Effects of singing bowl exposure on Karolinska sleepiness scale and pupillographic sleepiness test: A randomised crossover study.

Melanie Bergmann 1, Stefan Riedinger 2, Ambra Stefani 3, Thomas Mitterling 3, Evi Holzknecht 1, Peter Grassmayr 4, Birgit Högl 1
1Department of Neurology, Medical University of Innsbruck, Austria; 2Department of Therapeutic Radiology and Oncology, Medical University of Innsbruck, Austria; 3Department of Neurology 1, Kepler University Hospital, Linz, Austria; 4Bell Foundry Grassmayr, Innsbruck, Austria

ABSTRACT
This study evaluated the influence of a struck singing bowl on subjective and objective sleepiness during daytime compared to a relaxation period in a silent singing bowl. Subjective sleepiness was significantly lower after relaxation above a struck singing bowl. After gender stratification, the difference was still significant in women. Objective sleepiness was not different in both groups. Finally we can only speculate if women may be more susceptible to subjective improvements in case of sleepiness and show another perception of relaxation in a struck singing bowl compared to men.

EXTERNAL LINK
https://doi.org/10.1371/journal.pone.0233982

THIS PROTOCOL ACCOMPANIES THE FOLLOWING PUBLICATION
Bergmann M, Riedinger S, Stefani A, Mitterling T, Holzknecht E, Grassmayr P, Högl B (2020) Effects of singing bowl exposure on Karolinska sleepiness scale and pupillographic sleepiness test: A randomised crossover study. PLoS ONE 15(6): e0233982. doi: 10.1371/journal.pone.0233982

DOI
dx.doi.org/10.17504/protocols.io.bge9jth6

PROTOCOL CITATION
Melanie Bergmann, Stefan Riedinger, Ambra Stefani, Thomas Mitterling, Evi Holzknecht, Peter Grassmayr, Birgit Högl 2020. Effects of singing bowl exposure on Karolinska sleepiness scale and pupillographic sleepiness test: A randomised crossover study. protocols.io
https://dx.doi.org/10.17504/protocols.io.bge9jth6

MANUSCRIPT CITATION please remember to cite the following publication along with this protocol
Bergmann M, Riedinger S, Stefani A, Mitterling T, Holzknecht E, Grassmayr P, Högl B (2020) Effects of singing bowl exposure on Karolinska sleepiness scale and pupillographic sleepiness test: A randomised crossover study. PLoS ONE 15(6): e0233982. doi: 10.1371/journal.pone.0233982

EXTERNAL LINK
https://doi.org/10.1371/journal.pone.0233982

LICENSE
This is an open access protocol distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
SAFETY WARNINGS

Please do not share any identifiable data.

Identify participants

1. Inclusion criteria
   Participants can be included in this study if they:
   - are aged between 20 and 60 years.

2. Exclusion criteria
   Participants cannot be included in the study if they:
   - have a body mass index > 30 kg/m²,
   - report less than six hours of sleep the night before the assessment,
   - report insomnia, defined as subjective difficulty to initiate and/or maintain sleep,
   - report excessive daytime sleepiness, defined as ESS score > 10/24 points,
   - have known pupillary afferent or efferent lesions,
   - had more than three glasses of alcohol the prior evening,
   - had caffeine, nicotine, benzodiazepines, or stimulants the morning of the assessment.

Demographic information and clinical data

3. Each participant should be given an anonymous ID.
   - Age of the participants in years at the time of enrolment in the study.
     Missing data should be marked with 99.
   - Sex of the participants.
     If male, code as 0.
     If female, code as 1.
     Missing data should be marked with 99.
   - Height and weight of the participants at the time of enrolment in the study.
     Height in centimeters.
     Weight in kilograms.
     Missing data should be marked with 99.
   - Mean reported sleep duration on work-days (hours).
     Sleep duration in hours.
     Missing data should be marked with 99.
   - Mean sleep duration the night before the assessment (hours).
     Hours of sleep the night before the assessment.
     Missing data should be marked with 99.
   - Sleep deprivation the night before the assessment.
     Less than six hours of sleep the night before the assessment.
     If yes, code as 1.
Study Design and Study Procedures

4 By means of a coin toss, participants were randomised into one of the two groups regarding the order of the investigations. Participants changed groups, when they came back for the second investigation. The two assessments were performed one week apart, at the same time interval (between 11:00 and 18:00) at the bell foundry Grassmayr, Innsbruck, Austria.

In one experimental session, the singing bowl was struck. The other experimental session included an opportunity to rest without striking of the singing bowl.

If struck singing bowl, code as 0.
If silent singing bowl, code as 1.

- Struck singing bowl session: The participants lay down on a hammock over the singing bowl. The singing bowl was struck seven times, with intervals of 30 seconds. After the striking of the bowl, the volunteers spent 20 further minutes lying over the bowl relaxing.

Measures:
Karolinska Sleepiness Scale before the relaxation period as total score.
Pupillary unrest index before the relaxation period as mm/min.

Karolinska Sleepiness Scale after the relaxation period as total score.
Pupillary unrest index after the relaxation period as mm/min.

- Silent singing bowl session: Participants in the second group rested without the sound waves of the singing bowl. They spent 20 minutes in the hammock over the singing bowl.
Measures:
Karolinska Sleepiness Scale before the relaxation period as total score.
Karolinska Sleepiness Scale after the relaxation period as total score.
Karolinska Sleepiness Scale after the relaxation period as total score
Pupillary unrest index after the relaxation period as mm/min.