

## Supplementary Table : list of FIR activation foci

|  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|
| regions  | regions of interest, names adopted from MNI / ICBM atlas   |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #8B4513; margin-right: 5px;"></span>                          | frontal areas  |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #FF4500; margin-right: 5px;"></span>                          | mid-line areas   |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #FFA500; margin-right: 5px;"></span>                          | pre- to post-central areas   |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #FFFF00; margin-right: 5px;"></span>                          | parietal areas   |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #00FF00; margin-right: 5px;"></span>                          | occipital areas  |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #00FFFF; margin-right: 5px;"></span>                          | temporal areas   |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #00BFFF; margin-right: 5px;"></span>                          | insular and basal ganglia areas  |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #0000FF; margin-right: 5px;"></span>                          | cerebellum   |  |  |  |  |  |  |  |  |  |
| BA   | Brodmann area  |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #90EE90; border: 1px solid black; margin-right: 5px;"></span> | # position in cascade flow model (figure 2)  |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #FFB6C1; border: 1px solid black; margin-right: 5px;"></span> | bin FIR (Finite Impulse Response Function) bin number  |  |  |  |  |  |  |  |  |  |
| [x y z <sub>m</sub> z <sub>p</sub> ]   | coordinates according to SPM2 / MNI 152 atlas. The original PRESTO coordinates z <sub>p</sub> are adjusted to z <sub>m</sub> coordinates (see Methods section).                    |  |  |  |  |  |  |  |  |  |
| t, p   | statistical t-scores and p-values  |  |  |  |  |  |  |  |  |  |
| <span style="display: inline-block; width: 15px; height: 15px; background-color: #ADD8E6; border: 1px solid black; margin-right: 5px;"></span> | p-value threshold set to <0.01, to <0.001 and to <0.05 <sub>corr</sub> , respectively. Where indicated (⊗), FWE corr-ec-tion was applied with search volume set over entire brain. |  |  |  |  |  |  |  |  |  |
| k <sub>E</sub>   | cluster size for given p-value (· * ⊗) in voxels, while isomorph voxel size is 8 mm <sup>3</sup> .   |  |  |  |  |  |  |  |  |  |
| ABC...abc... capital letters stand for cluster center; small letters for subfoci in same cluster.  |  |  |  |  |  |  |  |  |  |  |

  

| regions of interest           | BA    | # | bin | [ x y z <sub>m</sub> z <sub>p</sub> ] | t    | p | k <sub>E</sub>   |
|-------------------------------|-------|---|-----|---------------------------------------|------|---|------------------|
| <b>main effect</b> – controls |       |   |     |                                       |      |   |                  |
| L postcentral gyrus           | 22/42 | 4 | 2   | -58 -4 6 -2                           | 4.58 | * | 419              |
| L supramarginal gyrus         | 40    | 2 | 2   | -40 -48 44 40                         | 3.68 | * | 29               |
| L middle occipital gyrus      | 18    | 2 | 2   | -30 -102 -4 -14                       | 5.19 | ⊗ | 10               |
| R middle "                    | 18    | 1 | 2   | 28 -102 -2 -12                        | 6.24 | ⊗ | 147 <sup>A</sup> |
| L inferior "                  | 18/19 | 2 | 2   | -48 -78 -6 -16                        | 3.93 | * | 164              |
| R inferior "                  | 18/19 | 2 | 2   | 40 -90 -12 -24                        | 4.59 | * | a                |

