

included chocolate, hot chocolate, crisps, burger and chips. Only 10 children engaged in calming activities in the hour before bedtime such as reading, colouring, lego and crafts. 28 children were left to self-settle and 22 had a parent laying or sitting next to them in their bedroom in order to fall asleep. **Conclusion** There was marked variation from the recommended bedtime routine in children with severe behavioural sleep difficulties, accepting that in some, socially desirable responses may have been given to the research staff during the assessment. Further work to explore the important factors in helping a child to self-settle is ongoing.

46 THE SLEEP, CIRCADIAN RHYTHMS AND MENTAL HEALTH IN SCHOOLS (SCRAMS) FEASIBILITY STUDY

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Introduction Adolescence is a key developmental period for the onset of mental illness. Healthy rhythms of sleep and activity are critical for mental wellbeing in young people. Yet getting healthy diurnal rhythms becomes challenging for teens, due to developmental changes and multiple social and technological factors modifiable risk factor. We addressed this relationship in a feasibility study by investigating sleep-wake patterns of teenagers and their mental health, wellbeing, and cognitive performance. **Methods** 9 schools of the SHINE network in Scotland took part in the study. Pupils wore an actigraph for 3 weeks, allowing the collection of objective rest-activity data. During the 3 weeks, they filled in twice a day a brief ecological momentary assessment with mood questions on their mobile phone (EMAapp). At the beginning and at the end of this

period, participants also completed a digital online survey with further questions about mental health, sleep, and wellbeing (pre- and post- questionnaire) and they performed a cognitive assessment (6 subtests) on the online platform Test-MyBrain (TMB).

Results The feasibility study included two data acquisitions. In Winter (Feb-March 2021), during the lockdown, 8 schools took part for a total of 60 students, whereas, in Summer (May-June 2021), 3 schools took part for a total of 15 students.

Preliminary feasibility results are summarised in the table 1 below.

Discussion Overall, relatively good participation, especially during the lockdown. Compliance decreased from the pre- to the post- questionnaire session and within TMB itself. Only 2 people fully completed the study. 11% of the pupils had problem with the EMA app, as reflected in the average low entries. Regarding the actigraph, it was generally well tolerated (a few pupils complained having a rash at the end). Further actigraphy analyses are ongoing.

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47 IS SUBJECTIVE SLEEP CONTINUITY ASSOCIATED WITH FLUID INTELLIGENCE?

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Introduction Previous research has indicated that poor subjective sleep quality is associated with lower fluid intelligence scores (Smith et al., 2019). However, it is not known whether subjective sleep continuity is associated with fluid intelligence, or with set-shifting or mental rotation accuracy, since these are closely related to fluid intelligence (Kafadar et al., 2016; Varriale et al., 2018). The aim of the study was to investigate the relationship between sleep continuity, assessed using daily subjective sleep diaries and fluid intelligence. It was hypothesised that sleep continuity would be positively associated with 1) fluid intelligence, 2) mental rotation and 3) set-shifting.

Methods A total of 39 healthy good sleepers completed a daily subjective sleep diary (Consensus Sleep Diary-M) for

Abstract 46 Table 1

Winter Data Acquisition (Feb-March 2021, lockdown, home schooling)		8 schools; N _{final} = 60 (4 excluded)						Age 14.5; 72% female		
	Online Survey (nr participants)	TMB 1. Letter/Number Switching (nr participants)	TMB 2. Multiple Object Tracking (nr participants)	TMB 3. Verbal Paired Associate (nr participants)	TMB 4. Fast Choices Test (nr participants)	TMB 5. Visual Pairs (nr participants)	TMB 6. Continuous Concentration (nr participants)	EMAapp (nr participants; 3 weeks)	EMAapp (nr entries /43)*	Actigraph (3 weeks)
Pre questionnaire	56 (91%)	49 (81%)	46 (72%)	46 (72%)	46 (72%)	46 (72%)	45 (70%)	57 (95%)	19 (44%)	Upcoming
Post questionnaire	47 (75%)	47 (73%)	46 (72%)	46 (72%)	39 (63%)	39 (63%)	40 (64%)			
Summer Data Acquisition (May-June 2021, back to school)		3 schools; N _{final} = 15 (2 excluded)						Age 14; 34% female		
Pre questionnaire	15 (100%)	15 (100%)	14 (83%)	14 (83%)	14 (83%)	14 (83%)	14 (83%)	11 (73%)	21 (49%)	Upcoming
Post questionnaire	12 (74%)	12 (74%)	12 (74%)	12 (74%)	12 (74%)	12 (74%)	12 (74%)			

*no entries excluded

seven consecutive days electronically. On Day 7, participants completed three cognitive tasks (Ravens Standard Progressive Matrices, Wisconsin Card Sorting task and a Mental Rotation task). Standard measures of sleep continuity were derived from sleep diaries, including sleep onset latency (SOL), number of awakenings (NWAK), wake after sleep onset (WASO), time in bed (TIB) and sleep efficiency (SE%). Three Pearson's correlations were conducted between the cognitive tasks and sleep continuity measures. All p-values were adjusted for multiple comparisons (adjusted p-value = .01).

