International Journal of Research in Medical Sciences
Zerin FF et al. Int J Res Med Sci. 2025 Jun;13(6):2674-2679
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20251669

Review Article

Comparing the theory of planned behavior and transtheoretical model in limiting screen time before bedtime: a narrative review

Farhana F. Zerin[1]*, Hadeer Hegazy[1], Nasrin Akter[2], Bilkis Banu[3], Sonia J. Bithi[4], Fatema Afrin Kanta[2]

[1]Department of Public Health, Georgia Southern University, Statesboro, Georgia, USA
[2]Department of Public Health, Northern University Bangladesh, Dhaka, Bangladesh
[3]Department of Public Health, International University Bangladesh, Dhaka, Bangladesh
[4]Department of Prosthodontics, Dhaka Community Medical College, Dhaka, Bangladesh

Received: 02 April 2025
Accepted: 05 May 2025

***Correspondence:**
Farhana F. Zerin,
E-mail: fz00290@georgiasouthern.edu

ABSTRACT

Excessive screen time before bed is becoming an increasing public health issue, as it's associated with poor sleep, impaired cognitive functioning, and elevated stress levels. The key to healthier digital habits is understanding behavior change mechanisms. The purpose of this article is to compare the theory of planned behavior (TPB) and the transtheoretical model (TTM) to determine their relative effectiveness for screen use reduction prior to sleep. TPB describes behavior change in regards to attitudes, subjective norms and perceived behavioral control; however, it also faces struggles with the intention-behavior gap, where individuals intend to reduce screen use but fail to act. In contrast, TTM recognizes that behavior change is a multi-stage process, allowing for tailored interventions based on an individual's readiness for change. This narrative review attempts to synthesize empirical research on TPB and TTM in a systematic literature search in ISI Web of Science, Scopus, PubMed, SID and Magiran. Studies were included if they focused on screen time reduction and applied either TPB or TTM. The review emphasizes that TPB gives insightful understanding of behavioral intentions, while TTM provides a step-by step, structured framework for intervention development. Findings suggest that integrating TPB's predictive strengths with TTM's staged framework could enhance intervention effectiveness. Future research should explore hybrid models that bridge the gap between intention formation and sustained behavior change, ultimately supporting better sleep hygiene and long-term digital well-being.

Keywords: Screen time reduction, Sleep hygiene, Behavior change, Theory of planned behavior, Transtheoretical model, Digital well-being

INTRODUCTION

A major public health issue is the extensive screen time before bed, which significantly alters the quality of sleep and well-being.[1] The widespread use of e-devices, such as television, computers (desktop and laptops), smartphones, tablets (iPads and e-readers), and gaming devices (Xbox, PlatStation, Nintendo) disrupts natural sleep patterns, contributing to insomnia, reduced cognitive function, and elevated stress levels.[2,3] This problem needs addressing to improve sleep habits and well-behaved well-being.[4] Frameworks such as the theory of planned behavior (TPB) and the transtheoretical model (TTM) are established theories in the field of health behavior change.[4,5]

Here, we apply TPB and TTM concepts to screen time behavior prior to sleep and assess the relevance of these theories to contemporary health behavior interventions.[6]

This study aims to identify effective strategies for reducing screen time and improving sleep hygiene by evaluating the strengths and limitations of these models.[7]

Theoretical background

Theory of planned behaviour

This is followed by the TPB which posits that intentions to engage in specific behaviors are determined by (positive or negative) attitudes, subjective norms, and perceived behavioral control towards this specific behavior, which is depicted in Table 1.[8] Attitudes are an individual's evaluation of performing a particular behavior (i.e., they can be favorable or unfavorable). Subjective norms looks at whether or not these social pressures or perceived or expected social pressures influenced you to engage or not engage in the behavior while perceived behavioral control reflects the person's belief that they would be able to perform the behavior.[9] TPB has been applied to various health behavior predictors such as sleep behavior and device screen time.[10,11] It offers a framework for understanding and predicting behavior that encompasses cognitive factors that influence intentions and behavior.8 TPB's utility has been shown in various health-related contexts, such as smoking cessation, regular exercise practice, and dietary behavior changes.[9] One of its greatest limitations, however, is the intention-behavior gap, such that individuals may express the intention to reduce screen use, yet fail to follow through with the behavior change.[12]

