Seeing Emotion in a Neutral Face: The Moderating Role of Social Stress on Facial Affect Recognition and Mimicry

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Abstract
Research from social neuroscience and social vision has shown that seemingly minute changes in facial characteristics (e.g., sex, hair, head tilt, angularity, etc.) can change the perception of emotion. However, relatively little evidence examines how internal bodily states affect emotion perception. A basic emotion theory approach would suggest that all emotions have distinct physiological manifestations, leaving little room for differences in perceiver physiology to alter emotion perception. However, recent evidence suggests that a different approach, or, at the very least, an altered approach may be necessary to explain emotion variation left unsatisfied by basic emotion theory. The current investigation examined how social stress can change the perception of dynamic facial expressions of emotion. Participants underwent a stress test and viewed morphing facial expressions while their facial muscle and reaction time responses were recorded. Results from the current investigation revealed two key findings: First, social stress caused an exaggerated facial muscular response to angry faces. Second, social stress recorded. Results from the current investigation revealed two key findings: First, social stress caused an exaggerated facial muscular response to angry faces. Second, social stress caused a greater corrugator response than the Control Condition, F(1, 20) = 5.00, p = .04.

Method

Participants
- Participants (N = 30) were undergraduate students from a mid-sized liberal arts university in the Mid Atlantic
- The majority of participants were female (77%)

Materials and Stress Test
- Affective stimuli were taken from the NimStim Set of Facial Expressions (Tottenham, et al., 2009)
- Pictures were morphed to simulate dynamically moving faces
- The Trier Social Stress Test (TSST; Kirschbaum, et al., 1993) was used to induce stress
- The TSST consisted of preparing a mock speech to be evaluated in front of several confederate judges

EMG Procedure
- Potentials were amplified between 1000 Hz high-pass, 30 Hz low-pass with a 60 Hz notch filter
- Sampled at a frequency equal to 500 Hz
- Signals were rectified and then integrated using the root-mean-square technique, with a moving average filter of 100 ms (van Boxtel, 2010)

Discussion
- The current findings are important in helping elucidate the idiosyncratic nature of facial affective processing in social situations.
- The results add support to the psychological constructivist (Gendron & Barrett, 2009) approach to emotion (emotions are made up of more basic psychological ingredients, and when one of these ingredients is altered, so should the emotion).
- The present study’s results are in line with a Functional Forecasting Model (Wisbuksh & Adams, 2012) of emotional expression processing. Functional Forecasting provides the perceiver with useful information about approach-avoidance behaviors.
- Future research should replicate the results using a procedure not as complicated as the TSST to induce stress, compare the effects of acute stress with chronic stress on affect perception, and explore how stress interacts with other social cues to change affect interpretation.

Introduction
- Previous research has shown that myriad factors can influence how affective stimuli are perceived
- Sex of the emote, permanent wrinkles, and contextual cues all affect how a perceiver identifies an expression on the face (Hess, Adams, & Klueck, 2004; Hess, Adams, Grammer, & Klueck 2009).
- Perceivers of dynamic facial expressions of emotion (the so-called “sensitive observer” effect) are often met with variation left unsatisfied by basic emotion theory (Scherer 

Hypotheses

Results

Facial EMG Responses
- Mixed between-within subjects (condition X time) ANOVAs were performed. There were no within subject interactions or main effects
- Main effects for between groups revealed that the Stress Condition had greater zygomaticus responses than the Control Condition, F(1, 20) = 5.00, p = .04, h^2 = .20
- Main effects for between groups revealed that the Stress Condition had greater corrugator responses than the Control Condition, F(1, 20) = 5.00, p = .04, h^2 = .20

Reaction Time Responses
- Stressed participants responded 560 ms faster to angry faces than those in the Control Condition, t(21) = 2.24, p = .036, d = .91, CI [.39, .80, 1.08054]

Figure 1. Example stimulus of a prototypical neutral expression morphing into a prototypical happy expression over 1000 ms

Figure 2. Mean zygomaticus EMG responses for Control and Stress Conditions to dynamic angry faces

Figure 3. Mean corrugator EMG responses for Control and Stress Conditions to dynamic angry faces

Figure 4. Participant reaction times means for each emotional condition

References