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The Effect of Gender Congruency Between Perceiver and Target on Emotional Recognition

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Abstract: Several meta-analyses have concluded that women are more accurate at reading emotions than men, especially the recognition of nonverbal behavior shown through facial expressions. A few studies have demonstrated that women are more accurate at identifying the nonverbal behavior of other women, compared to the ability of men to read the nonverbal behavior of other men. While on average women typically outperform men in tasks involving nonverbal behavior, they also succeed at reading other women whereas men do not show this gender congruency effect. The goal of this research was to further explore this effect of congruency between the gender of the target (the stimuli) and the gender of the perceiver (the participant), and the accuracy in reading nonverbal behavior. Three tasks were used involving reading nonverbal behavior. The Diagnostic Accuracy of Nonverbal Analysis (DANVA) and the Profile of Nonverbal Accuracy (PONS) depicted individuals engaging in natural behavior, while the Emotional Bias Task portrayed morphed pictures of human actors to displaying various emotions.

Keywords: *gender, emotion recognition, nonverbal behavior*

Emotional recognition within faces is the prominent way that humans communicate nonverbally to infer the emotional state experienced by another person. Humans possess a need to obtain information from faces. Since humans spend a lot of time analyzing faces, patterns of accuracy have developed between gender. Past literature has shown that women have an advantage over men at identifying emotions overall when completing different emotional recognition tasks. Studies have also shown that females have a bias of identifying female emotional stimuli better, than identifying male facial expressions. (Hall & Murphy, 2006; Lewin & Herlitz, 2002). There are few theories that try to provide evidence for why women display these patterns when performing in various facial recognition tasks. This article will show the skills that humans have acquired between gender and across cultures.

Preferred Attention to Faces in Humans

Social skills and the preferred attention to faces develop early in life. Frith and Frith (2002) found that infants have a preference for social stimuli, which is one of the few social skills that develop in the early stages of life. Reddy, Wilken and Koch (2004) showed that facial recognition is

preferred over the recognition of objects (i.e. shapes, colors). Each participant was shown various conditions of spatial tasks while faces were flashed in their periphery. The results showed that the participants attended more to the faces and were able to recognize the gender of the stimuli, even when attending to the faces was not the focus of the task. They were less likely to attend to the spatial tasks that were shown to them (Reddy, Wilken, & Koch, 2004). A similar pattern occurred even when the presentation of faces was inverted (Reddy, Moradi & Koch, 2007). Finkbeiner and Palermo (2009) suggest faces are processed even when humans are not intentionally paying attention to them. In this experiment, participants were subliminally and non-subliminally shown faces during different tasks. Faces were processed more when the participant was subliminally shown faces, rather than when participants consciously perceived the stimuli. This shows that humans only need a small level of attention in order to process the general features of a human face.

These articles suggest that humans have an innate preference for faces. Humans use this preference to attain as much information from them, including specific emotion recognition.

Men and women, however, have shown different patterns of how they recognize emotions during these tasks.

Gender Patterns in Facial Recognition Tasks: Processing of Emotions Between Men and Women

Meta-analytic studies have confirmed that women are more accurate at identifying emotions during facial recognition tasks than men. Thayer and Johnsen (2000) conducted a study using Ekman and Freisen (1976) faces' that were projected onto a screen. Results showed women identified facial expressions correctly more often than men, overall. These results also are congruent with the findings of Hall and Murphy (2006). Lewin and Herlitz (2002) developed a study where participants were separated and presented faces in two different conditions: a full-face condition and a feature only condition (i.e. only eyes were shown). In both conditions, women had a higher accuracy score than men at recognizing emotions within the faces shown. Women have also shown same correlation in the form of brain imaging. Ino et al. (2012) measured participants brain activity using functional magnetic resonance imaging (fMRI) while assessing the emotions of grey scale photographs of human expressions. Men showed lower activity in facial recognition areas of the brain while conducting a facial recognition task. Women had higher brain activity when identifying emotions during the tasks (Ino et al., 2010). Carroo and Latham (1987) did not see a difference between male and female brain scans, but did show that women received higher scores on facial recognition tasks. Men have not been able to show the same pattern, indicating that women have some advantage over men at identifying emotions. Same-sex Bias of Emotional Recognition

