Affective expression-modulated nodes in large-scale body networks in the human brain

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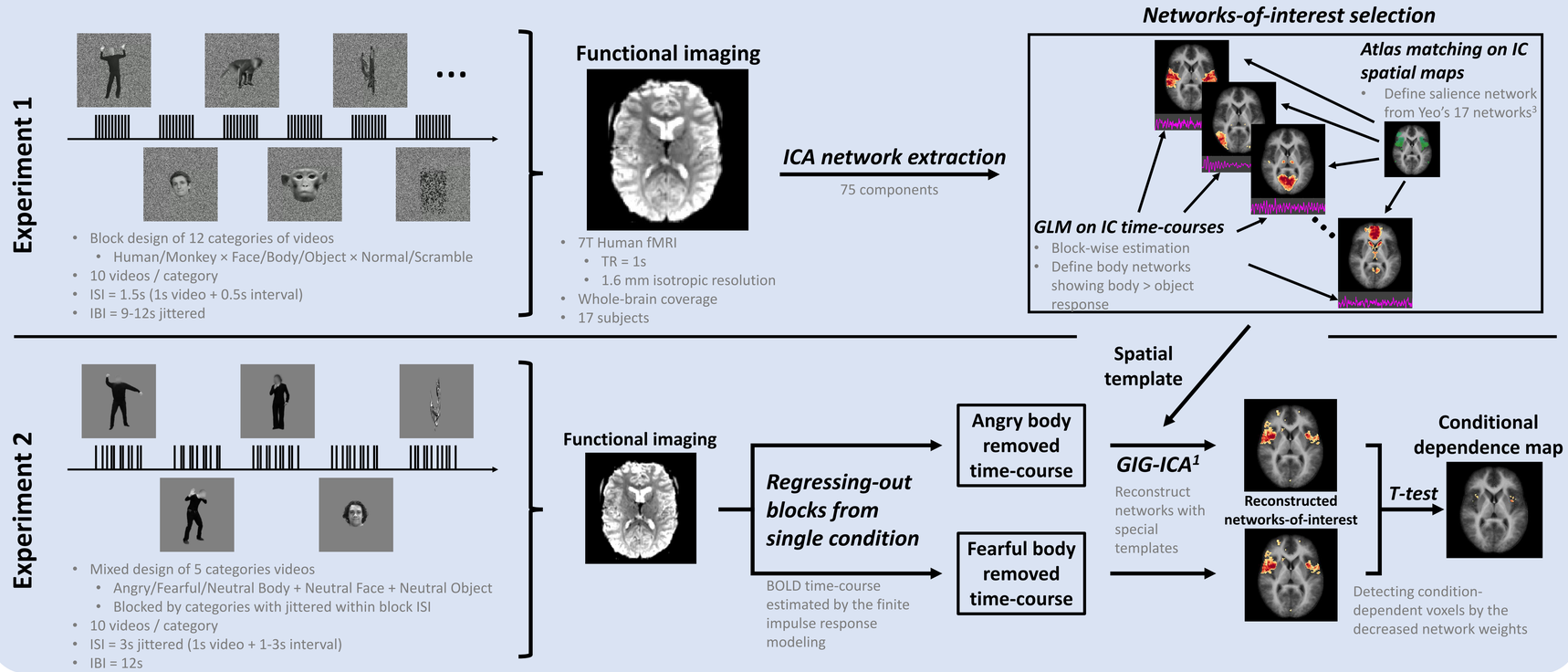
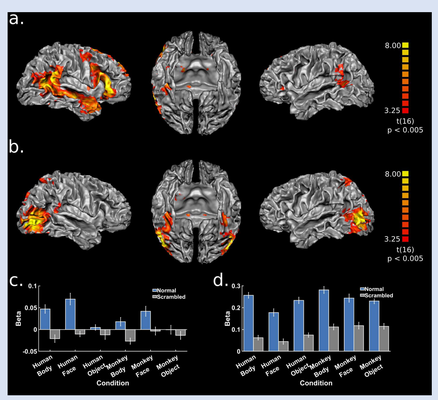
Motivation

