Supplementary File IV for Bursty, irregular speech input to preschoolers predicts vocabulary size

1 The relationship between naps and vocabulary outcomes

Here we evaluate the relationship between nap duration and concurrent vocabulary size. Here we assume that the duration of the child's nap during the recording is representative of their typical nap duration. We first removed recordings that did not contain any sleep (N=3). We could not reliably distinguish between potential overnight sleep and naptimes, so we then removed all recordings that contained nighttime sleep epochs (recorded overnight) to be maximally conservative. We also removed this because we did not have data on the duration of children's typical overnight sleep (the recorder was either turned off when the child went to bed or the battery would run out shortly after). We limited the analysis to children under 42 months who we assumed would still be taking daily naps. Finally, if a child only had 1 isolated epoch (5-minute segment) of sleep, we did not consider this to be a true "nap' ' (our modeling results were the same whether or not we took this data cleaning step). This resulted in N=124 remaining recordings from N=115 children.

To model the relationship between nap duration and concurrent vocabulary size, we fit a baseline linear mixed effects model to predict children's vocabulary size for the N=114 children. The baseline model included a random intercept for child and fixed effects of Child Age (in months, centered and scaled), Maternal Education (centered and scaled), and Child Gender (contrast coded). To this model we added an effect of Nap Duration (centered and scaled) which improved upon the baseline model (χˆ2=4.45, p=.03). The model summary is listed in Table 1. There was a significant, positive relationship between nap duration and concurrent vocabulary (β=0.15, p=.03), suggesting that children who tend to take longer naps may have larger receptive vocabularies.

Table 1

The relationship between nap duration and concurrent vocabulary size

Intercept	107.91***
	(104.28, 111.54)
	t = 58.25
	p < .001
Age (mos)	2.33***
	(1.75, 2.90)
	t = 7.95
	p < .001
Gender:Female	3.86
	(−1.39, 9.11)
	t = 1.44
	p = 0.15
Mat. Ed.	4.37***
	(2.15, 6.60)
	t = 3.86
	p < .001
Nap Duration (mins)	0.15*
	(0.01, 0.29)
	t = 2.16
	p = 0.03
Observations	122
Log Likelihood	−491.06
Akaike Inf. Crit.	996.12
Bayesian Inf. Crit.	1,015.75

Note: *p<0.05; **p<0.01; ***p<0.001