



The longitudinal associations of sleep problems in early childhood with psychotic and borderline personality disorder symptoms in adolescence

Session title: The role of sleep in mental health disorders

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Association of Parent-Reported Sleep Problems in Early Childhood With Psychotic and Borderline Personality Disorder Symptoms in Adolescence

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Key Points

Question What is the association of early childhood sleep problems with psychosis and borderline personality disorder in adolescence?

Findings In this cohort study of data from 7155 participants, frequent night awakenings at 18 months and irregular sleep routines at 6 and 30 months and 5.8 years of age were associated with psychotic experiences, whereas shorter nighttime sleep duration and later bedtime at 3.5 years of age were associated with borderline personality disorder symptoms. Depression at 10 years of age mediated only the associations between frequent night awakenings at 18 months of age and irregular sleep routines at 5.8 years of age with psychosis.

Meaning The findings suggest that specific early childhood sleep problems are differentially associated with later psychopathologic symptoms.

Rationale of the study

Adolescence

Key developmental period to study many mental disorders

Brain hormonal changes occurring during this period

Key to identify relevant risk factors associated with increased risk of psychopathology in adolescence

Why sleep as risk factor (I)

Sleep is a key factor associated with **developmental psychopathologic symptoms**

Considered a **fundamental operating state** of the central nervous system, occupying up to one-third of human life



Why sleep in early childhood as risk factor (II)

Adequate sleep in childhood is essential for **optimal cognitive and emotional functioning**

The potential association **of sleep with frontal lobe functions** is especially relevant in early childhood, when the brain shows substantial **dynamic plasticity**



Advantages of investigating sleep as risk factor

Early behavioral sleep problems may **be modifiable risk factors** associated with future psychopathologic symptoms

Longitudinal studies

To determine whether sleep problems **precede** the development of psychopathology



Prospective studies examining sleep in childhood are needed



It is **still unclear** whether sleep problems **precede** their onset

Previous longitudinal studies between early sleep in childhood and psychopathology in adolescence

Only two studies have longitudinally reported the links between childhood sleep problems (nightmares) and subsequent mental health problems in adolescence

1

Nightmares across childhood and **psychotic experiences** in adolescence

2

Nightmares across childhood and **BPD** symptoms in adolescence

Possible explanations

Sleep problems indirectly increase the risk of psychosis and/or BPD by increasing the risk of depression (**depression as mediator**)

Sleep problems are associated with both disorders, appearing **earlier in development** than other psychopathologic symptoms

Sleep and both psychosis and BPD share **common underlying mechanisms**

Gap in the literature

- Previous studies focused only on parasomnias, whereas the associations of **more frequent sleep problems** (ie, behavioral sleep problems) are underinvestigated

Given that **15% to 30%** of children younger than 5 years experience **behavioral sleep problems**

- There is a need to understand these sleep problems

Psychotic symptoms are **common** among BPD, and **genetic overlap** exists

- Unclear whether sleep in childhood have a **similar** association with both conditions; or whether **different pathway**

Why this study?

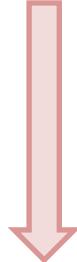
Scarce longitudinal studies
in the long run

- So far, main focus in nightmares
- *What happens with other more commonly observed sleep problems in childhood, such as behavioural sleep problems?*

Sleep associated with several
mental disorders

- Is there a specific pathway linking sleep and psychosis, or **do they share similarities** with other mental health problems?
- Psychosis and BPD some genetic overlap
- *Do sleep problems in early childhood equally affect psychosis and BPD in adolescence or do they present different pathways?*

Objective



- ❖ To examine the **prospective associations** between several parent-reported sleep problems in early childhood and psychotic and BPD symptoms at 11 to 13 years of age

- ❖ To investigate the **potential mediation** of the associations by **depression at 10 years of age**



Sample



Initial recruitment

-14,541 mothers during pregnancy

14,676 foetuses

14,062 live births

13,988 alive at 1 year

Data were available on **7155** participants

(3718 girls [52%]) who

reported on **psychotic experiences at 12 to 13 years** of age and **6333** (3280 girls [52%]) who reported on **BPD symptoms at 11 to 12 years**

Measures selected for this study

Sleep

Childhood

- Parent reported items
- 6, 18 and 30 months; 3.5, 4.8, 5.8, and 6.8 years
- Nighttime sleep duration, night awakenings, bedtime, and sleep routines

Other relevant variables

COVARIATES

Gender

Emotional Temperament

Family adversity

Childhood abuse

Prematurity

Maternal age when infant was born

Outcomes

BPD symptoms at 11-12 years

The UK Childhood Interview for DSM-IV Borderline Personality Disorder. The derived dichotomous outcome represented the frequent or repeated occurrence of 5 or more BPD symptoms.

