



Abstract

In natural situation, there are various sounds in the environment and we move our head and/or eyes towards the sound where we attend to. The current study demonstrates that **our pupillary light reflex responds to the luminance of the sound's location/direction even when we do not move our eyes over there**. In other words, we can predict people's auditory attention by pupillary response. This technique has applications in various fields such as human factors, medicine, etc. For example, it can be used to assess the quality of the sounds or warning signals in terms of their ability to capture user's attention. Or it can be used to help the diagnoses of hearing loss and/or attentional deficit.

Pupil not only reflects the luminance of the location where our eyes look at, but also where we attend to.

We recently found that when attending to a particular side of the ear (left or right), pupil responds to the luminance condition of the visual field corresponding to the attended ear side even when the eyes do not move.



Auditory attention revealed as pupillary response

Method

- Display with luminance disparity
- Attending to the left or right ear while fixating a central point on the display



- Pupillary light reflex reflects the luminance of the visual field corresponding to the attended ear side.
→ **Common mechanism of audio-visual spatial attention?**
- Unconscious response
→ **The prediction cannot be cheated by intentional control.**

Visual stimulus

Display with luminance disparity



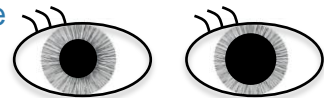
Attend to the ear



Left ear

Right ear

Pupillary response



Pupil constriction

Pupil dilation

Reflected as the luminance of the attended visual field

References

- [1] H.-I. Liao, H. Fujihira, S. Furukawa, "The pupillary light response reveals the focus of auditory spatial attention," Association for Research in Otolaryngology (ARO) 41st Annual MidWinter Meeting. San Diego, California, USA. 2018.

Contact

Hsin-I Liao Sensory Resonance Research Group, Human Information Science Laboratory