Perceptions of Facial Affect in the Shy and the Not-shy

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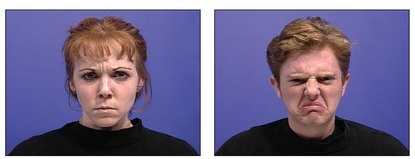
Abstract: The purpose of the present study was to investigate whether people higher in shyness perceive and respond to facial expressions of emotion differently than the non-shy. Previous research suggests that shy individuals are more sensitive to stimuli that are processed through the sensory system. Interpersonal sensitivity is greater in clinical profiles of shyness clinic clients than in normative samples. Evolutionary models of personality suggest that shy people are more likely to be sensitive only to facial expressions related to social threat, such as anger, fear or contempt. In this study shy and not-shy participants rated facial expressions of six basic emotions, using full-color stills from high-resolution video images. We predicted that shy individuals would rate equivalent video images as more intense than the non-shy, particularly images that occur earlier in the sequence of transitioning from a neutral state to the full blown expression of emotion, and particularly emotions that signal social threat. We also predicted that shy participants would rate their own emotional responses to the images as more intense. Shy and not-shy participants did not significantly differ in their perceptions of the expressions of anger, fear, sadness, and surprise. Shy participants did, however use more adjectives to describe facial expressions of fear. Shy participants perceived less, not more, disgust than not-shy participants early in the sequence of the development of the emotion, but rated disgust expressions as more intense in the final frames of the sequence. They perceived less happiness in facial expressions, particularly early in its development. Males gave more neutral ratings to disgust and sadness early in the development of the emotion than females. Females perceived more sadness overall in sad facial expressions than males. Interestingly, males were more likely to rate angry faces as disgusted faces than females were.

Introduction: Facial expression is a primary way to communicate emotion, and sensitivity to others' emotions is considered an adaptive social response that contributes heavily to effective interpersonal communication (Ekman & Friesen, 1975; Zajonc, 1984). Affective responses appear to occur automatically and do not necessarily involve cognitive processes (LeDoux, 2000; Zajonc, 1984). A processing system that allows for immediate reactions to threats to survival has an evolutionary advantage both in recognizing potential sources of social support and potential predators (LeDoux, 2000; Plutchik, 1997; Trower & Gilbert, 1989; Zajonc, 1984). Shy individuals, however, may have an overly sensitive reaction pattern to stimuli that present only mild social threat (Davidson, Marshall, Tomarken, & Henriques, 1998; Henderson, 1997; Kagan, 1999). Reactions may be experienced as adaptive but be maladaptive because they interfere with realistic, objective processing of data. If so, shy people should be more sensitive only to facial expressions related to social threat, such as anger or fear.

Research has recently demonstrated that social phobics show greater amygdala activation in response to neutral faces than controls while giving equivalent subjective ratings, and social anxiety symptoms predict better memory for facial expressions of contempt in social phobics (Birbaumer et al, 1998; Stein, et al, 2002). Are socially anxious individuals indeed more sensitive or reactive to other human faces, and do these reactions bypass cognitive processing? Are shy or socially anxious people more sensitive to emotions suggesting social threat or to all emotions? To date, no research has demonstrated that shy individuals demonstrate more sensitivity to facial expressions of emotion, and results of studies that point to this possibility have been conducted only with people carrying clinical diagnoses of social anxiety disorder. Our research seeks to fill this gap. Based on the idea that shy individuals may be more sensitive to emotion, they may both perceive it as more intense and also detect emotion earlier in a transition from a neutral emotional state to a full-blown emotion. They may also show a greater degree of reactivity to facial expressions by rating their emotional reactions to the expressions as more intense. Preliminary findings from the first in a series of studies are presented here.

We predicted that shy individuals would rate equivalent video images as more intense than the non-shy would rate them, particularly those images that occurred earlier in the sequence of transitioning from a neutral affective state to the expression of the emotion. To investigate degree of reactivity, we predicted that shy participants would rate their emotional reactions to the images as more intense than the non-shy would. We also predicted that shy participants would show more sensitivity to facial expressions of emotions associated with social threat.

Method: The participants were 18 shy and 15 not-shy Stanford students, 22 females and 11 males with a mean age of 18.7, SD = 1.0. As a pre-task measure, all participants completed the state version of the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). As a post-task measure, all participants again completed the PANAS and a questionnaire asking about their emotional states while rating the faces. The test procedure was for all participants to view still frames randomly sampled and presented from morphed transition clips between neutral and six basic emotions (Schiano, et al., 1999).



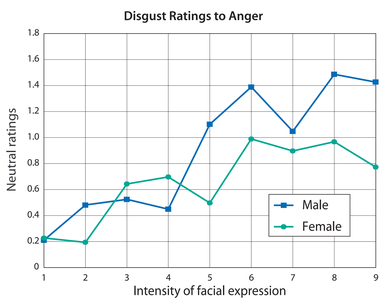
The participant indicated which emotion was present in each of the stimuli and rated the intensity of each emotion on a scale from 0 to 6. They also had the option to type in any emotion displayed by the stimulus that was not listed and to rate that emotion. Each participant was presented the following instructions:

> *"A face will be presented on the monitor, along with a list of seven standard emotions with rating scales from 0 to 6. You will be asked to rate the degree to which each of these emotions is present in the face. If there is another emotion present in the face (in addition to the six listed, you the choose the 'other' category. Click on the box under other to typed in the additional emotion, then rate it using the 0 to 6 scale. When you are satisfied with your rating choices, click on 'next image' to continue to the next trail."*

