behaviors can be affected by many different variables. Other examples of these variables could be the culture someone was raised in or the gender they were raised as. The current study will focus on how these different factors differentiate abilities to perceive emotions through both facial expressions and postures.

Why Do We Need to Understand Emotion?

Understanding nonverbal expressions and body language is key for successful social interactions both in people's private and professional lives. This skill is incredibly important for students of every discipline; no matter what field a student is entering, they will still have to interact with other individuals throughout their career. College students in particular encounter a wide variety of interactions from their peers to professors to potential employers. Students are constantly encouraged to put themselves out there and expand their network, but how many of them actually know how to do that? A large part of networking is being able to interpret the feelings of others and being able to respond appropriately. Nonverbal communication and expressions are often mentioned in various psychology and business leadership courses, but very few students are required to take classes such as these. Outside of the two previously mentioned disciplines, public speaking also teaches students about body language. This course is required by many disciplines, and it does well in teaching students how to present themselves when speaking to a crowd. However, does it benefit them in their everyday life, speaking to individuals and reading the body language of others? This course is typically taken early on in students' college careers, and depending on the students' major, much of the

information taught there is not reinforced during their time at college. Many students will need this information to pull from during their junior and senior years as they are searching for potential internships and employment. It is imperative that this information is continuously taught throughout every level of each discipline. These “soft skills” are reinforced in disciplines such as business and psychology. However, they may not often be mentioned in disciplines relating to Science, Technology, Engineering, and Math (STEM) where these skills are just as important for developing people’s careers. The nonverbal course content required for college students is something that many universities need to address as many students do not receive the training they need to be successful in this aspect of their careers. Though courses should still be academic in nature, an increasing part of them should reflect the ‘real world’ and particularly the people and social issues that may be encountered. Since many industries rely on consumer satisfaction, it is imperative that students are aware of how to effectively communicate and recognize emotions in order to be successful in their careers post-graduation.

Gender and Emotion Recognition

Many studies over the years have demonstrated a difference in ability to recognize and identify facial expressions based on gender. For example, a meta-analysis by McClure (2000) found a significant female advantage in facial emotion processing among infants, children, and adolescents. Additionally, in Hoffman et. al, (2010), both men and women were equal in their ability to perceive emotions when given highly expressive stimuli, but women were better at perceiving subtle displays of emotions. Numerous studies, including the work by McClure (2000) and Hoffman et al., (2010),

provide evidence that women generally have higher levels of accuracy when recognizing emotions from facial expressions.

Ethnicity: In-Group Advantage for Emotion Recognition

While gender differences are widely found in the literature, other demographic factors can influence emotion recognition accuracy as well. Based on work by Elfenbein and Ambady (2003), cultural familiarity likely plays a role in a person's emotion recognition. The results of the aforementioned study suggest that the universal affect system that governs individual emotional expression can be characterized by small differences across cultures and that these differences become more recognizable with greater levels of cultural contact. A similar study tested for cultural ingroup advantage in emotion recognition between African American, African International, European American, and European International students (Wickline, 2009), which showed that although expressions of emotion are partially universal, there are subtle differences across cultures that people have to learn, which tends to make them more accurate at interpreting emotions in their own cultural group versus other groups. Based on the previous studies, it can be understood that people from different cultural backgrounds do have some in-group advantages and will often have an easier time recognizing emotions from people within their group.

Program of Study: Why do Business, Psychology, and STEM Majors All Need

Nonverbal Communication/Soft Skills?

Different industries have different expectations for the college graduates entering their field. These expectations are constantly changing and increasing as industries become more competitive. In the current study, I will be focusing on the expectations

surrounding soft skills and nonverbal communication among three different fields of study including business, psychology, and STEM (Science, Technology, Engineering, and Math).

As psychology majors, many students are expected to have a general understanding of nonverbal cues such as body language and facial expressions. The level of this expectation can vary depending on what field the student is planning on entering, but it is still an important basic skill to develop as a psychology major. For example, if a student anticipates entering into the field of clinical psychology they will find that nonverbal communication is not only important for reading a patient but also for establishing a rapport with that patient (Dimatteo & Taranta, 1979). More recent publications will also argue that being able to capture nonverbal signs like facial expressions or posture can affect a provider's treatment plan (Donovan, et al., 2017). Even in careers such as industrial/organizational psychology, the ability to recognize emotion and nonverbal communication is vital for establishing a safe and healthy work environment. Based on the previous literature it can be understood that being able to recognize emotions can be a much needed resource in many psychology based careers.

