

Dear Dr John Ashburner

In your reply to Micael Andersson you wrote:

"This fixes this part of the code. I'll work through other parts of SPM in order to try to identify other potential problem areas. A note will be going out to the list about this."

We have made some final testing concerning the effects of the matlab reshape bug. First, the results indicate that spm2 with 6.5.1 produces reliable and accurate data. Second, we have some data on systematic errors with 6.5 which you might find helpful.

Our results show that group averaged results between matlab versions can differ with 4 - 5 mm in the Z direction. Potentially this may mean that the anatomical localizations reported in published papers are quite erroneous and conclusions may not be substantiated by data. In effect, corrections of published work may be warranted. For this reason it seems important to alert SPM users to this problem.

In the attached pdf-file you will find some data that we have used to get a rough estimate of the magnitude of the error.

Best regards from all of us

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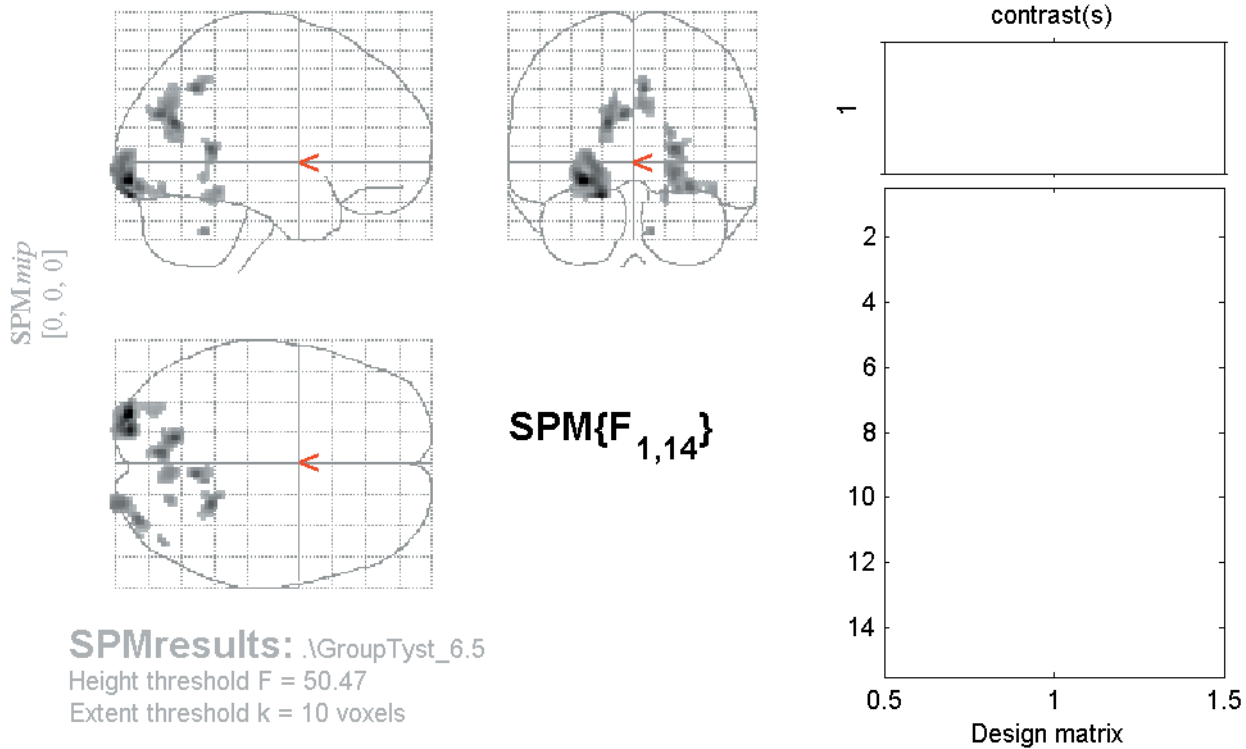
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Differences between means for 15 subjects. Each subject is analyzed with spm2 and with two versions of matlab (6.5 and 6.5.1). The mean for x, y and z is computed for each subject and for each version. The mean differences between versions is computed for each subject for x, y and z.