Table 1: Sources and description of the individual components under theory of planned behaviour.[1]

Component	Description	Derived form
Attitudes	The degree to which the performance of the behavior is positively or negatively valued	Expectancy-value attitudes: behavioral beliefs
Subjective norms	The perceived belief of others' attitudes about an individual's engagement in a behavior	Expectancy-value norm: normative belief
Intent	An indication of a person's readiness to perform a given behavior	Attitudes, social norms, volitional control

Trans theoretical model

TTM of behavioral change (as developed by Prochaska and DiClemente) envisions behavioral change as a multi-stage process, often used in its later versions in the context of five stages: pre-contemplation, contemplation, preparation, action, and maintenance.[13] Table 2 summarizes the trajectory of the TTM through several stages. While TPB focuses on cognitive determinants, TTM offers a structured approach to tailoring interventions based on an individual's current state of readiness to change.[14]

Table 2: Stages of changes and their definitions from the transtheoretical model of behavioral change.[30]

Stage	Definition
Pre-contemplation	Has no intention of taking action within the next 6 months
Contemplation	Intends to take action in the next 6 months
Preparation	Intends to take action within the next 30 days and has taken some behavioral steps in this direction
Action	Has changed for behavior less than 6 months
Maintenance	Has changed behavior for more than 6 months

TTM acknowledges that behavior change is non-linear and individuals may relapse or progress faster within each phase.[15] This model has been extensively used in real-world health interventions, including smoking cessation, dietary and weight-reduction programs, and substance use interventions, and has been demonstrated to induce successful long-term behavior change.[16] However, the limitations of TTM include difficulties with stage classification, the resource-intensive nature of interventions and limited attention to external environmental influences on screen time behaviors, such as social and technological factors.[12]

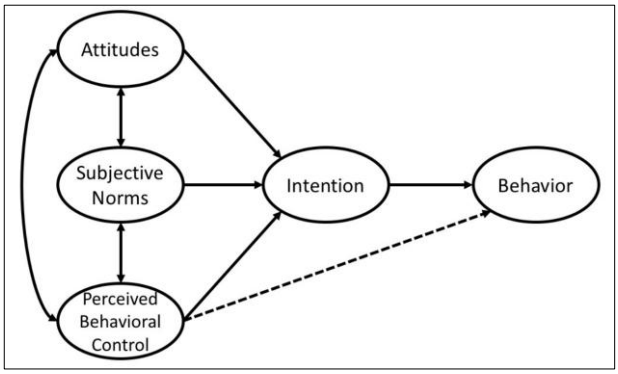

Figure 1: Theory of planned behaviour.[1]

METHODS

This narrative review was conducted to contrast the TPB and the TTM for the reduction of screen time before bedtime. A structured literature search was conducted to widely cover all the relevant studies.

Literature search strategy

A comprehensive literature search was conducted on ISI Web of Science (ISI-WOS), Scopus, PubMed, Google

Scholar, Science Direct, SID, and Cochrane Library databases. These databases were chosen for their extensive coverage of behavioral and psychological health sciences, ensuring access to high-quality, peer-reviewed articles. The following search terms and Boolean operators were used: "theory of planned behavior" OR "planned behavior model" AND "screen time before bed" (in the title, abstract, keywords), "trans theoretical model" OR "stages of change model" AND "screen time" (in the title, abstract, keywords), "stages of change" AND ("pros OR cons") AND "behavioral change", and "screen time reduction" AND ("intention OR behavior change").

Eligibility criteria

Studies published in English between 2015 and 2025 were included if they met the following criteria: provided empirical evidence evaluating TPB or TTM in behavioral modification; addressed behavior change interventions related to screen time reduction; provided empirical evidence evaluating TPB or TTM in behavioral modification; and discussed predictive power, limitations, or effectiveness of these models in intervention settings.