Business majors will find that nonverbal communication is key to success in the field of business. On a basic level, having the ability to read nonverbal cues can allow for a deeper interpersonal connection that can be seen at every level of business. This could be seen by a salesman being able to successfully read a customer's nonverbal cues and pitch a sale in a way that the customer will be more likely to accept or the way a manager uses body language and nonverbal cues to interact and create a connection with their employees. A 2020 study showed that a manager's emotion recognition ability is

connected to the levels of stress and emotional demands employees experience (Tucker, et al., 2020). These soft skills are vital in all aspects of business, from creating and maintaining beneficial relationships between employees and management, to building customer rapport and retention.

Many Science, Technology, Engineering, and Math (STEM) majors will find that their technical training is applicable to their careers. Oftentimes, when someone is establishing their career, they will focus only on a handful of skills they believe are necessary for that career. In the case of STEM majors, this means focusing more on technical skill rather than soft skills. Research from Stevens and Norman (2016) state that when looking at feedback from employers, many suggest recent graduates lack the soft skills they need in order to adapt to their work environment and learn fast in the workplace. Soft skills such as nonverbal communication are key to being successful in their careers, but many students from these departments will find that the training they receive on this topic is very limited. More effort should be put in to make these students ready for their careers whilst they are in school. The potential lack of soft skill training could also cause students to miss out on job opportunities, specifically ones that are higher on the payscale. According to data collected in Stewart (2017), the jobs with the highest median in STEM are ones that require high understanding of STEM skills and high understanding of soft skills. Based on the previous literature, it appears that there is untapped potential for STEM students to learn more about soft skills in addition to technical skills.

Goals of the Current Study

Given the previous literature, three primary hypotheses will be tested during this study. Previous research has often found that women make fewer errors in emotion recognition than men (McClure, 2000 & Hoffman et al., 2010). The first hypothesis is that there will be a difference in the ability to perceive nonverbal language based on the gender of the viewer, specifically that women will make fewer errors than men when interpreting emotions from both faces and postures.

Many studies of emotion recognition have been conducted using the Diagnostic Analysis of Nonverbal Accuracy (DANVA2; Nowicki & Carton, 2004). Furthermore, as previously established, studies have been conducted that assess the possibilities of in-group advantage, or how people of different racial/ethnic groups recognize emotions differently between 'White' faces and 'African American' faces (Elfenbein & Ambady, 2003 & Wickline, et al., 2009). However, the DANVA2 images have not been used to assess the possibility of differences in perceived emotion based on the degree of an individual's skin tone, rather than by ethnic/cultural group. This is based on the idea that different cultural groups perceive and express emotions differently. However, since the cultural groups of the subjects in the DANVA2 images are unknown, I am testing whether someone will have a higher accuracy when perceiving the emotions of someone with a similar skin tone compared to someone with a different skin tone. I am testing the idea that an individual will see someone with a similar skin tone to their own as being more familiar and recognize the displayed emotions based on how the viewer's culture perceives and expresses emotion. I predicted that there will be a difference in how individuals with different skin tones perceive the emotions of those with different perceived skin tones as compared to that of their own. Specifically, participants will be

more accurate at identifying the emotions of others with the same skin tone as themselves.

For the final hypothesis, previous studies have not investigated whether students from different college majors might be more or less accurate at emotion recognition. I predict that there will be a difference in how business, psychology, and STEM majors perceive nonverbal cues based on body language and facial expression. I hypothesize that among these college majors, students in STEM majors will be less accurate than business or psychology majors at identifying emotions through both facial expressions and postures. Additionally, based on psychology majors' exposure to emotion processing topics in psychology courses, I predict psychology majors will be more accurate at identifying emotions through facial expressions and postures than business majors.

Method

Participants

In order to conduct this study, power analysis (using G-power) indicated an ideal sample size of 180. In total, 195 participants were recruited via convenience sampling. Of the responses collected, 174 subjects had valid (fairly complete) data. The 21 cases that were deemed unusable were primarily due to incomplete data resulting from participant attrition.

