

# Sonic Cradle - Immersive interaction design combining breathing- and neurofeedback to foster focused attention meditation on breath

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## ABSTRACT

Mindfulness meditation is widely recognized for its psychological and physical well-being benefits. However, entering and maintaining a mindful state and increasing one's self awareness is often challenging, especially for novice meditators.

We are designing a system to help novice meditators with these challenges by providing real-time neuro- and biofeedback generated from EEG and respiration data. This design builds upon "Sonic Cradle" (Vidyarthi & Riecke, First International Conference on Mindfulness 2013, International Journal Of Human-Computer Studies 2014), an exploratory HCI paradigm designed to foster meditative attentional patterns as a user progressively shapes a soundscape with their breath.

While this original design proved effective in helping users reach a state comparable to mindfulness meditation, participants reported that the soundscape could also occasionally distract them away from their breath. To address this, we integrate EEG data to detect when users have achieved a state of focused attention, and gradually reduce soundscape saliency. Conversely, when EEG data reveals a state of distraction, the soundscape becomes more salient, increasing its ability to cue users back to their breath with curiosity as proved to be effective in Vidyarthi & Riecke (2013). This playful interaction invites users to focus on their breathing with curiosity and non-judgment when they are exhibiting a state of distraction. Once they achieve focused attention, the interaction paradigm fades out, allowing users to meditate undisturbed.

We guide design decisions through extensive literature review and iterative evaluation with experienced and novice meditators, including a mixed-methods study to test our design hypothesis and guide future development.

## REFERENCES

- Vidyarthi, K. J., & Riecke, B. E. (2013, May). Could an interactive medium introduce non-practitioners to mindfulness meditation? Talk presented at the First International Conference on Mindfulness, Rome, Italy.
- Vidyarthi, J., & Riecke, B. E. (2014). Interactively Mediating Experiences of Mindfulness Meditation. *International Journal Of Human-Computer Studies*, 72(8-9), 674–688. doi:10.1016/j.ijhcs.2014.01.006

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*Prpa, M., Quesnel, D., Vidyarthi, J., Kitson, A., & Riecke, B. E. (2016, May). Sonic Cradle — Immersive interaction design combining breathing– and neurofeedback to foster focused attention meditation on breath. Poster presented at the 2nd International Conference on Mindfulness, Rome, Italy. Retrieved from <http://www.cmc-ia.org/icm2016rome/>*