Panel A. Percent Trials Accepted: Pts LPE

YOU GAIN (cents)	-2	-4	-8	-16	-32	-64
+2	78%	65%	50%	39%	30%	41%
+4	91%	78%	54%	52%	39%	41%
+8	93%	87%	80%	54%	41%	39%
+16	96%	91%	91%	80%	61%	61%
+32	96%	96%	96%	93%	83%	61%
+64	100 %	100 %	91%	91%	93%	87%

RED CROSS LOSES (cents)

Panel B. Percent Trials Accepted: Pts no LPE

	-2	-4	-8	-16	-32	-64
+2	52%	52%	36%	27%	23%	30%
+4	66%	52%	30%	45%	30%	23%
+8	82%	64%	59%	41%	34%	27%
+16	75%	73%	70%	68%	41%	50%
+32	84%	82%	86%	64%	68%	45%
+64	80%	82%	82%	84%	75%	77%

RED CROSS LOSES (cents)

Panel C. Percent Trials Accepted: controls

YOU GAIN (cents)	-2	-4	-8	-16	-32	-64
+2	58%	38%	33%	17%	15%	21%
+4	71%	63%	27%	35%	17%	13%
+8	85%	75%	58%	31%	25%	17%
+16	88%	85%	81%	63%	27%	29%
+32	90%	87%	88%	69%	52%	33%
+64	96%	92%	81%	87%	75%	56%

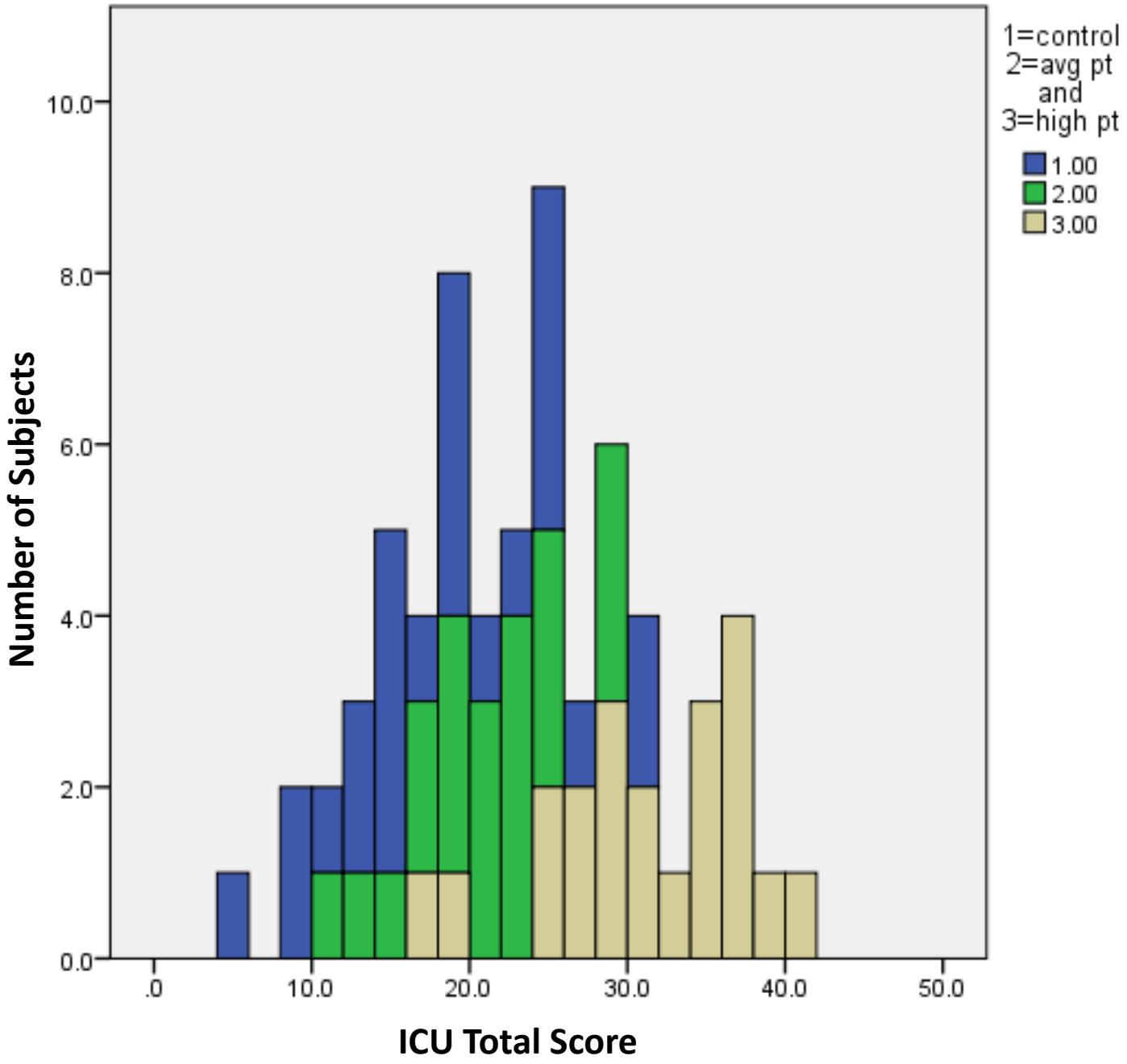
RED CROSS LOSES (cents)

