

Min Zhang – Abstract

“Listening Effort Allocation, Stimulus-Driven, Goal-Driven, or Both?”

Background

Listening effort is particularly difficult to define and quantify in the domain of speech comprehension. Many factors can impact the effort exertion from the listeners into a given situation. Current evidence in listening effort have revealed a monotonic change of listening effort as a function of task demand, which suggest the effort allocation to be a stimulus-driven process. However there is a big gap on what actually drives effort allocation between the listening effort literature and the effort-related research in other fields based on the theoretical foundations used. The present study aims to bridge the gap.

Method

Both the stimulus-driven factor (speech rate) and the goal-driven factor (reward) were manipulated in the study. 40 participants were recruited. They were asked to answer a list of reasoning questions about the spatial relationship between 3 objects by pressing the appropriate key on a keypad. Participants must answer the question correctly in order to get the corresponding points, and their task goal is to obtain the full payment \$50 dollars upon the completion of the experiment within a limited time period. Their pupil dilation was tracked as an indicator of listening effort throughout the whole experiment except during breaks.

Results

There was a significant interaction effect of speech rate and reward on listening effort during the decision-making phase and response phase. There was a significant main effect of speech rate across the entire time window of the trials, and the significant main effect of reward was also observed throughout the majority of the cognitive processing phases.

Conclusion

Listening effort is a goal-driven decision-making process rather than a mere stimulus-driven process. People allocated more effort on the difficult items than easy ones, and distributed more effort on high reward items than low reward ones.