- 2 Rotge JY, Langbour N, Guehl D, Bioulac B, Jaafari N, Allard M, et al. Gray matter alterations in obsessive-compulsive disorder: an anatomic likelihood estimation meta-analysis. Neuropsychopharmacology 2010; 35: 686–91.
- 3 Eickhoff SB, Laird AR, Grefkes C, Wang LE, Zilles K, Fox PT. Coordinate-based activation likelihood estimation meta-analysis of neuroimaging data: a random-effects approach based on empirical estimates of spatial uncertainty. *Hum Brain Mapp* 2009; 30: 2907–26.
- 4 Turkeltaub PE, Eden GF, Jones KM, Zeffiro TA. Meta-analysis of the functional neuroanatomy of single-word reading: method and validation. *Neuroimage* 2002; 16: 765–80.
- 5 Chamberlain SR, Menzies L, Hampshire A, Suckling J, Fineberg NA, del Campo N, et al. Orbitofrontal dysfunction in patients with obsessivecompulsive disorder and their unaffected relatives. *Science* 2008; 321: 421–2.

Luiz Kobuti Ferreira, Laboratory of Psychiatric Neuroimaging (LIM-21), Department and Institute of Psychiatry, Faculty of Medicine, University of São Paulo, São Paulo, Brazil. Email: kobuti@yahoo.com; Geraldo F. Busatto, Laboratory of Psychiatric Neuroimaging (LIM-21), Department and Institute of Psychiatry, Faculty of Medicine, University of São Paulo, São Paulo, Brazil

doi: 10.1192/bjp.197.1.76a

Authors' reply: As pointed out by Ferreira & Busatto, one parameter critically influencing the results of a coordinate-based meta-analysis is the FWHM of the kernel. The optimal FWHM has been found to depend on the meta-analytic method. In signed differential mapping (SDM), a 25 mm FWHM shows a good compromise between sensitivity and control of false positives.2 This FWHM may account for different sources of spatial error such as registration mismatch, the size of original clusters or the location of the peak coordinates within the clusters. Much smaller FWHMs are common in activation/anatomical likelihood estimation (ALE), usually 10-15 mm.3 However, the use of these small FWHMs has not been clearly justified and it might lead to a dramatic reduction in sensitivity. Salimi-Khorshidi et al1 found that the sensitivity of the ALE method with a standard deviation of 5 mm (corresponding to 10-15 mm FWHM) was approximately 50% of the sensitivity achieved with a standard deviation of 15 mm (corresponding to 35 mm FWHM).

Other limitations of ALE may be more serious^{2,4} and have motivated the development of other methods such as SDM.² For example, coordinates of increased and decreased activation (or, in this case, grey matter volume) are computed separately. This means that when calculating the meta-analytic increase in a voxel, the (negative) values of those studies reporting decreases in the same voxel are artificially replaced by zeros, leading to an inflation of the meta-analytic increase. Similarly, when computing the meta-analytic decrease, the (positive) values of those studies

reporting increases in the same voxel are artificially replaced by zeros, leading to an inflation of the meta-analytic decrease. Therefore, brain regions with higher variability are more likely to be detected as significant in the meta-analysis, to the extent that some brain regions may appear to have both increases and decreases at the same time (e.g. see Menzies *et al*⁵). This is both mathematically and physiologically implausible. Another advantage of SDM is the strict inclusion of coordinates that are statistically significant at the whole-brain level and using the same threshold throughout the brain.² This is of utmost importance given that it is not uncommon in neuroimaging studies that some regions (e.g. *a priori* regions of interest) are more liberally thresholded than the rest of the brain, thus potentially leading to false positives.

Unfortunately, psychiatric neuroimaging is plagued with methodological problems such as small sample sizes and overly liberal statistical methods, often making findings hard to replicate. Meta-analytical methods have the potential to overcome some of these limitations by helping researchers 'see the forest before the trees'. However, if the methods or its parameters are not chosen rigorously, meta-analyses may suffer from the same problems that motivated their development in the first place.

- 1 Salimi-Khorshidi G, Smith SM, Keltner JR, Wager TD, Nichols TE. Meta-analysis of neuroimaging data: a comparison of image-based and coordinate-based pooling of studies. *Neuroimage* 2009; 45: 810–23.
- 2 Radua J, Mataix-Cols D. Voxel-wise meta-analysis of grey matter changes in obsessive-compulsive disorder. Br J Psychiatry 2009; 195: 391–402.
- 3 Rotge JY, Langbour N, Guehl D, Bioulac B, Jaafari N, Allard M, et al. Gray matter alterations in obsessive-compulsive disorder: an anatomic likelihood estimation meta-analysis. Neuropsychopharmacology 2010; 35: 686–91.
- 4 Laird AR, Fox PM, Price CJ, Glahn DC, Uecker AM, Lancaster JL, et al. ALE meta-analysis: controlling the false discovery rate and performing statistical contrasts. *Hum Brain Mapp* 2005; 25: 155–64.
- 5 Menzies L, Chamberlain SR, Laird AR, Thelen SM, Sahakian BJ, Bullmore ET. Integrating evidence from neuroimaging and neuropsychological studies of obsessive-compulsive disorder: the orbitofronto-striatal model revisited. Neurosci Biobehav Rev 2008; 32: 525–49.

Joaquim Radua, Division of Psychological Medicine, Institute of Psychiatry, King's College London, PO 69, London SE5 8AF, UK. Email: Joaquim.Radua@iop.kcl.ac.uk; David Mataix-Cols, Division of Psychological Medicine, Institute of Psychiatry, King's College London, UK

doi: 10.1192/bjp.197.1.77

Correction

Association between extreme autistic traits and intellectual disability: insights from a general population twin study. *BJP*, 195, 531–536. Table 1 (p. 534): the figures in parentheses are upper and lower boundaries (+/–) of the 95% confidence intervals, calculated using corrected standard errors (not s.d. values, as originally reported). The online version of this table has been corrected post-publication in accordance with this correction.

doi: 10.1192/bjp.197.1.77a