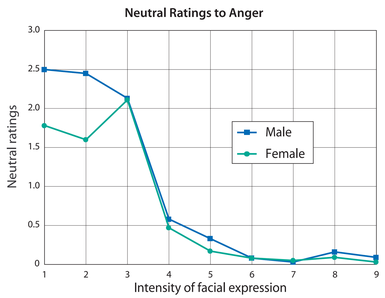
Facial Stimuli

Shy	18
Not Shy	15

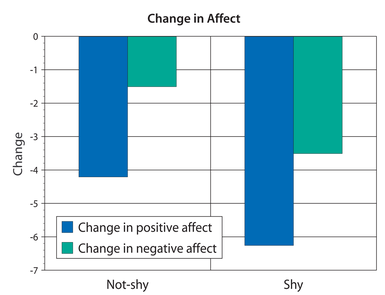
Results: A 2 (gender) by 2 (shy) by 9 (frame) mixed-model design with repeated measures on frame was used to analyze the data. A 2 x 2 x 9 multivariate analysis of variance (MANOVA) was conducted on gender, shy and frame (from 1 to 9) as the repeated measure. Preliminary data analyses revealed that shy and non-shy participants did not significantly differ in their perceptions of the expressions of anger, fear, sadness, and surprise, whether early or late in the sequence from neutral to the most intense expression. Interestingly, however, there was a disgust by sex interaction, with males more likely to rate angry faces as disgusted than females were, particularly when expressions of anger were more intense (late in the sequence of their development) $F(8, 22) = 3.4$, $p. < 0.01$. The absolute ratings were not high, and whether that means the differences are not salient, or that the differences are subtle, but important needs to be determined empirically.



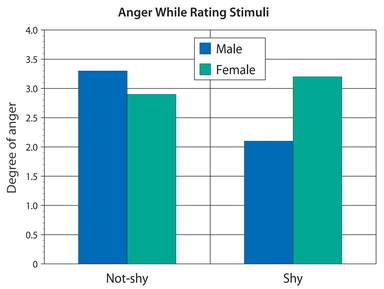
Shy participants perceived less disgust in facial expressions of disgust early in their development from neutral to intense than non-shy participants, while they rated disgust expressions as more intense later in the sequence than the non-shy did $F(1, 29) = 4.7$, $p. < 0.05$. Males perceived disgust faces as neutral early in the development of disgust more than females did $F(1, 29) = 2.9$, $p. < 0.05$. Males also perceived neutral expressions in early expressions of sadness more than females did $F(1, 29) = 3.4$, $p. < 0.08$, a difference which approached significance. Shy participants tended to perceive less happiness overall than the non-shy did in facial expressions of happiness $F(1, 31) = 3.7$, $p. < 0.07$. Females perceived more sadness overall in sad facial expressions than males did $F(1, 29) = 4.1$, $p. < 0.05$.

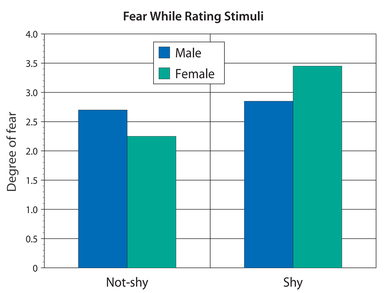


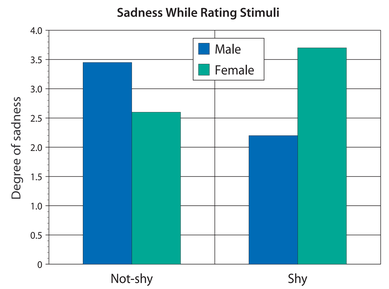
Multivariate analyses of variance on PANAS scores revealed that shy and not-shy participants differed in both positive and negative affect prior to the rating task $F(2, 30) = 6.2$, $p. < 0.01$. Shy participants were lower in positive affect (shy M = 22.7, SE = 1.4; not-shy M = 29.0, SE = 1.6) and higher in negative affect (shy M = 17.7, SE = 1; not-shy M = 14.0, SE = 1.1). All participants had significantly lower positive and lower negative affect ratings after the task $F(1, 29) = 16.61$, $p. < 0.000$, and there were no differences in affect change scores.



Univariate analyses of variance were conducted on the emotions participants experienced while rating the faces. Emotions were anger, fear, happiness, and sadness. Shy males experienced the least anger while rating faces $F(3, 29) = 1.8$, $p. < 0.17$ and differed significantly from not-shy males and shy females (shy males M = 2.1, SD = .6; not-shy males = 3.3, SD = 1.; shy females M = 3.2, SD = 1.4; not-shy females = 2.9, SD = 1.5), but results did not reach significance. The means were also in the predicted direction for reactions to fear. Shy females reported more fear than non-shy females, but these results also were not significant. Ratings of experienced emotion of happiness did not differ. Ratings for sadness approached significance $F(3, 29) = 2.7$, $p. < .07$, with shy females experiencing more sadness while doing the task than shy males. Not-shy males reported more sadness than shy males.







Discussion: These findings suggest that shy people may be not as perceptive or attentive to facial expressions of emotion signalling social threat, such as disgust, or possibly anger, early in their development, but with increasing intensity they may become more reactive than the non-shy. Shy participants perceived less happiness overall, which may be related to lower extraversion or less positive, more neutral or more negative mood states. Their affect ratings were significantly less positive and more negative than those of the non-shy at pre-test, while all participants experienced the a similar change in affect during the task. Limitations of the study were our small sample size and ratings of experienced emotion that were not fine-grained enough. We are analyzing data from an evaluation condition and a reduced evaluation condition and those results will be forthcoming.

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