

## The cardiac pre-ejection period as a measure of listening effort during a speech-in-noise task

Bethany J. Plain\*<sup>a,c</sup>, Michael Richter<sup>b</sup>, Adriana A. Zekveld<sup>a,d,e</sup>, Thomas Lunner<sup>d,f</sup>, Tanveer Bhuiyan<sup>c</sup>, Sophia E. Kramer<sup>a</sup>

a Amsterdam UMC, Vrije Universiteit Amsterdam, Otolaryngology Head and Neck Surgery, Ear & Hearing, Amsterdam Public Health Research Institute, De Boelelaan 1117, Amsterdam, the Netherlands

b School of Natural Sciences and Psychology, Liverpool John Moores University, Liverpool, United Kingdom

c Eriksholm Research Centre, Snekersten, Denmark

d Department of Behavioural Sciences and Learning, Linköping University, Linköping, Sweden

e Linnaeus Centre HEAD, The Swedish Institute for Disability Research, Linköping and Örebro Universities, Linköping, Sweden

f Department of Health Technology, Technical University of Denmark, Denmark

**Background:** A person's motivation to listen is an important, but relatively recent, consideration in listening effort research. Several studies using physiological measures of listening effort have demonstrated that offering performance-dependent monetary reward increases effort investment during listening tasks. For example, in a study by Richter (2016), participants were offered a monetary reward during a tone discrimination task, while effort was indexed by changes in cardiac pre-ejection period (PEP) reactivity. PEP is a measure of sympathetic nervous system activity on the heart and has been primarily used to demonstrate mental effort during cognitive tasks. Until now, this measure has not been implemented during a speech-in-noise paradigm, and its sensitivity to speech intelligibility and monetary reward in such a task is unknown.

**Objectives:** The first aim of this study was to determine whether PEP is sensitive to varying speech intelligibility levels in a speech-in-noise task. Secondly, we aimed to clarify the impact of monetary reward on PEP.

**Method:** 32 Young, normally-hearing participants (mean age= 22.2 years, SD=  $\pm 3.0$ ) were recruited at VU University Medical Center. Participants completed a Dutch speech-in-noise test with a single-talker masking noise. Six fixed signal-to-noise ratios, spanning from very difficult (-21dB SNR) to very easy (-1dB SNR), were presented in a block-wise fashion. Participants could earn a low (€0.20) or high (€5.00) reward by obtaining a score of  $\geq 70\%$  of words correct in each block. No feedback was presented. We analysed the change in PEP, as measured throughout the listening task, relative to baseline. After each block, participants rated their subjective effort investment, performance level, tendency to give up and the perceived difficulty of the task.

**Results:** Results showed that PEP reactivity is sensitive to signal-to-noise ratio, particularly at -21dB, the most challenging condition. In contrast to previous findings, there were no obvious effects of monetary reward on PEP.

**Conclusion:** Changes in effort investment during a speech-in-noise task are reflected in the sympathetic nervous system activity to the heart. PEP can be used as an additional physiological measure of listening effort, but further investigation into the most appropriate test parameters will be beneficial.

**Poster only**

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Submitting author: Bethany Plain  
Email addresses: b.plain@amsterdamumc.nl, bepl@eriksholm.com  
Phone number: +44 7955154938