Psychotic experiences at 12-13 years

Psychosis-Like Symptom Interview. We coded the presence of at least 1 definite psychotic symptom not attributable to sleep or fever.

Mediator

Depressive symptoms during the past 2 weeks were assessed using the short (13-item) Mood and Feelings Questionnaire. Total Mood and Feelings Questionnaire scores at **10 years** of age were obtained.

Table 2. Unadjusted and Adjusted Associations Between Childhood Sleep Patterns and Psychotic Experiences at 12 to 13 Years of Age^a

Sleep variable	Psychotic symptoms								
	Model A			Model B			Model C		
	β	P value	OR (95% CI)	β	P value	OR (95% CI)	β	P value	OR (95% CI)
Night sleep duration by age									
6 mo	-0.045	.35	0.96 (0.87-1.05)	-0.032	.51	0.97 (0.88-1.06)	-0.043	.38	0.96 (0.87-1.06)
18 mo	0.011	.88	1.01 (0.88-1.16)	0.009	.90	1.01 (0.88-1.16)	0.006	.93	1.01 (0.88-1.16)
30 mo	-0.065	.42	0.94 (0.80-1.10)	-0.060	.45	0.94 (0.81-1.10)	-0.064	.42	0.94 (0.80-1.10)
3.5 y	0.009	.92	1.01 (0.83-1.22)	0.038	.69	1.04 (0.86-1.26)	0.024	.80	1.02 (0.85-1.24)
4.8 y	0.019	.87	1.02 (0.82-1.27)	0.010	.93	1.01 (0.81-1.26)	-0.008	.94	0.99 (0.80-1.24)
5.8 y	0.031	.79	1.03 (0.82-1.29)	0.062	.59	1.06 (0.85-1.34)	0.045	.70	1.05 (0.83-1.31)
Bedtime by age									
6 mo	0.119	.02	1.13 (1.02-1.25)	0.095	.07	1.10 (0.99-1.22)	0.099	.06	1.10 (1.00-1.23)
18 mo	0.108	.16	1.11 (0.96-1.30)	0.085	.28	1.09 (0.93-1.27)	0.074	.34	1.08 (0.92-1.26)
30 mo	0.187	.03	1.20 (1.02-1.43)	0.127	.13	1.10 (0.96-1.30)	0.130	.13	1.11 (1.00-1.24)
3.5 y	-0.037	.73	0.96 (0.78-1.19)	-0.068	.52	0.94 (0.76-1.15)	-0.069	.52	0.93 (0.76-1.15)
4.8 y	-0.007	.95	0.99 (0.80-1.24)	0.012	.92	1.01 (0.81-1.26)	0.020	.86	1.02 (0.82-1.28)
5.8 y	-0.116	.36	0.89 (0.70-1.14)	-0.143	.25	0.87 (0.68-1.11)	-0.112	.37	0.89 (0.70-1.14)
Night awakenings frequency by age									
6 mo	0.046	.32	1.05 (0.96-1.15)	0.036	.44	1.04 (0.95-1.14)	0.045	.34	1.05 (0.95-1.15)
18 mo	0.131	.02	1.14 (1.02-1.27)	0.114	.04	1.12 (1.00-1.25)	0.120	.03	1.13 (1.01-1.26)
30 mo	-0.089	.360	0.92 (0.76-1.11)	-0.082	.41	0.92 (0.76-1.12)	-0.088	.38	0.92 (0.75-1.11)
3.5 y	0.093	.29	1.10 (0.92-1.30)	0.072	.42	1.08 (0.90-1.28)	0.075	.40	1.08 (0.91-1.28)
4.8 y	-0.016	.67	0.98 (0.92-1.06)	-0.016	.69	0.98 (0.91-1.07)	-0.023	.66	0.98 (0.88-1.08)
5.8 y	0.009	.69	1.01 (0.97-1.05)	0.010	.64	1.01 (0.97-1.06)	0.010	.63	1.01 (0.97-1.05)
Regular sleep routines by age									
6 mo	-0.432	.005	0.65 (0.48-0.88)	-0.362	.02	0.70 (0.51-0.95)	-0.387	.02	0.68 (0.50-0.93)
18 mo	-0.276	.11	0.76 (0.54-1.07)	-0.234	.18	0.79 (0.56-1.12)	-0.247	.16	0.78 (0.55-1.11)
30 mo	-0.499	.009	0.61 (0.42-0.88)	-0.488	.01	0.61 (0.42-0.90)	-0.439	.02	0.64 (0.44-0.95)
3.5 y	-0.093	.71	0.91 (0.56-1.49)	-0.003	.99	1.00 (0.60-1.64)	0.039	.88	1.04 (0.62-1.73)
4.8 y	-0.239	.40	0.79 (0.45-1.38)	-0.203	.48	0.82 (0.46-1.44)	-0.134	.65	0.88 (0.49-1.56)
5.8 y	-1.176	<.001	0.31 (0.19-0.50)	-1089	<.001	0.34 (0.20-0.55)	-1.140	<.001	0.32 (0.19-0.53)

