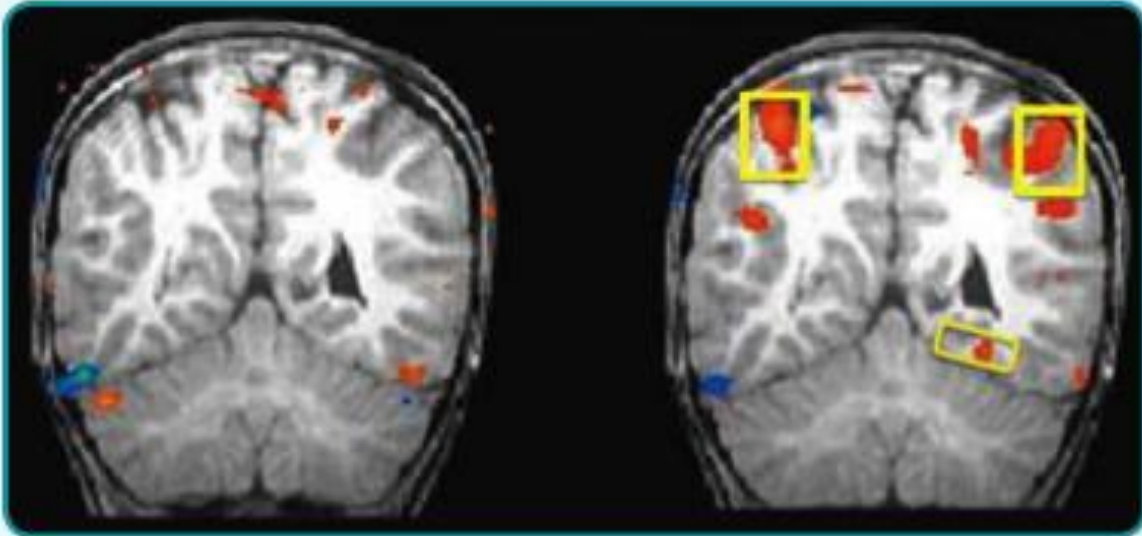


## The Relationship Between Letter Printing and Brain Activation

### EXPERIMENT

Using fMRI (functional Magnetic Resonance Imaging), Dr. James studied how letter printing affects the brain activation of children.<sup>6</sup>



Comparison of pre-experimental (left side) and post-experimental (right side) brain scans in children<sup>6</sup>

(Red indicates that there is a significant difference in conditions. Blue indicates that there is no change in conditions.)<sup>6</sup>

### RESULTS

- After printing letters (interacting with the letters to create context, rather than simply observing letters as objects), brain activation in the children studied was significantly increased and showed similarity to that of adults.<sup>6</sup>
- When preschool children looked at and identified a letter, they did not exhibit the same brain activation as adults.<sup>6</sup>
- In the brain's visual regions, when comparing writing, typing, tracing, and visual control, much more activation was exhibited after the writing experience than any of the other experiences.<sup>6</sup>

### IMPLICATIONS

- Neuroimaging is a sensitive marker of learning changes.<sup>6</sup>
- Knowing how a child's brain works should inform our educational practices.<sup>6</sup>
- The act of writing by hand makes a significant difference to brain activation patterns.<sup>6</sup>

James, K.H. (2012), How printing practice affects letter Perception: An Educational Cognitive Neuroscience Perspective. Presented at Handwriting in the 21<sup>st</sup> Century? And Educational Summit, Washington, D.C, January 23, 2012.