# Modifiable Media-Related Factors Associated With Adolescent Sleep Health: Findings From a Nationally Representative Study

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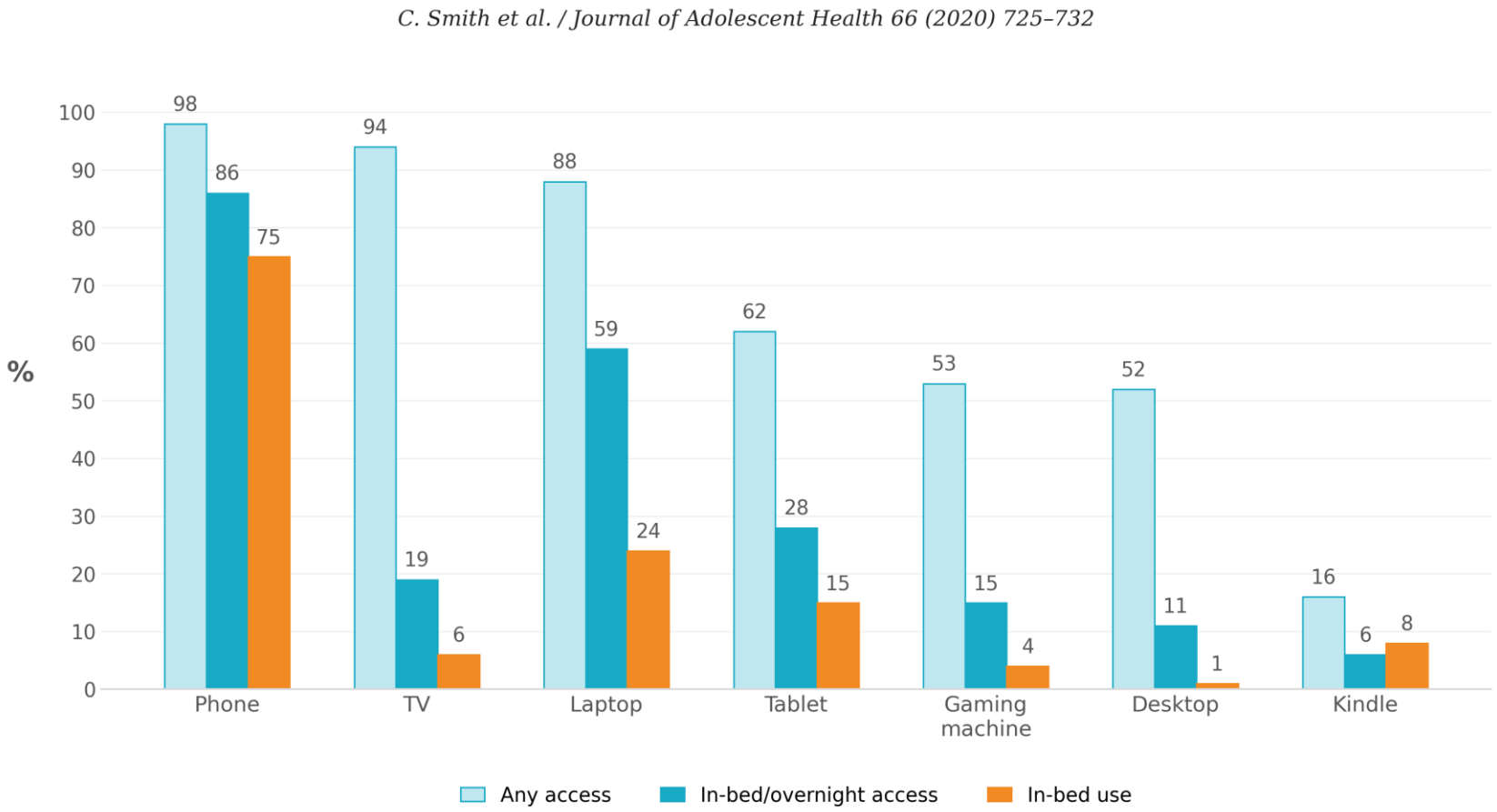
# Technology use in the evening is common among adolescents