Abbreviation: OR, odds ratio.

^a All the time points are included within the same model for each sleep variable. Standardized residuals are used as sleep measures at 18 and 30 months and at 3.5, 4.8, and 5.8 years, in which the sleep variables at later measurement time points are regressed on the corresponding variables at previous measurement

waves. Model A is the unadjusted model; model B, adjusted for emotional temperament at 2 years, family adversity, and childhood abuse; and model C, adjusted for emotional temperament at 2 years, family adversity, childhood abuse, sex, prematurity, and maternal age when infant was born.

Table 3. Unadjusted and Adjusted Associations Between Childhood Sleep Patterns and Borderline Personality Disorder Symptoms at 11 to 12 Years of Age^a

Sleep variable	Borderline personality disorder symptoms								
	Model A			Model B			Model C		
	β	P value	OR (95% CI)	β	P value	OR (95% CI)	β	P value	OR (95% CI)
Night sleep duration by age									
6 mo	-0.035	.41	0.96 (0.89-1.05)	-0.043	.31	0.96 (0.88-1.04)	-0.040	.36	0.96 (0.88-1.05)
18 mo	-0.049	.44	0.95 (0.84-1.08)	-0.050	.42	0.95 (0.84-1.08)	-0.063	.33	0.94 (0.83-1.06)
30 mo	-0.027	.71	0.97 (0.84-1.12)	-0.011	.88	0.99 (0.86-1.14)	-0.009	.91	0.99 (0.86-1.14)
3.5 y	-0.234	.005	0.79 (0.67-0.93)	-0.193	.02	0.82 (0.70-0.97)	-0.245	.004	0.78 (0.66-0.92)
4.8 y	0.115	.25	1.12 (0.92-1.36)	0.119	.23	1.13 (0.93-1.37)	0.163	.11	1.18 (0.96-1.44)
5.8 y	0.104	.32	1.11 (0.90-1.36)	0.073	.48	1.08 (0.88-1.32)	0.051	.62	1.05 (0.86-1.29)
Bedtime by age									
6 mo	0.093	.046	1.10 (1.00-1.20)	0.089	.06	1.09 (1.00-1.20)	0.082	.09	1.09 (0.99-1.19)
18 mo	0.043	.55	104 (0.91-1.20)	0.050	.48	1.05 (0.92-1.21)	0.056	.43	1.06 (0.92-1.22)
30 mo	-0.079	.35	0.92 (0.78-1.09)	-0.098	.25	0.91 (0.77-1.07)	-0.088	.31	0.92 (0.77-1.08)
3.5 y	0.269	.005	1.31 (1.08-1.58)	0.227	.02	1.25 (1.48-1.52)	0.274	.005	1.32 (1.08-1.60)