	Difference $M_{6.5.1} - M_{6.5}$		
	x	y	z
P1	2,67	-0,33	5,67
P2	2,96	-2,72	0,40
P3	0,00	0,00	8,00
P4	0,25	-0,75	2,00
P5	-0,18	1,45	6,18
P6	0,00	1,43	6,14
P7	0,00	-0,80	9,20
P9	1,85	3,00	0,69
P10	0,10	1,70	4,40
P11	0,06	0,56	2,63
P12	0,00	-1,60	-1,00
P13	-0,13	1,88	4,00
P14	-0,86	-2,29	12,57
P15	-0,50	-0,88	2,88
P16	0,00	-0,13	3,25
Mean	0,41	0,04	4,47
std.dev.	1,13	1,63	3,61
t	1,42	0,08	4,80
p	0,1763	0,9340	0,0003

There is a significant difference between matlab versions for z. Matlab 6.5.1 gives a higher value for z, 95% confidence interval  $4,47 \pm 1,83$ .



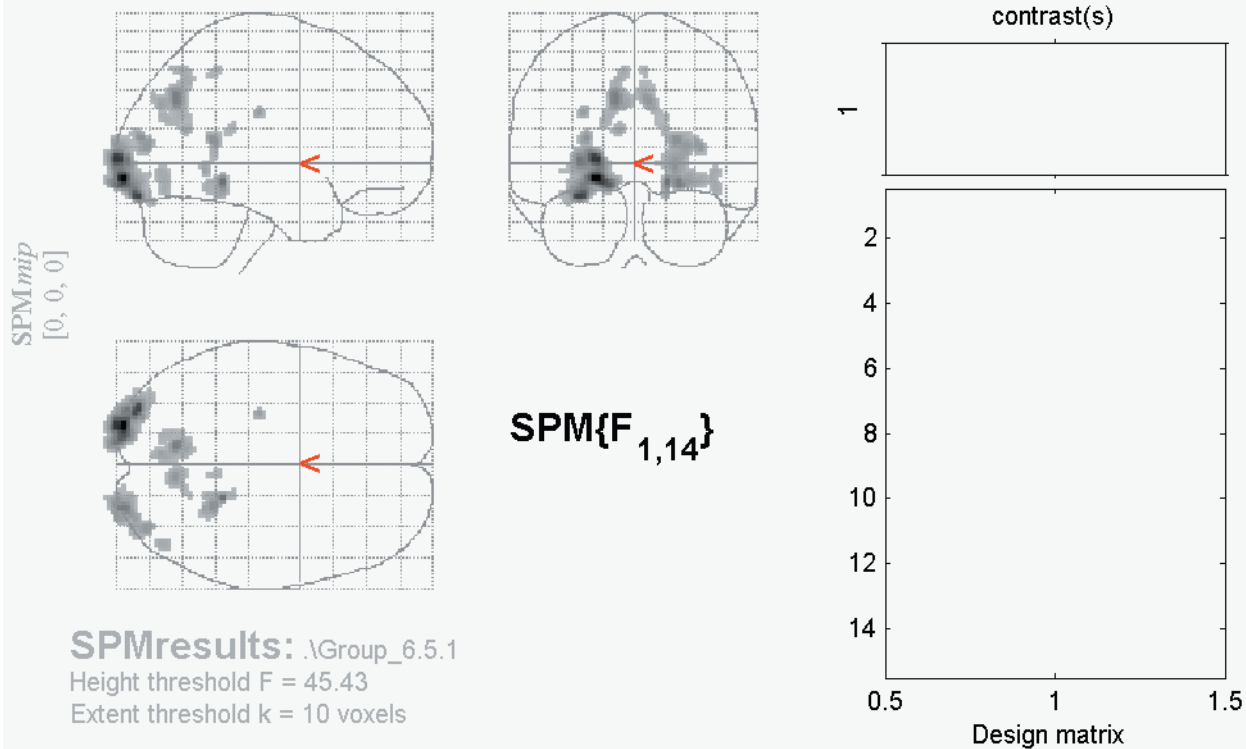
**Statistics: *p-values adjusted for search volume***

