Supplementary Online Material

Materials and Methods

The meta-analysis shown in Fig. 1B focuses on hemodynamic signal increases in the medial frontal cortex (MFC) associated with pre-response conflict (PRC), decision uncertainty (DU), response errors (RE), and negative feedback (NF). A literature search revealed 58 papers (published between 1997 and April, 2004) reporting activations for at least one of the conditions of interest. Papers that did not report coordinates were excluded, as were studies in which the statistical contrasts did not unequivocally pertain to the conditions of interest. Additionally, papers with methodological problems such as insufficient trial numbers to enable reliable statistical analyses were also excluded. The resulting set of studies that were included in the meta-analysis comprises 38 fMRI studies, listed in Table S1. If more than one coordinate per condition was reported, the three most significant activation coordinates were included in the meta-analysis. This was done to account for extended activations. Restricting the analysis to one coordinate per study might have occluded overlapping foci of activation. As a result, a total of 71 coordinates were included (PRC, 34; DU, 6; RE, 23; NF 8). For studies in which coordinates referred to the Montréal Neurological Institute (MNI) standard brains, a conversion of the coordinates to Talairach space *(1)* was performed according to the method developed by M. Brett (http://www/mrc-cbu.cam.ac.uk/Imaging/mnispace.html). The mean x coordinate for the entire sample of contrasts was 0.99 (SEM = .72; not significantly different from 0, $p > .17$), suggesting that the activations did not tend to be lateralized to either hemisphere. This was also tested for each condition separately, revealing no lateralization for PRC (mean x = -0.22, SEM = 1.30; $p > .87$) and NF (mean x = 1.87, SEM = 1.57; $p > .27$) and a tendency for a lateralization to the right for RE (mean x = 1.73, SEM = .89; $T(21) = 1.94$, $p = .065$). In the DU condition, all six coordinates were on the right hemisphere (mean x = 4.00, SEM = .93; $T(5) = 4.30$, $p < .01$).

In Fig. 1B the y and z coordinates were visualized on one sagittal midline slice. For each activation focus, a symbol corresponding to the condition of interest was mapped onto a schematic sagittal slice taken from the atlas by Talairach and Tournoux (*S1*), showing the borders of the Brodmann areas (BA). The same schematic has been used in previous meta-analyses (*S2*). It is important to note that the borders between BAs can only serve as an approximation.

Table S1. Studies and coordinates included in meta-analysis.

Reference	Coordinates (x/y/z)
Badre D, Wagner AD, *Neuron* **41**, 473 (2004).	PRC, 8.91/19.23/34.96
Barch DM, Braver TS, Sabb FW, Noll DC, *J Cogn Neurosci* **12**, 298 (2000).	PRC, 4.5/15/39, 10.50/3/42.00, -4.5/21/48
Barch DM *et al.*, *Cereb Cortex* **11**, 837 (2001).	DU, 3/28/29
Botvinick MM, Nystrom LE, Fissell K, Carter CS, Cohen JD, *Nature* **402**, 179 (1999).	PRC, -2/28/31
Braver TS, Barch DM, Gray JR, Molfese DL, Snyder A, *Cereb Cortex* **11**, 825 (2001).	PRC, 2/3/48; RE, -1/21/27
Carter CS *et al.*, *Science* **280**, 747 (1998).	PRC, 4/25/43
Carter CS *et al.*, *Proc Natl Acad Sci U S A* **97**, 1944 (2000).	PRC, 0/15/41
Carter CS, MacDonald AW, Ross LL, Stenger VA, *Am J Psychiatry* **158**, 1423 (2001).	RE, 0/27/36
Casey BJ *et al.*, *Proc Natl Acad Sci U S A* **97**, 8728 (2000).	PRC, -8/22/32, -5/18/57
Dassonville P *et al.*, *Neuroimage* **13**, 1 (2001).	PRC, -6/5/46, -6/12/44
Durston S *et al.*, *Neuroimage* **20**, 2135 (2003).	PRC, 3/42/17, 19/38/37
Erickson KI *et al.*, *Human Brain Mapping* **21**, 98 (2004).	PRC, 2/22/42
Fan J, Flombaum JI, McCandliss BD, Thomas KM, Posner MI, *Neuroimage* **18**, 42 (2003).	PRC, -5.94/37.64/14.70*
Fiehler K, Ullsperger M, von Cramon DY, *Eur J Neurosci*, **19**, 3081 (2004).	RE, 1/21/38
Garavan H, Ross TJ, Murphy K, Roche RA, Stein EA, *Neuroimage* **17**, 1820 (2002).	RE, 5/10/46
Garavan H, Ross TJ, Kaufman J, Roche RA, Stein EA, *Neuroimage* **20**, 1298 (2003).	RE, 2/12/48, -3/33/22, 9/16/28
Holroyd CB *et al.*, *Nature Neuroscience* **in press** (2004).	RE, 1/18/44; NF, 4/18/44
Hazeltine E, Poldrack R, Gabrieli JD, *J Cogn Neurosci* **12 Suppl 2**, 118 (2000).	PRC, -18/0/60
Kerns JG *et al.*, *Science* **303**, 1023 (2004).	PRC, 1/10/40; RE, 3/14/41
Kiehl KA, Liddle PF, Hopfinger JB, *Psychophysiol.* **37**, 216 (2000).	RE, 3.96/23.15/35.69, -7.92/44.29/11.60*

