

# Effect of angry context on insula activity during social perception

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## Introduction

Our previous research questions were: is the action perception affected by emotional contexts? Do the affective engagements differently involve the voluntary movement control ?

Such results showed that the perception of the same action kinematics but in different emotional contexts activated differently the cerebello-thalamo-cortical pathway underlying the voluntary movements control.

The left supplementary motor cortex (SMA), left ventrolateral thalamus, and the right cerebellar lobule V had greater activation in the angry context than the joyful context (Mazzola et al. under revision).

## Current Purpose

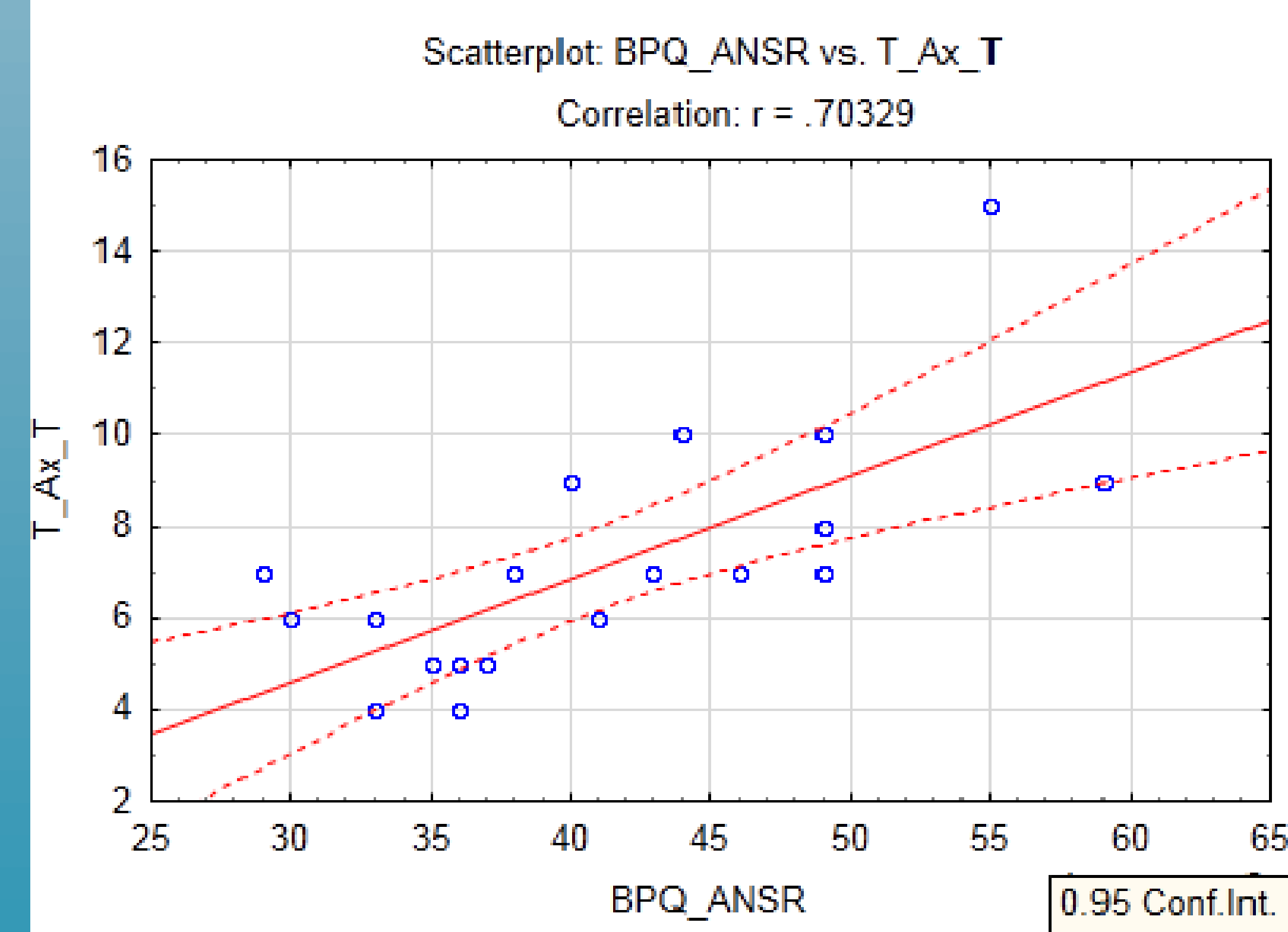
What is the effects of the emotional contexts during social perception? Is the posterior insula involved by the emotional contexts?

The posterior insula subserves different functions such as skeletomotor body orientation, environmental monitoring and response selection (Cauda et al. 2011, Neuroimage).

In particular, the right posterior insula plays a crucial role in the genesis of our self-awareness of limb movement (Farrer et al. 2003, Neuroimage).

## Methods

- Participants: 21 (8 females; mean age 27, SD 3.03).
- Questionnaires: Body Perception Questionnaire (BPQ) (Porges, 1983), State Trait Anger Expression Inventory (STAXI) (Spielberger, 1988), Interpersonal Reactivity Index (IRI) (Davis, 1983).
- fMRI experimental paradigm: 2 counterbalanced sessions: JOY and ANGER. 4 conditions per session: grasping alone, neutral grasping, emotional (angry/joyful) grasping, emotional (angry/joyful) face. Videoclip duration: 1.7 sec. Total run time about 18 minutes. No task during scan session: "See the videos very carefully". Postscanning: "Did you see it?"
- fMRI analyses were performed with SPM8.