Panel D. Spearman Correlation Matrix

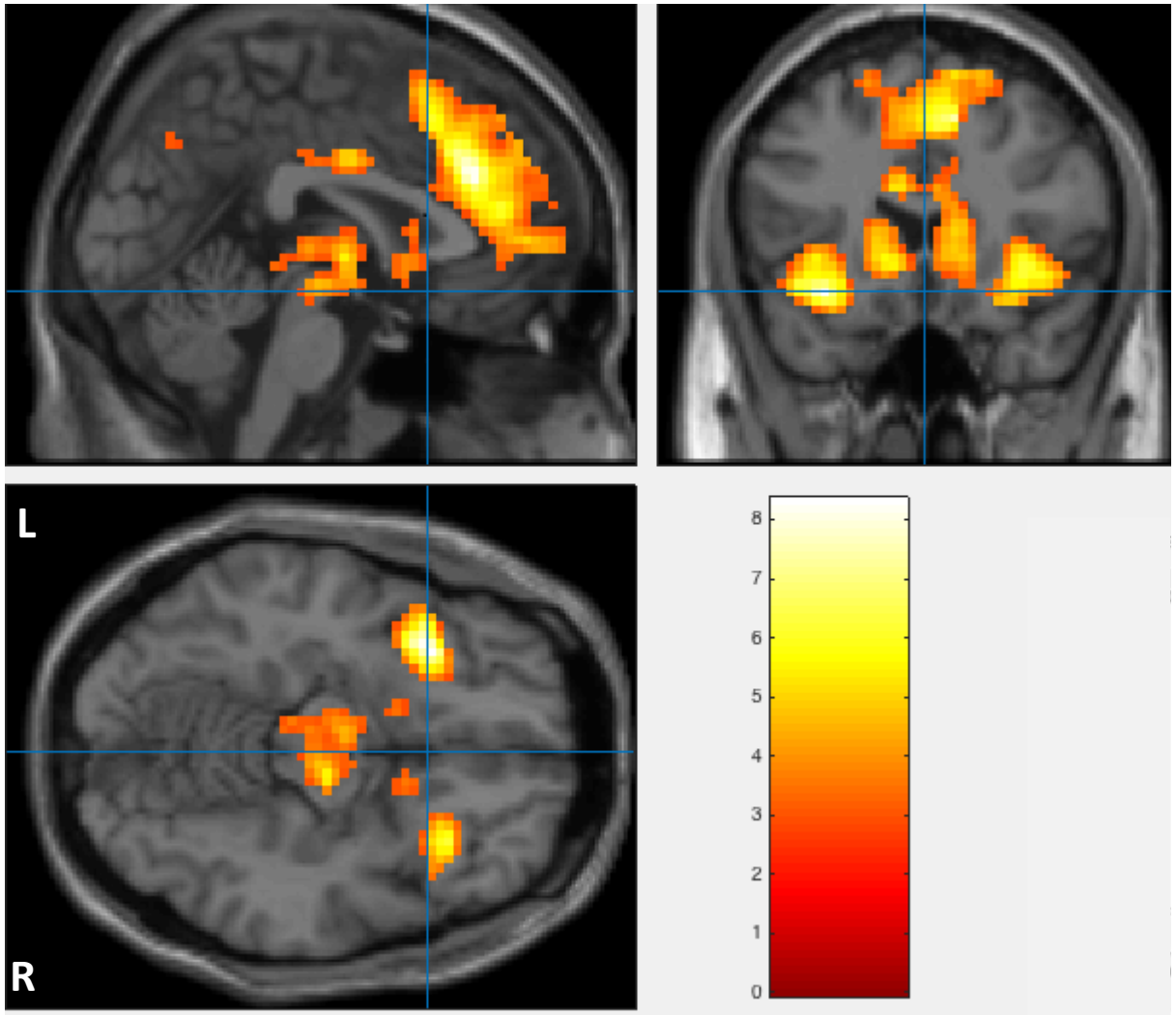
	PT	FS	PD	CH	RC	S
EC	0.66; p<0.001	0.46; p<0.001	0.11; p=0.40	0.34; p=0.007	0.39; p=0.001	-0.34; p=0.006
PT	1	0.43; p<0.001	0.07; p=0.61	0.33; p=0.008	0.36; p=0.004	-0.33; p=0.008
FS		1	0.22; p=0.08	0.16; p=0.21	0.21; p=0.10	-0.18; p=0.16
PD			1	0.02; p=0.90	0.04; p=0.76	0.01; p=0.94
CH				1	0.97; p<0.001	-0.92; p<0.001
RC					1	-0.88; p<0.001