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| regions of interest             | BA    | #  | bin | [ x y z <sub>m</sub> z <sub>p</sub> ] | t    | p | k <sub>E</sub>   |
|---------------------------------|-------|----|-----|---------------------------------------|------|---|------------------|
| R inferior "                    | 19    |    | 2   | 44 -72 -6 -16                         | 3.48 | * | a                |
| median frontal gyrus (preSMA)   | 6     |    | 3   | -4 2 62 60                            | 3.24 | * | 3                |
| L intraparietal sulcus          | 40    | 9  | 3   | -38 -42 42 38                         | 4.83 | * | 361              |
| L middle occipital gyrus        | 18    |    | 3   | -34 -96 -6 -16                        | 6.47 | ⊗ | 165 <sup>B</sup> |
| L inferior "                    | 19/37 |    | 3   | -40 -70 -2 -12                        | 3.97 | * | b                |
| R inferior "                    | 18    |    | 3   | 42 -90 -4 -14                         | 6.97 | ⊗ | 440 <sup>C</sup> |
| R inferior "                    | 18    |    | 3   | 28 -102 -4 -14                        | 5.72 | ⊗ | c                |
| R inferior "                    | 19    |    | 3   | 44 -70 -10 -22                        | 5.16 | ⊗ | c                |
| L inferior temporal gyrus       | 19    |    | 3   | -42 -60 -10 -20                       | 3.70 | * | b                |
| L "                             | 37    |    | 3   | -48 -42 -12 -24                       | 3.77 | * | 39               |
| L putamen                       | pu    | 10 | 3   | -22 12 -8 -18                         | 4.32 | * | 172              |
| R "                             | pu    |    | 3   | 28 8 0 -10                            | 4.07 | * | 65               |
| R caudate head                  | nc    | 11 | 3   | 16 12 -10 -20                         | 3.83 | * | 90               |
| median frontal gyrus (preSMA)   | 6     |    | 4   | -4 8 62 60                            | 3.80 | * | 82               |
| L postcentral gyrus             | 40    |    | 4   | -48 -34 50 46                         | 3.47 | * | d                |
| L precentral gyrus              | 6     |    | 4   | -24 -6 54 50                          | 4.89 | * | 348              |
| L intraparietal sulcus          | 40    |    | 4   | -42 -46 48 44                         | 3.63 | * | 128 <sup>D</sup> |
| R "                             | 40    |    | 4   | 40 -48 48 44                          | 3.52 | * | 24               |
| L inferior occipital gyrus      | 19/37 |    | 4   | -38 -70 2 -8                          | 4.36 | * | 203              |
| R "                             | 18/19 |    | 4   | 42 -74 -6 -16                         | 3.69 | * | 48               |
| L putamen                       | pu    |    | 4   | -18 12 -4 -14                         | 4.67 | * | 249              |
| L posterior insula              | 41/42 |    | 4   | -36 -24 10 2                          | 3.67 | * | 37               |
| R putamen / caudate head        | pu/nc |    | 4   | 14 12 -2 -12                          | 4.72 | * | 324              |
| anterior rostral cingulate zone | 8/32  |    | 5   | -2 20 46 42                           | 4.13 | * | 388 <sup>E</sup> |
| median frontal gyrus (preSMA)   | 6/8   |    | 5   | -2 12 56 54                           | 3.91 | * | e                |
| L precentral gyrus              | 6     |    | 5   | -56 0 42 38                           | 3.33 | * | 6                |
| L intraparietal sulcus          | 40    |    | 5   | -46 -44 50 46                         | 4.64 | * | 388              |
| L anterior insula               | ins   |    | 5   | -34 20 -2 -12                         | 4.02 | * | f                |
| L pallidum, putamen             | nl    |    | 5   | -18 4 2 -8                            | 4.21 | * | 469 <sup>F</sup> |
| L inferior frontal gyrus        | 45/46 |    | 6   | -54 24 24 18                          | 3.97 | * | h                |
| R middle "                      | 45/46 |    | 6   | 46 36 20 12                           | 3.88 | * | 75               |
| R superior "                    | 6     |    | 6   | 20 2 56 54                            | 3.58 | * | 33               |
| anterior rostral cingulate zone | 6/32  |    | 6   | -2 22 42 38                           | 5.08 | ⊗ | 29 <sup>G</sup>  |
| median frontal gyrus (preSMA)   | 6     |    | 6   | -2 4 60 58                            | 4.04 | * | g                |
| L precentral gyrus              | 6/8   |    | 6   | -56 6 42 38                           | 4.71 | * | 747 <sup>H</sup> |
| R superior parietal gyrus       | 40    |    | 6   | 46 -44 60 58                          | 3.48 | * | 42               |
| L intraparietal sulcus          | 40    |    | 6   | -44 -44 50 46                         | 4.27 | * | 451 <sup>I</sup> |
| L "                             | 7/40  |    | 6   | -34 -54 44 40                         | 3.82 | * | i                |
| L anterior insula               | ins   |    | 6   | -30 24 2 -8                           | 3.43 | * | 31               |
| L middle frontal gyrus          | 10    | 20 | end | -30 50 22 14                          | 4.58 | * | 345              |
| median frontal gyrus (SMA)      | 6     | 22 | end | -2 -4 56 52                           | 4.99 | ⊗ | 7                |
| L precentral gyrus              | 4     | 24 | end | -38 -18 58 56                         | 6.12 | ⊗ | 195              |

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| regions of interest            | BA   | #  | bin | [ x y z <sub>m</sub> z <sub>p</sub> ] | t    | p | k <sub>E</sub>   |
|--------------------------------|------|----|-----|---------------------------------------|------|---|------------------|
| L postcentral "                | 1-3  |    | end | -54 -26 48 44                         | 5.11 | ⊗ | 19               |
| R postcentral "                | 1-3  |    | end | 60 -20 48 44                          | 4.08 | * | k                |
| L rostral intraparietal sulcus | 40   | 23 | end | -38 -44 58 56                         | 5.77 | ⊗ | 115 <sup>J</sup> |
| L caudal intraparietal sulcus  | 7    | 18 | end | -18 -74 56 52                         | 4.75 | * | j                |
| R rostral "                    | 40   | 19 | end | 46 -40 50 46                          | 5.24 | ⊗ | 56 <sup>K</sup>  |
| L supramarginal gyrus          | 2/40 | 17 | end | -60 -24 26 20                         | 5.33 | ⊗ | 79 <sup>L</sup>  |
| L frontoparietal operculum     | 2/40 |    | end | -56 -12 24 16                         | 5.18 | ⊗ | l                |
| L "                            | 40   |    | end | -54 -24 18 10                         | 5.16 | ⊗ | l                |
| L inferior occipital gyrus     | 37   |    | end | -48 -70 0 -10                         | 3.81 | * | 59               |
| L anterior insula              | ins  |    | end | -26 24 10 2                           | 3.30 | * | 5                |
| L putamen                      | pu   |    | end | -24 -6 -6 -16                         | 3.75 | * | 37               |
| R posterior insula             | ins  |    | end | 34 -22 2 -8                           | 3.22 | * | 3                |
| R cerebellar lobule            |      |    | end | 38 -54 -36 -50                        | 3.23 | * | 2                |