Participants were recruited in multiple ways, including word of mouth, posting flyers, recruitment emails, and the SONA research system. Additionally, I reached out to various professors, department heads, and deans within each discipline in an attempt to recruit participants with the support of an authority figure. The majority of the participants for this study were recruited through the SONA research system ($n = 135$),

with the remainder coming from flyers and word of mouth ($n = 39$). No compensation was given out through this study apart from the research credits given out through SONA (where applicable). To participate, individuals were required to be students at Georgia Southern University and be 18 years or older.

Participants ranged in age from 18 to 50 years old ($M = 21.28$, $SD = 4.37$). Of the participants, 121 (69.5%) identified as female, 43 (24.7%) identified as male, 7 (4%) preferred to self-describe their gender identity, and 3 (1.7%) preferred not to answer. The sample showed the majority of participants identified as White/European American (52.9%), followed by 25.9% Black/African American, 7.5% Hispanic/Latin(x), 6.3% Biracial/Multiracial, 1.7% Asian/Asian American, 1.1% Native America/First Peoples, and 4.6% unspecified. Of the participants, 27% were first year students, 25.3% were sophomores, 27.6% were in their junior year, 18.4% were seniors, and 1.7% remained unidentified by class status. The majority of the sample were psychology majors (48.8%), followed by business majors (17.4%) and STEM majors (15.7%), and 18.1% were undeclared or were of a different major.

Participants were asked to self-identify their skin tone scale based on a modified version of the Fitzpatrick Scale (Fitzpatrick, 1988), using three categories (light, medium, dark) instead of the original six. Of the participants, 55.7% self-identified as having a light skin tone, 26.4% self-identified as having a medium skin tone, and 17.8% self-identified as having a darker skin tone.

Measures

Emotion Recognition: Adult Faces. The Diagnostic Analysis of Nonverbal Accuracy was originally introduced in 1989; the original DANVA collection included a

multi-ethnic set of faces displaying four emotions: happiness, sadness, anger, and fear (Nowicki & Duke, 1989). This collection was initially validated through construct validity using data from a sample of over 1,000 children. However, the original DANVA did not include varying levels of emotion. This was an issue, as perceiving emotions can be more or less difficult depending on whether the stimuli are displaying high or low-intensity emotions. Therefore, DANVA2-AF (Diagnostic Analysis of Nonverbal Accuracy: Adult Faces) was created in order to address both high and low-intensity emotions (Nowicki & Carton, 2010). The DANVA2-AF contains 24 images of faces with an equal number expressing 4 different emotions: happy, sad, anger, and fear. The images also express these emotions at high and low intensity levels ($n = 12$ each). Participants of a study using the DANVA2-AF will observe these images for a total of two seconds and will then be asked to identify which of the four emotions the image was expressing. At the end of the test, the participants' total number of errors is calculated; a higher score indicates that more errors were made.

Emotion Recognition: African American Faces. The Diagnostic Analysis of Nonverbal Accuracy: African American Adult Faces (DANVA2-AAAF) consists of 32 images of faces with an equal number expressing 4 different emotions: happy, sad, anger, and fear. The images also express these emotions at high and low intensity levels ($n = 16$ each). These images will be treated just as the DANVA-AF images. Participants viewed the images for 2 seconds and then reported what emotion they believed the image was displaying. A higher score indicates more errors.

Emotion Recognition: Analysis by Skin Tone. In order to test the hypothesis regarding skin tone and in-group recognition, the DANVA2 images from the adult faces

and African American faces were combined into a single stimuli group with a total of 56 images. These images were then separated into three groups based on degree of skin tone. The Fitzpatrick scale (Fitzpatrick, 1988) was used as a reference for grouping the images (see Appendix). The light skin tone group consisted of Fitzpatrick's type 1 and 2 skin tones; the medium skin tone group consisted of Fitzpatrick's type 3 and 4 skin tones; the dark skin tone group consisted of Fitzpatrick's type 5 and 6 skin tones. Interrater reliability was then used to categorize the 56 DANVA2 faces into dark, medium, and light skin tones. The primary goal was to reach an initial percent agreement of at least 70%. Another member of the research lab and I independently assessed the DANVA face subsections (adult faces and African American faces) and categorized them into three groups based on skin tone (light, medium, and dark). After individually grouping the images, the results were then compared. We had an initial agreement percentage of 91%. We compared and discussed the discrepancies in our results until a consensus was met and 100% agreement was reached. Based on our results, we concluded that 13 of the images have a dark skin tone, 25 of the images have a medium skin tone, and 18 of the images have a light skin tone.