set-level		cluster-level			voxel-level					x,y,z {mm}		
<i>p</i>	<i>c</i>	<i>p</i> <sub>corrected</sub>	<i>k</i> <sub>E</sub>	<i>p</i> <sub>uncorrected</sub>	<i>p</i> <sub>FWE-corr</sub>	<i>p</i> <sub>FDR-corr</sub>	<i>F</i>	( <i>Z</i> <sub>≡</sub> )	<i>p</i> <sub>uncorrected</sub>			
10			395		0.001	0.001	153.50	5.69	0.000	-26	-92	-10
					0.003	0.001	134.33	5.55	0.000	-18	-92	-18
					0.025	0.001	95.21	5.16	0.000	-20	-96	-4
			194		0.010	0.001	109.73	5.32	0.000	-14	-68	22
					0.018	0.001	100.53	5.22	0.000	-6	-76	26
					0.080	0.001	78.58	4.93	0.000	-12	-72	30
			68		0.018	0.001	100.52	5.22	0.000	22	-48	8
					0.276	0.001	61.58	4.64	0.000	26	-52	-8
			46		0.020	0.001	98.73	5.20	0.000	6	-56	40
					0.029	0.001	92.96	5.13	0.000	30	-88	-14
					0.033	0.001	90.94	5.10	0.000	22	-96	-6
					0.074	0.001	79.65	4.95	0.000	24	-96	-14
			77		0.109	0.001	74.70	4.87	0.000	6	-70	32
					0.114	0.001	74.12	4.86	0.000	10	-52	-38
			10		0.114	0.001	74.10	4.86	0.000	18	-44	-16
					0.139	0.001	71.66	4.82	0.000	20	-70	16
			17		0.139	0.001	71.66	4.82	0.000	20	-70	16
					0.210	0.001	66.26	4.73	0.000	44	-74	-16
			12		0.210	0.001	66.26	4.73	0.000	44	-74	-16

table shows 3 local maxima more than 8.0mm apart

Height threshold: F = 50.47, p = 0.000 (0.527)  
 Extent threshold: k = 10 voxels, p =  
 Expected voxels per cluster, <k> = 1.416  
 Expected number of clusters, <c> =  
 Expected false discovery rate, <= 0.00

Degrees of freedom = [1.0, 14.0]  
 Smoothness FWHM = 10.1 10.2 10.9 {mm} = 5.1 5.1 5.4 {voxels}  
 Search vol: 1577192 cmm; 197149 voxels; 1308.8 resels  
 Voxel size: [2.0, 2.0, 2.0] mm (1 resel = 139.98 voxels)



SPMresults: \Group\_6.5.1  
 Height threshold F = 45.43  
 Extent threshold k = 10 voxels