- Face and body expressions provide crucial information about potential social threat
- An efficient response to such cues requires cooperation between social perception and defensive action processing systems, which so far are mostly studied separately
- Here we are specifically interested in the voxel-network interaction during the cross-system processing
- Two different threat-related social cues were investigate with naturalistic body expressions:
  - defensive action (expressing fear)
  - attacking action (expressing anger)
- ICA based network analysis[1,2] was conducted, focusing on:
  - Salience network[4]
  - Two additional body networks as defined in Li (2022)[2]
- Modulations of threatening body expression were tested on both voxel- and network-levels



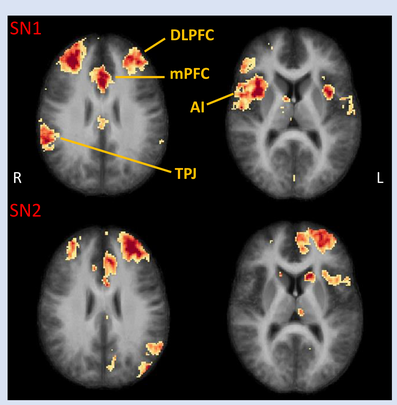
Key results

- The connectivity of temporoparietal junction (TPJ) and anterior insula (AI) was dependent on angry expression processing in the salience network
  - Only the frontal nodes in the salience network were more sensitive to fearful expression
- More fearful-dependent nodes were found in the two body networks including the extrastriate body area (EBA), superior temporal sulcus (STS), TPJ, and multiple frontal nodes
- Overlap among the three networks was found in the right TPJ, suggesting a hub rule of distributing body information to different down-stream systems

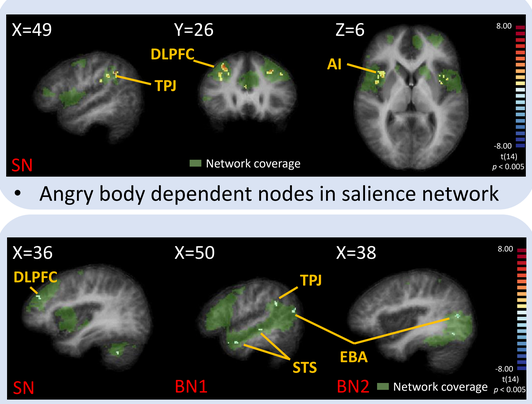


- Two body networks defined by GLM on IC time-courses
  - Panel (c) & (d) showing the GLM betas for each body network

Preceding paper

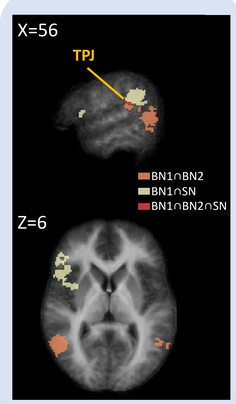


- Two salience network (SN) related components were detected by the atlas-based labeling (the results were combined in the following analysis)



- Angry body dependent nodes in salience network

- Fearful body dependent nodes in salience network (SN) and two body networks (BN)
- No angry dependent nodes were found in body networks



- The intersection of all three networks was found in rTPJ

[1] Du, Y., & Fan, Y. (2013). Group information guided ICA for fMRI data analysis. Neuroimage, 69, 157-197.
[2] Li, B., Solanas, M. P., Marrazzo, G., Raman, R., Taubert, N., Giese, M., ... & de Gelder, B. (2022). A large-scale brain network of species-specific dynamic human body perception. bioRxiv.
[3] Yeo, B. T., Krienen, F. M., Sepulcre, J., Sabuncu, M. R., Lashkari, D., Hollinshead, M., ... & Buckner, R. L. (2011). The organization of the human cerebral cortex estimated by intrinsic functional connectivity. Journal of neurophysiology.
[4] Seeley, W. W., Menon, V., Schatzberg, A. F., Keller, J., Glover, G. H., Kenna, H., ... & Greicius, M. D. (2007). Dissociable intrinsic connectivity networks for salience processing and executive control. Journal of Neuroscience, 27(9), 2349-2356.

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