A small pattern has been observed where women are better at recognizing emotions from female face stimuli as compared to men being able to recognize emotions. Rehnman and Herlitz (2006) conducted a study with Bangladeshi and Swedish children who were the age of 9. The children compared pictures of both male and females that were Bangladeshi and Swedish. They

found that girls correctly recognized emotions overall, and especially recognized more emotions correctly of other female faces across both ethnicities. The male participants did not have the same effect and tended not to recognize other males emotions (Rehnman & Herlitz, 2006). There is very little evidence where men may have the same advantage as women when identifying their respective gender. Rahman and Anchassi (2002) found that men had more activation in the brain for happy, sad, and angry emotions when the stimuli were men. They did not seem to have more activation for female stimuli or emotions overall (Rahman & Anchassi, 2002). The literature has not shown, so far, that men have a same-sex bias, where as women have shown this pattern constantly.

Cultural and Ethnic Influences on Facial Recognition

Researchers have found a correlation between a specific culture a person was born into and their ability to recognize emotions in faces. Culture could be an indicator of how accurate a person can correctly depict emotions within their own country, across gender, and across cultures. In Adams, et al. (2009), Japanese and Caucasian American participants saw only the eyes of each stimuli, of both cultures. They were to judge the emotional states of the pictures presented based only on the eyes. Researchers found that participants were more accurate at identifying emotions when the stimuli was congruent with the culture they were more familiar with (Adams, et al., 2009). In the following section we will see the influence of culture on the United States compared to various countries throughout the world that suggests the ability to depict a emotion in a facial recognition test.

The Impact of Patriarchal Views on Emotional Recognition

Patriarchal structures, such as in the American society, could influence how women seem to interpret emotions from faces better than men. There are socially reinforced stereotypes that have been formed and believed of male and female social abilities. Briton and Hall (1995) measured

how these perceived notions predict the ability of a gender to understand emotions. Participants completed a survey and rated each example to best represent which manner a man or woman would engage in a certain behavior. Findings showed that women were assumed to be better at close social contact skills, including looking at faces and emotions. Men were rated to have less of those social skills. (Briton & Hall, 1995). Stereotypes like these tend to develop in societies like the United States, where division of labor is highly prioritized and supported (Eagly & Wood, 2011) This may be an implication of why women and men have different ways approaching social interactions based on the structure of the society, including recognition tasks.

Cross culture Facial Recognition Accuracy

Demtl et al., (2012) investigated if there was more activation of the amygdala when participants completed an emotion recognition task. Participants from Western and Eastern cultures viewed pictures of humans cross culturally as well as their respective cultures. Participants were attached to an fMRI to measure their brain activation during the task. The findings showed there were no significant difference between gender of each individual ethnic group with amygdala activation during the facial recognition task. It was interesting to see that Asian participants had a harder time depicting the emotions of Caucasians, especially photos depicting angry and disgust. Huang, et al. (2001) discovered, through participants judging emotions of static faces, that Chinese and Japanese participants also had a harder time identifying emotions of Caucasian pictures. This indicates that it is difficult to identify emotions that are not of the same culture that one belongs to or have been raised in.

Cross Culture and Gender Effects On Facial Recognition

A study conducted by Merten (2005) showed how culture can influence facial recognition between gender. This study included participants from various countries across the world (i.e. Germany, Mexico, Spain, Argentina, and many

others) The participants took the Emotion-Recognition Test (ERT) and were to choose one of the six basic emotions for each trial. The researchers concluded that females in most countries had higher recognition accuracy than males (Merten, 2005). This serves as evidence that no matter what culture a person may come from, women are still more likely to identify the correct emotions than men are.

Stimuli Influence on Facial Recognition

Researchers have traditionally shown facial recognition stimuli through static photos. Some studies have participants judge the emotions shown through video clips. Gender accuracy within each test is generally tested among each of these conditions to see if males or females are more accurate at correctly depicting emotions. This section shows the influence on gender that each type of stimuli may have on a participants decision in correctly depicting emotions.

It has been shown in studies previously mentioned in this article that, in static conditions, women are better at identifying emotions overall (Thayer & Johnsen, 2000; Hall & Murphy, 2006; Carroo & Latham, 1987). Women also have an advantage to identify the emotions of female stimuli (Rehman & Herlitz, 2006). These studies have shown that when faces are shown through pictures, the stimulus is effective in rendering these consistent patterns. However, there are not any studies available that show accuracy between gender or an advantage when identifying emotions through video clips. This experiment aimed to see if there was a gender congruency pattern that developed with video clips as a stimulus.