Emotion Recognition: Postures. To test participants' ability to recognize emotion through body language, the Diagnostic Analysis of Nonverbal Accuracy for Postures (DANVA2-POS) was used (Pitterman & Nowicki, 2004). The process used to create DANVA-POS parallels that of DANVA2-AF and DANVA-AAAF. The DANVA-POS includes 40 images of people expressing different emotions while standing and sitting. The faces of the people in the images are blocked out to prevent facial expressions from affecting the results. The 40 images displayed the following expressions: happy, sad,

angry, fearful, and neutral, all at varying intensities. For the purpose of this study, neutral expressions were not included, resulting in 24 postures. The participants were shown each image for two seconds and were then asked what emotion they thought the image displayed. The results were calculated in the same way as DANVA-AF and DANVA-AAAF, meaning the higher a participant's score is, the more errors.

Demographics and Individual Differences. A variety of demographic questions were asked at the conclusion of the study. Some of these questions addressed college major (business, psychology, computer science, or other), class status (first-year, sophomore, junior, senior), age, ethnicity, and gender. The participants were also asked to review the Fitzpatrick scale (Fitzpatrick, 1988), being provided the supplementary images to go with the categories, and rate their own skin tone as light, medium, or dark.

Procedure

This study was approved by the Institutional Review Board of Georgia Southern University (protocol #H23260). The online survey was created through Qualtrics. The emotion recognition tasks included 24 images of adult faces exhibiting different emotions at varying levels of intensity, 32 images of African American adult faces exhibiting different emotions at varying levels of intensity, and 24 images of people displaying these emotions through body language (posture). Participants were randomly assigned to view the three DANVA2 subsections (adult faces, African American faces, and postures) in a counterbalanced format to remove the possible impact of order effects. Thus, there were six possible order combinations for participants. After completing the emotion recognition tasks, the demographic section was presented, and then the participants were debriefed. Participants were told that the purpose of the research was to determine

potential connections between people's college major, gender, and skin tone; and their ability to 'read' emotion in postures or faces similar to and different from their own.

Data Analytic Strategy

After being collected, the data was cleaned, inspected, and cases with a large number of missing values were removed. Then I utilized, respectively, a MANOVA with a series of independent sample *t*-tests, a 3 (skin tone: participant) x 3 (skin tone: face stimulus) Multivariate Analysis of Variance (MANOVA), and a MANOVA with three one-way between-subjects ANOVAs for follow-up to test my three hypotheses.

Results

Hypothesis 1: Gender Differences in Emotion Recognition

The hypothesis that women would make fewer emotion recognition errors than men was partially supported by a 3 (DANVA subtest) x 2 (gender) Multivariate Analysis of Variance (MANOVA), which had a significant main effect for gender, $F(1, 162) = 7.23, p < .001, \eta^2 = .04$ (small effect), and subtest, $F(2, 324) = 90.11, p < .001, \eta^2 = .36$ (large effect), with no significant interaction, $F(2, 324) = 2.07, p = .13, \eta^2 = .01$ (small effect). Please see Table 1 for descriptive statistics.