**main effect** – dyscalculia

|                                 |       |  |     |                 |      |   |                  |
|---------------------------------|-------|--|-----|-----------------|------|---|------------------|
| L middle occipital gyrus        | 18    |  | 2   | -28 -104 -2 -12 | 5.03 | * | 99               |
| R middle "                      | 18    |  | 2   | 28 -104 0 -10   | 4.47 | * | l                |
| R inferior "                    | 17/18 |  | 2   | 22 -96 -10 -20  | 4.60 | * | 204 <sup>L</sup> |
| L middle occipital gyrus        | 18    |  | 3   | -26 -104 -4 -14 | 3.25 | · | 34               |
| R "                             | 18    |  | 3   | 28 -104 0 -10   | 3.74 | * | 4                |
| R anterior insula               | ins   |  | 4   | 42 22 -8 -18    | 3.32 | · | 32               |
| R middle frontal gyrus          | 46    |  | 5   | 46 42 16 8      | 3.92 | * | 22               |
| R anterior insula               | ins   |  | 5   | 32 24 4 -6      | 4.42 | * | 99               |
| L middle frontal gyrus          | 10/46 |  | 6   | -46 54 6 -4     | 3.96 | * | 23               |
| L "                             | 10/46 |  | 6   | -54 44 16 8     | 3.64 | * | 3                |
| R "                             | 10/46 |  | 6   | 44 46 12 4      | 4.44 | * | 238              |
| anterior rostral cingulate zone | 6/8   |  | 6   | 2 16 52 48      | 3.46 | * | 1                |
| L intraparietal sulcus          | 40    |  | 6   | -48 -36 52 48   | 2.92 | · | 111              |
| R supramarginal gyrus           | 40    |  | 6   | 66 -38 48 44    | 3.92 | * | 29               |
| L anterior insula               | ins   |  | 6   | -34 12 8 0      | 3.55 | * | 8                |
| R "                             | ins   |  | 6   | 30 20 -2 -12    | 3.90 | * | 30               |
| L precentral gyrus              | 3/4   |  | end | -40 -28 60 58   | 4.46 | * | 254              |
| R intraparietal sulcus          | 40    |  | end | 50 -48 50 46    | 4.12 | * | 42               |
| L supramarginal gyrus           | 7/40  |  | end | -48 -52 56 52   | 4.58 | * | 78               |
| L frontoparietal operculum      | 40/43 |  | end | -66 -18 16 8    | 3.72 | * | 8                |

**main effect** – comparison : controls > dyscalculia

|                          |      |  |     |              |      |   |    |
|--------------------------|------|--|-----|--------------|------|---|----|
| R putamen / caudate head | nc   |  | 4   | 14 16 2 -8   | 3.69 | * | 60 |
| L middle frontal gyrus   | 9/10 |  | end | -28 50 24 16 | 3.59 | * | 33 |

