

INTRODUCTION

Temperament refers to the constellation of *individual differences determining how children experience the world*.^[1]

As an information processing system shaping adjustment, temperament may help explain different mental states associated with chronotypes and behaviors associated with sleep disturbance. However, little is known about chronotype and sleep disturbance association with temperament in school-age children.

We aimed to analyze temperament in relation to morningness-eveningness [M/E] and sleep problems in middle childhood.

RESULTS

	Bedtime resistance	Snoring	Nightmares	Somniloquy	Bruxism	Sleepiness
Activity	.126*	.080	.159**	.061	.126*	.086
Emotionality	.163**	.149**	.164**	.158**	.117*	.122*
Sociability	-.046	-.019	.089	.094	.083	.051
Task persistence	-.225***	-.083	-.043	-.128*	-.108*	-.134*
M/E	.152**	-.029	-.103	-.033	.153*	.101

Pearson partial correlations between the diurnal type, temperament, and sleep problems controlling for age and gender. * $p < .05$, ** $p < .01$, *** $p < .001$

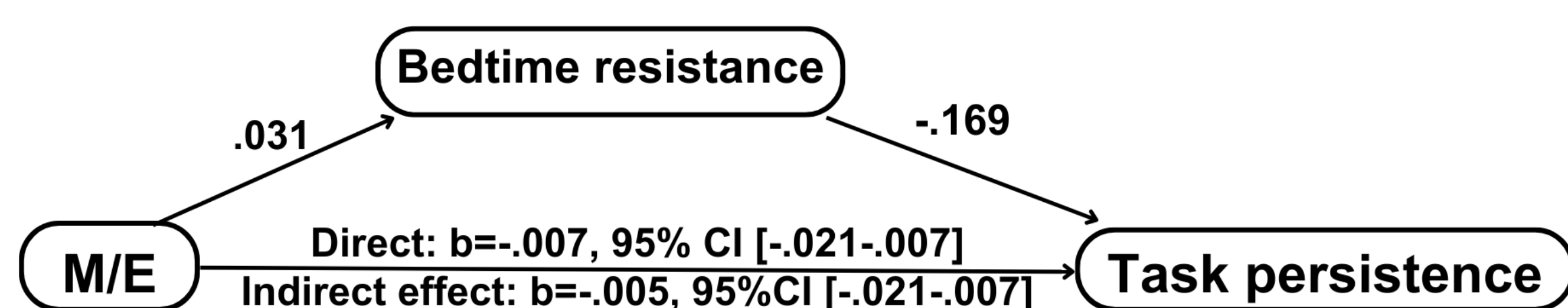
↑ **task persistence**: ↓ **daytime sleepiness, bruxism, somniloquy, and bedtime resistance.**

↑ **emotionality**: ↑ **bedtime resistance, snoring, nightmares, somniloquy, bruxism, and sleepiness.**

↑ **activity**: ↑ **bedtime resistance, nightmares, and bruxism.**

↑ **M/E**: ↑ **bedtime resistance and bruxism.**

M/E was significantly associated with task persistence ($r = .13$, $p = .03$), but not other temperament domains. A mediation analysis was performed to assess the role of bedtime resistance in the relationship between M/E and task persistence.



The relationship between M/E and task persistence was mediated by bedtime resistance, with lower bedtime resistance associated with greater task persistence.

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METHODS

Participants: parents/guardians of 376 school children (3rd, 4th, and 5th grades) aged 8-11 years old (52.13% girls)

Measures & outcomes:

Children's Chronotype Questionnaire [2,3] ↑ (↓) **M/E scores** ↔ ↑ (↓) eveningness

Children's Sleep-Wake Patterns Questionnaire [4] ↑ (↓) scores ↔ ↑ (↓) **sleep problems**

School-Age Temperament Inventory [1,5] **4 temperamental traits** [**EMOTIONALITY**: intensity and frequency with which the child expresses negative affect; **TASK PERSISTENCE**: degree of self-direction a child exhibits in fulfilling tasks and other responsibilities; **ACTIVITY**: the child's initial response to new people and situations; **SOCIABILITY**: large motor activity]. > scores: the child is high in negative reactivity, task-persistent, active, and tends to withdraw.

DISCUSSION

Our results support the **association between sleep problems and temperamental traits** (higher emotionality, higher activity, and lower task persistence) **in middle childhood**, but suggest **temperament is poorly correlated with M/E in children.**

M/E was only associated with task persistence, and this relationship was mediated by bedtime resistance. Morningness-oriented children who offer less bedtime resistance exhibit higher self-direction in fulfilling tasks and responsibilities. Evening-oriented children may refuse to go to bed, impacting parent-child interactions, which are known to be related to task-persistence development.^[6]

We can hypothesize that **temperament/personality differences** described in adolescents and adults do not solely depend on chronotype but **develop over time through the interplay between diurnal type and environmental factors** (i.e., diurnal types are differently affected by **uniform social schedules**).

These results may have important implications as low task performance predicts low school achievement.^[6,7]

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