It's written all over your face: investigating the processing of a group of faces in social anxiety

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Disclosure

Why Should We Care?

- About 15 million American adults are affected by social anxiety disorder, making it the second most prevalent psychiatric disorder (Kessler et al., 2005).
- Often chronic and unremitting (e.g., Dingemans et al., 2001)
- Highly comorbid with other disorders
- Impairments

Why Facial Expressions?

- What do socially anxious individuals worry about?
  - The fear and anxiety of being judged and evaluated by other people.
  - Facial pictures are more directly related to their concerns (e.g., Bradley et al., 1998).

Biases in Social Anxiety

- Negative attentional biases
- Negative interpretation biases and/or
- Lack of positive interpretation biases

- Most previously research examined the processing of a single facial picture.

Social Anxiety and Facial Crowds

- Being in front of a *group* of people is one of the most anxiety provoking and avoided social interactions
- Only three studies (Gilboa-Schechtman, Presburger, Marom, & Hermesh, 2005; Lange, Keijers, Becker, & Rinck, 2008; Lange et al., 2011) have examined the processing of multiple faces in socially anxious individuals.
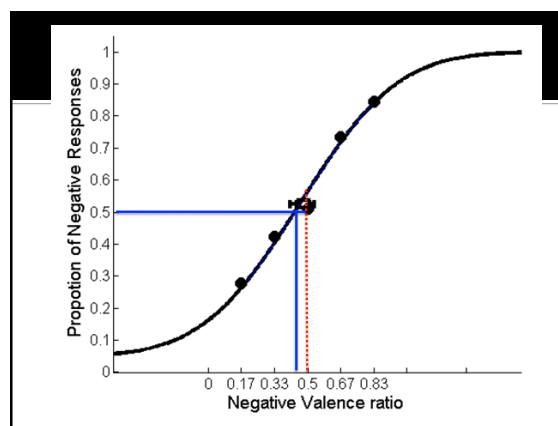
Study 1

- 97 participants (62 F, 35 M, mean age = 21.55)
- Social Interaction Anxiety Scale (m= 21.12, SD = 13.33)

Ensemble Coding Task

- 6, 12, 24 pictures of faces with equal number of men and women
- Angry and happy faces
- Number of negative pictures varied
  - 1:5, 2:4, 3:3, 4:2, 5:1 (negative: positive)
- Indicate whether the overall set was negative or positive

Analyses: Behavioral Data

- First fitted a psychometric function to the data and assessed the shape of the function
- Point of subjective equality (PSE)
  - The valence ratio at which a facial crowd is judged 'negative' on 50% of trials.
  - *Bias*
- SD of the function
  - How spread the given function is across different valence ratio
  - *Precision* of emotion judgments

Results

- Mean PSE = .54; mean SD = .49
- Higher levels of social anxiety were associated with a lower PSE, r=-.25, p=.014

Study 2

- Exactly the same as Study 1
- Continuously assessed participants' facial muscle activities

Why Look at Facial Muscle Activity?

- Happy facial pictures ➜ *zygomatic major*
- Angry facial pictures ➜ *corrugator supercilii*

- EMG responses can be detected when people are unconsciously exposed to facial pictures
(Dimberg, Thunberg, & Elmehed, 2000)

Why Look at EMG response?

- EMG responses serve as a proxy for how a group of facial pictures displaying mixed emotions is actually perceived

Hypotheses

- High Social Anxiety (SA) group will exhibit a lower PSE than the control group.
- If socially anxious individuals perceive a group of faces with mixed emotions more negatively than the controls, these biased perception would be reflected by greater *corrugator supercilli* and/or less *zygomatic major* muscle activities.
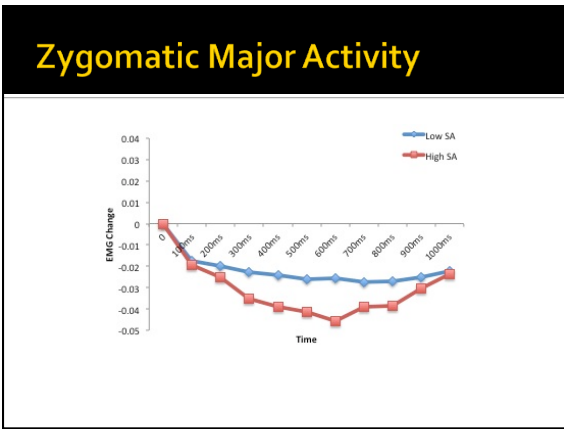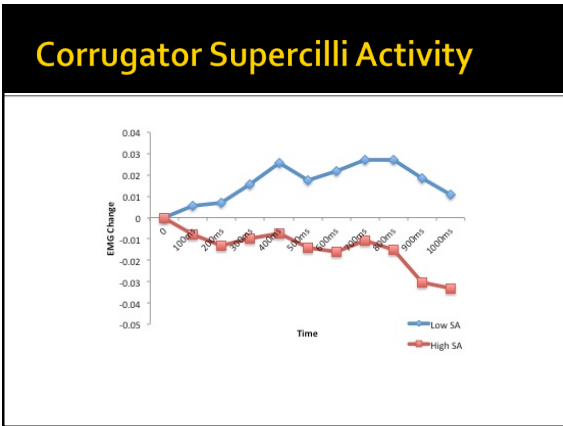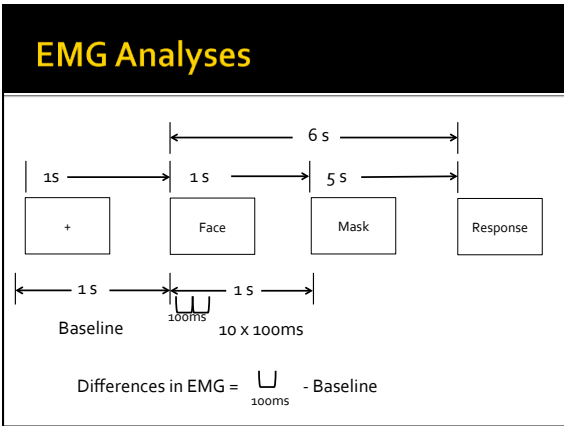
Methods

- Participants were pre-selected based on their scores on the Social Phobia Scale (SPS)

- High SA (N=18), mean SPS = 7.76 (SD = 4.44)
- Control (N=18), mean SPS = 37.67 (SD = 11.42)
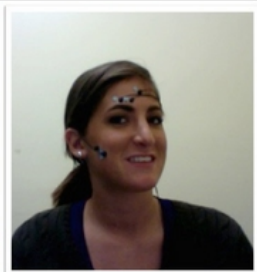
Results

- Significant group differences in PSE
  - High SA = 0.48 vs. Low SA = 0.56
- No significant differences in SD
  - High SA = 0.31 vs. Low SA = 0.30

EMG Analyses

6 s

1 S → 1 S → 5 S

| + | Face | Mask | Response |

1 S — 1 S
100ms
Baseline   10 x 100ms

Differences in EMG = ⊔ (100ms) - Baseline

Corrugator Supercilli Activity

Zygomatic Major Activity

Conclusion

- Socially anxious individuals exhibited a lower PSE than their less anxious counterparts
→ Socially anxious individuals perceived the overall emotion of the crowds more negatively

- No group differences in SD
→ Everyone can discern objectively positive from negative crowds with similar sensitivity.

Conclusions

- Socially anxious individuals
1. Exhibit negative biases
2. Lack positive biases that are present in controls
3. Suppress facial expressions

Limitations

- College students
- Only used angry and happy faces
  - Facial crowds consisted of facial expression of varying intensities