

# Sleep improvement and stress reduction by a breath-guiding device: An efficacy study of the Somnox 2 Breathe and Sleep Robot

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## Introduction

- In this study, the effectiveness of a breath-guiding device has been assessed using validated stress and sleep questionnaires in **a healthy user group experiencing self-reported sleep complaints due to stress**.
- The device used was the **Somnox 2 Breathe and Sleep Robot**, which allowed users to slow their breathing, following the breathing rhythm of the device.
- Slowed breathing has previously been shown to have positive impact on sleep and stress through activating the parasympathetic nervous system (Pal & Velkumary, 2004; Russo et al., 2017).

## Hypotheses

As there is ample evidence on the effects of pre-sleep breathing and relaxation activities to improve stress and sleep outcomes, it was expected that:

- Insomnia severity and impact would decrease** after a period in which the device was used, compared to baseline (hypothesis 1)
- Stress would decrease** after a period in which the device was used, compared to baseline (hypothesis 2)

Figure 1. The device



## Methodology

The approach was an efficacy study of 10 weeks, in which the effectiveness of the device in improving subjective sleep and stress and outcomes was explored.

## Descriptive statistics

	N = 42	
Gender (% female)	90.5%	
	M ± SD	Range
Age	45 ± 9.25	30-64

## Instruments

- To assess insomnia severity and impact, the **Sleep Condition Indicator (SCI)** was used. The SCI is a self-report questionnaire consisting of 8 items based on DSM-5 criteria to evaluate insomnia disorder. The global score ranges from 0 to 32, with a higher score indicating better sleep.
- To assess subjective stress complaints, the **Perceived Stress Scale (PSS)** was used: a self-report questionnaire consisting of 10 items measuring global stress levels by asking to which degree persons find their lives unpredictable, uncontrollable and overloaded. The global score ranges from 0 to 40, with higher scores indicating higher levels of stress.
- A **daily sleep diary** was used to track sleep.

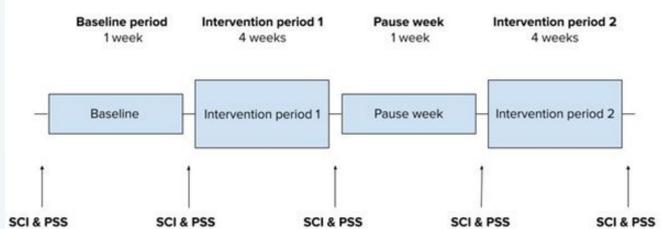
## Design

- Two different proprietary feedback algorithms were tested in a within subject design with a pause week between two intervention periods.
- Questionnaires were filled in five times and they were about the preceding period.

## Statistical analysis

- The data was pooled, as the initial analysis showed no differences between the two algorithms. Multiple Paired T-tests have been performed to test the hypotheses.

Figure 2. Study design



## Results

### SCI and PSS

	Week 1 (M ± SD)	Week 10 (M ± SD)	p-value
SCI	9.81 ± 3.84	17.29 ± 5.54	<0.001
PSS	17.52 ± 7.08	12.36 ± 5.02	<0.001

### Sleep diary

	Week 1 (M ± SD)	Week 10 (M ± SD)
Sleep onset latency (min)	49.68 ± 48.02	28.52 ± 37.12
Total wake time (min)	153.25 ± 37.12	82.05 ± 63.92
Total sleep time (min)	379.55 ± 100.78	431.02 ± 86.28
Sleep efficiency (total sleep time/total time in bed)	72% ± 18%	84% ± 12%
Perceived sleep quality*	2.64 ± 1.01	3.57 ± 0.98
Stress level*	2.8 ± 1.1	2.27 ± 0.97
Rested level*	2.52 ± 0.97	3.36 ± 0.96

\*These variables were measured on a 1-5 scale, with higher scores indicating a better sleep quality, more stress, and more restedness.

All sleep diary improvements were **statistically significant** (p < 0.001).

Figure 3. SCI scores by period

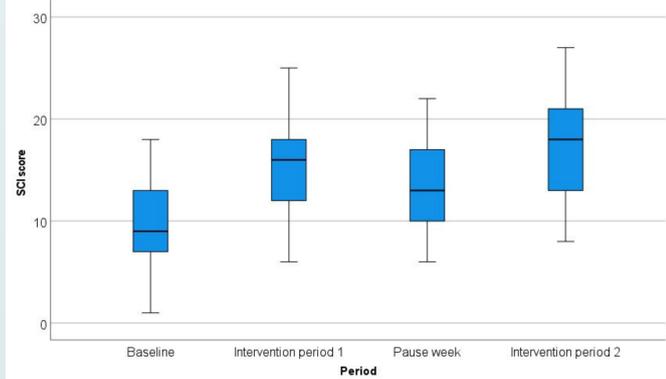
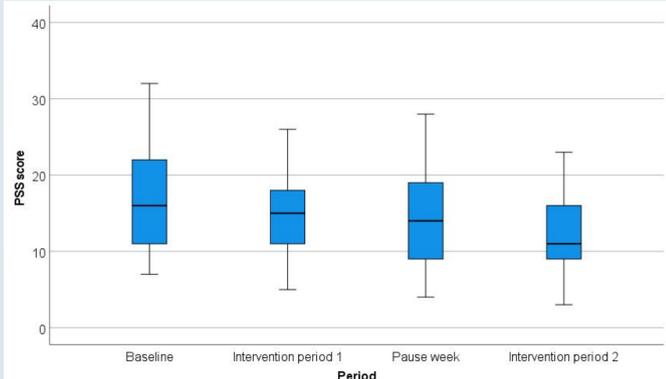


Figure 4. PSS scores by period



## Conclusion

The results have shown that **insomnia severity and stress levels can be reduced by the Somnox 2 Breathe and Sleep Robot**.

During use of the intervention, the average score for SCI increased by 7.48, **changing from “probable insomnia disorder” to “no insomnia disorder”**. This increase should be regarded as meaningful and likely **clinically relevant**, since the observed change exceeds the Reliable Change Index of the SCI (Espie et al., 2018).

This study has shown that **the Somnox 2 Breathe and Sleep Robot is an effective intervention**, and can thus be considered as a non-pharmacological intervention to improve sleep and stress.