Supplemental Figure 1. Shows the percent accepted for each Active Trial (same Matrix format as Figure 1, Panel B.1) for adolescent patients with limited prosocial emotions (LPE; **Panel A**), adolescent patients without LPE (**Panel B**) and typically developing adolescents **(Panel C).** Note: this figure utilizes components from previously published results of the AlAn's game protected under the Creative Commons Attribution license (Sakai et al., 2016; http://journals.plos.org/plosone/s/content-license). **Panel D.** Nonparametric correlation matrix (two-tailed; n=64) showing association between empathic concern (EC), perspective taking (PT), fantasy scale (FS), personal distress (PD) and outcomes from the AlAn's game including costly helping (CH), amount of money left in the Red Cross donation at the end of the game (RC) and amount of money taken for self (S).

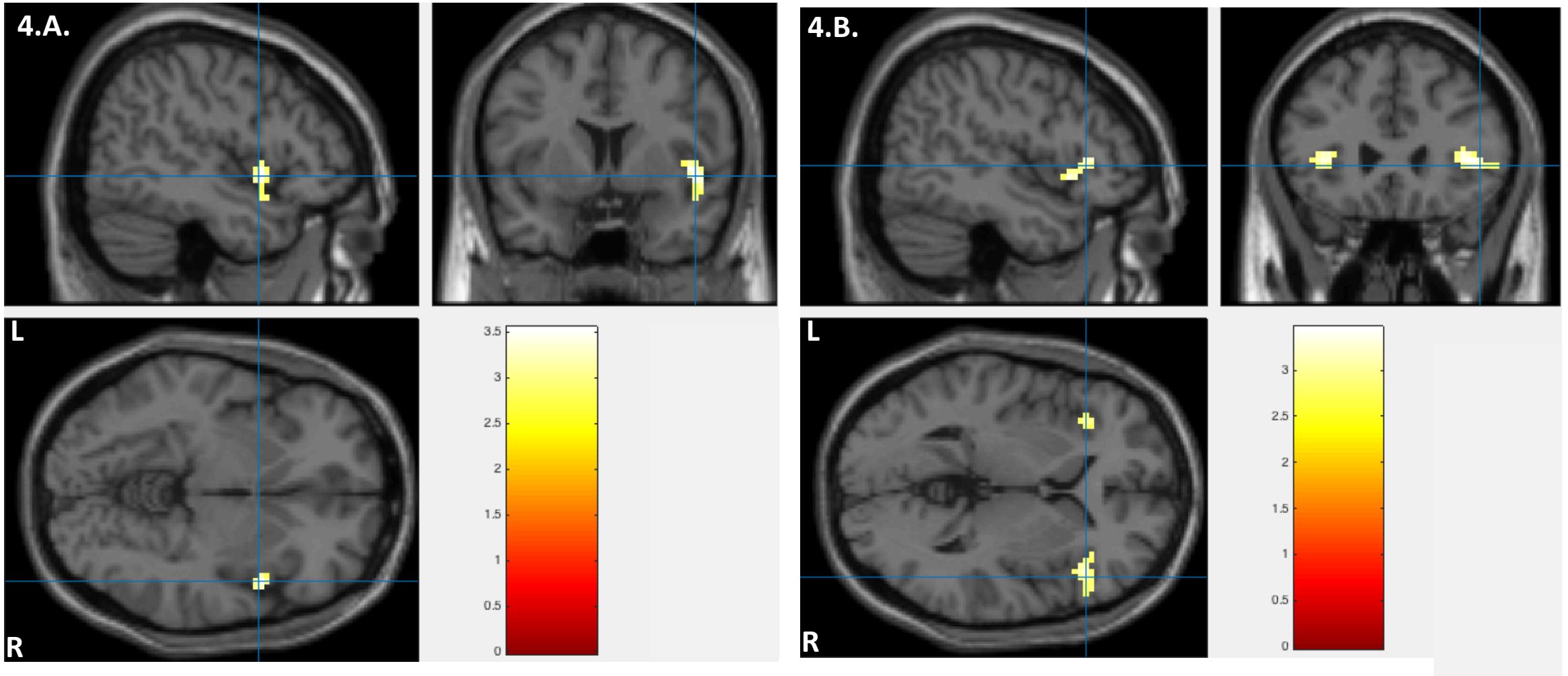
Supplemental Figure 2. Examining the distribution of total score from the Inventory of Callous Unemotional Traits (y-axis; number of subjects with each score indicated on the x-axis) by group (typically developing controls in blue, patients without LPE in green and patients with LPE in beige).
Note: The LPE categorization identifies groups that differ significantly in total score (see Table 1). But group score distributions are overlapping. ICU total score is approximately normally distributed across groups. Therefore we also tested for an association between ICU total score (a dimensional measure of level of callousness) and brain activation as has been commonly done in studies prior to the publication of DSM-5.



