Parietal differences during nonsymbolic number comparison in children with prenatal alcohol exposure

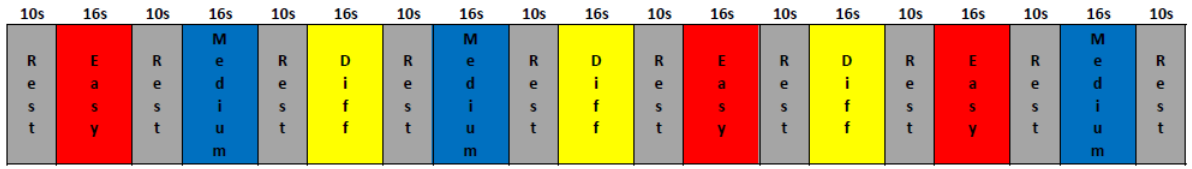
K.J. Woods[1,2], J.L. Jacobson[2-4], C.D. Molteno[4], J.C. Gore[5], S.W. Jacobson[2-4], and E.M. Meintjes[1,2]

Presented by Paul Taylor[1,2]

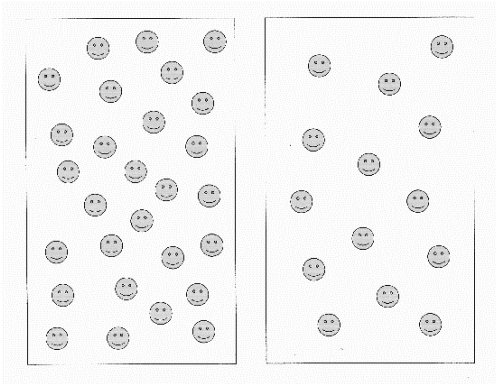
[1]MRC/UCT Medical Imaging Research Unit, University of Cape Town
[2]Department of Human Biology, University of Cape Town
[3]Department of Psychiatry and Behavioral Neurosciences, Wayne State University School of Medicine
[4]Department of Psychiatry and Mental Health, University of Cape Town
[5]Vanderbilt University Institute of Imaging Sciences, Vanderbilt University

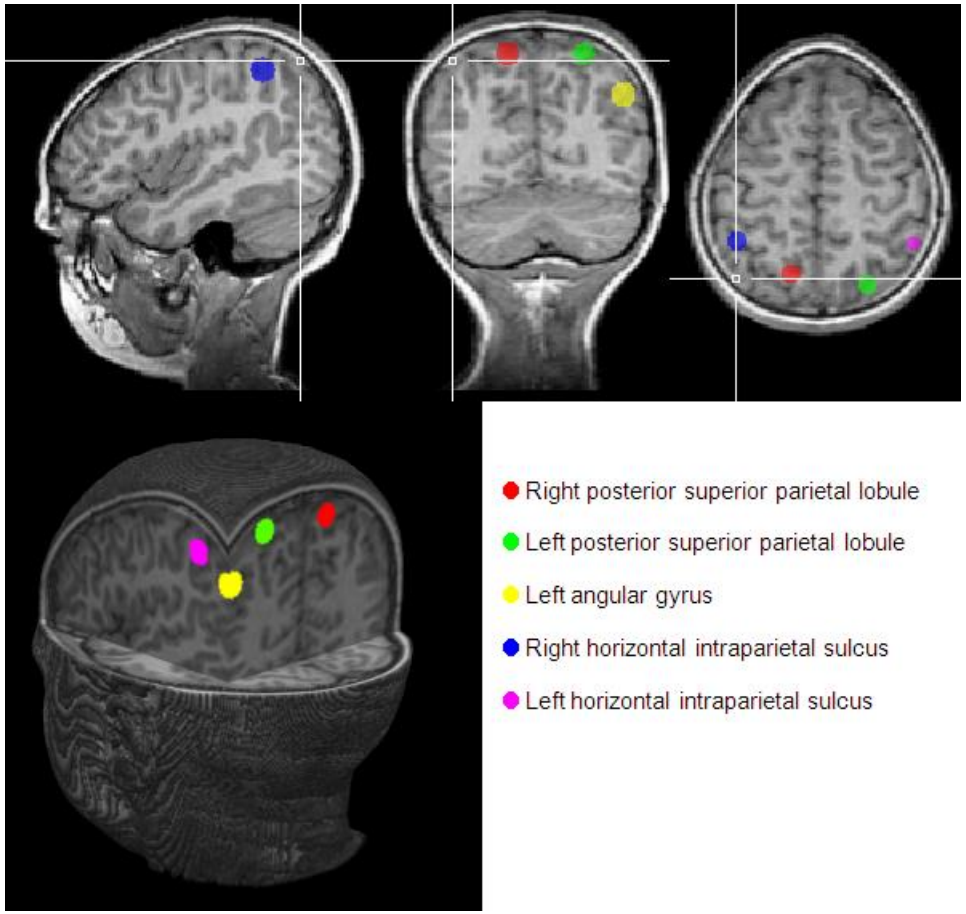
What is the effect of prenatal alcohol on brain activation in the parietal lobe during nonsymbolic number comparison?

