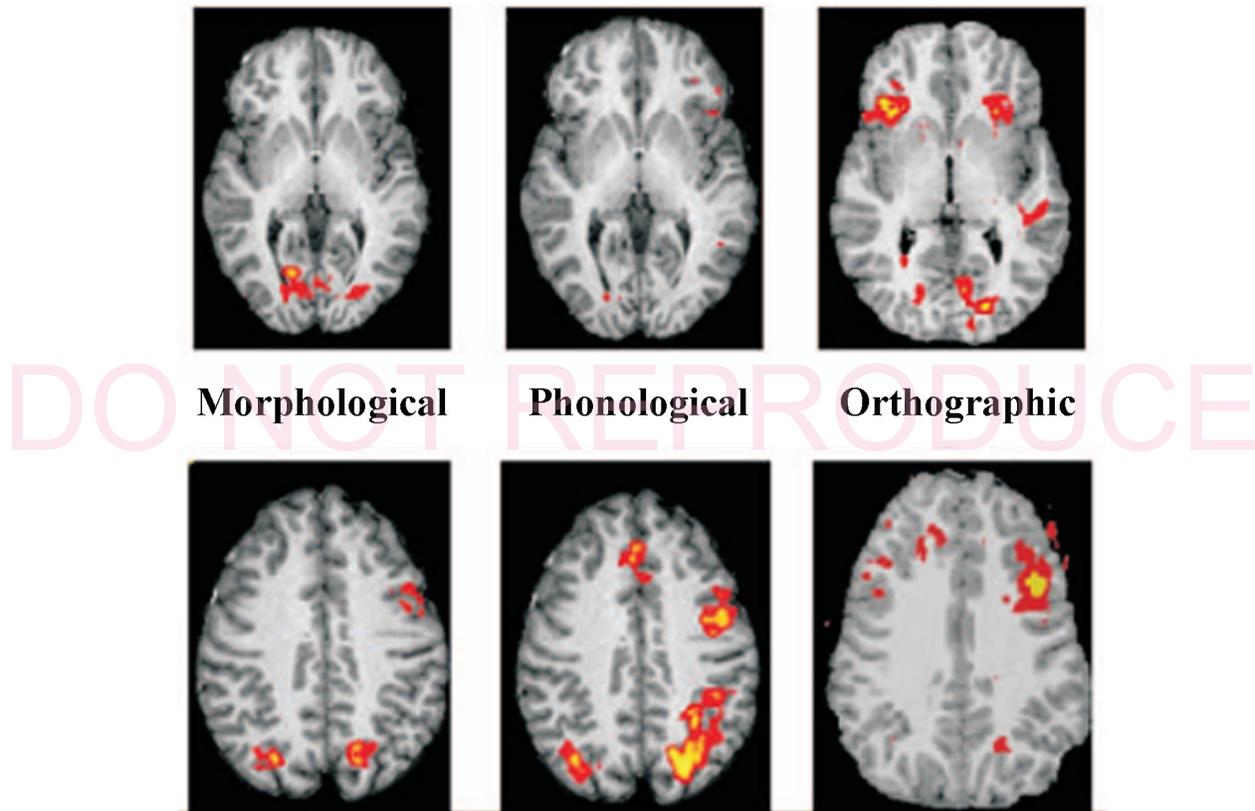


Excerpted from *Teaching Students with Dyslexia and Dysgraphia: Lessons from Teaching and Science*, by Virginia W. Berninger, Ph.D., & Beverly Wolf, M.Ed., page 119.



This figure shows a functional MRI (fMRI) of phonological, orthographic, and morphological word forms. Each column contains the fMRI overlay onto structural MRI at the same two anatomical axial sections of the brain:

- The first column of brain images contains the fMRI during **morpheme mapping**, which is the contrast between the morphological task (Does the top word come from the bottom word?) and the synonym task (Do both words mean the same?).
- The second column of brain images contains the fMRI during **phoneme mapping**, which is the contrast between the phonological task (Can the pink letters in the top word sound the same as the pink letters in the bottom word?) and the letter strings task (Do the top and bottom letter strings match exactly?).
- The third column of brain images contains the fMRI during **orthographic mapping**, which is the contrast between the spelling task (Are the top and bottom words both spelled correctly?) and the letter strings task.

The areas in red and yellow show the areas of brain activation. For morpheme mapping, these areas are in the occipital, parietal, and frontal lobes; for phoneme mapping, they are in the parietal, frontal, and cingulate areas; and for orthographic mapping, they are in the occipital, temporal, parietal, and frontal lobes in proficient readers.

(Adapted from Richards, T., Aylward, E., Raskind, W., Abbott, R., Field, K., Parsons, A., et al. [2006]. Converging evidence for triple word form theory in child dyslexics. *Developmental Neuropsychology*, 30, 547–589; www.informaworld.com; reprinted by permission of Taylor & Francis.)