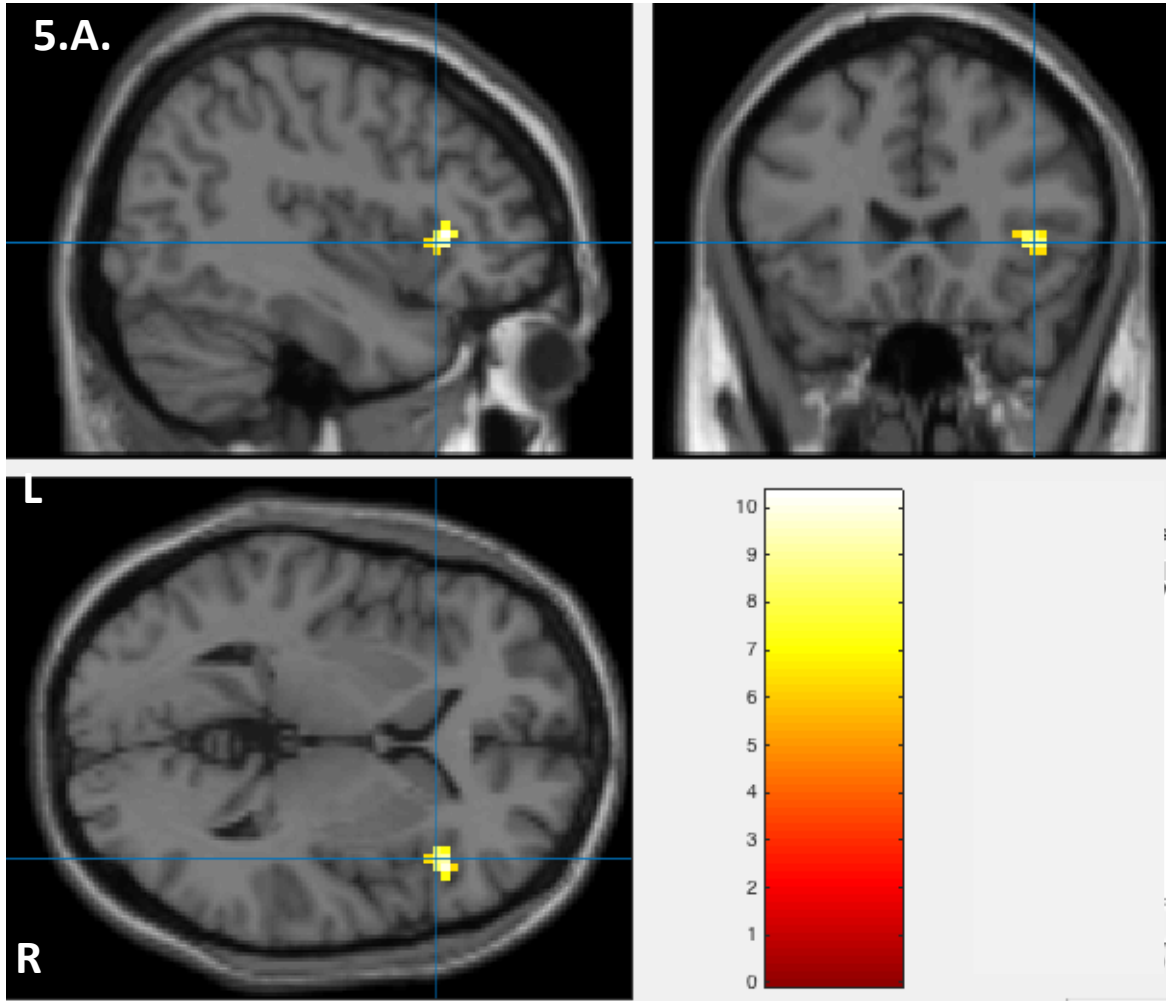
Supplemental Figure 3. Network activated during deliberations about acting to benefit self vs. to protect a beneficent other (Active Trials minus Calculation Trials on the AlAn's game). Results shown for 24 typically developing male adolescents using whole-brain analyses. Areas activating during decision-minus-baseline include: anterior cingulate cortex (Brodmann Areas 24 and 32), medial frontal gyrus, superior frontal gyrus and other medial frontal regions, bilateral inferior frontal gyri extending into the anterior insula, thalamus, and reward-related circuitry including midbrain and caudate (nucleus accumbens), one cluster in the right inferior parietal lobule (angular and supramarginal gyri; BA 40; not shown here) and one cluster in the precuneus (crosshairs x,y,z coordinates 3.0, 18.7, -13.4, respectively). See Supplemental Table 1.A for details about the 5 significant clusters.



