Facial Affect Alters Perceived Contrast

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I Introduction

Previous work reveals attentional influence on early visual processes like orientation detection and contrast judgements (Carrasco, 2006; Anderson, 2016).

Does emotion influence early visual processes like contrast sensitivity?

Two pronged research question:

i. Are early perceptual processes, namely contrast sensitivity altered by emotion?
ii. Does emotional valence play a significant role in contrast perception?

II Methods

- N = 20

Task objective:
- To determine the emotional expression on the face with the higher contrast.

Apparatus:
- Gaze Contingent Eye Tracking Study
- Eye Link 1000 Plus

Stimuli:
- KDEF Dataset (Lundqvist, et. al. 1998)
- 90 unique stimuli (30 identities x 3 valences)

Contrast levels:
- Standard: 0.06
- Test: 9 levels on Michelson Contrast set range: 0.025-0.16

Emotional valence manipulation:
- Positive (happy)
- Negative (angry)
- Neutral

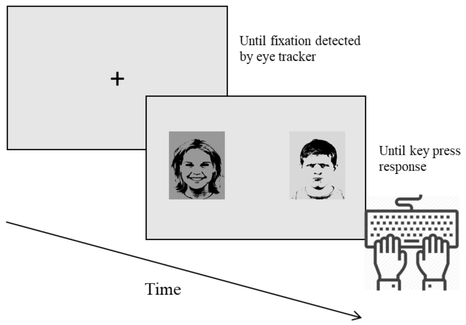

Fig. 1: Experimental sequence per trial

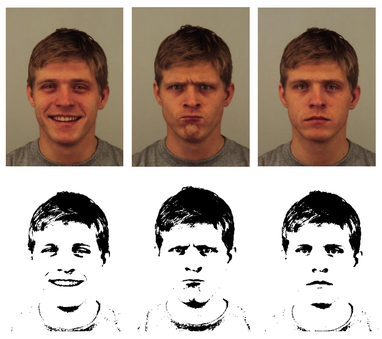

Fig. 2: Emotional Stimuli
(i) Original sample stimuli
(ii) Post-processing stimuli with examples of varied contrast

III Results

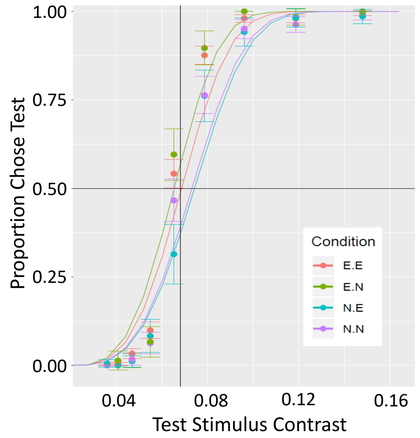

Fig. 3: GLM fit of proportion of choosing test as higher contrast for four conditions

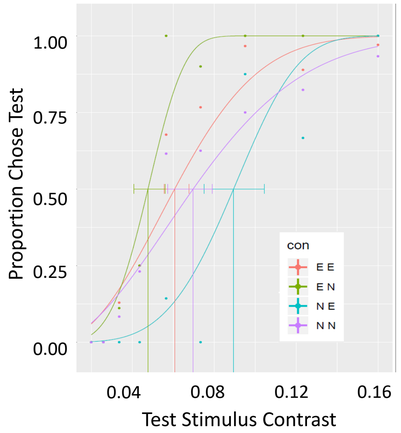

Fig. 4: Threshold data fit to Weibull functions

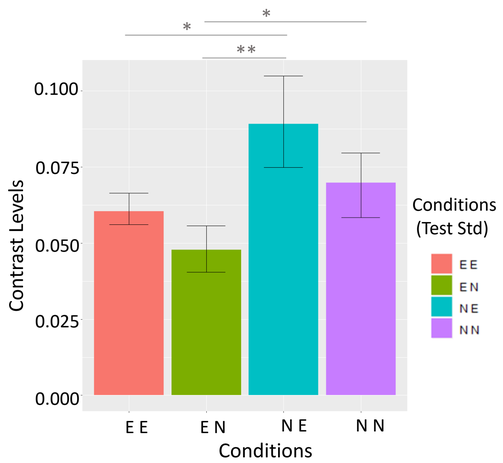

Fig. 5: Significant differences between threshold comparisons

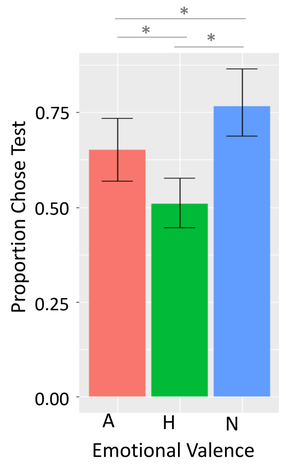

Fig. 6: Lowest threshold for happy vs angry vs neutral

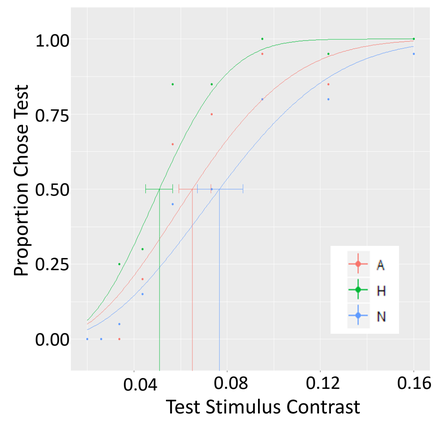

Fig. 7: Weibull functions for three valences; highest sensitivity for happy vs angry vs neutral

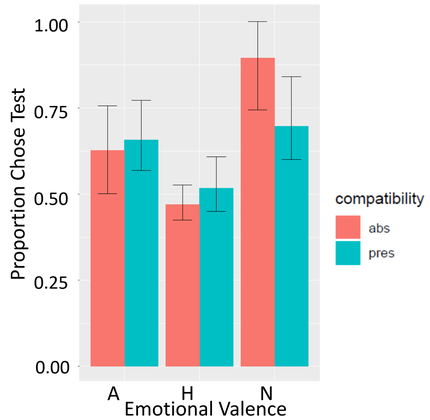

Fig. 8: Non-significant interaction between emotional valence and compatibility; only main effect of emotional valence

IV Discussion

- Presence of an emotional stimulus causes significant increase in perceived contrast.
- **Emotion leads to increased contrast sensitivity** (lowered threshold) for affective faces compared to non-affective faces.
- Emotional valence also modulates contrast perception.
- **Positively valenced emotional stimuli (happy faces) lead to enhanced contrast sensitivity** (lowest threshold) compared to negative emotional stimuli (angry faces), lastly followed by neutral stimuli (highest threshold).

Contrast sensitivity by valence: Happy > Angry > Neutral

V Future Directions

- Analysis of the eye tracking data for greater neurophysiological delineation.
- Effect of emotional arousal manipulation on contrast sensitivity.
- Influence of non-facial emotional stimuli on contrast discrimination.

Acknowledgments

Sincerest gratitude towards Dr. Anderson & Britt Lab, Shastri Indo Canadian Institute, Nithin George and IIT-GN faculty for their constant guidance, support and expertise.