CURRENT STUDY

The current study was aimed to identify if the data collected would be consistent with the findings from past literature. This is important because facial expressions are a part of nonverbal communication that humans use no matter what culture they live in. It is important to know what emotions a person is displaying in order to react to them correctly. The main questions we explored were (1) to see if our results will show women

having an advantage at identifying emotions overall and (2) to have a gender congruency where women will be able to identify emotions of females more often than men identifying male stimuli. These questions will be observed under different conditions of stimuli.

Research Questions and Hypothesis

As reviewed above, two patterns have been observed in literature. First, women, on average, show a small but real advantage over men at identifying emotions (Thayer & Johnsen, 2000). Second, women are relatively better at recognizing the facial emotions of their own gender (Rehman & Herlitz, 2006), while men tend to not clearly show this gender congruency effect. I attempted to see if the same findings will be concluded in the current study with these research questions and hypothesis:

- RQ 1: Will females perform more accurately on average across each of the tasks?
- H 1: I believe, women will be more accurate at detecting emotions on all four face tasks.
- RQ 2: Will we identify a perceiver target-gender congruency effect across each of the paradigms (e.g., women more accurate for female faces)?
- H 2: Women will be relatively more accurate at perceiving emotions with female targets while men will not be relatively more accurate at perceiving emotions in male targets.

METHODS

Participants

The participants were students who attend a Midwestern university. The majority of the students were enrolled in the introductory psychology course taught at the university and signed up for the psychology study pool to be considered for participation. The other students were volunteers and were not associated with the study pool, but participants of the same university. There were 18 participants in total with 11 females and 7 males. Their ages ranged from 19 to 33 years with a mean age of 22. The ethnicities

recorded were Caucasian, Black/African Americans, Hispanic/ Latino/a, Asian/Pacific Islander. All, except one participant, were born in the United States of America and one participant is originally from Brazil.

Materials

Every participant completed three assessments for this study. Two of these tests have been used extensively throughout the history of emotional detection and one is a newly developed instrument. The tests used were the Profile of Nonverbal Sensitivity test (PONS) (Rosenthal et al, 1981) and the Diagnostic Analysis of Nonverbal Accuracy (DANVA) (Nowicki & Carton, 1989), and the Emotional Bias Task that was developed by Stephanie Miller and Dr. Peterson for another IRB approved study (see *Stress and the Development of Face Emotion Processing*). The explanation of each task, as well as the participant experience while performing the task will be explained below. All tasks were performed in front of a computer monitor.

Task 1: Profile of Nonverbal Sensitivity (PONS)

Stimuli. A woman was shown in short video clips displaying an emotional scene in multiple conditions (i.e. the woman shown speaking in a blurred voice, the woman shown speaking but no sound heard by participant, a black screen displayed with the sound of the woman's blurred voice portrayed, or gestures/body language shown with or without sound). For this study, only the facial expression condition were scored, therefore there only 16 of the trials were scored out of the 64 trials.

Participant Experience. In each trial, participants viewed the stimulus and had to make a forced-choice between two different descriptions of the emotional scene portrayed (e.g., "showing jealous anger" versus "looking at nature"). An answer sheet and a writing utensil were provided for the participant to answer the questions manually.

Task 2: Diagnostic Analysis of Nonverbal Accuracy (DANVA)

Stimuli. Static pictures and voice clips of adults and children were presented for each participant on a computer monitor. The pictures were the only items scored for this task. There were 24 trials for each group of adult and child faces.

Participant Experience. Each picture was flashed for a brief period and the participants were to choose which emotion they believed corresponded with the picture shown from the options of happy, sad, fearful, and angry. Participants were shown the children's faces then the adult faces and chose which emotion they believed corresponded with each picture.

Task 3: Emotional Bias Task

Stimuli. For each stimulus, photographs of an adult actor's face were blended (e.g. neutral face and an emotion face) to form into an emotional expression. The emotion intensities ranged between 10%-90%. An example is a neutral face of 30% is blended with an expression such as happy of 70%, in order to make a 100% composite blend of a new face. The options available to choose from were calm, happy, sad, and angry.

Participant Experience. In each trial, the participants saw still photos of morphed faces for a brief period of time, and indicated which emotion they believe best described the actor in the picture.