Table 1

Emotion Recognition Errors by Participant Gender and Nonverbal Channel

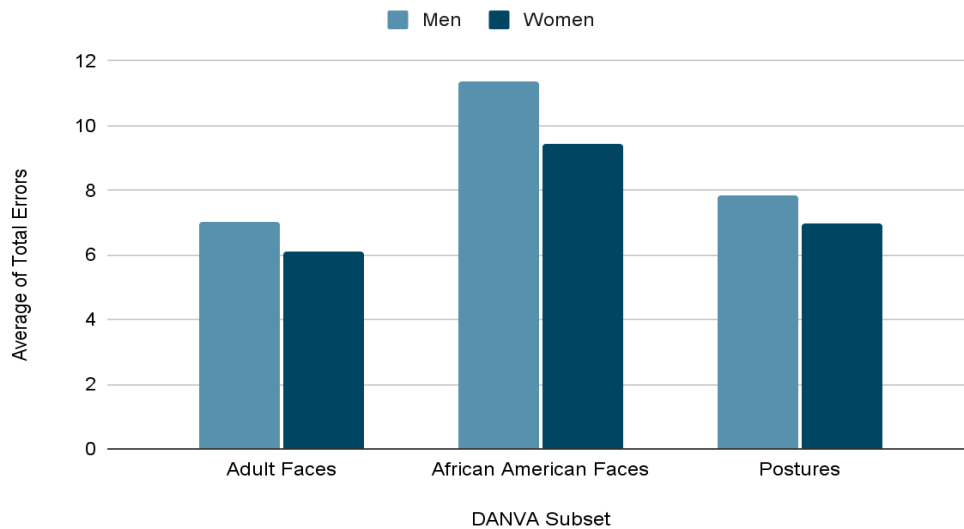
	Men		Women	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Adult Faces	7.02	3.42	6.12	2.69
African American Faces	11.37	4.15	9.43	3.16
Postures	7.87	4.17	6.98	3.05

Note. DANVA = Diagnostic Analysis of Nonverbal Accuracy.

Because there was no interaction, three follow-up independent sample *t*-tests were conducted. The first compared the total errors experienced by men and women when using the standard adult set of faces. The second compared the total errors between men and women when using the African American set of faces, and the last compared the total number of errors between men and women using the set of postural stimuli. Please see Figure 1. It was found that overall women made fewer errors than men when using the African American stimuli, $t(162) = 3.18, p < .001, d = 0.56$ (medium effect), and the adult faces stimuli, $t(162) = 1.75, p = 0.04, d = 0.31$ (small effect). However, while the independent samples *t*-test for the postural stimuli was in the predicted direction, these results were not large enough to be significant, $t(162) = 1.46, p = 0.073, d = 0.26$ (small effect).

Figure 1

Emotion Recognition Errors by Gender for Adult Faces, African American Faces, and Postures



Hypothesis 2: In-Group Advantage for Emotion Recognition by Skintone

To test the hypothesis that there would be an in-group advantage for skin tone regarding emotion recognition in faces, I utilized a 3 (skin tone: participant, between) x 3 (skin tone: faces stimuli, within) Multivariate Analysis of Variance (MANOVA). For this hypothesis, the percentage of errors were used instead of a total number of errors given that there were 18 light skin tone stimuli, 25 medium skin tone stimuli, and 13 dark skin tone stimuli. Please see Table 2 for descriptive statistics.

Table 2

Percentage of Facial Emotion Recognition Errors by Participant Skin Tone and Stimuli

Skin Tone

Participant Skin Tone	Light		Medium		Dark	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
DANVA Stimuli Skin Tone						
Light	.261	.117	.300	.091	.220	.122
Medium	.300	.149	.345	.110	.296	.159
Dark	.317	.173	.325	.107	.305	.214

Note. DANVA = Diagnostic Analysis of Nonverbal Accuracy.

This model indicated two main effects, one for participant skin tone, $F(2, 171) = 6.14, p < .001, \eta^2 = .07$ (medium effect), and one for stimuli skin tone, $F(2, 342) = 8.64, p < .001, \eta^2 = .05$ (small effect), with no interaction, $F(4, 342) = 1.40, p = .23, \eta^2 = .016$ (small effect). The lack of interaction does not support the in-group advantage that was hypothesized.

Two follow-up tests were calculated to further explain the patterns found in the significant main effects for participant skin tone and stimuli skin tone. The follow-up between-subject comparisons for participant skin tone showed that participants with a lighter skin tone ($M = .26$, $SE = .01$) made significantly fewer errors than either participants with a medium skin tone ($M = .31$, $SE = .02$) or darker skin tone ($M = .32$, $SE = .02$), which did not differ significantly from each other. A follow-up one-way ANOVA within for stimuli skin tone was also significant, $F(2, 346) = 16.05$, $p < .001$, $\eta^2 = .09$ (medium effect). All participants made significantly more errors on the medium skin tone images ($M = .32$, $SE = .01$) than the light skin tone images ($M = .28$, $SE = .01$) or darker skin tone images ($M = .26$, $SE = .01$), which did not differ significantly from each other.

Hypothesis 3: Emotion Recognition Differences by College Major

The hypothesis that different college majors would have different levels of emotion recognition accuracy was partially supported with a Multivariate Analysis of Variance (MANOVA). Please see Table 3 for descriptive statistics and Figure 2 for comparison of error scores.