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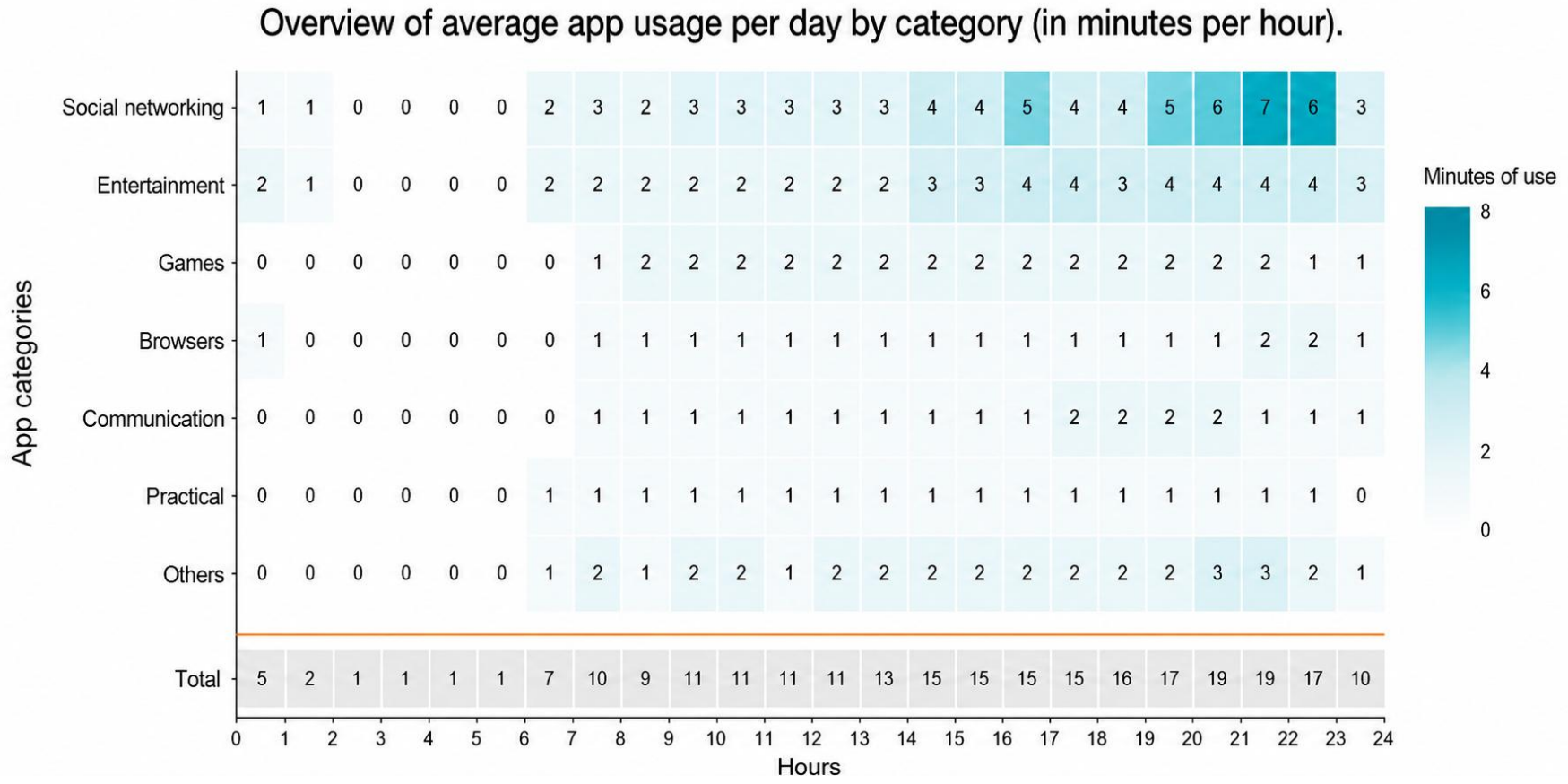


Blahošová et al. 2023

# Modifiable media-related factors of sleep

- Time spent on media activities ≠ contextual conditions of media use
- Many are modifiable and may contribute to improvements in adolescent sleep (Hale et al., 2018)
- Previous studies often examined these factors in isolation or focused only on individual or social level of influence (e.g., Gentile et al., 2014; Šmotek et al., 2020)

## Modifiable media-related factors of sleep observed in the currents study

# Methods

## Sample

2,500 Czech adolescents aged 11–16 (50% female) + caregivers

## Data collection

Self-report questionnaires completed by adolescents and caregivers

## Variables

**Sleep outcomes**

- Meeting sleep duration recommendations (≥8 hr/night, Hirshkowitz et al., 2015)
- Subjective sleep quality (Buysse, 2014)
- Daytime sleepiness (PDSS, Drake et al., 2011)

**Modifiable media-related factors**

- Adolescents' media-related behaviors
- Bedroom media environment
- Parental mediation practices

**Covariates**

- Age
- Sex
- Bedroom sharing
- Screen time

## Analysis

Hierarchical logistic and linear regression models (*stats,* R*)*

*Step 1*: Covariates → *Step 2*: Individual-level factors → *Step 3*: Family-level factors

# Relative Contribution of Individual- and Family-Level Factors

Adolescents' own behaviors and bedroom media environment contributed most (as compared to parenting factors)

**Incremental model contribution and overall fit across sleep outcomes**

| Model | Sleep ≥8 hours/night | Sleep Quality | Daytime Sleepiness |
|---|---|---|---|
| Model 1: + Covariates ($\Delta R^2$) | + .142 | + .036 | + .059 |
| Model 2: + Individual-level factors ($\Delta R^2$) | + .042 | + .033 | + .092 |
| Model 3: + Family-level factors ($\Delta R^2$) | + .017 | + .010 | + .003 (ns) |
| Superior model (Nagelkerke's $R^2/R^2$) | .201 | .079 | .154 |

