Supplementary Table 1. Changes in connectivity between the pre and post bladder distention scans in the control cohort

| | | | | | MNI coordinates | | |
|---|---|---|---|---|---|---|---|
| Seed Region | Brain region | vox | p val | z-max | z-max x (mm) | z-max y (mm) | z-max z (mm) |
| **Post > Pre Bladder distention** | | | | | | | |
| Right PAG | R Cerebellum VIIIa[c] | 184 | .0035 | 3.94 | 14 | -64 | -56 |
| | L Cerebellum VIIIa[c] | 69 | .0351 | 3.81 | -28 | -56 | -56 |
| | R superior frontal gyrus[d], SMA | 141 | .0379 | 3.29 | 14 | -2 | 70 |
| Right Amygdala | R primary somatosensory cortex[a] | 295 | .0042 | 3.58 | 46 | -28 | 42 |
| | L secondary somatosensory cortex[a] | 267 | .0065 | 3.76 | -58 | -14 | 14 |
| | L primary somatosensory cortex[a] | 174 | .0307 | 3.7 | -40 | -22 | 34 |
| | R medial frontal gyrus[b] | 999 | .0000 | 4.58 | 18 | 56 | -8 |
| | L posterior cingulate (BA 30)[b] | 102 | .0136 | 3.28 | -4 | -46 | 20 |
| | hypothalamus | 2 | .0094 | 2.83 | -8 | -4 | -4 |
| | R insula[d] | 455 | .0001 | 3.67 | 40 | 8 | -12 |
| | R insula[d] | 81 | .0487 | 3.31 | 40 | -10 | 14 |
| | L insula (BA 13)[b] | 192 | .0057 | 3.36 | -36 | -14 | 18 |
| | L insula[b,d] | 185 | .0065 | 3.56 | -40 | 14 | -6 |
| | L thalamus[d] (pulvinar[b]) | 356 | .0005 | 4.45 | -16 | -24 | 8 |
| | R thalamus[d] (medial dorsal nucleus[b]) | 207 | .0050 | 3.39 | 6 | -10 | 8 |
| | midbrain | 93 | .0355 | 4.38 | -16 | -22 | -12 |
| | R premotor cortex (BA 6)[a] | 814 | .0000 | 4.03 | 2 | 14 | 46 |
| | R premotor cortex (BA 6)[a] | 150 | .0291 | 4.02 | 4 | 18 | 46 |
| | L anterior cingulate[b,d] | 1291 | .0000 | 3.87 | -2 | 32 | 22 |
| Left Amygdala | L medial frontal gyrus[b] | 804 | .0000 | 4.32 | -8 | 62 | 0 |
| | R posterior cingulate[d] | 193 | .0015 | 3.24 | 2 | -42 | 16 |
| | hypothalamus | 2 | .0107 | 2.49 | -8 | -4 | -4 |
| | L insula[d] | 143 | .0102 | 4.02 | -36 | -10 | 2 |
| | L insula (BA 13)[d] | 79 | .0456 | 3.32 | -38 | 22 | 0 |
| | L thalamus[b,d] | 312 | .0005 | 3.79 | -8 | -12 | 6 |
| | R thalamus[d] (medial dorsal nucleus)[b] | 272 | .0010 | 3.77 | 12 | -22 | 6 |
| | R premotor BA 6[a] | 183 | .0106 | 3.26 | 12 | 4 | 72 |
| | anterior cingulate[d] (BA 24)[b] | 443 | .0001 | 3.86 | 0 | 16 | 30 |

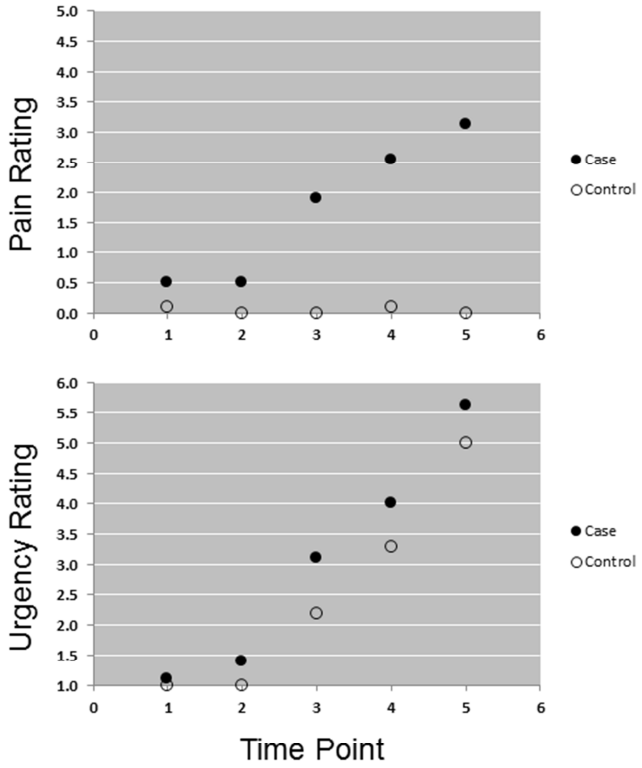
Note. R = right, L = left. SMA = supplementary motor area, OFC = orbital frontal cortex. Results are based on a volume of interest cluster correction for multiple comparisons. Brain regions labled according the [a]Juelich Histological Atlas, [b]Talaraich Atlas, the [c]Cerebellar Atlas in MNI space after normalization in FLIRT, and [d]Harvard-Oxford Cortical Structural Atlas.

