Supporting information

Methods

Children's Sleep Habits Questionnaire: Items were scored on a three-point Likert scale as follows: 'usually' if sleep behaviour occurred 5-7 times a week; 'sometimes' if it occurred 2-4 times a week; and 'rarely' for 0-1 times a week. In this sample, internal consistency of the night waking (α 0.55 controls; α 0.72 EP), sleep duration (α 0.73 controls; α 0.81 EP) and daytime sleepiness scores (α 0.67 controls, 0.76 EP) was moderate. Apart from night waking and daytime sleepiness for term-born controls, all other Cronbach's alpha values were acceptable [1] and in some instances higher than those reported in clinical (α 0.44-0.80) and community samples (α 0.54-0.69) [2].

Pediatric Sleep Questionnaire: Items were scored yes (1), no (0) or 'don't know' (missing). Due to overlap on the Du Paul ADHD rating scale, three items concerning fidgeting/squirming, being on the go/as if driven by a motor and interrupts or intrudes on others were taken from the ADHD rating scale and recoded from "never or rarely" to "no" and "sometimes", "often" or" very often" to "yes". Six items on the SDB subscale relate to ADHD symptoms, therefore meeting the SDB cut-off could not be used as an independent predictor of ADHD symptoms.

Du Paul ADHD Rating Scale-5: Items are rated on a four-point Likert scale as follows: "never or rarely", "sometimes", "often" or "very often". In this sample, internal consistency for the inattention subscale (α 0.90 term-born controls, α 0.94 EP) and the hyperactivity/impulsivity scale (α 0.77 term-born controls, α 0.90 EP) was good.

Strengths and Difficulties Questionnaire: In this sample, internal consistency was good (α 0.76 term-born controls; α 0.79 EP).

Statistical analyses: For comparison between paths in mediation models, fully standardised betas were calculated from the unstandardised betas produced by binary logistic regression using the following formula: $\beta = b(s_x)R/s_{logit(\hat{Y})}$ [3] where b is the unstandardised regression coefficient, s_x is the SD of the independent variable, R is $\sqrt{Cox\ and\ Snell\ R^2}$ and $s_{logit(\hat{Y})}$ is the SD of the predicted logits of the dependent variable.

Table S1. Inattention, hyperactivity and emotional problem scores for habitual snorers versus non-habitual snorers for children without severe neurodevelopmental disability (extremely preterm children and term-born children).

			Mean (SD)	Adjusted mean difference (95% CI)[a]	P value	Cohen's d
Inattention	Habitually snores	No n=207	6.4 (6.5)	4.6 (1.7, 7.5)	.002	0.68
		Yes n=24	11.6 (8.6)			
Hyperactivity-impulsivity	Habitually snores	No n=207	3.0 (4.0)	4.52 (2.6, 6.5)	<.001	0.76
		Yes n=24	7.9 (8.2)			
Emotional problems	Habitually snores	No= 207	2.1 (2.3)	0.74 (-0.27, 1.76)	.150	0.27
		Yes= 24	2.8 (2.8)			

[a] Adjusted for sex and Index of Multiple Deprivation

Table S2. Sleep disturbance and symptoms of sleep disordered breathing in extremely preterm children without severe disability and term-born controls at 11 years of age.

	Term-born controls		Extremely preterm without severe disability		Mean difference (95% CI)	p value	Adjusted Mean difference (95% CI) [a]	p value	Benjamini-Hochberg critical value	Unadjusted Cohen's d
	n	Mean (SD)	n	Mean (SD)						
Sleep duration	121	3.8 (1.3)	133	3.9 (1.5)	<0.1 (-0.3, 0.4)	.865	<0.1 (-0.3, 0.4)	.838	.050	0.07
Sleep onset latency	121	1.6 (0.7)	135	1.8 (0.8)	0.2 (0.2, 0.4)	**.033**	0.2 (<0.1, 0.4)	**.030***	.033	0.27
Night waking	116	3.4 (0.9)	133	3.7 (1.2)	0.3 (0.2, 0.6)	**.036**	0.3 (0.2, 0.6)	**.037***	.042	0.28
Daytime sleepiness	117	10.6 (2.6)	135	11.9 (3.4)	1.2 (0.5, 2.0)	**.001**	1.2 (0.5, 2.0)	**.002***	.017	0.43

	n	n (%)	n	n (%)	OR (95% CI)		Adjusted OR (95% CI)			
Sleep disordered breathing	112	2 (1.8)	129	29 (22.5)	16.0 (3.7, 68.6)	**<.001**	16.8 (3.9, 73.5)	**<.001 ***	.008	-
Snores more than half the time	104	4 (3.8)	127	20 (15.7)	4.7 (1.5, 14.2)	**.006**	4.8 (1.6, 14.9)	**.006***	.025	-

[a] Adjusted for sex and Index of Multiple Deprivation; Cohen's d: small effect=0.2, medium effect=0.5 and large effect=0.8; p values <.05 in bold; *p values remained significant after Benjamini-Hochberg correction, i.e. p value lower than Benjamini-Hochberg critical value. Only the primary outcomes for sleep disordered breathing and habitual snoring used in the mediation analysis are reported.

Table S3. Proportion of overweight/obese children according to habitual snoring status.

	Term-born controls		Extremely preterm children	
		Overweight/obese n (%)		Overweight/obese n (%)
Habitual snoring	n=4	2 (50.0)	n=32	9 (28.1)
No habitual snoring	n=99	16 (16.2)	n=118	21 (17.8)

Table S4. Partial correlations between Children's Sleep Habits Questionnaire sub-scale scores and inattention and hyperactivity/impulsivity symptoms and emotional problems for children without severe neurodevelopmental disability (extremely preterm children and term-born children), controlling for sex and index of multiple deprivation (n=245).

	Sleep duration	Sleep onset delay	Daytime sleepiness	Night waking
Inattention	.26**	.22**	.41**	.29**
Hyperactivity-impulsivity	.36**	.32**	.38**	.40**
Emotional problems	.35**	.25**	.40**	.32**

**P<.01; Missing values excluded listwise

References:

1. Tavakol M, Dennick R (2011) Making sense of Cronbach's alpha. Int J Med Educ 2:53

2. Owens JA, Spirito A, McGuinn M (2000) The Children's Sleep Habits Questionnaire (CSHQ): psychometric properties of a survey instrument for school-aged children. Sleep-New York- 23:1043–1052

3. Menard S (2011) Standards for standardized logistic regression coefficients. Soc Forces 89:1409–1428