Functional connectivity between midline structures is increased in first-episode psychosis during movie viewing

Eva Rikandi, Teemu Mäntylä, Jaana Suvisaari, Tuukka T. Raij

Background: Patients with psychotic disorders have aberrant functional connectivity patterns when compared with healthy control subjects. Differences are present during rest and while performing simple tasks, but are inconsistent across studies. We set out to study functional connectivity alterations during an audiovisual movie, a stimulus mimicking the complexity of everyday information processing.

Methods: We analyzed two samples of first-episode psychosis patients and control subjects. 14 patients and 12 controls were scanned with GE Signa 3T (Scanner 1) and 32 patients and 20 controls with Siemes Skyra 3T (Scanner 2). Both samples were shown scenes from the movie Alice in Wonderland. Seed region of the functional connectivity analysis was defined according to voxels in the precuneus (Figure 1) that best identified patients in our previous study.

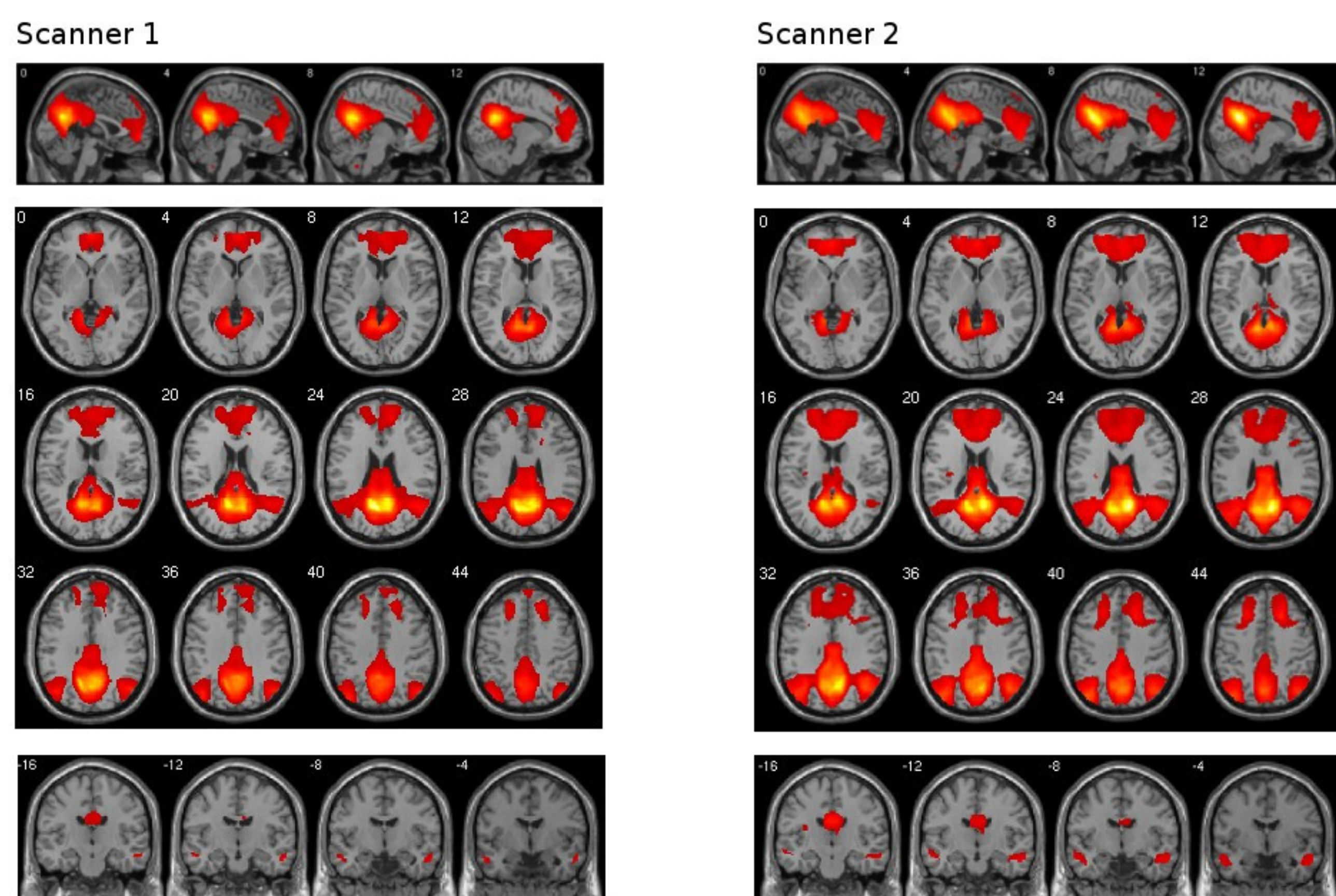Figure 1. Precuneus seed region