Supplementary Table 2. Within group differences between the pre and post bladder distention scans

| Seed Region | Brain region | vox | p val | z-max | MNI coordinates x (mm) | y (mm) | z (mm) |
|---|---|---|---|---|---|---|---|
| **Post > Pre Bladder distention** | | | | | | | |
| Case | | | | | | | |
| Left Amygdala | *R anterior cingulate (BA 24)*[b] | *73* | *.0774* | *3.13* | *12* | *26* | *20* |
| Control | | | | | | | |
| Right PAG | R Cerebellum VIIIa[c] | 184 | .0035 | 3.94 | 14 | -64 | -56 |
| | L Cerebellum VIIIa[c] | 69 | .0351 | 3.81 | -28 | -56 | -56 |
| | R superior frontal gyrus[d], SMA | 141 | .0379 | 3.29 | 14 | -2 | 70 |
| Left PAG | *R insula[b]/OFC[d]* | *53* | *.0962* | *3.19* | *32* | *18* | *-14* |
| Right Amygdala | R primary somatosensory cortex[a] | 295 | .0042 | 3.58 | 46 | -28 | 42 |
| | L secondary somatosensory cortex[a] | 267 | .0065 | 3.76 | -58 | -14 | 14 |
| | L primary somatosensory cortex[a] | 174 | .0307 | 3.7 | -40 | -22 | 34 |
| | *L Cerebellum VIIIb[c]* | *29* | *.0996* | *3.51* | *-22* | *-48* | *-54* |
| | R medial frontal gyrus[b] | 999 | .0000 | 4.58 | 18 | 56 | -8 |
| | L posterior cingulate (BA 30)[b] | 102 | .0136 | 3.28 | -4 | -46 | 20 |
| | hypothalamus | 2 | .0094 | 2.83 | -8 | -4 | -4 |
| | R insula[d] | 455 | .0001 | 3.67 | 40 | 8 | -12 |
| | R insula[d] | 81 | .0487 | 3.31 | 40 | -10 | 14 |
| | L insula (BA 13)[b] | 192 | .0057 | 3.36 | -36 | -14 | 18 |
| | L insula[b,d] | 185 | .0065 | 3.56 | -40 | 14 | -6 |
| | *L insula* | *61* | *.0819* | *3.65* | *-30* | *26* | *12* |
| | *pons* | *73* | *.0644* | *2.89* | *-2* | *-42* | *-38* |
| | L thalamus[d] (pulvinar[b]) | 356 | .0005 | 4.45 | -16 | -24 | 8 |
| | R thalamus[d] (medial dorsal nucleus[b]) | 207 | .0050 | 3.39 | 6 | -10 | 8 |
| | midbrain | 93 | .0355 | 4.38 | -16 | -22 | -12 |
| | R premotor cortex (BA 6)[a] | 814 | .0000 | 4.03 | 2 | 14 | 46 |
| | R premotor cortex (BA 6)[a] | 150 | .0291 | 4.02 | 4 | 18 | 46 |
| | L anterior cingulate[b,d] | 1291 | .0000 | 3.87 | -2 | 32 | 22 |
| Left Amygdala | L medial frontal gyrus[b] | 804 | .0000 | 4.32 | -8 | 62 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| R posterior cingulate[d] | 193 | .0015 | 3.24 | 2 | -42 | 16 |
| hypothalamus | 2 | .0107 | 2.49 | -8 | -4 | -4 |
| L insula[d] | 143 | .0102 | 4.02 | -36 | -10 | 2 |
| L insula (BA 13)[d] | 79 | .0456 | 3.32 | -38 | 22 | 0 |
| L thalamus[b,d] | 312 | .0005 | 3.79 | -8 | -12 | 6 |
| R thalamus[d] (medial dorsal nucleus)[b] | 272 | .0010 | 3.77 | 12 | -22 | 6 |
| R premotor BA 6[a] | 183 | .0106 | 3.26 | 12 | 4 | 72 |
| anterior cingulate[d] (BA 24)[b] | 443 | .0001 | 3.86 | 0 | 16 | 30 |

R = right, L = left. SMA = supplementary motor area, OFC = orbital frontal cortex.
Results are based on a volume of interest cluster correction for multiple comparisons.
Results in italics indicate trend effects of $p < .1$. Brain regions labled according the (a)Juelich Histological Atlas,
(b)Talaraich Atlas, the (c)Cerebellar Atlas in MNI space after normalization in FLIRT, and (d)Harvard-Oxford Cortical Structural Atlas.