Table 3

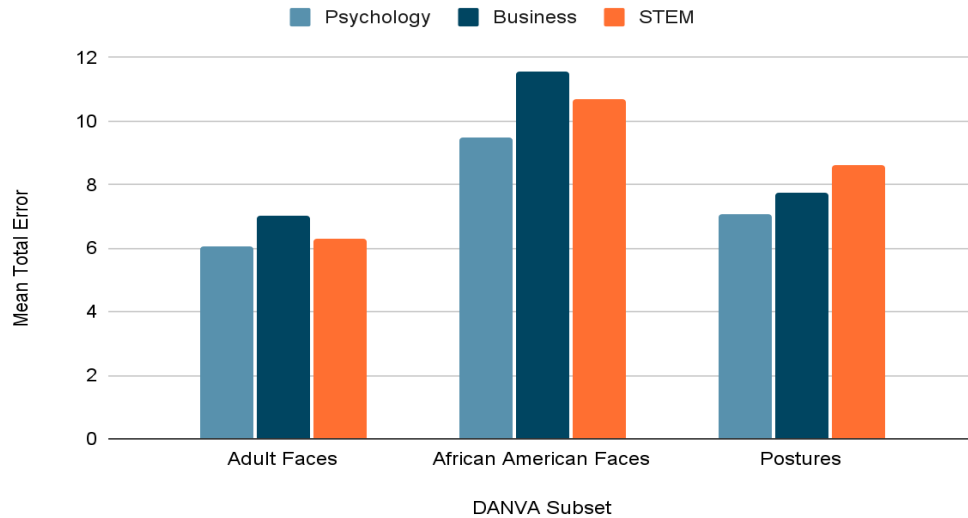
Emotion Recognition Errors by Participant Gender and Nonverbal Channel

	Business		Psychology		STEM	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Adult Faces	7.00	3.37	6.06	2.96	6.30	2.80
African American Faces	11.57	4.78	9.50	3.30	10.70	3.73
Postures	7.77	3.85	7.05	3.38	8.59	4.25

Note. DANVA = Diagnostic Analysis of Nonverbal Accuracy.

Figure 2

Average Total Facial Emotion Recognition Errors for Each Major



This analysis did not demonstrate a significant main effect for major, $F(2, 138) = 2.67, p = .07, \eta^2 = .04$ (small effect), but did have a significant effect for DANVA subtest type, $F(2, 276) = 85.19, p < .001, \eta^2 = .38$ (large effect), with no significant interaction, $F(4, 276) = 1.90, p = .11, \eta^2 = .03$ (small effect). Given there was no significant interaction, I followed up with three one-way, between subjects ANOVAs. The first ANOVA tested for differences between college majors when looking at Adult Faces. This test showed that there was not a significant difference by college majors for the ability to recognize emotion in adult faces, $F(2, 138) = 1.07, p = .37, \eta^2 = .02$ (small effect). The second ANOVA revealed that there was a significant difference between the majors' abilities to recognize emotions in African American faces, $F(2, 138) = 3.88, p = .02, \eta^2 = .05$ (small effect). Given the significant data for the African American faces stimuli, I used a Scheffé post-hoc test to determine the source of the difference. The Scheffé test showed that within the African-American stimuli, business majors had a significantly higher error

rate than psychology majors. However, this was the only significant pairwise comparison among the results. The third ANOVA showed there were no significant differences by major for the ability to recognize emotion in postures, $F(2, 138) = 1.93, p = .15, \eta^2 = .02$.

Discussion

Based on previous research, I hypothesized that there would be a difference in one's ability to perceive nonverbal language based on the gender of the viewer, specifically, that women would make fewer errors interpreting emotions from both faces and postures than that of men. These tests found that the results of the two facial stimuli groups reflected what previous studies have shown, that women tend to recognize emotions from facial expressions more accurately than men (McClure, 2000 & Hoffman et al., 2010). The test regarding postural stimuli, however, was not congruent with previous findings.