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| regions of interest                   | BA    | #         | bin      | [ x y z <sub>m</sub> z <sub>p</sub> ] | t    | p | k <sub>E</sub>    |
|---------------------------------------|-------|-----------|----------|---------------------------------------|------|---|-------------------|
| <b>product size effect</b> – controls |       |           |          |                                       |      |   |                   |
| L inferior frontal gyrus              | 9     |           | <b>2</b> | -52 18 32 26                          | 3.73 | * | a                 |
| L middle "                            | 8     |           | <b>2</b> | -58 12 44 40                          | 3.75 | * | 394 <sup>A</sup>  |
| L superior "                          | 6     |           | <b>2</b> | -34 8 66 64                           | 4.01 | * | 163               |
| R superior "                          | 6     |           | <b>2</b> | 34 4 70 68                            | 4.20 | * | 249               |
| anterior rostral cingulate zone       | 6/8   |           | <b>2</b> | -2 18 48 44                           | 4.52 | * | 182               |
| L posterior superior parietal lobule  | 7     |           | <b>2</b> | -22 -76 56 54                         | 4.55 | * | c                 |
| R "                                   | 7     |           | <b>2</b> | 26 -70 64 62                          | 3.63 | * | 99                |
| R rostral intraparietal sulcus        | 40    | <b>8</b>  | <b>2</b> | 42 -40 48 44                          | 4.12 | * | 363 <sup>B</sup>  |
| R "                                   | 40    |           | <b>2</b> | 38 -46 40 36                          | 4.04 | * | b                 |
| L superior occipital gyrus            | 19    | <b>5</b>  | <b>2</b> | -10 -88 34 28                         | 4.83 | * | 2108 <sup>C</sup> |
| L superior "                          | 19    |           | <b>2</b> | -22 -86 38 32                         | 4.47 | * | c                 |
| R middle "                            | 19    | <b>7</b>  | <b>2</b> | 34 -92 22 14                          | 6.00 | ⊗ | 79                |
| L inferior "                          | 18/19 | <b>3</b>  | <b>2</b> | -38 -88 -12 -24                       | 5.69 | ⊗ | 151 <sup>D</sup>  |
| cuneus                                | 17/18 |           | <b>2</b> | 12 -80 12 4                           | 3.59 | * | e                 |
| L lingual gyrus                       | 17/18 |           | <b>2</b> | -10 -84 8 0                           | 4.24 | * | 796 <sup>E</sup>  |
| LR lingual gyri                       | 17/18 |           | <b>2</b> | -4 -88 4 -6                           | 4.07 | * | e                 |
| L inferior temporal gyrus             | 19/37 |           | <b>2</b> | -48 -68 -20 -32                       | 5.11 | ⊗ | d                 |
| R caudate head / putamen              | nc/pu |           | <b>2</b> | 18 14 -2 -12                          | 3.96 | * | 75                |
| R superior lateral cerebellum         |       | <b>6</b>  | <b>2</b> | 42 -72 -26 -40                        | 6.11 | ⊗ | 284               |
| R medial cerebellum                   |       |           | <b>2</b> | 10 -82 -32 -46                        | 3.41 | * | 42                |
| L inferior frontal gyrus              | 45/46 |           | <b>3</b> | -46 24 24 18                          | 6.35 | ⊗ | f                 |
| L inferior "                          | 9/46  |           | <b>3</b> | -48 14 28 22                          | 6.15 | ⊗ | f                 |
| R inferior "                          | 46    |           | <b>3</b> | 48 26 28 22                           | 3.97 | * | j                 |
| L middle "                            | 46    | <b>12</b> | <b>3</b> | -52 36 22 14                          | 6.40 | ⊗ | 798 <sup>F</sup>  |
| R middle "                            | 10    |           | <b>3</b> | 40 58 22 14                           | 4.16 | * | 136               |
| anterior rostral cingulate zone       | 6/8   | <b>14</b> | <b>3</b> | 0 18 52 48                            | 5.41 | ⊗ | 41                |
| L postcentral gyrus                   | 2     |           | <b>3</b> | -50 -32 58 56                         | 3.45 | * | 14                |
| L posterior superior parietal lobule  | 7     |           | <b>3</b> | -24 -66 62 60                         | 4.36 | * | 452 <sup>G</sup>  |
| L "                                   | 7     |           | <b>3</b> | -24 -72 54 50                         | 4.07 | * | g                 |
| L inferior occipital gyrus            | 18/19 |           | <b>3</b> | -42 -90 -10 -20                       | 3.96 | * | 42                |
| R "                                   | 18    |           | <b>3</b> | 36 -96 -8 -18                         | 4.83 | * | 2216 <sup>H</sup> |
| R "                                   | 18    |           | <b>3</b> | 16 -106 0 -10                         | 4.57 | * | h                 |
| R precuneus                           | 7     |           | <b>3</b> | 20 -86 50 46                          | 3.96 | * | 165               |
| cuneus                                | 19    |           | <b>3</b> | 0 -90 28 22                           | 3.77 | * | i                 |
| LR lingual gyri                       | 17/18 | <b>15</b> | <b>3</b> | 4 -82 6 -2                            | 4.80 | * | 134 <sup>I</sup>  |
| L anterior insula                     | ins   | <b>13</b> | <b>3</b> | -30 28 -2 -12                         | 5.72 | ⊗ | 61                |
| R "                                   | ins   |           | <b>3</b> | 38 18 10 2                            | 4.12 | * | 116 <sup>J</sup>  |
| R "                                   | ins   |           | <b>3</b> | 32 28 2 -8                            | 4.00 | * | j                 |
| R caudate body                        | nc    |           | <b>3</b> | 14 -2 14 6                            | 3.29 | * | 4                 |
| L putamen                             | pu    |           | <b>3</b> | -16 8 -6 -16                          | 3.44 | * | 14                |
| R pallidum / anterior thalamus        |       |           | <b>3</b> | 8 -4 -4 -14                           | 3.40 | * | 8                 |

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| regions of interest           | BA     | # | bin | [ x y z <sub>m</sub> z <sub>p</sub> ] | t    | p | k <sub>E</sub>   |
|-------------------------------|--------|---|-----|---------------------------------------|------|---|------------------|
| L superior lateral cerebellum |        |   | 3   | -44 -78 -22 -34                       | 3.71 | * | 103 <sup>K</sup> |
| L "                           |        |   | 3   | -50 -68 -24 -36                       | 3.47 | * | k                |
| R "                           |        |   | 3   | 52 -74 -24 -36                        | 4.48 | * | h                |
| L inferior frontal gyrus      | 9      |   | 4   | -48 12 32 26                          | 4.25 | * | 214              |
| R inferior "                  | 9/46   |   | 4   | 50 28 32 26                           | 3.22 | * | 2                |
| L middle "                    | 10     |   | 4   | -40 60 16 8                           | 4.14 | * | 54               |
| R middle "                    | 8      |   | 4   | 52 20 50 46                           | 3.96 | * | 69               |
| R inferior occipital gyrus    | 18/19  |   | 4   | 34 -86 2 -8                           | 3.48 | * | 26               |
| L anterior insula             | ins/47 |   | 4   | -36 24 -10 -22                        | 3.57 | * | 56               |
| R "                           | ins    |   | 4   | 30 28 -4 -14                          | 3.53 | * | 26               |