4.8 y	-0.151	.15	0.86 (0.70-1.06)	-0.153	.14	0.86 (0.70-1.05)	-0.210	.053	0.81 (0.66-1.00)
5.8 y	-0.044	.69	0.96 (0.77-1.19)	-0.040	.71	0.96 (0.78-1.19)	-0.032	.77	0.97 (0.78-1.20)
Night awakenings frequency by age									
6 mo	-0.082	.09	0.92 (0.84-1.01)	-0.085	.08	0.92 (0.84-1.01)	-0.078	.12	0.92 (0.84-1.02)
18 mo	0.021	.69	1.02 (0.92-1.14)	-0.002	.97	1.00 (0.90-1.11)	-0.024	.68	0.98 (0.87-1.09)
30 mo	0.090	.28	1.09 (0.93-1.29)	0.088	.30	1.09 (0.93-1.29)	0.104	.22	1.11 (0.94-1.31)
3.5 y	0.096	.20	1.10 (0.95-1.28)	0.073	.34	1.08 (0.93-1.25)	0.060	.45	1.06 (0.91-1.24)
4.8 y	-0.025	.57	0.98 (0.90-1.06)	-0.033	.59	0.97 (0.86-1.09)	-0.033	.60	0.97 (0.86-1.10)
5.8 y	0.008	.64	1.01 (0.97-1.04)	0.010	.60	1.01 (0.97-1.05)	0.011	.57	1.01 (0.98-1.05)
Regular sleep routines by age									
6 mo	0.091	.57	1.10 (0.80-1.49)	0.140	.38	1.15 (0.84-1.58)	0.139	.40	1.15 (0.83-1.58)
18 mo	-0.223	.16	0.80 (0.58-1.10)	-0.167	.30	0.85 (0.62-1.16)	-0.154	.35	0.86 (0.62-1.19)
30 mo	0.128	.54	1.14 (0.76-1.71)	0.184	.38	1.20 (0.80-1.82)	0.179	.40	1.20 (0.79-1.82)
3.5 y	-0.428	.06	0.65 (0.41-1.02)	-0.357	.12	0.70 (0.44-1.10)	-0.343	.15	0.71 (0.44-1.13)
4.8 y	0.106	.71	1.11 (0.63-1.95)	0.156	.59	1.17 (0.67-2.05)	0.217	.46	1.24 (0.70-2.22)
5.8 y	-0.511	.06	0.60 (0.35-1.03)	-0.327	.26	0.72 (0.41-1.27)	-0.395	.17	0.67 (0.38-1.10)

Abbreviation: OR, odds ratio.

^a All the time points are included within the same model for each sleep variable. Standardized residuals are used as sleep measures at 18 and 30 months and at 3.5, 4.8, and 5.8 years, in which the sleep variables at later measurement time points are regressed on the corresponding variables at previous measurement

waves. Model A is the unadjusted model; model B, adjusted for emotional temperament at 2 years, family adversity, and childhood abuse; and model C, adjusted for emotional temperament at 2 years, family adversity, childhood abuse, sex, prematurity, and maternal age when infant was born.

