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Sleep related learning in children with developmental disorders

This research examines the role of sleep on learning and daytime behaviour in typically developing children and children with developmental disorders.

Key words: sleep; learning; developmental disorders; memory consolidation; daytime behaviour

Key findings

The findings are of scientific interest as little is currently known about the role of sleep on learning. The value of sleep, and in particular for children, in the context of our increasingly busy modern lives, is also of interest to parents and educators e.g. teachers.

- Sleep contributes to optimal consolidation of learning as well as social and neuropsychological functioning.
- Most children with developmental disorders such as Down syndrome and Williams syndrome suffer from sleep problems.
- Sleep has a huge impact on family functioning.

What we did

Our research studies (2009 to date) were supported by the British Academy and the Williams syndrome Foundation, UK. The new project (starts March 2014) on sleep related learning in ADHD (Attention Deficit Hyperactivity Disorder) is supported by the Waterloo Foundation.

Sleep is necessary for optimum physiological and psychological functioning, including the ability to form and retrieve certain types of memories. The consolidation of newly acquired information and skills is essential for successful school performance.

Sleep disturbances are common in children with neurodevelopmental disorders such as Autism, ADHD, Down syndrome and Williams syndrome. It is therefore possible that sleep disturbances contribute to some of the cognitive difficulties/impairments observed in these children, which could be improved if sleep problems were treated.

The main focus of our research studies was to examine sleep patterns in children with developmental disorders and the role of sleep on memory consolidation.

Our studies have shown that insufficient sleep and frequent night wakings in children are associated with lower scores on tests of mental motor.

How we did it

School age children with Down syndrome, Williams syndrome and mainstream typically developing children took part in the studies. Sleep was measured using actigraphy (a small activity-monitoring device) and sleep diary. A number of different cognitive tasks were administered for each study such as the Finger Tapping Task – a motor memory task (children had to type a sequence of numbers such as 4-1-3-2-4 displayed at the top of the screen as quickly as possible in 30 second runs), attention tasks and daytime behaviour questions.

Implications

Current studies, including ours, report that poorer sleep quality, shorter sleep duration and increased daytime sleepiness have all been modestly but significantly associated with poorer school performance, especially in early childhood. The extent to which reductions in sleep quality impair off-line memory consolidation is an important consideration. The current research programme supports the notion that sleep is necessary for enhanced memory consolidation in children and reinforces the importance of sleep for children to maximise learning potential.

Further information

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