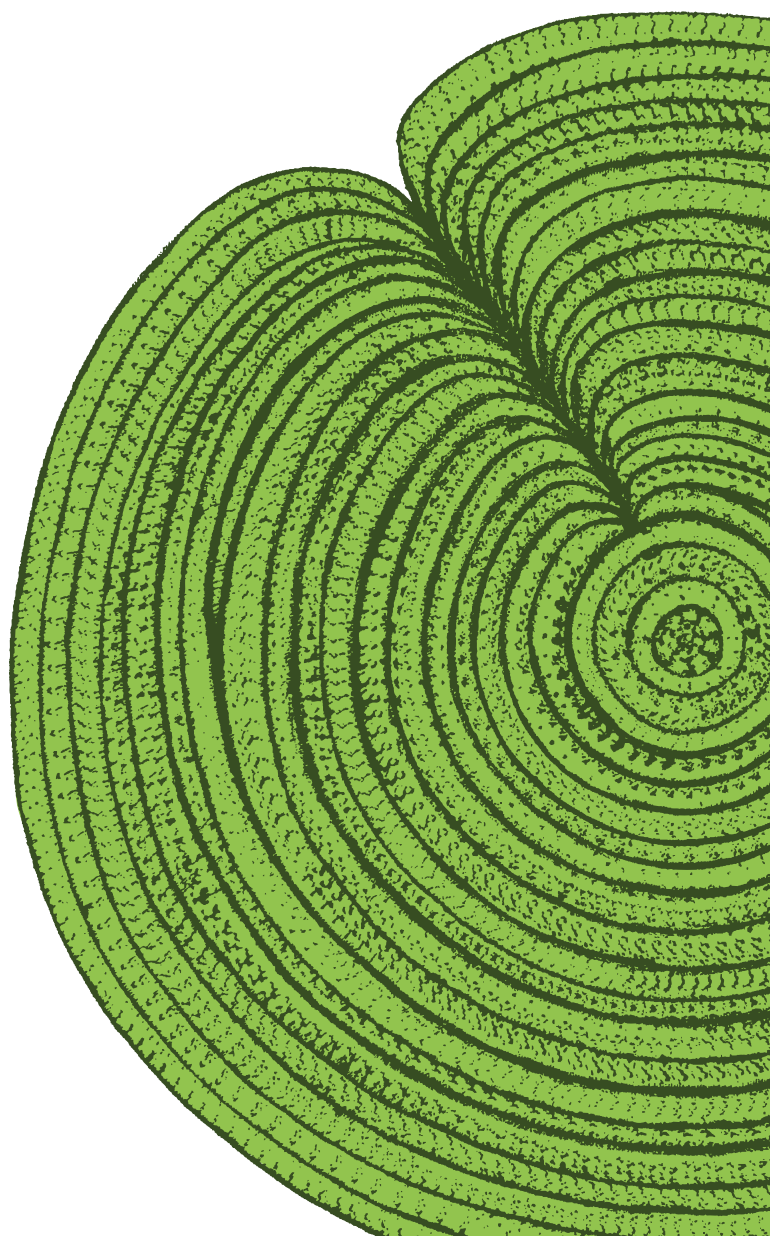




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**Ecological sounds are more effective than artificial sounds in breath modulation**Tesařová M<sup>1,2</sup>, Drandić V<sup>2</sup>, Santoro I<sup>2</sup>, Murgia M<sup>2</sup>, Sors F<sup>2</sup>, Agostini T<sup>2</sup>

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The use of auditory cues for the modulation of movement and physiological parameters has been investigated in different domains. However, most of the previous studies used artificial cues, which did not provide information related to individual's perceptual experience. In this study, we compared the effects of ecological and artificial cues on breathing. Consistently with the Theory of Event Coding, we hypothesized that the ecological cues would affect breathing more than the artificial ones. Indeed, the more the perceptual experience overlaps the action experience, the more the former would influence the latter.

To address this question, we created a database of ecological sounds by manipulating the breathing sounds of a volunteer. We also created a database of artificial sounds which had the same temporal features as the ecological ones. Twenty volunteers were then exposed to three different conditions – ecological sound, artificial sound, and control – while we monitored their breath duration. In each session, participants were first asked to breathe normally, and then to synchronize the beginning of their inspiration with the beginning of the inspiration sound, for each breath. Only in the control condition no cue was provided for this second phase.

The statistical analyses then revealed that breath duration variability in the ecological condition was significantly reduced in contrast with the other two conditions.

The results seem to confirm our hypothesis that ecological sounds capture the timing of breathing better than artificial sounds, guiding as a consequence participants' breathing. Our results provide further support to the validity of the Theory of Event Coding, suggesting its possible extension in the domain of physiological functions that are both consciously and unconsciously controlled. If the future research confirmed the effectiveness of ecological sound training, the current intervention techniques could be improved in various domains (e.g. motor rehabilitation, sport performance).