Conclusions: A link between DTI FA and mTBI history in the ILF and H1 may support the notion that mTBI has a role in impacting on inhibition networks. Future research would benefit from longitudinal analysis and inclusion of more subtle neuropsychological assessments. Use of DTI as a means of monitoring change in cumulative mTBI is supported.

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M. OLAITHE, P.R. EASTWOOD, T.C. SKINNER, D. HILLMAN & R.S. BUCKS. Cognitive Dysfunction in Obstructive Sleep Apnoea; Mechanisms of Harm.

Objective: Obstructive Sleep Apnoea (OSA) is a common sleep disorder diagnosed in ~23% of the population, with increasing risk in older adults and for males. OSA is characterized by repeated upper airway collapse, resulting in chronic, intermittent hypoxia and sleep fragmentation. Meta-analysis reveals that OSA causes cognitive difficulties in attention, memory and executive function (EF). Beebe and Gozal (2002) have proposed that sleep fragmentation and hypoxia combine to lead to cognitive dysfunction. This study tested this hypothesis.

Participants and Methods: Participants (N = 157) were recruited from the general public and from Sir Charles Gairdner Hospital, Perth. All participants underwent a full, diagnostic polysomnography and completed cognitive assessment of attention, short-term & long-term memory and EF. One factor congeneric models were built to examine individual latent constructs of hypoxia, sleep fragmentation, executive function, attention, short term and long term memory. Finally a theoretically driven model was constructed to examine the relationships between hypoxia and sleep fragmentation, and cognitive function

Results: Final model fit was good, X^2/df = 113.9, CFI = .94. After controlling for both IQ and daytime sleepiness, significant relationships were found between oxygen desaturation and sleep fragmentation to attention (p = .04, p = .02 respectively) and executive function (p = .05, p = .02 respectively). No significant predictors of memory function were found.

Conclusions: These results confirm that more severe OSA is significantly associated with poorer attention and executive function. However, this paper provides only partial support for Beebe and Gozal's model. Whilst attention and executive deficits were related to fragmentation and hypoxia, LT and ST memory deficits were not. Memory dysfunction in OSA may be a product of low mood and/or daytime sleepiness.

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Objective: White matter lesions (WMLs), asymptomatic lacunar infarcts, brain microbleeds (MBMs) and enlarged perivascular spaces (EPVS) have been identified as silent lesions due to cerebral small vessel disease (cSVD). All these markers have been individually linked to cognitive functioning, but are also strongly correlated with each other. The combined effect of these markers on cognitive function has never been studied and would possibly provide more useful information on the effect on cognitive function. The aim of this study therefore was to investigate whether a higher total burden of cSVD was associated with a decreased performance in cognitive function.

Participants and Methods: We included 189 patients with a high prevalence of cSVD (112 hypertensive patients and 77 first-ever lacunar stroke patients). Patients underwent brain MRI and extensive neuropsychological assessment. We rated the presence of any asymptomatic lacunar infarct, extensive WMLs, any deep MBM, and moderate to extensive EPVS in the basal ganglia. One point was awarded for the presence of each of these markers, with a minimum score of 0 and a maximum of 4. Associations with domains of cognitive function were analyzed with correlation analyses.

Results: Correlation analyses revealed significant associations between cSVD category and all cognitive domains (all p < .001). Results remained significant for information processing speed (r = -.18, p < .013) and overall cognition (r = -.17, p < .017), after correction for age and sex. Testing of trend using linear regression analyses revealed the same results.

Conclusions: We demonstrated that after adjustments for age and sex, a higher total burden of cSVD is associated with decreased performance on tests of information processing speed and overall cognition. Longitudinal studies following increase of MRI markers and cognitive decline over time are needed in order to confirm a causal relationship between total burden of cSVD and cognitive function.

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Objective: Previous studies have found young children exposed to maternal opioid and polysubstance use in utero are at increased risk for neuropsychological difficulties. The study investigated whether these waned, persisted, or increased over time, and to what extent such perinatal vulnerability could be compensated by being raised in optimized surroundings.

Participants and Methods: In the present study, 60 children with substance exposure and 48 control children without known prenatal risk were followed longitudinally. The most common main drug of choice among the pregnant mothers was opiates (n = 31). The children’s general cognitive abilities were assessed at 1, 2 and 3 yrs of age using the Bayley-II Mental Development Index, at 4½ yrs using the McCarthy General Cognitive Index, and at 5½ yrs using the WISC-R Total IQ.

Results: Children with prenatal drug exposure had significantly (p < .05) lower cognitive abilities than children in the control group at all time points (M = 96.1, SD = 17.0 and M = 116.1, SD = 14.2, respectively, at 5½ yrs, p < .001). Mixed effects models showed that the group difference was stable from 1 to 3 yrs of age but increased between 3 and 5½ yrs. The group difference at 8½ yrs was significant even after controlling for earlier cognitive abilities in regression analyses. The group differences remained when assessing only exposed children who moved to stable adoptive/foster homes before 1 yr of age (n = 50). The study could not isolate effects of prenatal substance exposure.

Conclusions: However, the results indicate that children exposed to opioid and polysubstance abuse in utero do not cognitively “catch-up” over time. Instead, risk effects appear to increase with age, even in adoptive/foster children with minimal postnatal risk. As the complexity of the learning environment and social relationships increases over time, there may be transactional processes in which neurobiological vulnerabilities increase increasingly important with respect to various aspects of children’s functioning.

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Objective: Individuals with ACC have difficulties across a number of areas of language function, including expression and comprehension. There is currently limited and conflicting research regarding the laterisation of language in ACC and no functional magnetic resonance imaging (fMRI) studies have been conducted to investigate language activation in children and adolescents with ACC.

Participants and Methods: The current study used an expressive language fMRI task (a visually presented noun-verb generation paradigm) to investigate language laterisation in seventeen (9 male) young people aged 8-22 years (M=12.41, SD=3.65; 53% right-handed) with partial or complete ACC and fourteen (3 male) age matched typically developing controls (M=12.55, SD=3.36; 71% right-handed). Participants were scanned on a 3T Siemens Trio at the Royal Children’s Hospital, Melbourne. Laterality indices were calculated using a threshold independent bootstrapping method (Wilk & Schnathorst, 2006), with the frontal lobe as the region of interest.