Toddler Aggression : An Interactive Function of Sleep and Daytime Activity

Indiana University

Megumi Kuwabara, Angela D. Staples, Jackson A. Goodnight, John E. Bates

Introduction

•Greater amounts of sleep disruption predict more negative behavior in school for preschoolers (Bates, et al., 2002).

•Greater sleep disruption predicts more negative emotionality for toddlers with Difficult and Resistant to Control temperaments (Staples, et al., 2005).

•Sleep disruption and boredom proneness predict hyperactivity scores in adults (Kass, et al., 2003).

•Sleep efficiency improved by the increase in daytime activity level for elderly male samples (Shirota, et al. 2000).

•Children at risk for sleep-disordered breathing had more aggressive behaviors reported by mothers (Chervin, et al. 2003).

Questions

•Does sleep disruption predict aggressive behaviors?

•Do sleep disruption and daytime activity level interact in predicting aggressive behaviors?

Methods

Participants

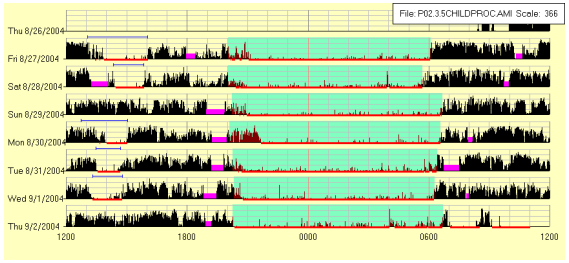
•27 child (2.5 years old) and parent pairs

Procedure

•Actigraphs were worn by children for 6 nights and 7 days
Sleep variables derived via Sadeh algorithms

•Sleep Diaries were kept by parents about children's sleep (ie: time woke up, time got up, time put down on the bed)

•Parents were asked to fill out the Proactive and Reactive Aggression Scale and the Child Misbehavior Questionnaire



"1200" = noon, "1800" = 6 PM, "0000" = midnight, "0600" = 6 AM
Green shaded area = diary-reported night time sleep
Red underline = actual sleep (very low activity as detected by the actigraph watch)
Blue line on top = diary-reported nap time
Pink block = no actigraph data (watch not worn)

Variables used for Analysis

•Sleep Disruption composite: averaged z-scores of the standardized composite of variability of bedtime, amount of sleep, and lateness of bedtime

•Daytime Activity Level : the mean daytime activity level excluding naps

•Percentage Sleep: the time asleep vs. time awake between falling asleep and waking in the morning

•Nighttime Activity Level : the mean night time activity level (movements during sleeping)

•Proactive and reactive aggression

•Hit other kids: from the Child Misbehavior Questionnaire

•Hit adults: from the Child Misbehavior Questionnaire

Results

Main Effects

•Nighttime Activity Level predicted Hit other kids r=.411
•Nighttime Activity Level predicted Hit adults r=.410

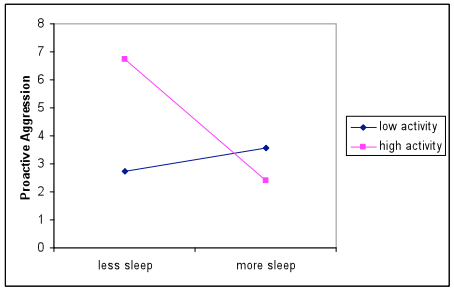
Interaction Effects

•Percentage of sleep, daytime activity level, and a sleep-activity interaction term predicted proactive (adj. r^2 =.37; $F(3,21) = 5.12$, $p < .05$)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part
1	(Constant)	3.855	.279		13.823	.000			
	Zscore: up activity mean (mean daytime activity)	.709	.328	.421	2.162	.044	.130	.454	.374
	Zscore: true sleep period percent sleep (percent of time sleeping between falling asleep and waking up)	-.871	.307	-.544	-2.835	.011	-.263	-.556	-.491
	slppXdact	-1.284	.361	-.758	-3.556	.002	-.347	-.642	-.616

a. Dependent Variable: Home Behavior - Proactive Aggression at 30 Mo

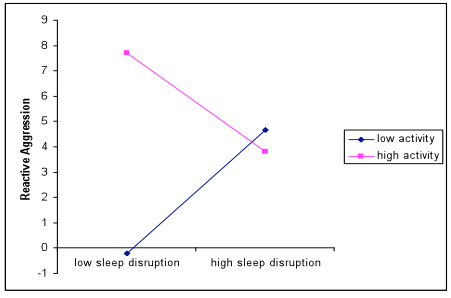


•sleep disruption, daytime activity level, and a sleep-activity interaction term predicted reactive aggression (adj. r^2 =.24; $F(3,26) = 3.68$, $p < .05$)

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Correlations Zero-order	Correlations Partial	Correlations Part
1	(Constant)	3.993	.544		7.338	.000			
	Zscore: up activity mean (mean daytime activity)	1.768	.610	.641	2.897	.008	.282	.517	.497
	Late Bed, Var Bedtime, VarAmount	.254	.914	.051	.277	.784	-.151	.058	.048
	Interaction: z score Late Bed,Var Bedtime, VarAmount X z score daytime activity	-2.194	.772	-.614	-2.841	.009	-.246	-.510	-.487

a. Dependent Variable: Home Behavior - Reactive Aggression at 30 Mo



General Discussion

Summary of Results

•Children who were highly active during the day (+ 1 SD) and slept a higher percent of their time in bed were less likely to initiate aggressive interactions, suggesting that they were more able to regulate their behavior.

•Highly active children who experienced more disrupted sleep were less likely to respond aggressively, while those who experienced less disrupted sleep showed more reactive aggressive responses.

Perhaps highly active children who experience poor sleep quality may have less social engagement, which may lead to less opportunity for aggression. In contrast, highly active children who are well rested may be more likely to interact with others, which may create more opportunities for conflict (e.g., about toys).

Limitation

The generalizability of these result is limited due to small number of participants and predominately middle class, European American sample.

Future Direction

- How temperament of active children plays a role in sleep and aggressive behavior.
- How these variables interact in older children (3 and 3.5 years old).

For further questions

Please contact mekuwaba@indiana.edu

More information on this and related projects are available at www.indiana.edu/~batessdl/