**Supplement 1. Sleep data cleaning details**

Acronyms: SE=Sleep efficiency; SOL=Sleep onset latency; SQ=Sleep quality; TIB=Time in bed; TST=Total sleep time; TWAK=Terminal wakefulness; WASO=Wake after sleep onset

**I. Sleep diary data cleaning details**

1. Long Terminal Wakefulness (TWAK):

For some participants on some nights, self-reported TWAK (time between final awakening and final arising) was very long (i.e., hours), which impacted time in bed (TIB) and ultimately sleep efficiency (SE). Due to the sleep diary questions included in the current study, TWAK includes both the time after an individual wakes up (but may be trying to go back to sleep) AND time hanging out in bed after waking up (texting, reading, etc.). As a result, longer TWAK leads to longer TIB, which ultimately underestimates SE. Some researchers (e.g., Reed & Sacco, 2016) have suggested rethinking the denominator in SE (which takes into account all time in bed, including TWAK). Instead of TWAK (which may include hanging out in bed without the intention of going back to sleep), some work includes only time after awakening when an individual was actively trying to go back to sleep (a better complement to sleep onset latency [SOL] on the front end of the sleep period). Unfortunately, the current study did not include sleep diary questions assessing this component of the sleep pattern.

With the data available in the current study, TWAK (and related TIB and SE estimates) were calculated in three ways:

* 1. Use TWAK as reported by the participant (used widely in the field, Carney et al., 2002 using the core sleep diary questions). This metric may underestimate SE.
	2. Exclude TWAK and calculate TIB without TWAK. Sleep period starts with the intention to fall asleep and ends with the final awakening. This metric may overestimate SE.
	3. Modify TWAK to account for outliers defined as TWAK > 30 minutes. This metric is aimed at more accurately estimating SE. For outliers, compare wake time on the TWAK outlier day to the average wake time for that person (computed averages separately for weekdays and weekends):
		1. If wake time is within the .5 *SD* range of average wake times, recode TWAK as 30 minutes max.
		2. If wake time is more than .5 *SD* later than the average wake time, recode TWAK as 10 minutes max.
		3. If wake time (WT) is more than 0.5 *SD* earlier than the average wake time, recode TWAK = average WT - WT on that day
		4. If newly calculated TWAK is greater than outlier, keep original value.
1. If TWAK is negative (i.e., final awakening reported as later than time getting out of bed [final arising]). In all cases, the difference was no more than 50 minutes. The decision was made to flip the estimates for final awakening and final arising (i.e., final arising will be later than final awakening). With this decision, we assume the adolescent did not understand the questions, but that they are reporting times that are close and likely meant the reverse.
2. If TST is negative (i.e., SOL + WASO > TIB) → Code data as missing (-88)
3. If SOL reported as a range (e.g., 5-15 minutes) → Code as middle of the range (e.g., 10 minutes)
4. If SOL reported as less than one minute (e.g., 10 seconds) → Code 0-29 seconds as 0 minutes; Code 30-59 seconds as 1 minute
5. If sleep parameter is reported as “about 2 hours” → Code as 2 hours
6. If sleep parameter is reported as a “few minutes” → Code as 5 minutes
7. If sleep parameter is reported as “a couple of hours” → Code as 2 hours
8. If sleep parameter is reported as “a few hours” → Code as 3 hours
9. The following responses were coded as missing data (-88)
	1. “hours” or “many many hours”
	2. “a while”, “not long”, or “all night”
	3. “fell right asleep”
	4. “can’t remember” or “don’t know”

**II. Actigraphy data cleaning details**

1. Two authors manually inspected to verify adherence and detect potential outliers.
2. Philips Actiware software automatically generates sleep-wake statistics needed for our analyses. The following Actiware parameters were used to score actigraphy data:
	* + - 1. Immobile minutes for sleep onset and sleep offset: set to 10 minutes (default)
				2. Wake threshold selection: High

*Decisions made during this process are detailed below:*

1. Multiple/additional sleep intervals in a 24-hour period were identified for 58% of participants on at least one day and a total of 6% of days in the dataset (i.e., this occurred for most participants once but on a very small number of days across the dataset).
	1. There are two options for coding multiple sleep intervals.
		1. Continuation of primary sleep interval (TST)
		2. Separate period of sleep distinct from the primary sleep interval (i.e., napping or a secondary sleep interval).
	2. The following criteria were used to decide whether there were two distinct sleep intervals and to determine which was primary vs. secondary.
		1. Time elapsed between the two sleep intervals is >= 2 hours. This criterion indicates that a meaningful secondary interval is present.
		2. Time of day: Does the sleep interval occur during “typical waking hours”? If YES, code as nap. We coded whether these naps occurred: before 12pm, 12-8pm, or after 8pm in case useful for later analysis. Most (85%) of the additional sleep intervals were identified as secondary sleep intervals (or naps).
		3. In minor cases, there was not >= 2 hours between the two sleep intervals but, if combined, total sleep time (TST) would be very long. The following additional criterion was used to cap TST. If combined intervals exceed 12 hours, then the multiple intervals are automatically coded separately.
		4. If it was unclear which interval was primary vs. secondary, the following criteria were used to identify the primary sleep interval: (1) The one that overlaps the most with the 12am-6am period (priority criterion, trumps #2 criteria), and (2) The longer one.
		5. Other criteria considered but did not end up being necessary/useful to identify whether the sleep interval was primary or secondary: (a) Duration of secondary sleep interval: This criterion was not helpful because additional sleep intervals varied considerably across the dataset. However, in all cases noted above, the secondary sleep interval (nap) was shorter than the primary sleep interval. (b) Whether an individual took the watch off and put it back on between the two sleep intervals: This would indicate significant activity (e.g., such as a shower/bath), which was the main time watch was removed.

**III. Selected References**

Carney, C. E., Buysse, D. J., Ancoli­Israel, S., Edinger, J. D., Krystal, A. D., Lichstein, K. L., &

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