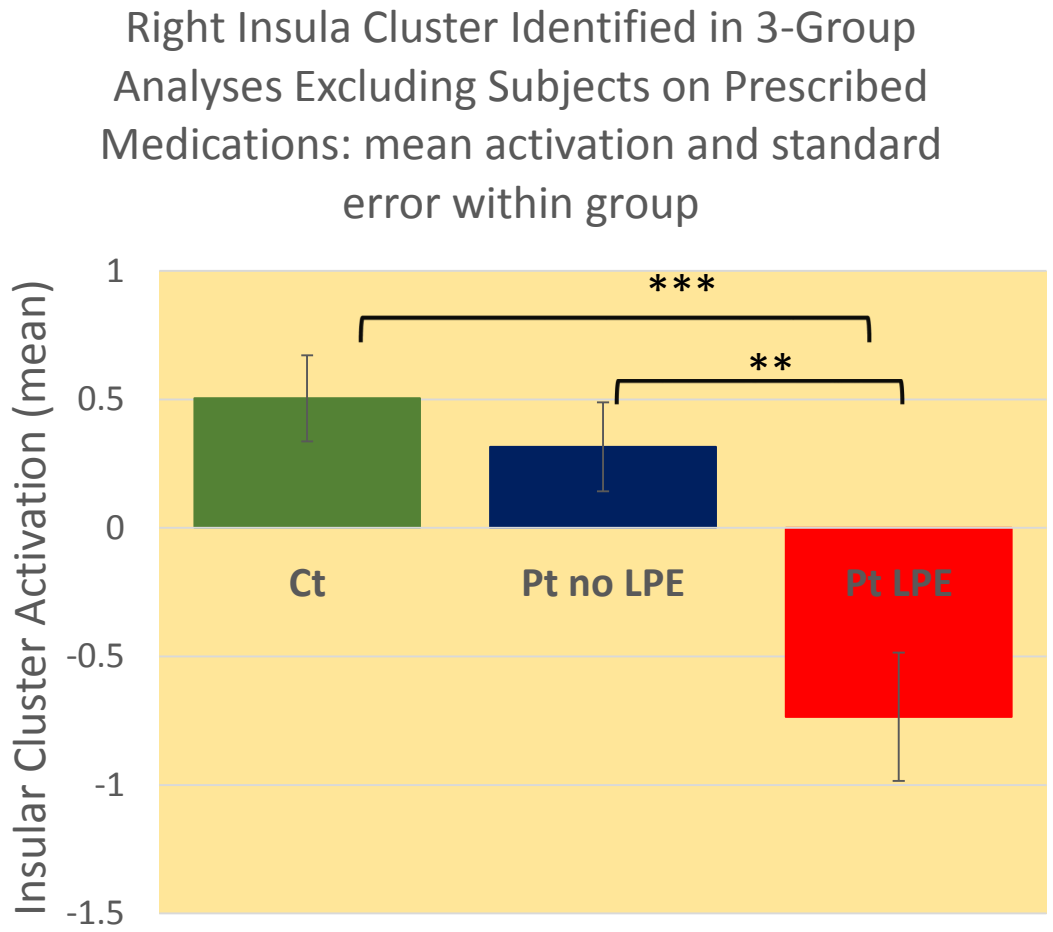
Supplemental Figure 4. Panel 4.A. Secondary analyses comparing patients without LPE > patients with LPE while controlling for age, IQ, motion and conduct disorder symptom count. Showing 33 voxel cluster in right anterior insula (voxel size $3mm^3$). (crosshairs x,y,z coordinates 48, 6.7, -4.71, respectively). Regions involved include superior temporal gyrus, insula and Brodmann Areas 22, 38 and 13. Peak voxel at 48, 8, -4, with a *t*=3.53. **Panel 4.B.** Secondary analyses dividing patients by a median split of ICU total score (instead of by LPE specifier). Comparison of typically developing adolescents > patients with high CU shown for two insula clusters are shown (crosshairs x,y,z coordinates 48, 26, 2). Both also involve superior temporal gyrus and the right cluster involves inferior frontal gyrus. Left cluster is 26 voxels and the right 63. A third cluster is not shown and involves the cerebellum (24 voxels and peak voxel at x,y,z coordinates 15, -55, -22, respectively).