Procedure

Each participant completed this study in the same computer lab at the university they attended. Once they arrived at the psychology lab, participants completed a consent form and a demographics sheet to record for statistical analyses. They completed each task at a computer and proceeded through each task in the order of the PONS, DANVA, and Emotional Bias Task. The instructions for each experiment were provided on the screen, and I made sure each participant understood the instructions provided. The experiment took about one hour to complete the entire process. Each participant received a

debriefing form in order to learn more about the study and have contact information if necessary. If a student signed up through the study pool they received extra credit. If they volunteered, they did not receive any credit or any gain.

RESULTS

PONS

The means and standard deviations of both males and females showed $M_{males} = 20$, $SD_{males} = 1.15$; $M_{females} = 20$, $SD_{females} = 1.41$. With $\alpha = .05$, $t(15) = 0$, $p = 1.0$, there was no significant difference between gender on the video tasks. The level of significance found suggests an artifact of low sample size and numerous items.

DANVA

With $\alpha = .05$, $F(1,16) = 1.256$, $p = .279$ when the gender of the participant was male and $\alpha = .05$, $F(1,16) = .135$, $p = .718$ when the gender of the participant was female, suggesting no significant cross gender difference within emotional recognition.

Emotional Bias Task

With $\alpha = .05$, $t(16) = -1.014$, $p = .312$. there is no significant difference between gender of participant and correct identification of cross-gender emotions. Males answered an average of 98 items correctly with a $SD = 4.48$ and Females answered an average of 92 items correctly with a $SD = 3.62$.

DISCUSSION

This study's purpose was to discover a possible relationship between the gender of the stimuli presented and the gender of the participant to accurately identify the correct emotions in facial recognition tasks. The stimuli presented in this study were still photos and video clips. We hypothesized that women would do better overall at identifying the emotions in all tasks provided (Thayer & Johnsen, 2000). It was also hypothesized that women would have a gender bias to identify emotions of women better than men identifying pictures of men (Rehman & Herlitz, 2006). Our results, however, did not

support this hypothesis and showed no significant difference within each task in this study.

The results of the PONS test displayed no significance in those who could identify the emotions of the woman speaking in a blurred voice and the gender of the participant. There has been no evidence in past literature of women having an advantage in identifying the emotions or having a gender bias during a video task. It is interesting that both males and females acquired the same standard deviation of 20 and a significance of exactly 1. There is no explanation to why this pattern occurred but noteworthy to consider. Women could be doing worse at identifying emotions overall, or men could be doing better at identifying emotions. But further testing would need to be done to confirm this prediction.

The DANVA also showed no significance between both of the hypothesized predicted. The performance between male and female participants showed a slight increase in the probability of correct answers when the gender of the participant was female. This slight increase was not significant, but still is noteworthy of identifying that women still performed at a high rate when identifying the emotions within the expressions of static photos of children and adults combined. This slight increase would need further analysis to confirm that women in this group are identifying emotions overall, over men.

The last stimuli, the Emotional Bias Task, also did not have a significant difference in this study for both questions presented. Women did correctly identify emotions with an average of 98 items, while males identified emotions correctly at an average at 92 items. There was a small difference in the amount of items identified, but not at a significant rate. If the test was replicated, it would be interesting to see if women still identified emotions overall.

The outcome of this project did not completely confirm results past literature. There was no significant difference where females were more advantageous at identifying emotions in different conditions. Although there were slight signs that suggested that there were positive patterns, they did not have a significance. There

were various limitations to this study that did not allow for a more comprehensive experience to explore these questions further.

Limitations

The sample size for this experiment was low in participants and did not match the amount of items that are presented in each stimuli. Therefore, there was not an accurate representation of the general population.

Internal Validity

There was a limited amount of people who had access to the study pool, and participation was optional, which contributes to the low sample size. Participants had previous knowledge of the study's goals which may have influenced the way that questions were answered. The length of the study could have affected how participants answered their questions due to the duration of time and the amount of trials that are presented within a given stimuli. Students could have become fatigued after the longer sections of tests.

External Validity

The participants are college aged students attending a university, therefore they do not present a representation of the population as a whole.

Future Research

To improve this study, the sample size would need to increase significantly, especially the population of male participants, to control for validity. The demographic pool would need to also increase by age, occupation, race/ethnicity, in order to more accurately represent the population as a whole. The increase of population would give an opportunity to try to match the number of trials with the sample size, to get a greater variance of answers. In order to have a wider variance on different types of stimuli used, the incorporation of morphing techniques could be used to test the same research questions and hypothesis. If this study was replicated, it would be interesting to see if the same patterns develop of women being more superior at identifying facial emotions and having a same sex bias for females, across

different types of stimuli such as morphing devices.

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