Neurodynamics of reading crowd emotion: Independent visual pathways and hemispheric contributions

Hee Yeon Im 1,2, Cody Cushing 3, Daniel N. Albohn 3, Troy G. Steiner 3, Noreen Ward 3, Reginald B. Adams, Jr. 1, Kestutis Kveraga 1,2

1 Athinoula A. Martinos Center for Biomedical Imaging, Department of Radiology, Massachusetts General Hospital, 2Department of Radiology, Harvard University, 3Department of Psychology, The Pennsylvania State University

Background

- The visual system exploits redundancies by extracting summary statistics from groups of similar items.
- In social situations, extracting average emotion from crowds of faces helps us to avoid potential threats (e.g., mob violence or mass panic).
- However, neurodynamics underlying this efficient, and socially important process is unknown.

Research Objectives

- Understanding different contributions of two major visual pathways, Magnocellular (M) / Dorsal and Parvocellular (P) / Ventral pathways to crowd emotion perception
- Understanding patterns of hemispheric (left vs. right) lateralization in reading crowd emotion

General Method

- Linear mapping of two extremely angry and happy faces
- Crowd emotion condition
  - Individual emotion condition
    - Visual field of presentation x Emotional valence
      - Visual field of presentation x Emotional valence

Crowd emotion processing engaged brain regions primarily in the dorsal visual stream, while individual emotion processing activated face-selective areas in the ventral visual stream.

Magno bias for crowd emotion: [1] fMRI

Crowd emotion processing showed greater interregional connectivity in the dorsal visual stream, while individual emotion processing showed greater connectivity in the ventral visual stream.

Angry: (e.g., mob violence or mass panic)

Individual emotion condition

Regions of interest: Brain network involved in emotional processing showed greater connectivity in the ventral visual stream, whereas, task-incongruent crowd emotion was facilitated in the LVF.

Hemispheric lateralization

Different patterns of hemispheric lateralization for reading crowd emotion from M- and P-biased stimuli

Conclusion

- Reading emotion from facial crowds vs. single face engage different neural substrates and reveal different neurodynamics.
- Reading crowd emotion is predominantly carried out by the M/dorsal stream, whereas individual face emotion processing preferentially engages P/ventral stream.
- Reading crowd emotion reveals differential involvement of the left and right hemispheres, with the right hemisphere being dominant for task-congruent facial crowd.

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