



Effects of an App-Based Mindfulness Intervention on Sleep Duration and Sleep Latency: Income as a Moderator

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Introduction

Research links poor sleep quality with health issues. In-person mindfulness training has shown positive effects on sleep quality (Bei et al., 2012; Carlson and Garland, 2005).

- However, not much research has tested the effects of app-based mindfulness training that is more accessible and flexible to participants but less intensive.

Also unclear if all participants will equally benefit.

- Lower income has been associated with higher stress levels (Hobkirk, Krebs and Muscat, 2018).
- Lower income individuals may benefit more from engaging in mindfulness intervention.

Aims

- Aim 1: Does the mindfulness meditation app Headspace impact sleep duration and sleep latency?
- Aim 2: Does income moderate this relationship?

Methods

Collected data from 142 employees from the University of California, Merced. Participants completed baseline surveys and were randomly placed into the Headspace or waitlist control group. Fitbit Charge 2 devices were given to all participants.

- Headspace: meditate each day for 10 minutes until the end of the 8-week study.
- Waitlist control: maintained their daily life and were given access to one free year of Headspace after study ended.

Measures:

- Baseline Measures
 - Reported income in dollar amounts; were then categorized into low (<\$50,000) and high income (>\$50,000) groups.
- Fitbit Charge 2
 - Collected sleep duration and sleep latency each night.
 - Sleep duration = total amount of sleep obtained during the nocturnal sleep episode.
 - Sleep latency = duration of time between when the lights are turned off as the individual attempts to sleep until the participant actually falls asleep

Results

Analysis of variance (ANOVA) was used to test whether:

- Being in the Headspace group versus the control group influenced how well a person slept (Aim 1)
- Income played a role in this relationship (Aim 1).

Testing Aim 1 (see Figure 1), the Headspace and control group did not differ significantly during week 0 for sleep duration ($p = .16$) or sleep latency ($p = .56$) – indicating successful random assignment. However, they also did not differ significantly during week 5 for sleep duration ($p = .49$) or sleep latency ($p = .86$) – suggesting no effect of the Headspace app.

Testing Aim 2 (see Figure 2), income did not significantly moderate the relationship between Headspace vs. control group and sleep duration ($p = .25$) or sleep latency ($p = .85$) at week 5.

Figure 1. Headspace

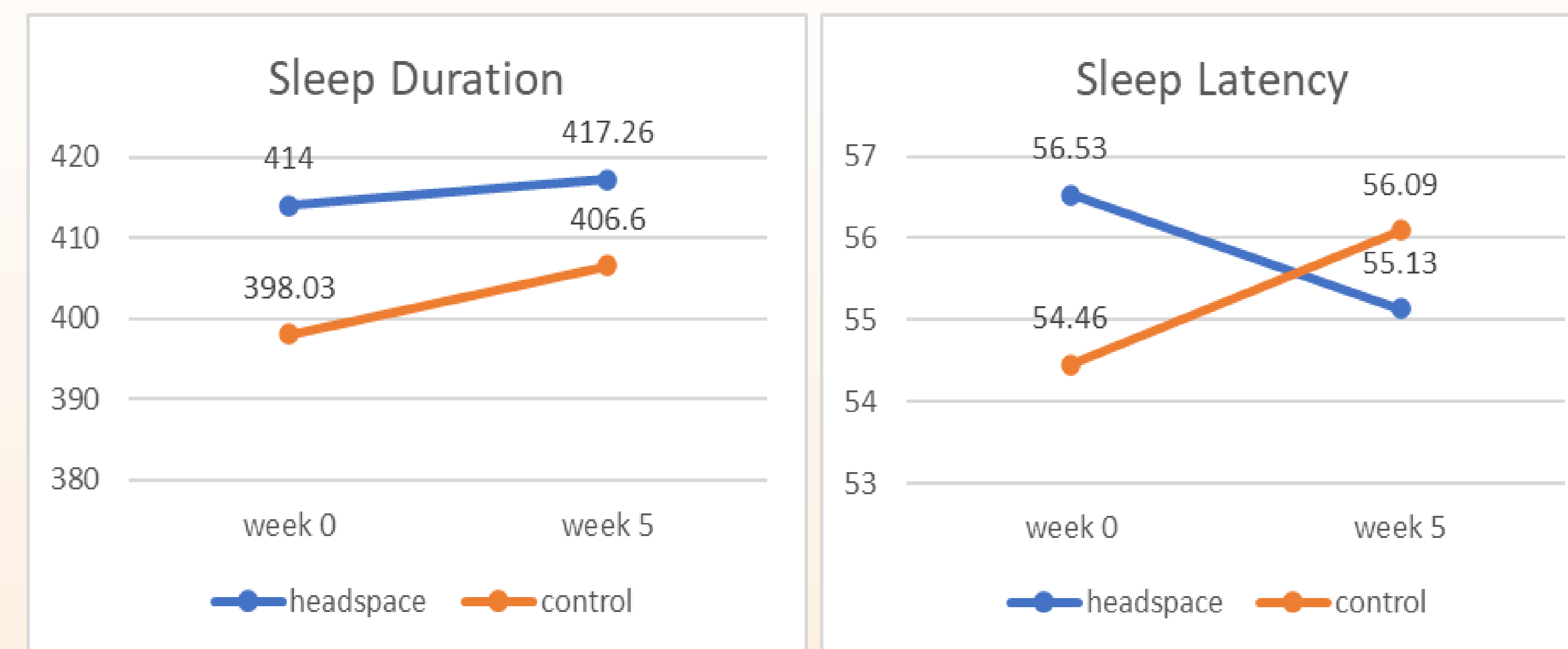


Figure 2. Headspace and Income

		Sleep Duration (Minutes)			
		Week 0		Week 5	
		Low Income	High Income	Low Income	High Income
Control		391.07	400.98	432.57	401.13
Headspace		422.64	408.5	405.76	419.31

		Sleep Latency (Minutes)			
		Week 0		Week 5	
		Low Income	High Income	Low Income	High Income
Control		43.08	57.93	53.51	56.6
Headspace		53.67	57.83	50.9	56.38

Discussion

Aim 1: Individuals in the Headspace group did not differ significantly from the control group at week 5, which suggests there being no effect of the app on the participants.

Aim 2: Income was not found to be a significant moderator.

Limitations and Future Research

The short length of the study could help explain the lack of improvement on sleep duration and sleep latency levels.

- Due to the length of the study, increasing the amount of time participants have to commit to the intervention may yield positive effects on sleep duration and sleep latency.

Because the focus of this study was to research stress, participants could have placed less emphasis on trying to improve their sleep, therefore explaining the lack of improvement. Future research may wish to test mindfulness meditation training aimed at bettering sleep duration and latency.

- This research can help in develop a more effective in-app mindfulness intervention to improve sleep quality.

References

Bei, B., Byrne, M. L., Ivens, C., Waloszek, J., Woods, M. J., Dudgeon, P., ... & Allen, N. B. (2013). Pilot study of a mindfulness-based, multi-component, in-school group sleep intervention in adolescent girls. *Early intervention in psychiatry*, 7(2), 213-220.

Hobkirk, A. L., Krebs, N. M., & Muscat, J. E. (2018). Income as a moderator of psychological stress and nicotine dependence among adult smokers. *Addictive behaviors*, 84, 215-223.

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