Eyes as a window of our mind

Abstract

Pupil size is indexed to changes in neural activities, which have been shown to reflect a broad range of cognitive processes. We investigated the temporal aspects of pupil size on perceptual bistability. Pupil size increased with an increasing number of perceptual alternations. Furthermore, pupil size was related to the frequency of perceptual alternation at least 35 s before the behavioral report of perceptual alternations. The overall results suggest that variability of pupil size reflects the stochastic dynamics of arousal fluctuation in the brain related to bistable perception. In future work, we plan to use pupil size to predict the representation of brain network shift across modality and task.

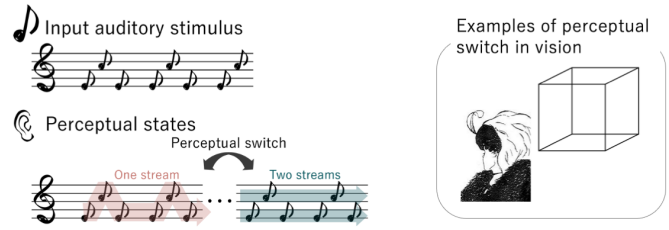
Pupil size tracks subjective perceptual changes

When you listen a certain auditory sound, the perception is spontaneously and temporally changed in multiple ways.

The pupil size may reflect a timing of the switch before we experience alternating percepts.

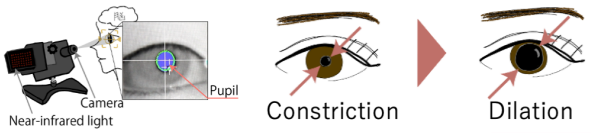
Bistable perception and perceptual switch

The moment-to-moment changes in our perception on a constant sensory input.

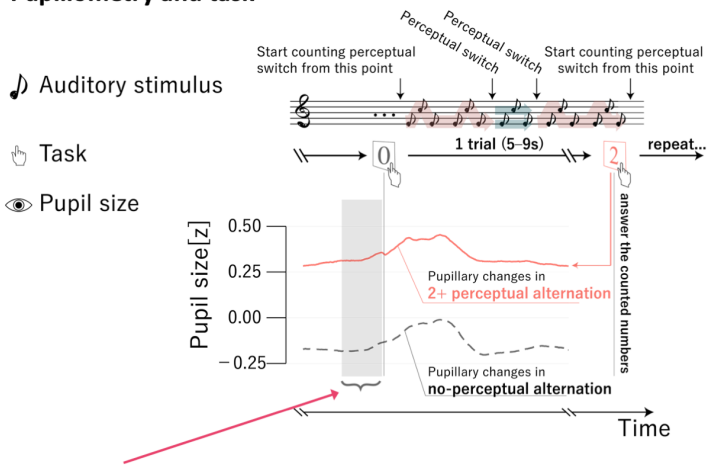


Pupillometry :

Pupil size is related to the autonomic system(norepinephrine) and indexed as an arousal level.

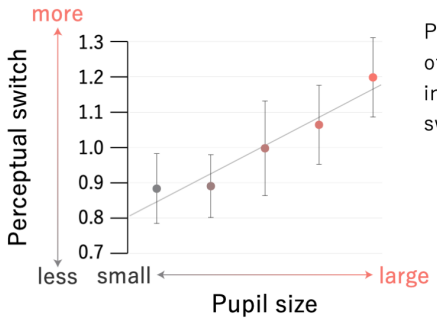


Pupillometry and task



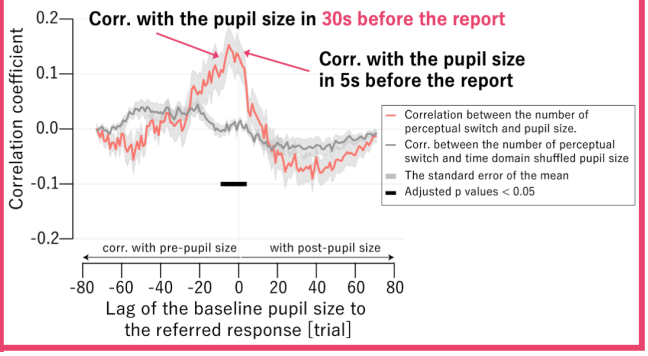
The analysis of the pupil size before the counting task corresponding to the answer.

Norepinephrine level might be related to the stochastic frequency of bistable perception



Pupil size before the assignment of the task increased with increasing number of perceptual switch.

The correlation lasts tens of seconds



References

[1] Y. Suzuki, H. Liao, S. Furukawa, “Temporal dynamics of auditory bistable perception correlated with fluctuation of baseline pupil size,” *Psychophysiology*, 2022. doi:10.1111/psyp.14028

Contact

Yuta Suzuki / Sensory Representation Research Group, Human and Information Science Laboratory
Email: cs-openhouse-ml@hco.ntt.co.jp