Trait anxiety moderates visual pathway contributions to the processing of clear versus ambiguous threat

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Background
- Fear expressions combined with averted gaze clearly signal where threat resides. Fear expressions coupled with direct gaze, however, are more ambiguous.
- Amygdalar responses have been found to be greater to clear threat when rapidly presented (300 ms) and to ambiguous threat for more sustained presentations (1 s; Adams et al., 2012). Similar flips have been reported as a function of anxiety (Ewbank et al., 2010).

Research objectives
- Understanding differential contributions of the magnocellular (M) and parvocellular (P) pathways to processing facial threat cues.
- Understanding the moderating role of trait anxiety on neural responses to threat.

Method
- 108 subjects (age: 18-70; mean = 37.05; SD = 14.7)
- Anxiety measurement: Spielberger State-Trait Anxiety Inventory (STAI; 1983)
- Multi-echo fMRI: 1.5T, TR: 2.5s, TE: 34ms

fMRI results: group analysis
- N = 108
- Covariates: age and anxiety

fMRI results: ROI analysis
- Amygdala coordinates: x=±18, y=-2, z=16

Behavioral results
- Faster RT with higher anxiety for M- and P-biased threat responses
- Better accuracy with anxiety for M-biased threat responses
- Accuracy decreased with anxiety for P-direct threat responses

Conclusion
- M and P pathways are geared toward processing clear threat and ambiguous threat cues in facial fear (reflexive vs. reflective processing), respectively.
- Observers’ trait anxiety specifically modulates these two major visual streams, both facilitating processing of M-biased clear threat cues and interfering with processing of P-biased ambiguous threat cues.
- Trait anxiety also differentially modulates the left and right amygdala reactivity to P-biased ambiguous and M-biased clear threat cues, respectively.

References

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