**Supplementary Materials**

1. **Participant exclusion**
   For our purposes, a nap was defined a sleep duration of at least 30 consecutive minutes following prior work (Gómez, Bootzin, & Nadel, 2006; Horváth, Myers, Foster, & Plunkett, 2015). Five children did not stay in the condition they were assigned to and were therefore excluded from analysis: 2 did not nap (for at least 30 minutes) in the Nap condition, and 2 napped (for any duration) in the Wake condition.

2. **Design and materials**
   The trials were presented in one of two orders: in the *forward* order, from first to last the novel verbs were *fez*, *moop*, *lorp*, and *biff*; and in the *backward* order, they were *biff*, *lorp*, *moop* and *fez*. Preliminary analyses showed no difference between orders ($t$ = -0.79, $p$ = 0.44), so we reported results collapsing across them. See the table below for trial information.

| Trial | Verb | Causative Event | Synchronous Event |
|---|---|---|---|
| **1** | *fez* | girl bouncing ball | girl and ball both rocking side to side |
| **2** | *moop* | boy spinning girl | boy and girl both waving |
| **3** | *lorp* | man opening box | man and box both falling |
| **4** | *biff* | girl pulling another girl | both girls squatting |

3. **Sleep**
   a. *Measuring Sleep.* In addition to collecting parental logs, we also had children wear an actigraphy monitor (Phillips ActiWatch) (So, Adamson, & Horne, 2007) as a backup in case parents did not complete the log, but all parents did. We did not use the actigraphy data because all children spent some portion of the delay in a moving vehicle which can be misinterpreted as movement by the actigraphy monitor (e.g., Meltzer, Montgomery-Downs, Insana, & Walsh, 2012; Tsai & Thomas, 2010).
   b. *Sleep information.* On average, children in the Nap Condition napped for 100.33 minutes during the delay (SD = 39.74). The average duration between these children's completion of Visit 1 and the onset of sleep was 95.29 minutes (SD = 38.12), and the duration between the offset of sleep and the start of Visit 2 was 153 minutes (SD = 45.52). The average duration of the total delay time was 250.00 minutes (SD = 49.75) for the Nap Condition, longer than 179.95 minutes (SD = 31.21) for the Wake Condition ($p < 0.001$). This was not expected and was not part of the planned analyses. But we ran the second-order orthogonal polynomial model with delay duration (in hours) added, and found no effect of delay duration ($p$ = 0.36). In addition, there was no correlation between task performance and delay duration (see 3c below). We also collected parental reports on children's usual sleep hours outside of the context of the study. Children in the Nap condition slept for an average of 12.77 hours (SD = 1.24), composed of 10.54 hours nighttime sleep and 2.24 hours daytime sleep. Children in the Wake condition slept for an average of 12.27 hours (SD = 1.24), on a par with children in the Nap condition ($p$ = 0.20), composed of 9.94 hours nighttime sleep and 2.33 hours daytime sleep.

c. *Correlation with task performance.* We asked whether performance on the verb-learning task correlated with sleep- or timing-related measures. Focusing on the 2.5 seconds of the Response window, we calculated for each participant a performance difference score (PDS), calculated as the mean proportion of causative scene looks at Visit 2 minus that at Visit 1. For children in the Nap condition, we asked whether PDS correlated with a) the duration of the child's nap, b) time between Visit 1 completion and sleep onset in the Nap Condition, or c) time between sleep offset and start of Visit 2 in the Nap Condition. For children in both Conditions, we asked whether PDS correlated with d) duration of the interval between Visit 1 and Visit 2, or e) the time of day the tests happened.[1] No significant correlations were found. See the table below for a summary of the statistics.

| **Correlation analyses** | **Condition** | **t** | **DF** | **p** | **Correlation** |
|---|---|---|---|---|---|
| PDS & nap duration | Nap only | -1.02 | 19 | 0.32 | -0.23 |
| PDS & time between V1 completion and sleep onset | Nap only | -0.65 | 19 | 0.52 | -0.15 |
| PDS & time between sleep offset and V2 start | Nap only | 0.13 | 19 | 0.90 | 0.029 |
| PDS & time between V1 completion and V2 start | Nap | -0.33 | 19 | 0.74 | -0.076 |
| PDS & time between V1 completion and V2 start | Wake | 1.00 | 19 | 0.33 | 0.22 |
| PDS & V1 completion time of day | Nap | -1.062 | 19 | 0.30 | -0.24 |
| PDS& V1 completion time of day | Wake | -1.76 | 19 | 0.095 | -0.37 |
| PDS & V2 start time of day | Nap | -0.95 | 19 | 0.35 | -0.21 |
| PDS & V2 start time of day | Wake | -1.47 | 19 | 0.16 | -0.32 |

## 4. GCA models

The models had Condition and Visit as fixed effects (adopting a deviation coding scheme (Wake as -.5 and Nap .5; Visit 1 -.5 and Visit 2 .5)), Time (collapsed into bins of 50 ms) as a continuous predictor, and Participant as a random factor. We applied the empirical logit transformation to the categorical dependent variable (i.e., target vs. non-target), which is robust to values at or near the boundaries 0 and 1 (Barr, 2008).

## 5. Data

We have made our data and R codes for data analyses available on Open Science Framework (https://osf.io/8jqkn).

[1] We converted the times at which Visit 1 ended and Visit 2 started into numerical numbers (e.g., 11:35am is converted into 11+35/60=11.58; 2:40pm is converted into 14+40/60=14.67), and conducted correlational analyses between these numbers and the performance difference score.

**References**

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