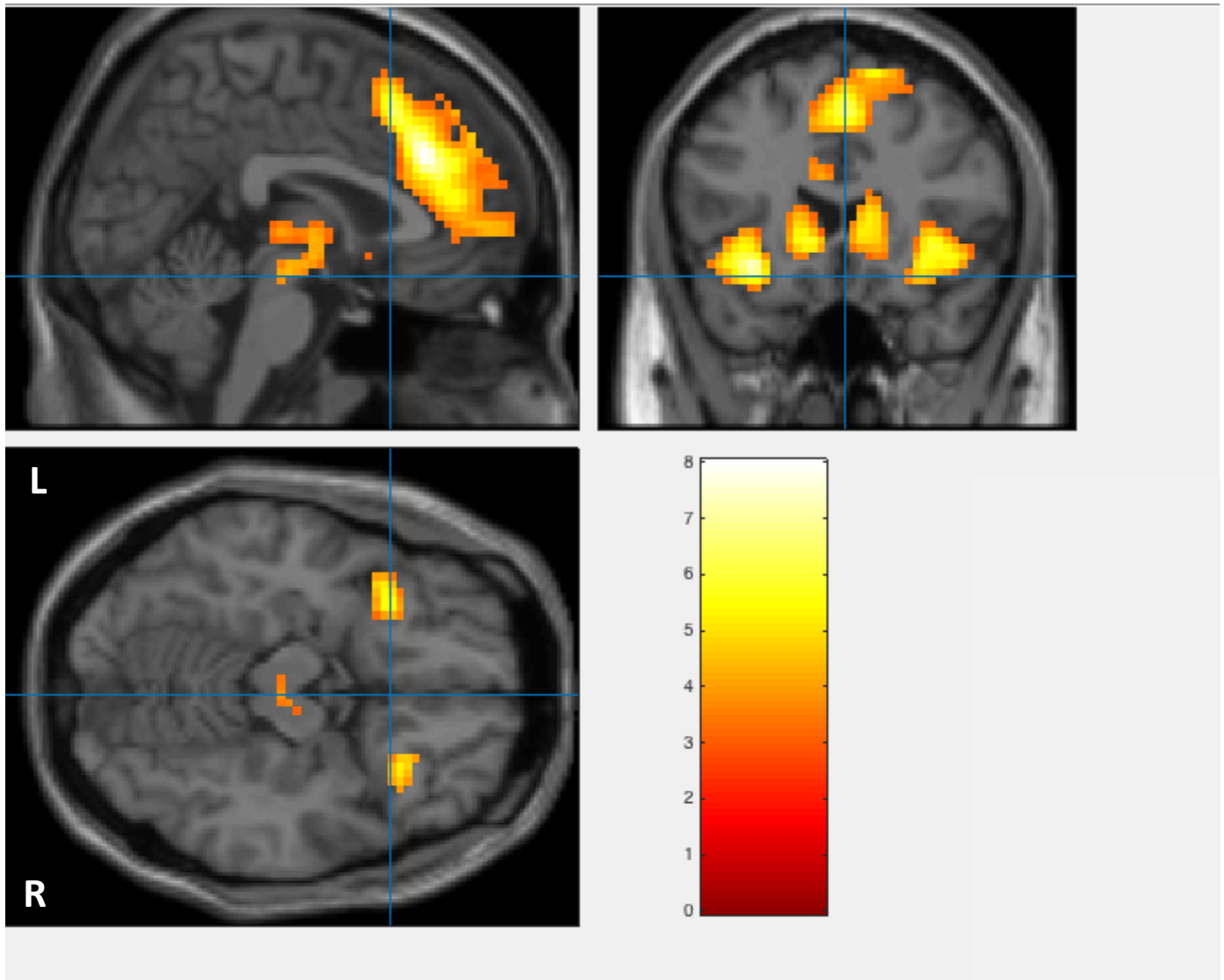
Supplemental Figure 5. Panel 5.A. Secondary analyses excluding adolescents who were on prescribed medications. Testing for group differences during decision (Active Trials minus Calculation Trials) in 12 patients with LPE, 12 patients without LPE and 21 typically developing youth. **Panel A.** Whole-brain three-group test for activation differences demonstrating a cluster in right insula and inferior frontal gyrus. [Cluster is referred to as "insula" cluster in this figure; crosshair x,y,z coordinates 42, 23 and 2, respectively]. **Panel B.** Cluster from three-group analyses was outputted for each subject (using MarsBaR) and within group means and standard errors are presented. Three group ANOVA was significant (F=10.77; $p<0.001$) as expected. Two group comparisons demonstrated that patients with LPE differed significantly from (1) typically-developing controls ($p<0.001$) and (2) patients without LPE ($p=0.004$) using post-hoc Tukey's tests.