Studies were excluded if they-lacked clear methodological descriptions or relevant findings, and were commentaries, editorials, or theoretical papers without empirical evidence.

Screening and selection process

The initial database search yielded 45 studies considering those articles from 2008 to onwards and were preserved in endnote software. Then two independent reviewers screened titles and abstracts for relevance using the software 'Rayyan'. Full-text screening was then performed to confirm eligibility. Any discrepancies were resolved through discussion or consultation with a third reviewer. To ensure a comprehensive review, the reference lists of included articles were manually searched for additional relevant studies.

Data extraction

A structured data extraction template was used to ensure consistency. The extracted data included: study characteristics (e.g., methodology, sample population), key findings on the application of TPB and TTM to screen time behaviors, reported strengths and limitations of each model, and intervention strategies and their outcomes.

Synthesis

The selected studies were reviewed and summarized to compare how TPB and TTM were applied in interventions aimed at reducing screen time. Findings were categorized based on their focus, theoretical approach, and intervention relevance. Tables and figures were used where applicable to enhance clarity. Following this structured review process, a total of 32 articles were included in the final synthesis.

DISCUSSION

Comparison of TPB and TTM

Figure 3 illustrates the increasing trend of using screens, highlighting the urgency of effective interventions. Attitudes and perceived behavioral control as TPB constructs are considered strong predictors of an individual's intention to reduce screen time.[17] However, a major challenge is the intention-behavior gap, where positive intentions often fail to translate into meaningful behavior change.[11] Conversely, TTM-based interventions have been more effective in stage-specific behavior change, as individuals in advanced stages report significantly lower screen time than those in earlier stages.[16] Nonetheless, the questions regarding the long-term sustainability of TTM-based interventions remained valid , as differences in sample sizes, methodologies, and intervention durations affect the findings generalizability.[18]

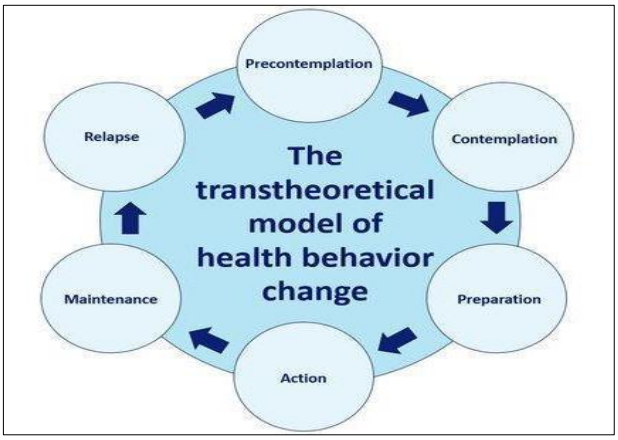

Figure 2: The transtheoretical model of health behavior change.[31]

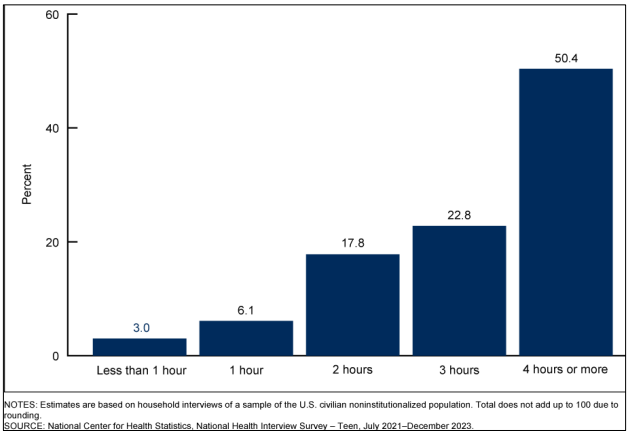

Figure 3: Distribution of teenagers ages 12-17, by hours of daily screen time: United States July 2021-December 2023.[32]

