

“Pre-sleep cognitive activity in adults: A systematic review”*

If sleep is essential (and it is!) then so is research on sleep onset and insomnia

- (A) What is the nature of “pre-sleep” thinking?
- (B) How/does pre-sleep thinking differ in insomnia?
- (C) Can bedtime thinking strategies facilitate sleep onset?
- (D) In what directions should this research be pursued in the future?

The conclusions below might surprise you...

A. Nature of pre-sleep cognitive activity in good sleepers and those with insomnia

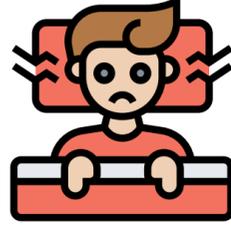
Normal sleep-onset cognition



Sleep-onset cognition in insomnia



Sensory imagery
Deactivation of higher cognitive processes
Hallucinations



MORE:
Planning
Problem solving
Unpleasant thoughts

B. Pre-sleep cognition in insomnia

Measures of pre-sleep cognition

Sleep-onset latency and insomnia are associated with

I. Full questionnaires

- 1 Night-time thought questionnaire (NTTQ)
- 2 Self-statement test: 60+ (SST: 60+)
- 3 Glasgow contents of thoughts inventory (CGCTI)
- 4 Insomnia worry questionnaire (IWQ)
- 5 Bedtime counterfactual processing questionnaire (BCPQ)
- 6 Nocturnal regret questionnaire (NRQ)

II. Questionnaires' subscales

- 1 Pre-Sleep arousal scale: (PSAS)
- 2 Pre-Sleep arousal scale, short form (PSAS-13)
- 3 Sleep disturbance questionnaire insomnia (SDQI)
- 4 Thought control questionnaire insomnia (TCQI)
- 5 Thought-control questionnaire insomnia revised (TCQI-R)
- 6 Sleep associated monitoring index (SAMI)

III. Interviews assessing pre-sleep cognition

- 1 Harvey's semi-structured interview
- 2 Nelson & Harvey (post experimental nap)
- 3 Bélanger, Morin et al.: Structured Neutralizing Interview

More thoughts that interfere with sleep

counterfactual processing

worries

maladaptive thought control strategies

covert monitoring

“cognitive arousal”**

C. Cognitive strategies and their effects on sleep-onset latency and insomnia

Cognitive strategies (23 studies)

Results

1. Paradoxical intention – 11 studies
2. Articulatory suppression – 1 study (with cognitive psychology)

SOME BENEFITS

3. Guided mental imagery – 3 studies
4. Unguided mental imagery (e.g. cognitive refocusing) – 4 studies
5. Hypnosis – 3 studies (small samples)

MIXED RESULTS

6. Suppression and distraction – 2 studies

NO BENEFIT

D. Conclusion

1. Pre-sleep mentation is relevant to sleep-onset latency and insomnia.
2. Some cognitive strategies seem helpful.

Research recommendations

1. There is a need for integrative design-oriented (“IDO”) theories of the sleep onset control system (“SOCS”), to explain normal sleep onset and “insomnolence” (see Notes).
2. Theories of insomnia should be grounded in IDO theories of the SOCS.
- ** 3. The construct validity of the concepts of “arousal” and “cognitive arousal” is doubtful; consider replacing them with IDO concepts.
4. Other significant folk psychology strategies should be characterized in IDO theoretical terms and empirically investigated (e.g., counting sheep, listening to podcasts/radio).
5. New cognitive strategies should be derived from IDO theories of the SOCS, and investigated empirically.

Notes

1. The notion of integrative design-oriented (IDO) theory was not explicitly discussed in the target SMR paper. It was presented in Beaudoin et al (2019). It involves developing interdisciplinary, multi-scale models of multiple and interacting human information processes (cognitive, affective, volitional, ancillary, etc) from the design-based of theoretical AI (which includes evolutionary and computational architecture-based theorizing). We claim SOCS theoretical concepts and computational should be grounded in a (necessarily broader) IDO theory of mind. The paper did not delve into strategies that have not been explored empirically (e.g., listening to radio).
2. “Insomnolence” is difficulty falling asleep, whether in clinical insomnia or not.

* This infographic is based on Lemyre, A., Belzile, F., Landry, M., Bastien, C., & Beaudoin, L. P. (2020). Pre-sleep cognitive activity in adults: A systematic review. *Sleep Medicine Reviews*, 50, 1-13.

Beaudoin, L. P., Lemyre, A., Pudlo, M. & Bastien, C. (2019). “Towards an integrative design-oriented theory of sleep-onset and insomnolence from which a new cognitive treatment for insomnolence (serial diverse kinesthetic imagining, a form of cognitive shuffling) is proposed.” Poster presented at the World Sleep Congress 2019. Vancouver, BC.

This infographic is Beaudoin, L.P. & Lefurgey-Smith, L. (2020) at Simon Fraser University <https://summit.sfu.ca/item/19617>