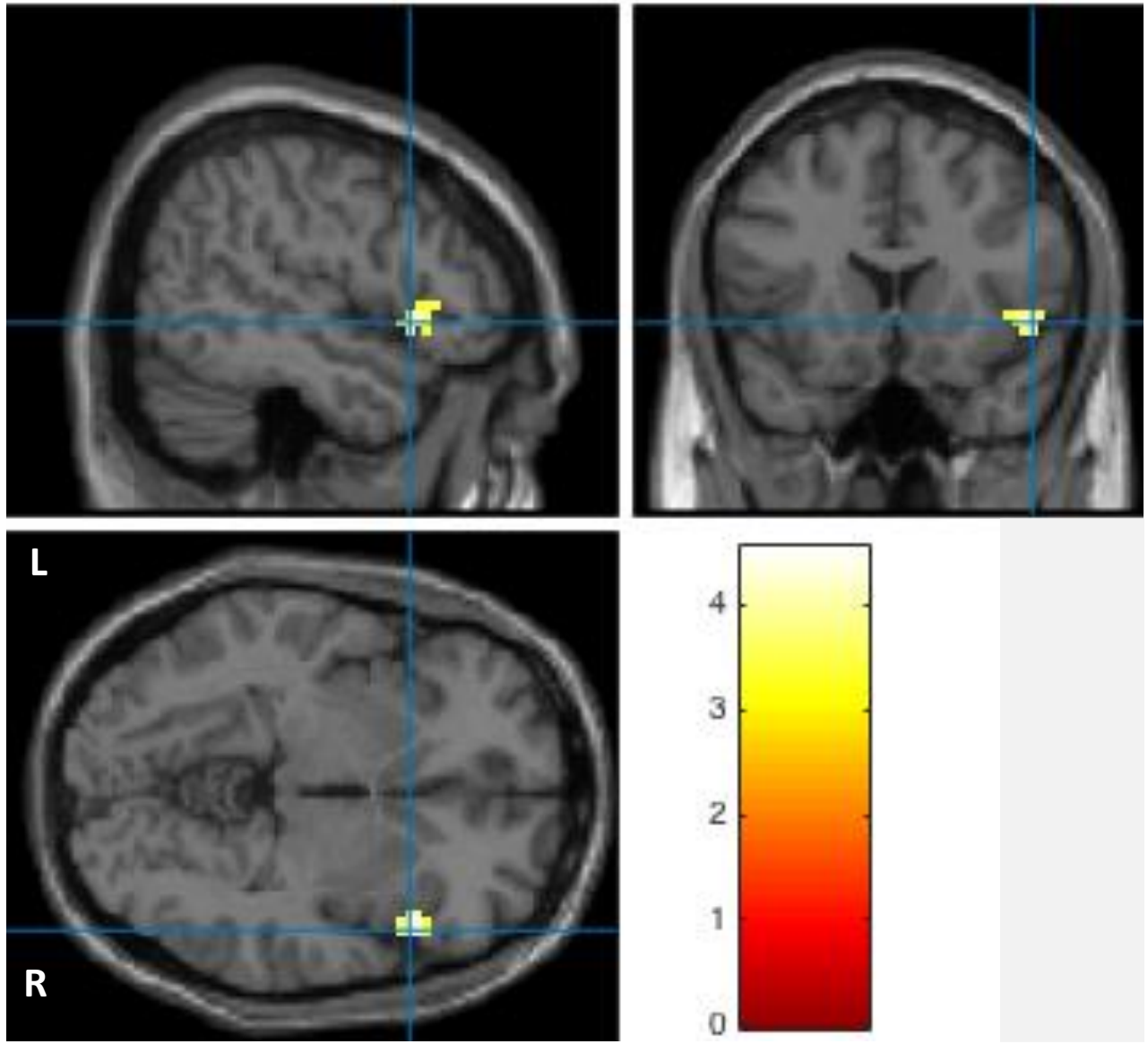


5.B.



Supplemental Figure 6. Using the more stringent Permutation test with going in $p<0.001$ (cluster defining threshold of $t=3.0902$) and 10,000 permutations generating a critical STCS of 96 voxels (voxel size 3mm^3). Network activated during deliberations about acting to benefit self vs. to protect a beneficent other (Active Trials minus Calculation Trials on the AlAn's game). Results shown for 24 typically developing male adolescents using whole-brain analyses. Areas activating during decision-minus-baseline include: anterior cingulate cortex (Brodmann Areas 24 and 32), medial frontal gyrus, superior frontal gyrus and other medial frontal regions, bilateral inferior frontal gyri extending into the anterior insula, thalamus, and reward-related circuitry including midbrain and caudate (nucleus accumbens), and one cluster in the right inferior parietal lobule (angular and supramarginal gyri; BA 40; not shown here; crosshairs x,y,z coordinates 4.4, 18.7, -14.7, respectively). In contrast to Supplemental Figure 3, no cluster was significant in the precuneus. See Supplemental Table 1.B for details about the 8 significant clusters.





Supplemental Figure 7. Using non-parametric permutation test with going in $p<0.001$ (cluster defining threshold of t=3.0902) and 10,000 permutations generating a critical STCS of 64 voxels (voxel size $3mm^3$). Comparison typically-developing adolescents > patients with LPE, showing one cluster in the right anterior insula (crosshairs x,y,z coordinates 49.9, 17.4, -4.7, respectively). Regions involved include inferior frontal gyrus and insula (aal) and Brodmann Areas 47, 45 and 13. Cluster is 74 voxels. Peak voxel at 51, 17, -4, with a t=4.52.