Effectiveness of TPB and TTM in behavioral change

TPB mainly focuses on the initiation of behavior change through cognitive determinants, but it places less emphasis on long-term behavior maintenance.[9] In contrast, TTM includes a maintenance stage, highlighting the need of ongoing effort and reinforcement strategies to sustain behavior change.[13]

While TTM has an advantage of sustaining behavior modification, evidence on the long-term effectiveness of TTM-based interventions is still researchable point. Some studies report success in screen time reduction, but longitudinal research is needed to determine whether these reductions persist over time.[16] For instance, Zhao et al showed that application of TPB based intervention like a brief theory-driven messages on reducing late evening electronic device use significantly reduced the intention of younger adults.[17] However, school based TPB intervention by Chin et al showed no significant changes of screen use among the teenagers.[18] On the other hand, TTM based interventions also found significantly effective in lowering the screen use behavior. Studies conducted by Jones et al and Kipping et al revealed the significant reduction of total screen time use among the TTM based intervention group especially among the teenagers.[19,20]

Practical implementation and interventions

Measurement and assessment

The quantifiable constructs such as attitudes, subjective norms, and perceived behavioral control that employed by TPB-based interventions, makes statistical analysis more precise.[9] In contrast, TTM-based interventions rely on stage classification and monitoring progression, which is more subjective and requires careful assessment to determine an individual's readiness to change.[14]

Designing effective interventions

TPB interventions typically target cognitive determinants, shaping behavioral intentions by influencing attitudes and strengthening perceived behavioral control. For example, interventions might encourage positive beliefs about reducing screen time or provide strategies enhancing self-control over device usage.[8] However, ongoing phase of the behavioral change of a respondent typically be happened on TTM-based intervention strategies. For example, individuals in the contemplation stage may benefit from motivational interviewing, while goal-setting interventions may be effective for those in the preparation and action stages.[23]

Comparative analysis of theoretical utility

Behavioral intentions can be anticipated by TPB strategies through structured cognitive constructs, while TTM can yield a dynamic, stage-based approach so that personalized effective interventions can be implemented.[24] However, TPB has some limitations too. Likewise, TPB is static in nature where intentions are more considered rather than actions for the aim to address the effective sustainable behavioral change communication.[12] Sometimes, classification of the stages of TTM seems to have ambiguities and intervention requirements are more resource consuming, which makes practical application difficult.[15]

Theoretical integration for a holistic approach

Combined application of TPB and TTM might be effective to accelerate the strengths of both frameworks, and yield a comprehensive framework for behavior change.[24] Cognitive determinants of TPB can scrutinize the behavioral intentions at each TTM stage, while TTM's structured progression always helps to apply TPB principles on a continuous basis. TPB aligns with TTM's contemplation stage, reshaping attitudes and increasing awareness of behavioral adjustment. Meanwhile, TTM's stage-based strategies support progression to action and sustained behavior change.[21] This combined approach may help bridge the gap between intention and behavior of a respondent and facilitate both the formation of intentions and their long-term execution simultaneously. Future research should explore integrated models that combine TPB's predictive power with TTM's staged interventions to improve screen time reduction efforts. In addition, there is also need for studies which will assess the way cognitive and stage-specific strategies trigger to drive sustainable behavior change.[12,25]

Practical implications for screen time interventions and future research directions

Blended interventions comprising both TPB and TTM might be more effective in reducing screen time before bedtime.[26] While TPB's cognitive focus is to shape behavioral intentions, at the same time TTM's stage-based approach ensures the person's readiness for change. For example, interventions can start by shaping attitudes and perceived control for individuals in the pre-contemplation or contemplation stages, then gradually shift to stage-specific strategies that promote action and long-term maintenance.[21,27] Future research should prioritize conducting longitudinal studies to explore whether integrated TPB-TTM interventions lead to sustainable reductions in screen time before bedtime. Moreover, studies should investigate how environmental and contextual factors influence screen behavior, to figure out the effective personalized intervention strategies.[23,28,29]

CONCLUSION

Excessive screen time before bedtime imposes a bunch of significant health risks, indicating the necessity of effective intervention strategies. This paper reviewed and examined TPB and TTM in implementing interventions to reduce screen use. TPB provides a structured understanding of cognitive factors influencing intentions,

while TTM offers a stage-based framework tailored to an individual's readiness for change. A blended approach combining TPB's predictive insights with TTM's staged progression may enhance the effectiveness of future intervention. Future research should focus on hybrid models that bridge the intention-behavior gap and support long-term behavior modification, contributing to improved sleep hygiene and digital well-being.

