Crowd emotion perception is lateralized in a goal-driven fashion and modulated by observer anxiety and stimulus characteristics: behavioral and fMRI results

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Background

- Crowd emotion provides important social information guiding our interactions with others (e.g., approach to make friends or avoid them to be safe).
- We can extract crowd emotion from multiple faces with different facial expressions very rapidly.
- However, little is known how this efficient, and socially important process is achieved.

Research objectives

- Understanding the factors that modulate crowd emotion perception and examining individual differences in this process.
- Investigating neural bases for extracting crowd emotion and single face perception.

Different visual pathways:
- Magnocellular (M) and Parvocellular (P)
- M pathway: more sensitive to low spatial frequency (e.g., global features)
- P pathway: more sensitive to high spatial frequency

Method

- 50 morphed faces between Happy and Angry
- 6 sets from different identities
- Which group (left or right) would you rather avoid? Approach?
- Visual field of presentation: Left, Right visual fields
- Anxiety: STAI
- MRI: 3T, TR=2s, 28 subjects (Avoidance only)

Behavioral Results

- Task goal-dependent laterality for crowd emotion
- Responses were more accurate when task-relevant crowd emotion was presented in left visual field (LVF).
- But not for single faces!

fMRI Results

- Crowd emotion perception is lateralized in a goal-driven fashion and modulated by observer anxiety and stimulus characteristics: behavioral and fMRI results

Summary

- Both behavioral and fMRI results show task-dependent lateralization for crowd emotion, but not for single face perception.
- High anxiety individuals made faster responses and showed a tendency to avoid happy crowds.
- While a single angry face preferentially activated the cortical face network, a crowd of angry faces activated orbital, premotor and frontal regions (dorsal stream) as well as cerebellum and brain stem (PAG).
- Angry stimuli preferentially activated the brain regions for clear threat (Also check out the neighboring poster #63.4047), whereas happy stimuli preferentially activated the cortical face network.

Conclusion

- Distinct neural mechanisms seem to support crowd emotion perception and single emotional face perception: orbital, premotor, and frontal regions for crowd emotion perception and temporal areas for a single emotional face.
- One possibility: different contribution of Magnocellular (quick and dirty processing of a gist, relying on low spatial frequency information) for crowd emotion perception and of Parvo pathway for a single emotional face perception.
- Anxiety modulates crowd emotion perception: high anxiety individuals react to emotional crowds faster and show tendency to avoid happy crowds.

References


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