Supplementary Figure 1. Average pain and urgency ratings collected during the MRI scanning protocol. The second time point was immediately before the first rsfMRI (pre) scan, and the fifth time point was immediately before the second rsfMRI (post) scan. There were significant between group differences ($p < .05$) in the pain ratings at time points 3-5 and significant between group differences ($p < .05$) in the urgency ratings at time point 2 (see Table 1).

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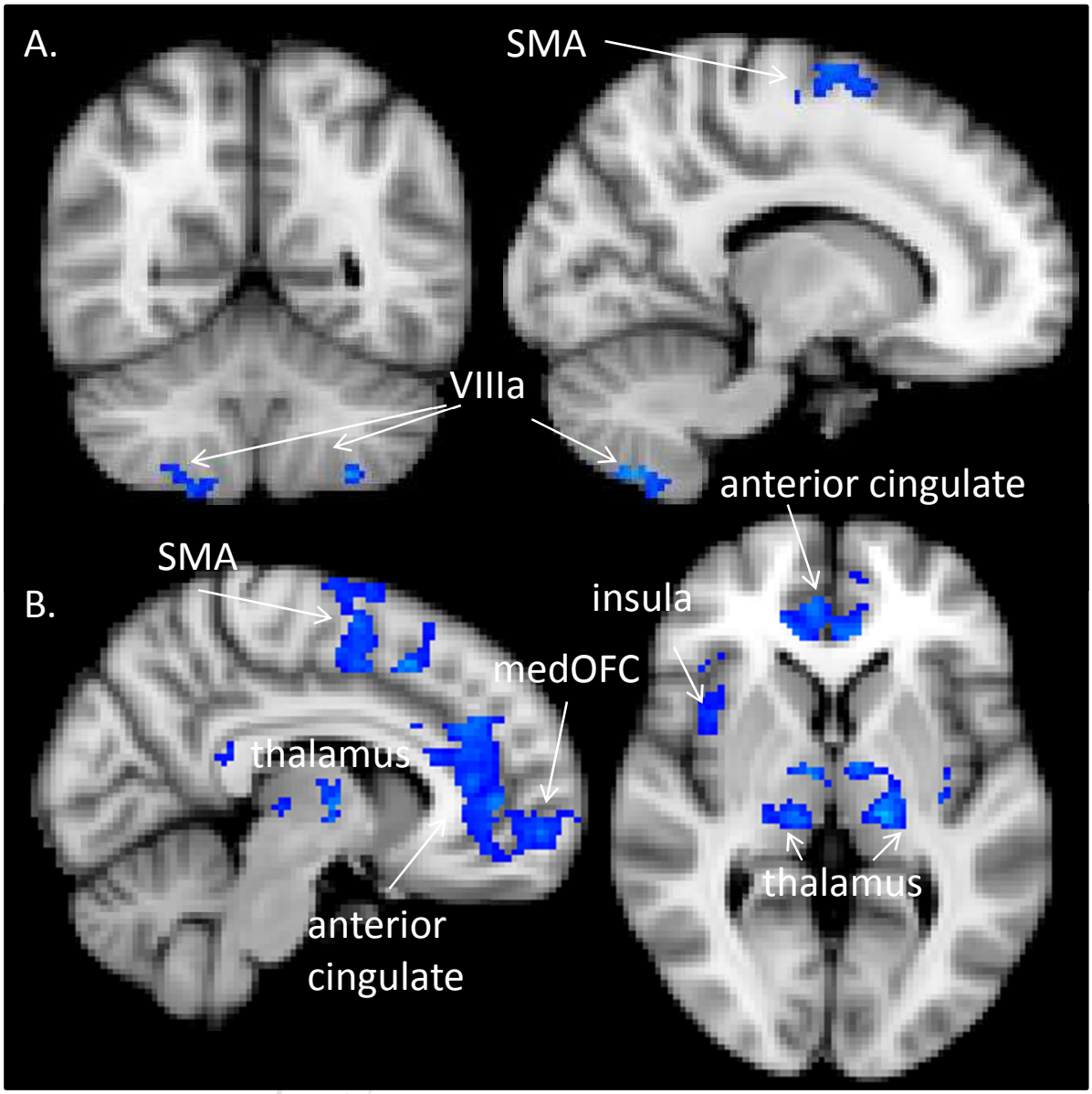


Supplementary Figure 2. Changes in functional connectivity after bladder distention in the control cohort. The upper panel (A) depicts results from the right PAG seed region; the lower panel (B) depicts results from the right LB amygdala seed region. Blue indicates brain regions that showed increased connectivity for the contrast post > pre bladder distention scan. medOFC = medial orbital frontal cortex; SMA = supplementary motor area