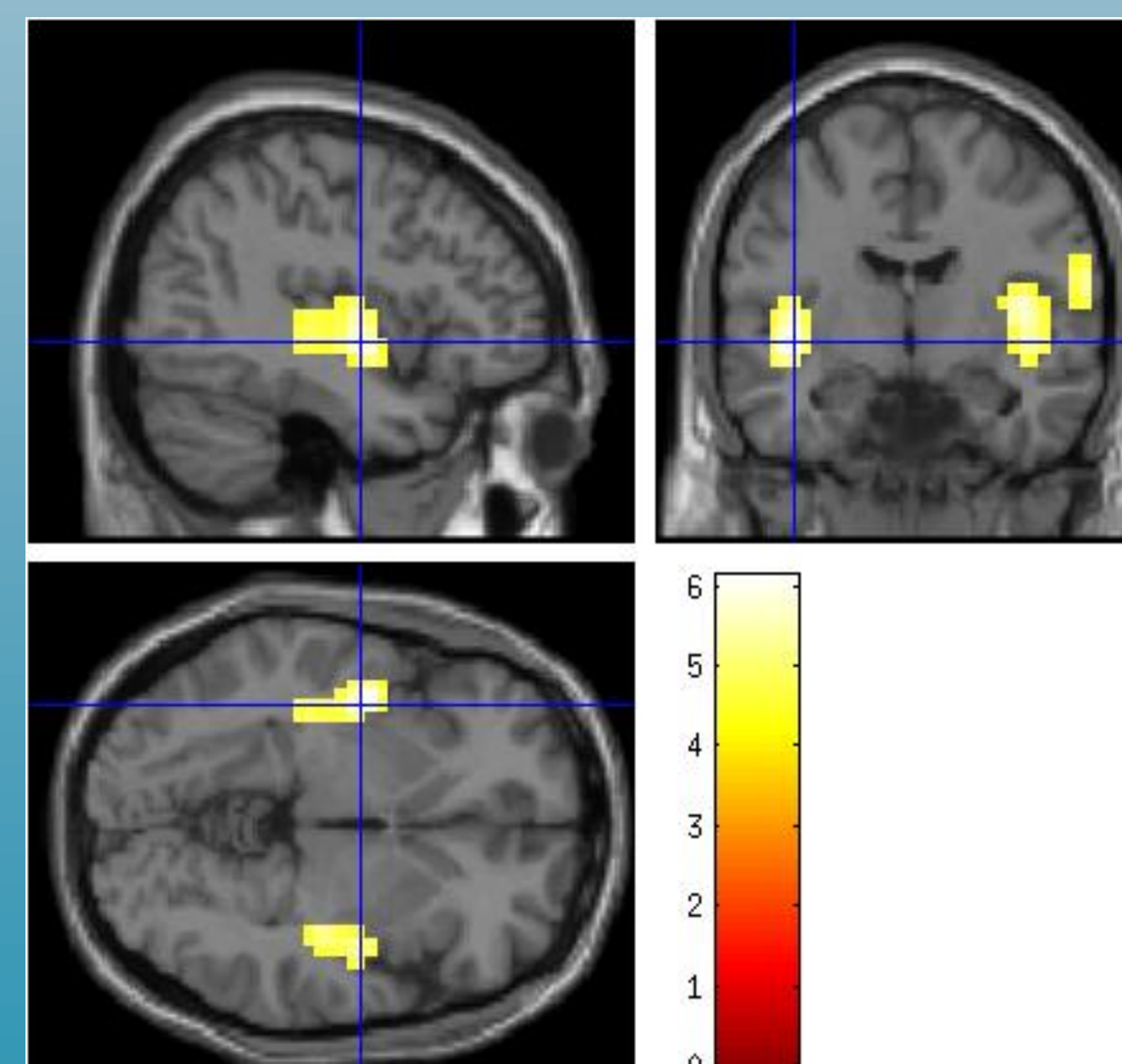


**Fig. 1:** Behavioral correlation between the disposition to express anger without provocation (T\_Ax\_T scale) and the measure of how own autonomic nervous system reacts (BPQ\_ANS scale).

## Results

The main effect of the emotional contexts showed a greater effect of the angry context in the bilateral insula and the right parietal operculum (OP4) ( $p < 0.05$  FWE corrected) (Fig. 2). The inverse comparison, that is, joyful context less angry context, did not reveal any significant change of brain activation even at a lower threshold ( $p < 0.01$ ).

Bilateral insula showed a greater activation also in the contrasts between angry grasping > joyful grasping as well as grasping alone in the angry context > joyful context.



**Fig. 2:** Main effect Angry session  $P < 0.05$  FWE corrected. Bilateral insula (peak coordinates  $x = -40, y = -7, z = 5; x = 42, y = -7, z = 10$ ); OP4 (peak coordinates  $x = 64, y = -7, z = 20$ ).

PPI analyses with seed regions in:

the right insula exhibited a strong positive connectivity with bilateral superior temporal gyri and the left precuneus ( $p < 0.01$  FWE corrected),

the left insula exhibited a strong positive connectivity with putamen ( $p < 0.05$  FWE corrected),

and the right OP4 with the right posterior cingulate cortex ( $p < 0.05$  FWE corrected), in the angry grasping.

## Discussion

These results showed the impact on insular activity of emotional contexts.

Taken together, these findings shed new light on the neural correlates of being emotionally situated during social perception (Arciero & Bondolfi, 2009, Wiley).

Moreover, these results support the perspective on emotion that consider how negative emotions narrow individuals' momentary thought-action repertoires by calling forth specific action tendencies, whereas positive emotions broaden individuals' momentary thought-action repertoires, prompting them to pursue a wider range of thoughts and actions than is typical.