**product size effect** – **dyscalculia**

|                                      |         |  |   |                 |      |   |                   |
|--------------------------------------|---------|--|---|-----------------|------|---|-------------------|
| L inferior frontal gyrus             | 44/45   |  | 2 | -52 16 12 4     | 3.96 | * | 78                |
| L inferior "                         | 9/45    |  | 2 | -62 16 26 20    | 3.47 | * | 2                 |
| R middle "                           | 9/46    |  | 2 | 50 38 30 24     | 4.75 | * | 176               |
| L precentral gyrus                   | 6       |  | 2 | -34 -2 48 44    | 3.90 | * | 92                |
| L "                                  | 6/8     |  | 2 | -54 8 44 40     | 3.59 | * | 15                |
| L intraparietal sulcus               | 7/19/39 |  | 2 | -30 -68 42 38   | 3.49 | * | 3                 |
| R "                                  | 40      |  | 2 | 44 -48 44 40    | 3.92 | * | 57                |
| L supramarginal gyrus                | 40      |  | 2 | -54 -40 48 44   | 3.69 | * | 14                |
| L middle frontal gyrus               | 9/46    |  | 3 | -54 28 34 28    | 4.14 | * | 267 <sup>L</sup>  |
| L middle "                           | 46      |  | 3 | -52 44 24 16    | 3.60 | * | l                 |
| R middle "                           | 9/46    |  | 3 | 40 28 32 26     | 5.43 | * | 533               |
| anterior rostral cingulate zone      | 6/32    |  | 3 | 4 26 42 38      | 4.44 | * | 384 <sup>M</sup>  |
| "                                    | 32      |  | 3 | -10 20 34 28    | 3.93 | * | m                 |
| L precentral gyrus                   | 6       |  | 3 | -32 0 56 54     | 4.20 | * | 177               |
| R rostral intraparietal sulcus       | 40      |  | 3 | 52 -48 50 46    | 5.63 | * | 1281 <sup>N</sup> |
| R middle "                           | 7/40    |  | 3 | 40 -58 54 50    | 4.97 | * | n                 |
| R caudal "                           | 7       |  | 3 | 34 -70 50 46    | 4.54 | * | n                 |
| L posterior superior parietal lobule | 7       |  | 3 | -28 -72 56 54   | 4.43 | * | 122               |
| L superior occipital gyrus           | 19      |  | 3 | -26 -90 22 14   | 3.76 | * | 50                |
| R "                                  | 19      |  | 3 | 30 -96 24 16    | 3.75 | * | 18                |
| R lingual gyrus                      | 17/30   |  | 3 | 14 -76 6 -2     | 3.67 | * | 25                |
| R anterior insula                    | ins     |  | 3 | 34 24 -2 -12    | 3.77 | * | 14                |
| L caudate head                       | nc      |  | 3 | -22 16 16 8     | 4.51 | * | 87                |
| R "                                  | nc      |  | 3 | 20 16 14 6      | 3.51 | * | 4                 |
| L superior cerebellum                |         |  | 3 | -48 -72 -26 -38 | 3.96 | * | 99                |
| R "                                  |         |  | 3 | 44 -72 -32 -46  | 4.48 | * | 131               |
| R "                                  |         |  | 3 | 34 -48 -32 -46  | 4.13 | * | 26                |
| R inferior frontal gyrus             | 47      |  | 4 | 56 20 -4 -14    | 4.14 | * | p                 |
| L middle "                           | 8       |  | 4 | -56 28 38 32    | 4.53 | * | 93                |
| L middle "                           | 10/46   |  | 4 | -48 46 24 18    | 3.94 | * | 69                |

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| regions of interest             | BA   | # | bin | [ x y z <sub>m</sub> z <sub>p</sub> ] | t    | p | k <sub>E</sub>    |
|---------------------------------|------|---|-----|---------------------------------------|------|---|-------------------|
| L middle "                      | 10   |   | 4   | -38 64 18 10                          | 3.92 | * | 42                |
| R middle "                      | 8/9  |   | 4   | 30 34 42 38                           | 3.51 | * | 6                 |
| L superior "                    | 6    |   | 4   | -16 8 54 50                           | 3.73 | * | 8                 |
| anterior rostral cingulate zone | 8    |   | 4   | 4 34 52 48                            | 3.82 | * | 58                |
| L middle intraparietal sulcus   | 40   |   | 4   | -44 -62 44 40                         | 4.50 | * | 214               |
| R rostral "                     | 40   |   | 4   | 52 -38 52 48                          | 4.95 | * | o                 |
| R inferior parietal lobule      | 7/40 |   | 4   | 38 -66 56 52                          | 5.33 | * | 1073 <sup>O</sup> |
| R precuneus                     | 7    |   | 4   | 10 -72 52 48                          | 4.09 | * | 190               |
| R anterior insula               | ins  |   | 4   | 34 24 -6 -16                          | 4.68 | * | 218 <sup>P</sup>  |
| R posterior caudate body        | nc   |   | 4   | 24 -26 20 12                          | 4.17 | * | 69                |

