

Toddler Negative Emotion as an Interactive Function of Sleep Disruption and Temperament

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INTRODUCTION

Disruptions in sleep may interfere with neural processes central in developing self-regulation (Dahl, 1996).

Recent research found that greater amounts of sleep disruption predicted more negative behavior in school for preschool aged children (Bates, et al., 2002).

The relation between sleep and school adjustment was moderated by temperamental resistance to control. Greater sleep disruptions were more detrimental for highly resistant children (Bates, et al., 2003).

The present study asked whether temperament moderates the relation between sleep and self-regulation of emotion in toddlers.

METHODS

Participants

- 21 mother-child dyads
- Children's age = 30 months
- 8 girls



Measures

- Activity monitor worn 4 nights
- Daily Sleep Diary
- Infant Characteristics Questionnaire

Negative emotion task

- 5 min during a home visit
- Mothers chose the situation (e.g. bath, hair cut)

RESULTS

Table 1
Descriptive Statistics

Variable	M	SD	Range
Bedtime	21:13	0:53	20:03 – 23:57
Amount of Sleep (h:mm)	9:29	0:44	7:50 – 10:34
Time to Fall Asleep - Variability	0:39	0:25	0:02 – 1:41
ICQ – Difficult	24.63	8.00	14 – 43
ICQ – Resistant to Control	13.70	3.27	7 – 21
Expressed negative emotion (sec)	36.52	27.79	0 – 118.65

Table 2
Bivariate Correlations

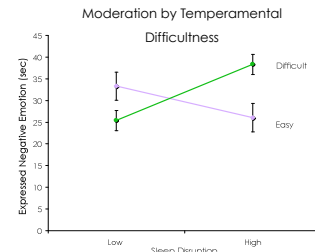
Variable	2	3	4	5	6	7
1. Bedtime						
2. Amount of Sleep	-.10	-.46*	.07	-.20	.05	.06
3. Time to Fall Asleep Variability		-.07	-.08	-.11	-.01	.17
4. Sleep Disruption			.77**	.59**	.48*	.39
5. ICQ – Difficult				.31	.46*	.37
6. ICQ – Resistant to Control					.67**	.23
7. Expressed Negative Emotion						.25

Note. Sleep disruption is a composite of the standardized values for bedtime, amount of sleep, and variability of time to fall asleep.
* $p < .05$ ** $p < .01$

Table 3
Prediction of Duration of Expressed Negative Emotion

Variable	B(SE)	β	t	AR ²
Sleep Disruption	-.04(.13)	-.061	-0.29	.319*
ICQ – Difficult	.09(.09)	.026	1.09	
Difficult x Sleep Disruption	.22(.08)	.575	2.97*	
Sleep Disruption	-.05(.13)	-.077	-0.41	.483**
ICQ – Resistant to Control	-.02(.09)	-.049	-0.24	
Resistant x Sleep Disruption	.29(.07)	.804	4.00**	

Note. β = unstandardized coefficients of the estimated regression model; β = standardized coefficient; AR² = adjusted proportion of explained variance.
* $p < .05$ ** $p < .01$



Children's bedtimes and amount of nightly sleep were similar to those of preschoolers (Bates, et al., 2002, 2003).

Children with later bedtimes had less variability in the amount of nightly sleep.

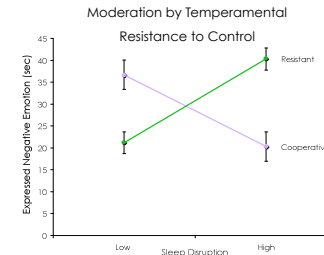
Children who were more difficult or resistant to control had more variability in time to fall asleep.

Children who were more resistant to control experienced more sleep disruption.

Multiple regression tested the moderating influence of temperament on the relation between sleep and expressed negative emotion.

Sleep disruption was the standardized composite of bedtime (mother report), amount of sleep (actigraph) and variability in the time to fall asleep.

To investigate the significant interaction, sleep disruption was split into high (+1 SD) and low groups (-1 SD) as were Difficult and Resistant to Control groups creating Difficult / Easy and Resistant / Cooperative groups respectively.



DISCUSSION

Summary of Findings

Difficult and Resistant children with large amounts of sleep disruption expressed negative emotions longer than Difficult and Resistant children with low amounts of sleep disruption.



An unexpected finding was that Cooperative children with little sleep disruption expressed negative emotions for the same time as Difficult and Resistant children with large amounts of sleep disruption.

The findings suggest that adequate sleep is especially important for emotion and its regulation in toddlers who are highly reactive (Difficult) and resistant to control.

Limitations and Future Directions

The generalizability of these results are limited due to the small sample size from a predominately middle class, European American sample.

Longitudinal data is currently being collected to replicate these findings in a larger sample with a standardized conflict task and to examine the developmental nature of regulatory ability and sleep patterns.

FOR FURTHER INFORMATION

Please contact adstaple@indiana.edu.

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