ACKNOWLEDGEMENTS

The authors acknowledge the support of their faculty mentor, Dr. Gulzar H. Shah, and Jiann-Ping Hsu College of Public Health at Georgia Southern University for providing valuable resources and academic guidance throughout the research process.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Arshad D, Joyia UM, Fatima S, Khalid N, Rishi AI, Rahim NUA, et al. The adverse impact of excessive smartphone screen-time on sleep quality among young adults: A prospective cohort. Sleep Sci (Sao Paulo, Brazil). 2021;14(4):337-41.
2. Schrempft S, Baysson H, Chessa A, Lorthe E, Zaballa ME, Stringhini S, et al. Associations between bedtime media use and sleep outcomes in an adult population-based cohort. Sleep Med. 2024;121:226-35.
3. Gradisar M, Wolfson AR, Harvey AG, Hale L, Rosenberg R, Czeisler CA. The sleep and technology use of amer icans: Findings from the National Sleep Foundation's 2011 sleep in america poll. J Clin Sleep Med. 2013;9(12):1291-9.
4. Hale L, Guan S. Screen time and sleep among school-aged children and adolescents: a systematic literature review. Sleep Med Rev. 2015;21:50-8.
5. Silva SSD, Silveira MACD, Almeida HCR, Nascimento MCPD, Santos MAMD, Heimer MV. Use of digital screens by adolescents and association on sleep quality: a systematic review. Cad Saude Publica. 2022;38(10):e00300721.
6. Fitzpatrick C, Almeida ML, Harvey E, Garon-Carrier G, Berrigan F, Asbridge M. An examination of bedtime media and excessive screen time by Canadian preschoolers during the COVID-19 pandemic. BMC Pediatr. 2022;22(1):212.
7. Nestler S, Böckelmann I. Influence of screen time on the sleep quality of students. Somnologie. 2023;27(2):124-31.
8. Ajzen I. The theory of planned behavior: Frequently asked questions. Hum Behav Emerg Technol. 2020;2(4):314-24.
9. Ajzen I, Schmidt P. Changing behavior using the theory of planned behavior. In: The Handbook of Behavior Change. 2020;17-31.
10. Mead MP, Irish LA. The Theory of Planned Behavior and sleep opportunity: A structural model. Sleep Health. 2021;7(1):83-9.
11. Zhang CQ, Zhang R, Schwarzer R, Hagger MS. A meta-analysis of the health action process approach. Health Psychol. 2019;38(7):623-32.
12. Roussel-Ouellet J, Beaulieu D, Vézina-Im LA, Turcotte S, Labbé V, Bouchard D. Psychosocial correlates of recreational screen time among adolescents. Int J Environ Res Public Health. 2022;19(24):16719.
13. Prochaska JO, DiClemente CC, Norcross JC. In search of how people change: Applications to addictive behaviors. Am Psychol. 2015;47(9):1102-11.
14. Hashemzadeh M, Rahimi A, Zare-Farashbandi F, Alavi NM, Daei A. Transtheoretical model of health behavioral change: A systematic review. Iran J Nurs Midwifery Res. 2019;24(2):83-90.
15. Buctot DB, Kim N, Kim SH. The role of nomophobia and smartphone addiction in the lifestyle profiles of junior and senior high school students in the Philippines. Soc Sci Humanit Open. 2020;2(1):100035.
16. Chung JE, Choi SA, Kim KT, Yee J, Kim JH, Seong JW, et al. Smartphone addiction risk and daytime sleepiness in Korean adolescents. J Paediatr Child Health. 2018;54(7):800-6.
17. Zhao X, Feng X, Garg R, Kelly KM. Reducing late evening bedtime electronic device intentions and use among young adults. Sleep Health. 2019;5(4):401-8.
18. Chin A Paw MJ, Singh AS, Brug J, van Mechelen W. Why did soft drink consumption decrease but screen time not? Mediating mechanisms in a school-based obesity prevention program. Int J Behav Nutr Physical Activity. 2008;5:1-11.
19. Jones D, Hoelscher DM, Kelder SH, Hergenroeder A, Sharma SV. Increasing physical activity and decreasing sedentary activity in adolescent girls–The Incorporating More Physical Activity and Calcium in Teens (IMPACT) study. Int J Behav Nutr Physical Activity. 2008;5:1-10.
20. Kipping RR, Payne C, Lawlor DA. Randomised controlled trial adapting US school obesity prevention to England. Arch Dis Childhood. 2008;93(6):469-73.
21. Prochaska J, Velicer W. The transtheoretical model of health behavior change. Am J Health Promot. 2021;35(1):124-39.
22. Throuvala MA, Griffiths MD, Rennoldson M, Kuss DJ. Motivational processes and dysfunctional mechanisms of social media use among adolescents: A qualitative focus group study. Comput Hum Behav. 2019;93:164-75.
23. Boonroungrut C, Fei H. The Theory of Planned Behavior and Transtheoretical Model of Change: A systematic review on combining two behavioral change theories in research. J Public Health Dev. 2018;16(1):75-87.
24. Labadorf EA. Smartphone habits and health: Testing Habit Theory to target perceived behavioral control