# DigiWELL Modifiable media-related factors across sleep outcomes

| | Factor | Sleep ≥8 hours/night | Sleep Quality | Lower Daytime Sleepiness |
|---|---|---|---|---|
| | **Screen time** | - | 0 | - |
| INDIVUDUAL | Screen restriction ≥1h before sleep (Yes) | 0 | 0 | 0 |
| | Bedroom screens (No) | 0 | 0 | 0 |
| | **Phone location during sleep (Away)** | 0 | + | + |
| | Phone mode during sleep (Off/Silent) | 0 | 0 | 0 |
| | **Phone use during sleep hours** | - | - | - |
| FAMILY | **Rules concerning phone use in the evening** | + | + | |
| | Rules concerning phone location at night | 0 | 0 | |
| | Monitoring | 0 | 0 | |
| | *Software monitoring computer use (Yes)* | 0 | - | |
| | Software monitoring phone use (Yes) | 0 | 0 | |
| | *Phone autonomy* | - | 0 | |

# Key takeaways

- Phone use during sleep hours was the only factor consistently associated with poorer sleep across all three outcomes.
- Keeping the phone away during sleep and evening phone-use rules showed favorable associations across two outcomes.
- Factors linked to device availability showed less consistent associations across both individual- and family-level
- Overall, individual-level factors contributed more than family-level factors.

# Discussion

1. Phone use at nighttime appeared most relevant factor, whereas most accessibility indicators were not independently associated with sleep outcomes.
2. Yet, accessibility may facilitate nighttime use:

   **Exploratory findings:**
   phone within reach → substantially more nighttime use ($d$ = 0.86, $P$ < .001)
   phone kept on → more nighttime use ($d$ = 0.31, $P$ < .001)
3. Several common recommendations such as avoiding screens for 1 hour before sleep, setting sleep-friendly phone mode, absence of screens in bedroom showed no independent associations, once the other factors were considered
4. Greater phone autonomy linked to insufficient sleep (and nighttime use)

   **Exploratory findings:**
   phone autonomy → more nighttime use ($\beta$ = 0.26, $P$ < .001)

# Discussion

**Practical implications**

- Targeting nighttime use (including through parental rules) may be more relevant than focusing only on pre-sleep usage
- Targeting device availability at night (including through parental rules) may be particularly important for adolescents who engage in nighttime media use
- Focus on adolescents' own media-use behavior, yet parental rules may still be useful when they directly target nighttime use
- While beneficial in other domains, autonomy-supportive media parenting may also be associated with poorer sleep health

**Limitations**

- Cross-sectional design precludes causal inference (e.g., low sleep propensity → nighttime use)
- Self-reports may have introduced inaccuracy
- Simplifications in measurement (e.g., single-item behavioural measures)

# References


Blahošová, J., Šaradín Lebedíková, M., Tancoš, M., Plhák, J., Šmahel, D., Elavsky, S., Tkaczyk, M., Sotolář, O., & others. (2023). *How are Czech adolescents using their phones? Analysis using objective smartphone data.*

Buysse, D. J. (2014). Sleep Health: Can We Define It? Does It Matter? *Sleep*, *37*(1), 9–17. https://doi.org/10.5665/sleep.3298

Drake, C., Nickel, C., Burduvali, E., Roth, T., Jefferson, C., & Badia, P. (2011). *Pediatric Daytime Sleepiness Scale*. https://doi.org/10.1037/t02761-000

Gentile, D. A., Reimer, R. A., Nathanson, A. I., Walsh, D. A., & Eisenmann, J. C. (2014). Protective Effects of Parental Monitoring of Children's Media Use: A Prospective Study. *JAMA Pediatrics*, *168*(5), 479. https://doi.org/10.1001/jamapediatrics.2014.146

Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., Hazen, N., Herman, J., Katz, E. S., Kheirandish-Gozal, L., Neubauer, D. N., O'Donnell, A. E., Ohayon, M., Peever, J., Rawding, R., Sachdeva, R. C., Setters, B., Vitiello, M. V., Ware, J. C., & Adams Hillard, P. J. (2015). National Sleep Foundation's sleep time duration recommendations: Methodology and results summary. *Sleep Health*, *1*(1), 40–43. https://doi.org/10.1016/j.sleh.2014.12.010

Smith, C., de Wilde, T., Taylor, R. W., & Galland, B. C. (2020). Prebedtime Screen Use in Adolescents: A Survey of Habits, Barriers, and Perceived Acceptability of Potential Interventions. *Journal of Adolescent Health*, *66*(6), 725–732. https://doi.org/10.1016/j.jadohealth.2019.12.007

Šmotek, M., Fárková, E., Manková, D., & Kopřivová, J. (2020). Evening and night exposure to screens of media devices and its association with subjectively perceived sleep: Should "light hygiene" be given more attention? *Sleep Health*, *6*(4), 498–505. https://doi.org/10.1016/j.sleh.2019.11.007

# Thanks for listening!

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