**Statistics: p-values adjusted for search volume**

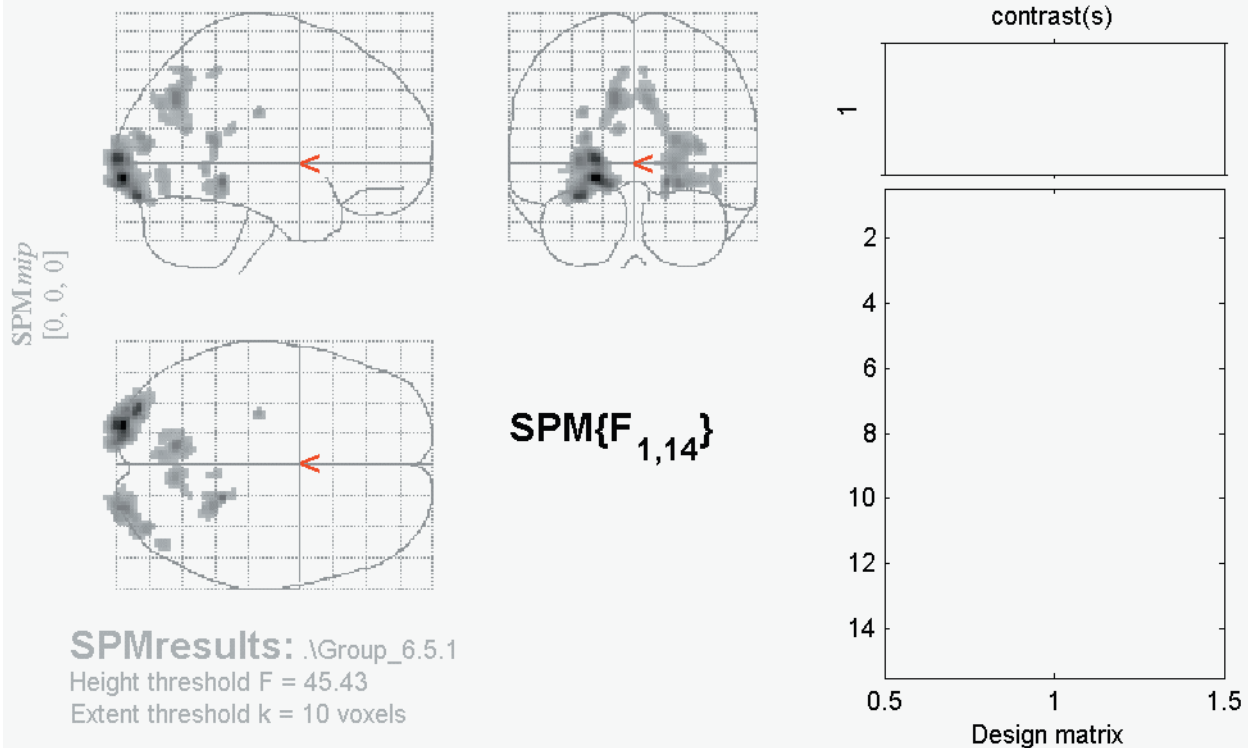
set-level		cluster-level			voxel-level					x,y,z {mm}
p	c	p <sub>corrected</sub>	k <sub>E</sub>	p <sub>uncorrected</sub>	p <sub>FWE-corr</sub>	p <sub>FDR-corr</sub>	F	(Z <sub>max</sub> )	p <sub>uncorrected</sub>	
12			808		0.000	0.000	329.30	6.50	0.000	-20 -96 -8
					0.000	0.000	239.49	6.17	0.000	-20 -100 2
					0.000	0.000	217.95	6.07	0.000	-30 -88 -18
			66		0.001	0.000	151.81	5.68	0.000	18 -42 -10
			451		0.003	0.000	134.12	5.54	0.000	24 -96 -12
					0.018	0.000	101.88	5.23	0.000	22 -100 -2
					0.041	0.000	88.81	5.07	0.000	36 -84 8
			284		0.003	0.000	133.94	5.54	0.000	-10 -68 34
					0.101	0.000	76.42	4.90	0.000	-6 -76 32
					0.194	0.000	68.37	4.77	0.000	-10 -62 44
			95		0.015	0.000	104.28	5.26	0.000	24 -48 12
					0.108	0.000	75.56	4.89	0.000	24 -52 -4
			35		0.017	0.000	102.31	5.24	0.000	-26 -86 14
			118		0.030	0.000	93.20	5.13	0.000	8 -68 34
					0.535	0.001	50.86	4.41	0.000	14 -62 24
			15		0.066	0.000	82.12	4.98	0.000	-28 -22 28
			16		0.105	0.000	75.93	4.89	0.000	-8 -62 18
			52		0.193	0.000	68.50	4.77	0.000	44 -76 -4
					0.206	0.000	67.39	4.75	0.000	44 -74 -14
			11		0.400	0.001	56.04	4.53	0.000	6 -46 50

table shows 3 local maxima more than 8.0mm apart

Height threshold: F = 45.43, p = 0.000 (0.701)  
 Extent threshold: k = 10 voxels, p =  
 Expected voxels per cluster, <k> = 1.682  
 Expected number of clusters, <c> =  
 Expected false discovery rate, <= 0.00

Degrees of freedom = [1.0, 14.0]  
 Smoothness FWHM = 10.1 10.2 11.0 {mm} = 5.1 5.1 5.5 {voxels}  
 Search vol: 1687136 cmm; 210892 voxels; 1383.9 resels  
 Voxel size: [2.0, 2.0, 2.0] mm (1 resel = 141.97 voxels)  
 Page 1

# Group\_6.5.1



**SPMresults:** \Group\_6.5.1  
 Height threshold F = 45.43  
 Extent threshold k = 10 voxels

**Statistics: p-values adjusted for search volume**

set-level		cluster-level			voxel-level					x,y,z {mm}
p	c	p <sub>corrected</sub>	k <sub>E</sub>	p <sub>uncorrected</sub>	p <sub>FWE-corr</sub>	p <sub>FDR-corr</sub>	F	(Z <sub>≡</sub> )	p <sub>uncorrected</sub>	
			14		0.415	0.001	55.38	4.52	0.000	16 -36 20

*table shows 3 local maxima more than 8.0mm apart*

Height threshold: F = 45.43, p = 0.000 (0.701)  
 Extent threshold: k = 10 voxels, p =  
 Expected voxels per cluster, <k> = 1.682  
 Expected number of clusters, <c> =  
 Expected false discovery rate, <= 0.00

Degrees of freedom = [1.0, 14.0]  
 Smoothness FWHM = 10.1 10.2 11.0 {mm} = 5.1 5.1 5.5 {voxels}  
 Search vol: 1687136 cmm; 210892 voxels; 1383.9 resels  
 Voxel size: [2.0, 2.0, 2.0] mm (1 resel = 141.97 voxels)  
 Page 2/2