

# The ramp paradigm: A new protocol for uncovering individual differences in walking to an auditory beat

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#### Introduction

Gait is an excellent model in auditory-motor synchronization because it is:

- Natural and automatic
- Influenced by the characteristics of an external auditory stimulus (e.g. tempo, regularity)<sup>2</sup>
- Reflects individuals differences in the responsiveness to the stimulus' tempo <sup>3</sup>

**Problem.** There is no suitable method which is highly sensitive to individual differences in adapting to rhythmic stimulation while walking.

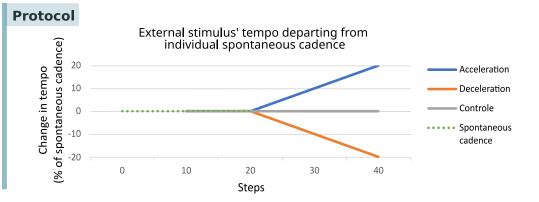
**Objective.** Devise a method of gait measurement that:

- Is highly sensitive to individual differences in responding to an auditory stimulus
- · Allows to define a stability window in the vicinity of spontaneous gait cadence

### Method

In order to highlight individual differences, we propose a new method called TeensyStep, based on TeensyTap<sup>4</sup>

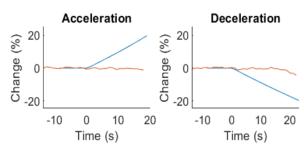




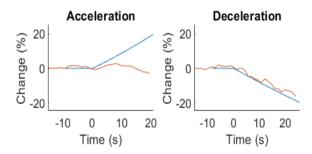
## Type of response to the auditory stimulation

When participants are asked to walk naturaly with the stimulus, we observe different responses :

## Exemple of a non-responder



#### Exemple of a responder



## **Conclusion**

- The Ramp paradigm is currently used as a way to test the effect of explicit and implicit response to the participants to the stimulus change) by manipulating the kind of instructions
- It allows us to observe distinct response profiles

**References.** 1: Dalla Bella et al., (2017) Scientific Reports, 7. https://doi.org/10.1038/srep42005; 2: Leow, L.-A., Parrott et al., (2014) Frontiers in Human Neuroscience, 8. https://doi.org/10.3389/fnhum.2014.00811; 3: Crosby et al., (2020) Frontiers in Neurology, 11. https://doi.org/10.3389/fneur.2020.517028; 4: Van Vuqt, (2020). Advances in Cognitive Psychology, 16, 302–308. https://doi.org/10.5709/acp-0304-y;