**product size effect** – comparison: controls > dyscalculia

|                            |       |  |   |                 |      |   |                 |
|----------------------------|-------|--|---|-----------------|------|---|-----------------|
| L inferior frontal gyrus   | 44/46 |  | 3 | -44 14 22 14    | 2.40 | . | 7               |
| L inferior occipital gyrus | 17    |  | 3 | -16 -94 -16 -28 | 2.83 | . | q               |
| R inferior occipital gyrus | 17    |  | 3 | 12 -94 -16 -28  | 3.68 | * | 67 <sup>Q</sup> |
| R fusiform gyrus           | 18/19 |  | 3 | 36 -78 -12 -24  | 2.83 | . | 216             |
| R inferior occipital gyrus | 18/19 |  | 4 | 34 -86 0 -10    | 2.53 | . | 17              |

**product size effect** – comparison: controls < dyscalculia

|                          |       |  |   |               |      |   |                  |
|--------------------------|-------|--|---|---------------|------|---|------------------|
| R middle frontal gyrus   | 9     |  | 2 | 50 36 36 30   | 4.14 | * | 92               |
| L precentral gyrus       | 6     |  | 2 | -38 6 48 44   | 3.34 | * | 20               |
| R inferior frontal gyrus | 9     |  | 3 | 64 14 30 24   | 3.80 | * | 88               |
| L precentral gyrus       | 6     |  | 3 | -30 -2 54 50  | 4.06 | * | 215              |
| R intraparietal sulcus   | 7     |  | 3 | 24 -70 46 42  | 3.51 | * | 38               |
| R supramarginal gyrus    | 40    |  | 3 | 58 -50 48 44  | 4.01 | * | 298 <sup>R</sup> |
| R "                      | 2     |  | 3 | 58 -28 48 44  | 3.59 | * | r                |
| L middle temporal gyrus  | 21/22 |  | 3 | -72 -40 0 -10 | 3.80 | * | 10               |
| L caudate head           | nc    |  | 3 | -22 20 16 8   | 3.43 | * | 19               |
| L middle frontal gyrus   | 10/46 |  | 4 | -48 48 26 20  | 3.37 | * | 9                |
| R middle "               | 8     |  | 4 | 28 32 44 40   | 3.58 | * | 36               |
| R intraparietal sulcus   | 40    |  | 4 | 48 -38 56 52  | 3.36 | * | 18               |
| R precuneus              | 7     |  | 4 | 14 -70 60 58  | 3.82 | * | 243              |

**distance effect** – controls

|                                 |       |  |   |                 |      |   |     |
|---------------------------------|-------|--|---|-----------------|------|---|-----|
| L frontal pole                  | 10    |  | 3 | -38 62 -4 -14   | 3.62 | * | 15  |
| R superior frontal gyrus        | 8     |  | 3 | 20 48 50 46     | 4.11 | * | 112 |
| R superior "                    | 10    |  | 3 | 36 68 8 0       | 3.53 | * | 34  |
| R middle "                      | 45/46 |  | 3 | 42 38 6 -2      | 3.29 | * | 7   |
| anterior rostral cingulate zone | 10/32 |  | 3 | -6 52 12 4      | 4.12 | * | 301 |
| R inferior parietal lobule      | 7/40  |  | 3 | 48 -76 48 44    | 3.45 | * | 10  |
| L middle occipital gyrus        | 18/19 |  | 3 | -46 -90 12 4    | 4.56 | * | 267 |
| L inferior temporal gyrus       | 20/37 |  | 3 | -50 -54 -20 -32 | 4.63 | * | 479 |

