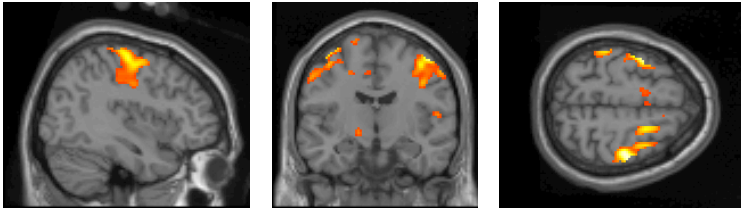


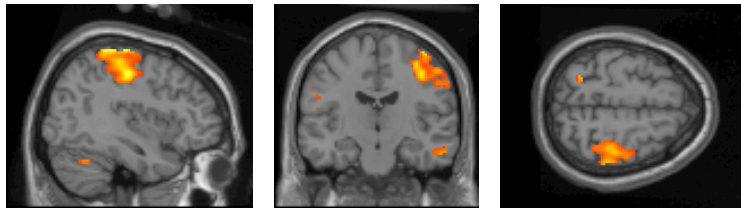
fMRI Findings in Adolescents with High Prenatal Exposures to Methylmercury and PCBs

Representative results: Fingertapping, left hand



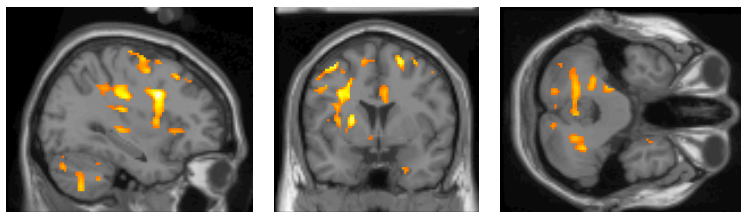
High MeHg and High PCB exposure

The high exposure group shows activation in the motor cortex bilaterally.



Low MeHg and Low PCB exposure

The low exposure group shows a similar level of activation in the right hemisphere, but no activation of the left (ipsilateral) motor cortex.



Subtraction of Activation of the Low Exposure Group from the High Exposure Group

Comparing the two groups, there is greater activation in the left hemisphere in the high exposure group, representing greater bilateral activation and recruitment of neurophysiological resources.

Similar effects were found across tasks.

Conclusions

High mixed MeHg and PCB exposure appears to be associated with losses in functional capacity in specific brain structures resulting in adaptive recruitment of other brain structures for task completion. Detailed analyses show similar individual effects of MeHg and PCBs. At the exposure levels encountered, MeHg seemed to have stronger effects than PCBs. These qualitative findings support conclusions from clinical test data but need to be extended to provide a detailed understanding of the functional abnormalities.

Background

Dose-effect relationships have been demonstrated between measures of prenatal exposures to methylmercury (MeHg) and/or polychlorinated biphenyls (PCBs) and neurocognitive and neuromotor functions later in life.

Methods

Twelve 16-year-old Faroese boys (all right-handed) were selected from the original birth cohort of 1022 children, according to the degree of their prenatal exposure to MeHg and PCBs. Functional MR imaging was carried out using four different paradigms: Finger tapping; Photic stimulation; Naming; and Visual organization tasks.