For the second hypothesis, I predicted that there would be a difference in how individuals with different skin tones perceive the emotions of those with different perceived skin tones as compared to that of their own. Specifically, I predicted that people would be more accurate at identifying the emotions of others with the same skin tone as themselves. Contrary to previous literature (Elfenbein & Ambady, 2003 & Wickline, et al., 2009), this hypothesis was not supported. However, I did find that participants categorized as having a lighter skin tone had higher levels of accuracy than participants that had medium or dark skin tones. However, I do believe this difference is likely due to a sampling bias as there were a disproportionate amount of participants that identified as having a light skin tone as compared to medium and dark skin tones. Additionally, I found that participants tended to have the lowest emotion recognition

accuracy when presented with facial expression stimuli that had a medium skin tone. A possible explanation for this could be that the medium skin tone category has higher levels of variation in cultures and ethnicities making the emotion recognition process less consistent due to cultural differences. However, I think the more likely explanation for this result is the difference in the amount of images presented for each category. The medium skin tone category had the most stimuli with 25, followed by light skin tones with 18, and dark skin tones with 13. This difference could have allowed more opportunities for participants to answer incorrectly, as compared to the other categories. Given the biases and flaws in the sample and stimuli, I do not believe that these findings are consistent with the literature.

For the final hypothesis, I predicted that there would be a difference in how business, psychology, and STEM majors perceive nonverbal cues based on body language and facial expression. I hypothesized that among these college majors students in STEM majors would be less accurate at identifying emotions through both facial expressions and postures than psychology or business majors. Additionally, I predicted that psychology majors will be more accurate at identifying emotions through facial expressions and postures and business majors. Based on the results, the hypothesis was partially supported, as psychology majors made significantly fewer errors than business majors when looking at the African American stimuli. This could be due to differences in familiarity of emotion recognition based on major; however, given that this difference was only found to be significant when using the African American stimuli, further research should be conducted before establishing that these results are consistent with the literature.

Limitations and Future Research Suggestions

Although the study did have elements that were established as being significant, there are still many pieces that can be improved when moving forward with this research. The measures used to collect data for this study worked, but it was not built for what I used it for, and this created some possible confounds in the stimuli. The DANVA2 has been used to determine differences based on cultural background; however, when this has been done the studies primarily focused on Eurocentric and Afrocentric comparisons. In the current study, I attempted to categorize the stimuli by shades of skin tone and in doing so this created an unbalanced set of stimuli. I ended up with 13 dark, 25 medium, and 18 light skin tone images. As a result, there were varying quantities of each emotion type within each skin tone category, along with varying amounts of high and low-intensity expressions. For future research, it may prove useful to redesign the DANVA2 stimuli, so that each skin tone category has the same number of stimuli, with the same amounts of emotions and intensities. It may also prove useful, if another DANVA subset were to be created, to collect data on the subjects in the images, such as their ethnicity or cultural background to allow future studies to test possible cultural correlations in emotion recognition.

In future studies, specifically, studies being conducted through a Primarily White institution, which by definition has a predominately White/European American population, it may be necessary to extend the time for data collection in order to gather a sample that represents a broader population. I was unable to collect as much data as I would have liked from people with medium and darker skin tones, and this contributed to our potentially biased sample. Other ways to prevent sample bias could include targeted

recruitment, such as recruiting from minority-focused clubs or courses on campus, or snowball sampling, where ethnic minority participants could help share the study with other ethnic minority individuals.

Conclusions

Despite the study's limitations, the concept of studying factors that affect emotion recognition is still something that should be pursued. Understanding how and why people understand emotions differently, is a primary factor that allows us to connect to others. As humans, we are constantly expressing emotions, and being able to connect with others and understand how they feel is something people throughout history have strived for. Psychology, at its most basic level, is doing our best to understand and help others. In the grand scheme, studying differences in emotion expression and how people perceive them can provide us with a better understanding of cultures all over the world. With the steady increase in connections around the world through the internet and social media, being able to understand the emotional nuances of other cultures is vital to making those lasting connections. Comparatively, on a smaller scale, understanding the differences in how people may perceive emotions can play an important role in our daily lives, at work, with friends, and in our daily online interactions as well. Additionally, more research should be done looking into the possible effect that a stimuli's skin tone may have on someone's ability to perceive the stimuli's emotions. The results of the study showed that participants had the most issues identifying emotions from stimuli with medium skin tones. Many avenues could be followed to test this idea, ranging from a participant's cultural background, worldview, or even ideology regarding other cultures.

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Appendix

The Fitzpatrick Scale