- 33 children (9.7-13.7 years)
  - 8 with fetal alcohol syndrome (FAS) or partial FAS (PFAS)
  - 5 nonsyndromal heavily exposed (HE)
  - 20 controls
  - Exposed = FAS/PFAS + HE
- fMRI task: which side has more faces?



- Parietal ROIs from Dehaene meta-analysis[1]



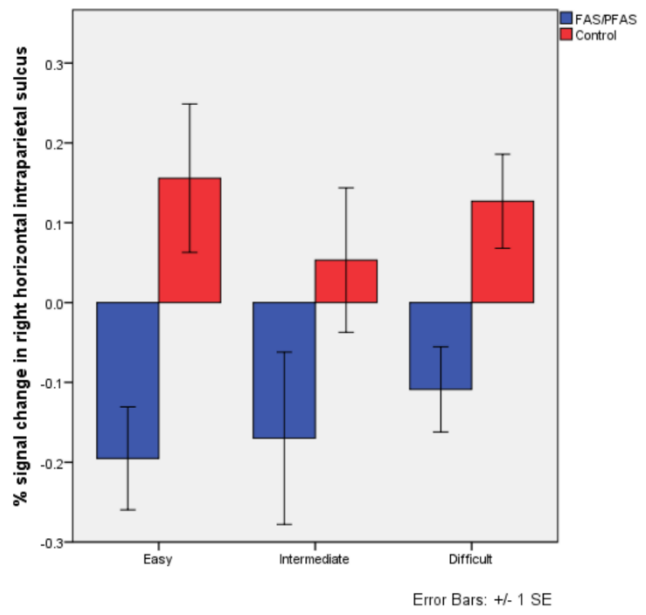


[1]Dehaene, S., *et al.* (2003). Cognitive Neuropsychology, vol. 20, no. 3-6, pp. 487-506.

Results

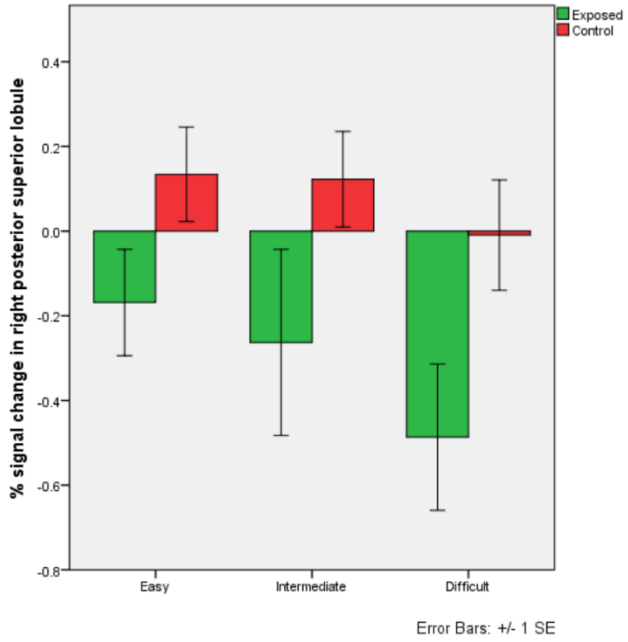
- Groups did not differ in performance
- Activation differed in right posterior superior parietal lobule and right horizontal intraparietal sulcus