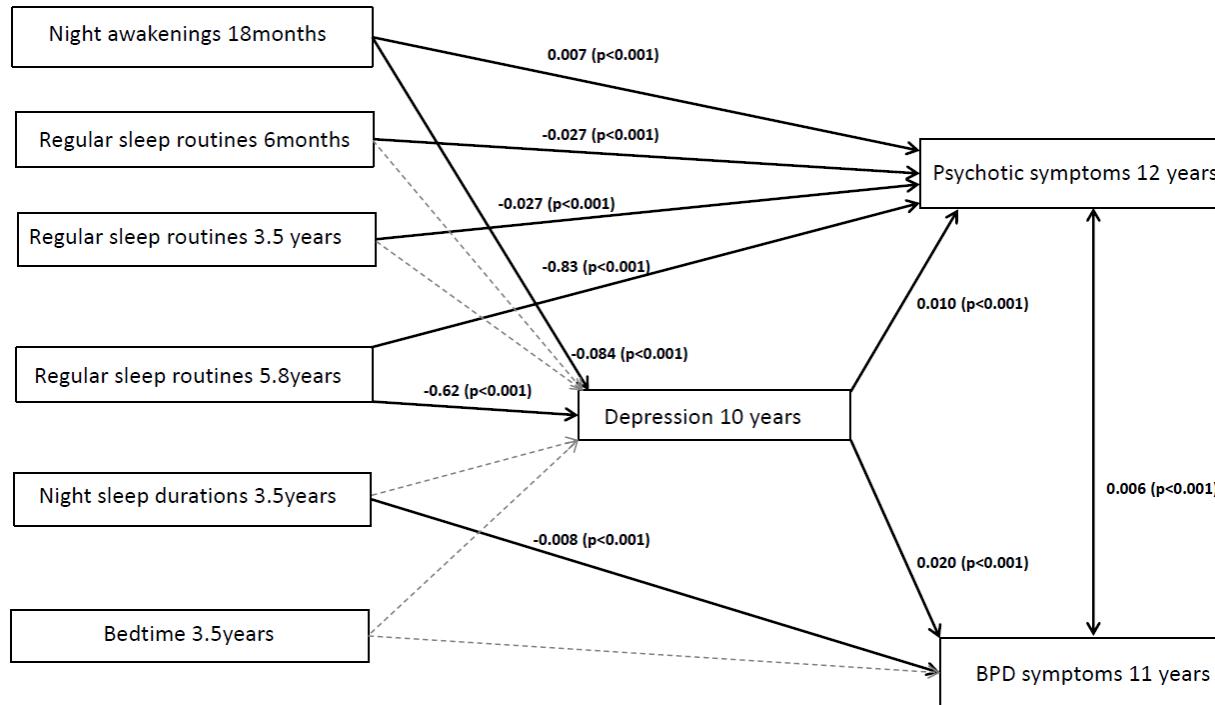


Table 4. Bootstrapped bias-corrected confidence intervals and p values for the Hypothesized Indirect Pathways to Psychotic Experiences and BPD Symptoms with Depression as Mediator

	Psychotic experiences at 12-13 years Via Depression at 10 years			BPD symptoms at 11-12 years Via Depression at 10 years		
	Lower Bound	Upper Bound	p	Lower Bound	Upper Bound	p
Family Adversity	0.021	0.032	0.003	0.042	0.056	0.003
Childhood abuse	0.004	0.011	0.003	0.008	0.019	0.003
Prematurity	0.002	0.008	0.002	0.004	0.014	0.003
Sex	-0.009	-0.004	0.006	-0.017	-0.007	0.005
Maternal age when born	-0.011	-0.005	0.002	-0.020	-0.009	0.002
Emotional temperament 2 years	0.005	0.011	0.005	0.009	0.020	0.005
Nigh awakening 18 months	-0.008	-0.002	0.002	-----	-----	-----
Regular sleep routines 6 months	-0.004	0.001	0.300	-----	-----	-----
Regular sleep routines 3.5 years	-0.002	-0.009	0.713	-----	-----	-----
Regular sleep routines 5.8 years	-0.010	-0.003	0.003	-----	-----	-----
Night sleep duration 3.5 years	-----	-----	-----	-0.012	0.002	0.225
Bedtime 3.5 years	-----	-----	-----	-0.001	0.121	0.119

Psychosis at 12-13 years

- **Frequent night awakenings** at 18months
- **Irregular sleep routines** at 6 and 30 months, and 5.8 years

BPD at 11-12 years

- **Shorter nighttime** sleep duration at 3.5 years
- **Later bedtime** at 3.5 years

Depression 10 years

- Mediator
- Only the associations between **frequent night awakenings** at 18 months and **irregular sleep routines** at 5.8 years with later psychotic experiences

Some **specificity** between particular early sleep difficulties and later differing psychopathologic symptoms (BPD vs Psychosis)

Important implications for helping practitioners **identify** children who might be at **higher risk** for psychotic experiences or BPD symptoms in adolescence

Design of more effectively **targeted sleep or psychological interventions** to prevent the onset of or attenuate these mental disorders



**THANKS FOR
YOUR
ATTENTION!**