within the Theory of Planned Behavior [Master's thesis]. Purdue University. 2024. Available at: https://hammer.purdue.edu/articles/thesis/_b_Smartphone_habits_and_health_Testing_Habit_Theory_to_target_perceived_behavioral_control_within_the_Theory_of_Planned_Behavior_b_/26322136?file=47750683. Accessed on 12 March 2025.
25. Hamilton K, Spinks T, White KM, Kavanagh DJ, Walsh AM. A psychosocial analysis of parents' decisions for limiting their young child's screen time: An examination of attitudes, social norms and roles, and control perceptions. Br J Health Psychol. 2016;21(2):285-301.
26. Laftah SA, Ali MBHA. Using the Transtheoretical Model of Change to Understand High School Students' Screen Time Behavior. Pak J Med Health Sci. 2022;16(05):535.
27. García-Feijóo L, Parra-Gallego I, Vázquez-Cano E. Coping Strategies and Self-Efficacy in University Students: A Person-Centered Approach. Front Psychol. 2020;11:841.
28. Raihan N, Cogburn M. Stages of Change Theory. In StatPearls. StatPearls Publishing. 2023.
29. Aulbach MB, Knittle K, Haukkala A. A dual process model to predict adolescents' screen time and physical activity: A longitudinal study. Psychol Health. 2021;36(12):1457-74.
30. Carmack CC, Lewis-Moss RK. Examining the theory of planned behavior applied to condom use: the effect-indicator vs. causal-indicator models. J Prim Prev. 2009;30:659-76.
31. Hui SK, Grandner MA. Associations between poor sleep quality and stages of change of multiple health behaviors among participants of an employee wellness program. Prev Med Rep. 2015;2:292-9.
32. Smith SM, Bais B, M'hamdi HI, Schermer MH, Steegers-Theunissen RP. Stimulating the Uptake of Preconception Care by Women With a Vulnerable Health Status Through mHealth App–Based Nudging (Pregnant Faster): Cocreation Design and Protocol for a Cohort Study. JMIR Res Protocols. 2023;12(1):e45293.

Cite this article as: Zerin FF, Hegazy H, Akter N, Banu B, Bithi SJ, Kanta FA. Comparing the theory of planned behavior and transtheoretical model in limiting screen time before bedtime: a narrative review. Int J Res Med Sci 2025;13:2674-9.