

Reducing Late Night Snacking: Exploring the Potential of Ambient Tangible Interfaces

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ABSTRACT

Background: Late-night snacking is an unhealthy behavior that can cause weight gain, reduce sleep quality and cause psychological issues, headaches, and digestive problems that can increase the risk of Non-Communicable Diseases (NCDs) [1,2]. Existing approaches focus mainly on raising awareness of the consequences of late-night snacking, diet tracking and nudging, often using apps on mobile devices. Despite the increased awareness, late-night snacking is a habit that people find difficult to quit. This research explored the potential of utilizing ambient, tangible and multisensory user interfaces that can be embedded into everyday spaces to stimulate a behavior towards discouraging unhealthy late-night snacking.

Solution: We designed NightSnakie, a snack dispenser that can be integrated easily into real-world living spaces (e.g., kitchen or living room). Based on existing behavior change techniques and theories, NightSnakie does not try to stop late-night snacking completely. Instead, it is aimed at discouraging unhealthy late-night snacking by replacing it with a small healthy snack at a regular time between the dinner and bedtime. It uses smell and audio based ambient stimulation to discourage further eating.

Methods:

(a) Design Methods — We adopted a user-centered, design-thinking driven iterative methodology to design NightSnakie.

(b) Evaluation Methods — To understand the pragmatic and hedonic stimulative qualities of NightSnakie, and to gain insights for detailing the design, we evaluated NightSnakie using AttractDiff. We conducted a design focus group (N=6) based on 1-2-4-all Liberating Structure method to gain insights for detailing the design of NightSnakie along five dimensions: type of snack, location, rewards (short-term, long-term), refill options, and user interaction.

Results: AttractDiff results indicate that the overall impression of the product's pragmatic quality and hedonic stimulation is positive. Attractiveness of the product is average indicating that it should be improved. We derived design guidelines for detailing the NightSnakie design based on the focus group results.

Conclusion: NightSnakie shows potential for reducing and discouraging unhealthy late-night snacking. The design guidelines derived from the focus group session can inform the detailed design of NightSnakie

[1] Luz, C.S.D.S., da Fonseca, A.E.T.P., Santos, J.S., Araujo, J.F., Duarte, L.L. and Moreno, C.R.D.C., 2024. Association of Meal Timing with Sleep Quality and Anxiety According to Chronotype: A Study of University Students. *Clocks & Sleep*, 6(1), pp.156-169.

[2] Jaffar, H.M., Ahsan, W., Aqeel, K., Sajjad, R., Tariq, M., Ahmed, H. and Fatima, N., 2023. Effect of Late-Night Eating on Health: A Survey from University Students. *Agricultural Sciences Journal*, 5(2), pp.93-99.