

Neural correlates of affective and non-affective social interactions processing from point-light displays

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INTRODUCTION

Biological motion processing is among the most basic of the human social cognitive abilities¹. Healthy individuals have been shown to be able to process a wide range of social signals from point-light displays (PLD), including affective state and intentions of the observed agent². The ability to process higher-order social information from PLD, e.g. to interpret social interactions (SI), has also been shown to be linked with widespread activity across main "social brain" networks^{3,4}. The main aim of the project was to examine the patterns of neural activity associated with processing of affective and neutral SI from PLD.

METHODS

Two pairs of professional actors were asked to perform a wide range of dyadic actions during two motion-capture sessions, including:

- (1) communicative interactions (e.g. A asks B to sit down; B sits down, COM)
- (2) emotional exchanges (e.g. A shouts at B; B apologizes, EMO)
- (3) independent actions of agents (e.g. A squats down; B jumps, IND)

Preprocessed stimuli have been visually degraded to PLD. Additionally displays of 100% scrambled motion (SCR) of two agents

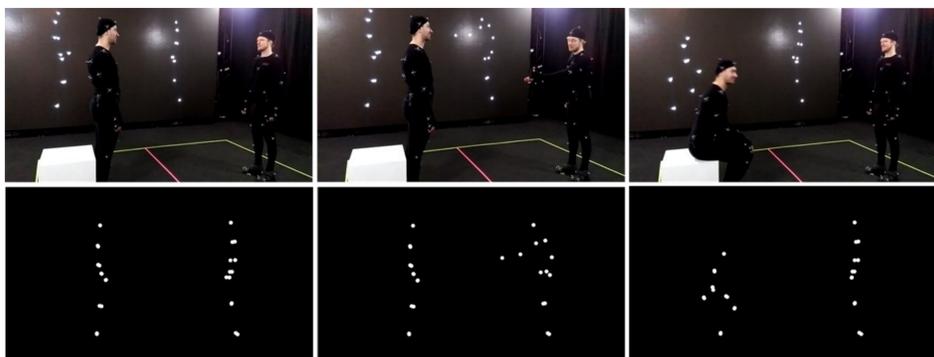


Fig. 1. Exemplary item presenting communicative interaction.

Fifty individuals (30 M; 33+/-8 yrs old) were presented with four types of displays and asked to qualify them into one of the four categories (COM/EMO/IND/SCR) during neuroimaging session. Stimuli were presented in a mixed design: upon presentation of 3 stimuli from the same category (9 s.) a response screen (RESP) was presented for 3 s. and then fixation cross (REST) was shown for subsequent 8 s. Task was presented in three runs, each lasting 7.5 min. Data were collected with 3T scanner with 32-ch. head coil and preprocessed using standard pipeline with SPM12 and ART. All of the results were FWE corrected to obtain $p < 0.05$.

RESULTS

SI elicited widespread activity in bilateral superior temporal sulci (STS) and the right precentral gyrus (PG), which could have been distinguished from the pattern of activation elicited by biological motion per se (bilateral posterior STS, fusiform gyrus and precuneus).

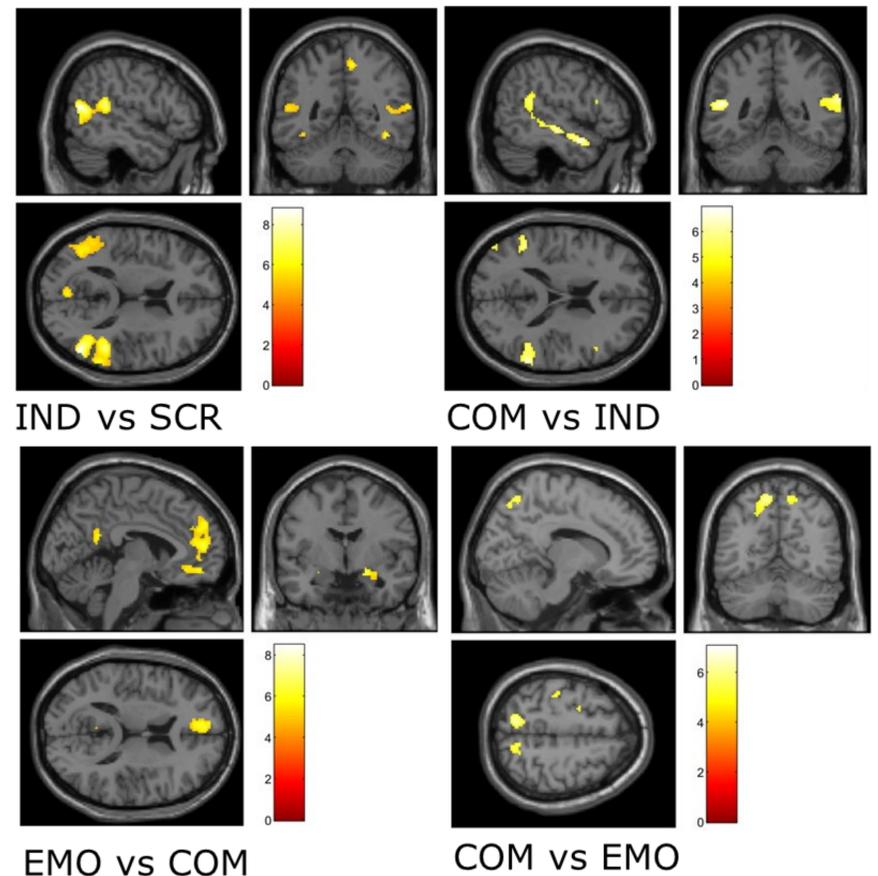


Fig. 2. Patterns of activation elicited by processing of SoPID vignettes.

COM>EMO elicited higher activity in bilateral superior parietal lobule and left PG, while the reverse contrast was associated with left medial prefrontal cortex and right amygdala activation. Furthermore, increased connectivity between the right posterior STS and dorsomedial prefrontal and limbic regions was observed for EMO>COM.

CONCLUSIONS

Similarly to previous studies we found that processing of social interactions is linked to the widespread activity of mentalizing and action observation networks in healthy individuals^{3,4}. We also established that differential patterns of activity within mentalizing and action observation network may be observed during the processing of specific types of SI. While it may be suggested that larger involvement of affective and mentalizing network during emotional vs. non-emotional interaction processing may be associated with implicit mentalizing, due to the overt nature of the task, this possibility should be examined by future studies based on passive viewing/spontaneous mentalizing paradigms.

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