continued on next page

| regions of interest             | BA       | #  | bin | [ x y z <sub>m</sub> z <sub>p</sub> ] | t    | p | k <sub>E</sub>   |
|---------------------------------|----------|----|-----|---------------------------------------|------|---|------------------|
| R inferior "                    | 19/37    |    | 3   | 52 -62 -20 -32                        | 3.53 | * | 78               |
| L middle "                      | 21       |    | 3   | -68 -34 -4 -14                        | 3.90 | * | 78               |
| R middle "                      | 21       |    | 3   | 72 -30 -10 -20                        | 4.16 | * | 63               |
| R superior "                    | 22/39/40 | 16 | 3   | 62 -58 22 14                          | 4.65 | * | 620              |
| L inferior anterior insula      | ins/13   |    | 3   | -30 4 -14 -26                         | 3.75 | * | 91               |
| L caudate head                  | nc       |    | 3   | -10 14 4 -6                           | 3.62 | * | 132 <sup>A</sup> |
| L "                             |          |    | 3   | -22 26 -2 -12                         | 3.62 | * | a                |
| R "                             | nc       |    | 3   | 14 18 4 -6                            | 3.55 | * | 21               |
| L middle frontal gyrus          | 10/46    |    | 4   | -50 42 22 14                          | 3.25 | * | 7                |
| LR median superior frontal gyri | 6/8      |    | 4   | -2 36 62 60                           | 4.24 | * | 565 <sup>B</sup> |
| LR "                            | 8        |    | 4   | -6 46 52 48                           | 3.58 | * | b                |
| anterior rostral cingulate zone | 9/10/32  |    | 4   | -4 48 16 8                            | 3.26 | * | 2                |
| "                               | 9        |    | 4   | -6 48 34 28                           | 3.25 | * | 1                |
| L inferior parietal lobule      | 19/39    |    | 4   | -52 -78 38 32                         | 3.42 | * | 10               |
| R supramarginal gyrus           | 2/40     |    | 4   | 66 -34 52 48                          | 3.49 | * | 13               |
| R "                             | 7/40     |    | 4   | 52 -60 54 50                          | 4.01 | * | 138              |
| R middle occipital gyrus        | 19       |    | 4   | 44 -92 18 10                          | 3.78 | * | 19               |
| L middle temporal gyrus         | 21       |    | 4   | -64 -44 -4 -14                        | 3.99 | * | 139 <sup>C</sup> |
| L "                             | 37       |    | 4   | -58 -56 -10 -22                       | 3.69 | * | c                |
| R "                             | 21       |    | 4   | 68 -32 -8 -18                         | 3.32 | * | 7                |
| L caudate head                  | nc       |    | 4   | -10 14 6 -4                           | 3.38 | * | 9                |
| R "                             | nc       |    | 4   | 10 16 6 -4                            | 3.77 | * | 59               |

**distance effect** – dyscalculia

|                            |      |  |   |              |      |   |     |
|----------------------------|------|--|---|--------------|------|---|-----|
| L frontal pole             | 10   |  | 3 | -22 72 4 -6  | 4.30 | * | 127 |
| R middle frontal gyrus     | 46   |  | 3 | 56 42 12 4   | 3.95 | * | 54  |
| LR superior frontal gyri   | 8    |  | 3 | 2 50 56 52   | 2.73 | . | 26  |
| posterior cingulates       | 23   |  | 3 | -2 -48 24 18 | 3.89 | * | 53  |
| R inferior parietal lobule | 7/40 |  | 3 | 48 -62 56 52 | 2.82 | . | 64  |
| R precuneus                | 7    |  | 3 | 12 -80 56 52 | 2.98 | . | 135 |
| L superior frontal gyrus   | 6    |  | 4 | -14 10 56 54 | 3.38 | . | 255 |
| R inferior parietal lobule | 40   |  | 4 | 48 -62 54 50 | 2.81 | . | 53  |

**distance effect** – comparison: controls > dyscalculia

|                           |       |  |   |              |      |   |    |
|---------------------------|-------|--|---|--------------|------|---|----|
| R superior temporal gyrus | 39/40 |  | 3 | 56 -52 26 20 | 3.42 | * | 27 |
|---------------------------|-------|--|---|--------------|------|---|----|

**task difficulty effect** – controls

|                            |      |  |   |              |      |   |     |
|----------------------------|------|--|---|--------------|------|---|-----|
| L inferior frontal gyrus   | 6/44 |  | 3 | -52 4 16 8   | 3.35 | * | 9   |
| R superior "               | 6    |  | 3 | 38 2 66 64   | 3.51 | * | 18  |
| R superior parietal lobule | 7    |  | 3 | 34 -54 66 64 | 3.47 | * | 22  |
| R anterior insula          | ins  |  | 3 | 38 24 -6 -16 | 4.23 | * | 101 |
| R putamen                  | pu   |  | 3 | 20 12 6 -2   | 3.45 | * | 22  |

continued on next page

| regions of interest             | BA     | #  | bin | [ x y z <sub>m</sub> z <sub>p</sub> ] | t    | p | k <sub>E</sub>   |
|---------------------------------|--------|----|-----|---------------------------------------|------|---|------------------|
| L middle frontal gyrus          | 9/46   |    | 4   | -50 26 30 24                          | 3.70 | * | 178              |
| R middle "                      | 9/46   |    | 4   | 50 36 28 22                           | 4.53 | * | 559              |
| R middle "                      | 9      |    | 4   | 54 18 40 34                           | 3.24 | * | 3                |
| L superior "                    | 10     |    | 4   | -26 56 6 -4                           | 3.58 | * | 32               |
| R superior "                    | 6      |    | 4   | 34 4 66 64                            | 4.09 | * | 256              |
| anterior rostral cingulate zone | 6/8/32 | 21 | 4   | 0 28 46 42                            | 5.94 | ⊗ | 161              |
| L supramarginal gyrus           | 40     |    | 4   | -48 -46 56 52                         | 3.37 | * | 21               |
| R inferior parietal lobule      | 40     |    | 4   | 52 -52 50 46                          | 4.27 | * | 201 <sup>A</sup> |
| R "                             | 2/40   |    | 4   | 50 -42 60 58                          | 3.72 | * | <sub>a</sub>     |
| L lingual gyrus                 | 17     |    | 4   | -8 -92 0 -10                          | 3.58 | * | 45               |
| R anterior insula               | ins    |    | 4   | 40 30 -4 -14                          | 3.84 | * | 109              |
| R caudate head                  | nc     |    | 4   | 16 24 0 -10                           | 3.51 | * | 27               |
| R middle frontal gyrus          | 6      |    | 5   | 42 16 60 58                           | 3.47 | * | 28               |
| anterior rostral cingulate zone | 8      |    | 5   | 2 26 50 46                            | 3.86 | * | 215              |
| L superior parietal lobule      | 7      |    | 5   | -26 -74 50 46                         | 3.34 | * | 25               |