Results Overall, no association was found between subjective sleep continuity (SOL, NWAK, WASO, TIB and SE%) and Ravens Standard Progressive Matrices, Wisconsin Card Sorting task, or Mental Rotation accuracy scores (all p-values > .01).

Discussion These results indicate that fluid intelligence, mental rotation and set-shifting are not associated with subjective sleep continuity. Previous literature has found associations between objective sleep measures and sleep spindle activity (Bódizs et al., 2014; Ujma et al., 2015), therefore fluid intelligence may only be associated with objective sleep architecture.

48 CHARACTERISTICS OF INITIAL SLEEP STUDY IN INFANTS WITH PRADER WILLI SYNDROME

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Introduction Patients with Prader Willi syndrome are predisposed to problems with ventilatory control and sleep disordered breathing. This may be further impacted by the commencement of growth hormone in infancy. As a result early monitoring with sleep study is indicated, however it can be challenging to effectively counsel families about the expected results in the first few months of life due to the paucity of data pertaining to infants reported in the literature. **Methods** We retrospectively collected first sleep study and demographic data from 36 children with a confirmed diagnosis of Prader Willi syndrome as determined by tertiary endocrine assessment and genetic variant.

Abstract 48 Table 1 First sleep study parameters of infants with Prader Willi Syndrome. Results are reported in medians with inter-quartile ranges. (TcPCO₂ = transcutaneous carbon dioxide, AHI = apnoea hypopnoea index)

Characteristic, n=36	Result
Gender M:F (%)	23 (64%) : 13 (36%)
Age at first study, Decimal years	0.57 (0.46, 0.75)
ODI 3%, events per hr (n= 33)	7.44 (4.3, 12.5)
Mean Oxygen Saturations, %	97.2 (96.1, 98.6)
Minimum Oxygen Saturation, %	86 (81, 88.8)
Mean TcPCO ₂ , kPa (n= 35)	5.5 (5.15, 5.8)
Maximum TcPCO ₂ , kPa (n= 35)	6.1 (5.7, 6.5)
Total AHI, events/hour (n= 27)	3.8 (1.9, 9.1)
Obstructive AHI (OAH), events/hour (n=26)	0.95 (0.1, 2.8)
Central AHI (CAHI), events/hour (n=26)	1.65 (0.3, 4.8)
Mixed AHI (MAHI), events/hour (n=26)	0 (0, 0.13)
Undefined AHI (UAHI), events/hour (n=26)	0.00 (0.00, 0.1)

Results The clinical characteristics and sleep study parameters are described in table 1. Whilst the median results related to both gas exchange and ventilation are reassuring, 6 (23%) patients of the 26 who had a breakdown of their AHI had an OAH >5, with a maximum recorded OAH of 27.7. Six (23%) of the 26 who had a breakdown of their AHI had a CAHI >5, with a maximum recorded CAHI of 9.9

Discussion This data shows that whilst the majority of patients who undergo baseline sleep study for Prader Willi syndrome will have a normal result, 23% may be expected to have an excess of obstructive events. This project may serve as useful pilot data to help counsel families ahead of the initial sleep study. It is our intention to follow these patients and collect longitudinal data to determine if baseline results are predictive of future need for respiratory support or response to growth hormone.

49 A PILOT META-ANALYSIS ON CONCUSSION-RELATED SLEEP DISTURBANCES

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Fatigue and poor sleep have been shown as factors of post-concussive symptoms (Broshek et al., 2015, Brain injury). Students, previously reported to have poor sleep, thus might be at increased risk of concussion-related sleep disturbances (McGrath et al., 2010, Journal of athletic training). This study explored the relationship between concussion and sleep, to serve as a pilot for a systematic meta-analysis.

We searched the following databases MEDLINE, EMBASE, CINAHL, Web of Science, PsycINFO, Cochrane Central Register of Controlled Trials, MedNar and OAIster with the search terms: sleep, concussion, mild traumatic brain injury, college/university and sports. Only studies using the Epworth sleepiness scale (ESS) and the Pittsburgh sleep quality index (PSQI) were included. Studies were excluded if they included non-human animals, patients with other neurological conditions or military personnel. Two researchers performed the filtering independently.

Our search produced 4460 results. We removed 834 duplicates and examined a random subset of 8 studies that met our exclusion criteria as a pilot study. Our analysis totaled 1086 participants (683 concussed). Using a random-effects model containing 4 studies per outcome test, we found that concussion was associated with increased PSQI (standardised mean difference: 0.76, 95% confidence intervals [0.52, 1.01], τ^2 : 0.03, I²: 49.28%, p value < 0.0001), and ESS (standardised mean difference: 0.47, 95% confidence intervals [0.24, 0.70], τ^2 : 0.02, I²: 42.56%, p value < 0.0001).

Our results suggest a diagnosis of concussion or mild traumatic brain injury is associated with lower sleep quality, as measured by PSQI, and sleepiness as measured by ESS, in this population. Further analyses of the rest of our dataset, covariates of the studies, verifications of the updated literature and assessments of the quality of each study are required.