Figure 2. Functional connectivity of the seed region across all time points. Patient and control data pooled.
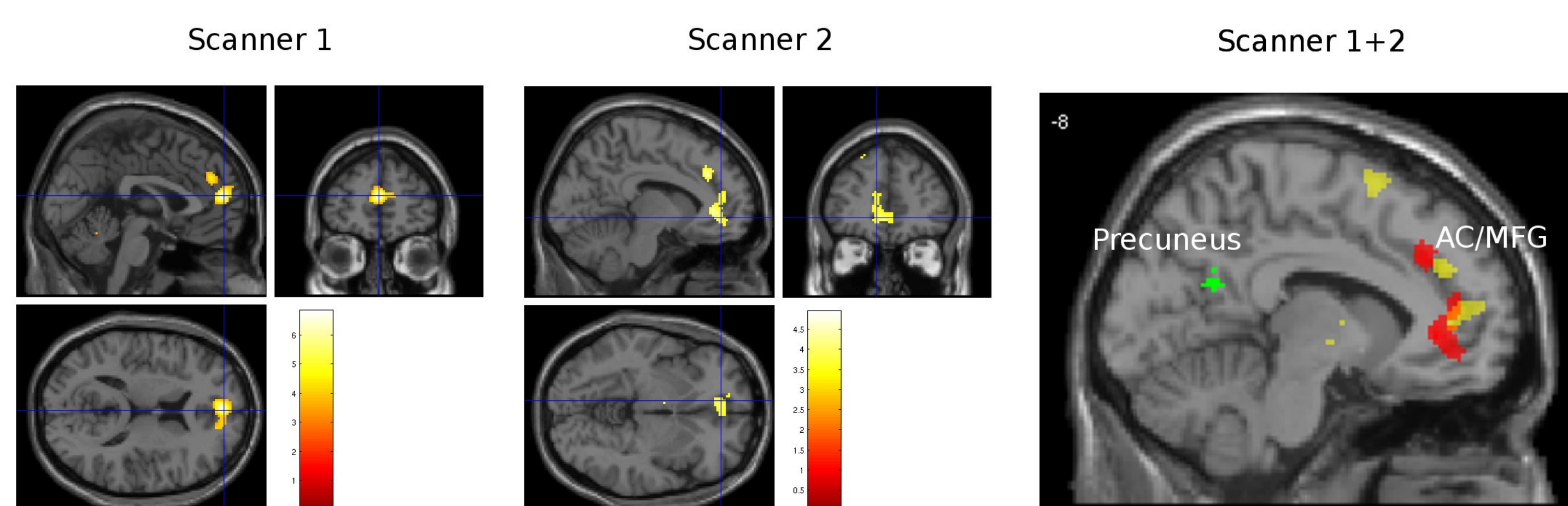

Figure 3. Regions with increased functional connectivity to the precuneus seed region in patients. Both samples shown separately (yellow) and superimposed on each other (yellow and red). Seed region shown in green, overlapping regions shown in orange.
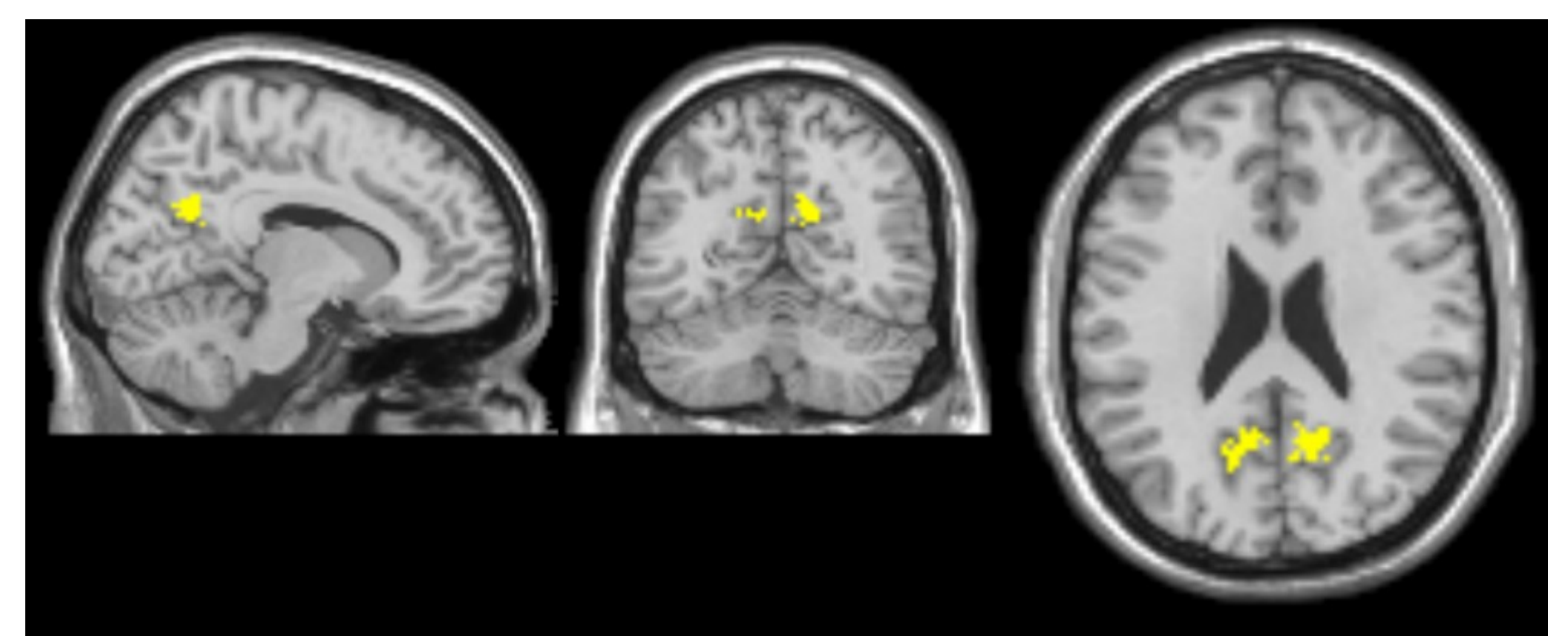
Results: In both samples the precuneus seed was functionally connected with regions that are part of the default mode network (FWE p < 0.05) (Figure 2). Patients had increased functional connectivity between the precuneus seed and the anterior cingulate and medial frontal gyrus (FWE p < 0.05). These findings were consistent across scanners (Figure 3).

Conclusion: Our replicated findings show that during naturalistic complex information processing, functional connectivity between the posterior and the anterior midline hubs of the default mode network is consistently increased.

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