Right horizontal intraparietal sulcus



Controls activated right horizontal intraparietal sulcus more than FAS/PFAS group

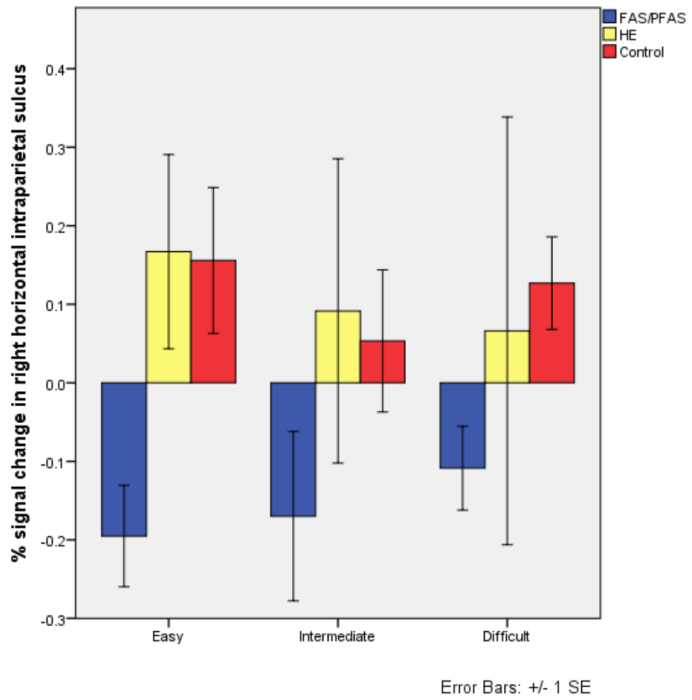
Right posterior superior lobule



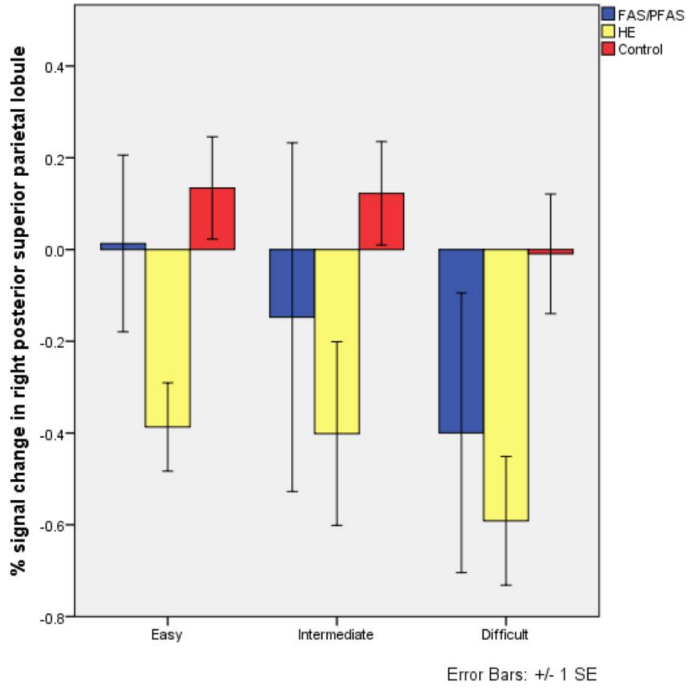
Controls activated right posterior superior parietal lobule more than exposed children

Results

Right horizontal intraparietal sulcus



Right posterior superior lobule



- Activation patterns of HE children
  - right horizontal intraparietal sulcus: similar to control children
  - right posterior superior parietal lobule: similar to FAS/PFAS group

Conclusions

- FAS/PFAS group showed less activation than controls in:
  - Right horizontal intraparietal sulcus: mediates mental representation of relative quantities
  - Right posterior superior parietal lobule: supports attentional function during number processing

- Nonsyndromal HE group
  - Right posterior superior parietal lobule activation lower than controls
  - Functioning of right horizontal intraparietal sulcus spared

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