Kaufman JN, Ross TJ, Stein EA, Garavan H, *J Neurosci* **23**, 7839 (2003).	RE, 4/14/31, 4/12/46
Knutson B, Westdorp A, Kaiser E, Hommer D, *Neuroimage* **12**, 20 (2000).	NF 4/14/32, -1/5/45
Laurens KR, Ngan ET, Bates AT, Kiehl KA, Liddle PF, *Brain* **126**, 610 (2003).	RE, -7.92/51.11/12.18, 0/24.91/31.92*
MacDonald AW, Cohen JD, Stenger VA, Carter CS, *Science* **288**, 1835 (2000).	PRC, 4/1/43
Milham MP, Banich MT, Barad V, *Brain Res Cogn Brain Res* **17**, 212 (2003).	PRC, 4/38/22, 8/8/32, -22/-4/44
Milham MP, Banich MT, Claus ED, Cohen NJ, *Neuroimage* **18**, 483 (2003).	PRC, 0/20/46, 0/10/52, -2/2/58,00
Milham MP *et al.*, *Brain Res Cogn Brain Res* **12**, 467 (2001).	PRC, 0/10/44
Monchi O *et al.*, *J Neurosci* **24**, 702 (2004).	NF, -8/20/42, 3/26/46, 4/14/50
O'Doherty JP, Dayan P, Friston K, Critchley H, Dolan RJ, *Neuron* **38**, 329 (2003).	NF, 2.97/11.07/46.43*
Rubia K, Smith AB, Brammer MJ, Taylor E, *Neuroimage* **20**, 351 (2003).	RE, 3/34/16
Ruff CC, Woodward TS, Laurens KR, Liddle PF, *Neuroimage* **14**, 1150 (2001).	PRC, -3.96/21.95/50.49, -3.96/6.64/54.94, 7.92/17.89/47.01*
Ullsperger M, von Cramon DY, *Neuroimage* **14**, 1387 (2001).	PRC, 4/28/42, 4/19/41, -5/34/3; RE, 7/19/30, 2/13/42, -2/5/47
Ullsperger M, von Cramon DY, *J Neurosci* **23**, 4308 (2003).	NF, 6/18/35; DU, 4/15/53
Ullsperger M, von Cramon DY, *Cortex* **in press** (2004).	RE, 4/8/35, 4/18/53, 4/-1/53
van Veen V, Cohen JD, Botvinick MM, Stenger VA, Carter CS, *Neuroimage* **14**, 1302 (2001).	PRC, -3/32/31
Volz KG, Schubotz RI, von Cramon DY, *Neuroimage*, **19**, 271 (2003).	DU, 8/18/46, 4/30/46
Volz KG, Schubotz RI, von Cramon DY. *Neuroimage*, **21**, 848 (2004).	DU, 4/21/47, 1/33/41
Zysset S, Muller K, Lohmann G, von Cramon DY, *Neuroimage* **13**, 29 (2001).	PRC, 1/26/42

Note: PRC = pre-response conflict, DU = decision uncertainty, RE = response error, NF = negative feedback; * coordinates transferred from MNI to Talairach space according to method by Brett.

References

S1. Talairach PT, Tournoux JA. *Stereotactic Coplanar Atlas of the Human Brain* Stuttgart: Thieme, 1988.

S2. Picard N, Strick PL, *Cereb Cortex* **6**, 342 (1996).