**task difficulty effect** – **dyscalculia**

|                                |        |  |   |                |      |   |     |
|--------------------------------|--------|--|---|----------------|------|---|-----|
| R postcentral gyrus            | 1/3    |  | 3 | 30 -32 68 66   | 4.06 | * | 67  |
| L rostral intraparietal sulcus | 2/40   |  | 3 | -56 -28 40 36  | 2.74 | . | 88  |
| R "                            | 40     |  | 3 | 44 -40 50 46   | 3.22 | . | 216 |
| R lingual gyrus                | 19/37  |  | 3 | 16 -54 -10 -22 | 2.61 | . | 27  |
| R fusiform/lingual gyrus       | 19/37  |  | 3 | 38 -66 -20 -32 | 3.24 | . | 147 |
| R anterior insula              | ins    |  | 3 | 30 36 -2 -12   | 2.95 | . | 71  |
| R caudate head                 | nc     |  | 3 | 8 6 10 2       | 3.16 | . | 62  |
| L basal ganglia                |        |  | 3 | -18 -14 -6 -16 | 4.26 | * | 45  |
| L inferior frontal gyrus       | 46     |  | 4 | -44 30 18 10   | 2.80 | . | 86  |
| R superior temporal gyrus      | 42     |  | 4 | 64 -32 20 12   | 4.83 | * | 253 |
| R anterior insula              | ins/47 |  | 4 | 34 36 -6 -16   | 4.33 | * | 72  |
| R putamen                      | pu     |  | 4 | 20 -8 -2 -12   | 5.02 | * | 79  |
| middle cerebellum              |        |  | 4 | 0 -76 -26 -38  | 3.73 | * | 34  |

**task difficulty effect** – **comparison: controls > dyscalculia**

|                                 |        |  |   |               |      |   |     |
|---------------------------------|--------|--|---|---------------|------|---|-----|
| R anterior insula               | ins/47 |  | 3 | 40 22 -10 -20 | 2.72 | . | 32  |
| R middle frontal gyrus          | 9      |  | 4 | 54 16 40 36   | 3.56 | * | 37  |
| L superior "                    | 10     |  | 4 | -24 60 4 -6   | 2.90 | . | 128 |
| anterior rostral cingulate zone | 8      |  | 4 | -2 26 48 44   | 3.26 | * | 4   |
| R inferior parietal lobule      | 40     |  | 4 | 52 -54 50 46  | 2.61 | . | 22  |

**task difficulty effect** – **comparison: controls < dyscalculia**

|                          |       |  |   |                |      |   |    |
|--------------------------|-------|--|---|----------------|------|---|----|
| R postcentral gyrus      | 3     |  | 3 | 22 -36 66 64   | 2.75 | . | 70 |
| R fusiform/lingual gyrus | 19/37 |  | 3 | 38 -66 -20 -32 | 3.27 | * | 6  |
| R caudate head           | nc    |  | 3 | 8 8 12 4       | 2.63 | . | 27 |

continued on next page



| regions of interest                 | BA    | # | bin | [ x y z <sub>m</sub> z <sub>p</sub> ] | t    | p | k <sub>E</sub>   |
|-------------------------------------|-------|---|-----|---------------------------------------|------|---|------------------|
| L basal ganglia                     |       |   | 3   | -20 -12 -6 -16                        | 3.73 | * | 50               |
| L inferior frontal gyrus            | 46    |   | 4   | -44 32 14 6                           | 2.91 | . | 94               |
| R superior temporal gyrus           | 40/42 |   | 4   | 66 -28 16 8                           | 4.46 | * | 342              |
| R putamen                           | pu    |   | 4   | 20 -8 -4 -14                          | 4.12 | * | 84               |
| <b>priming effect</b> – controls    |       |   |     |                                       |      |   |                  |
| anterior rostral cingulate cortex   | 9/32  |   | 5   | -2 42 24 18                           | 5.03 | * | 570              |
| L fusiform gyrus                    | 19/37 |   | 5   | -48 -68 -20 -32                       | 4.87 | * | 328 <sup>A</sup> |
| L inferior temporal gyrus           | 37    |   | 5   | -58 -50 -24 -38                       | 3.97 | * | <i>a</i>         |
| <b>priming effect</b> – dyscalculia |       |   |     |                                       |      |   |                  |
| anterior rostral cingulate cortex   | 24/32 |   | 5   | 0 28 26 20                            | 6.57 | * | 289 <sup>B</sup> |
| "                                   | 32    |   | 5   | -18 32 26 20                          | 4.51 | * | <i>b</i>         |