etal, temporo-occipital and fusiform cortex. Emotional oddballs engaged bilateral anterior temporal and left inferior frontal cortex to a greater extent than perceptual oddballs (as well as left amygdala at an uncorrected threshold of $p < 0.005$). By contrast, the P vs E noun comparison demonstrated bilateral occipito-parietal activation extending into inferior temporal cortex.

We next compared oddball-evoked responses between groups. Fig. 1b (also see table 1) shows responses signifi-

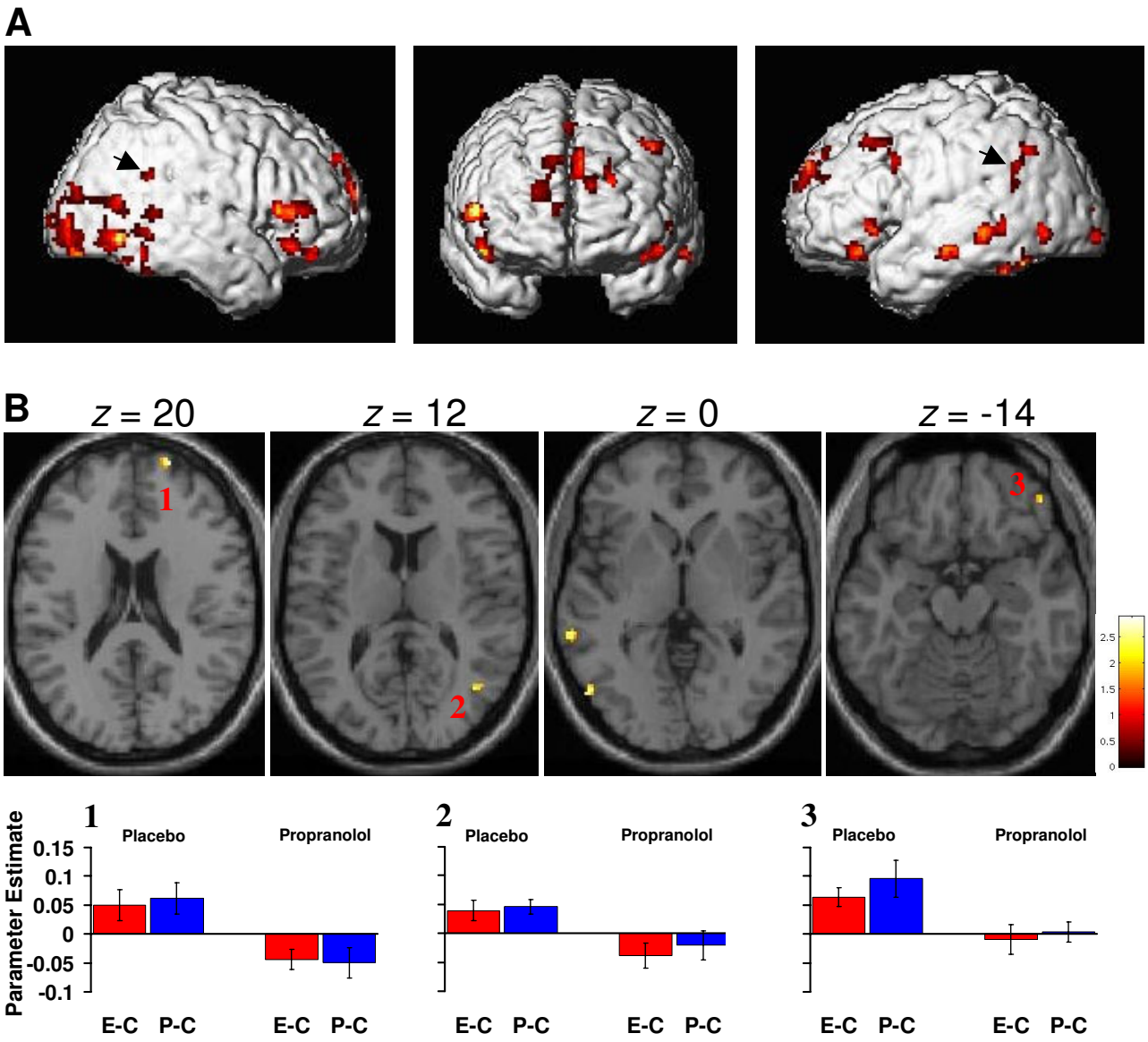

Figure 1
Oddball responses in humans are modulated by the β-adrenergic antagonist propranolol. (**a**) Oddball responses in the placebo group common to both emotional (E) and perceptual (P) oddballs. The statistical parametric map (SPM) is rendered onto a canonical brain. The threshold for illustration, here and in (b), is $p < 0.005$, uncorrected, with an extent threshold here of 25 voxels. Arrows point to responses in bilateral supramarginal gyrus. (**b**) Oddball-evoked responses that are significantly greater in the placebo vs propranolol group. The SPM (masked inclusively by regions showing oddball responses in the placebo group) is overlaid on axial slices with the *z* coordinate (distance in mm from the anterior commissure) indicated above. Response estimates are plotted relative to control (C) nouns for the response in *1* right anterior prefrontal cortex, *2* right temporo-parietal junction, and *3* right inferior frontal gyrus (co-ordinates given in table 1). Error bars represent ± 1 SE of the mean.