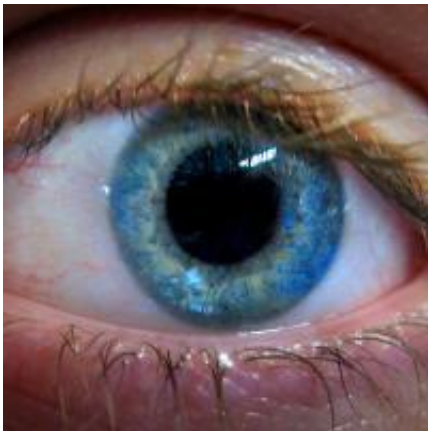


Study: Pupil size shows reliability of decisions

September 18 2014



The precision with which people make decisions can be predicted by measuring pupil size before they are presented with any information about the decision, according to a new study published in *PLOS Computational Biology* this week.

The study, conducted by Peter Murphy and colleagues at Leiden University, showed that spontaneous, moment-to-moment fluctuations in pupil size predicted how a selection of participants varied in their successful decision making. A larger pupil size indicated poorer upcoming task performance, due to more variability in the decisions made once the relevant information was presented. The authors also found that certain individuals who had the largest pupils overall also

tended to be the least consistent in their decisions.

The results were obtained by measuring pupil size before each segment of the task began and monitoring each participant's subsequent performance in deciding which direction a cloud of dots was moving in. These results were then combined with a simple mathematical model that described how people make decisions.

These findings reveal that a person's state of responsiveness, as measured by pupil size, is a key determinant of the variability of the decisions they make about the world around them. When hyper-responsive, our decision making appears to be less reliable and will more likely lead to undesirable outcomes. Critically, the findings also open up areas for future research aimed at improving the precision with which we make decisions, to help us achieve better outcomes from the choices that we make.

The results were obtained by measuring the pupil size of 26 volunteers as they performed a visual choice-based task designed to mimic the kinds of challenging perceptual decisions that are frequently encountered in everyday life. Pupil size gives a good indication of how responsive a person is at any given moment, with larger pupils correlating with increased responsiveness, though little was previously understood about how pupil size might relate to our ability to make reliable perceptual judgements.

Dr Murphy comments, "we are constantly required to make decisions about the world we live in. Researchers have long known that the accuracy and reliability of such everyday decision making can be tremendously variable for different people at different times, but we understand quite little about where this variability comes from. In this study, we show that how precise and reliable a person is in making a straightforward decision about motion can be predicted by simply

measuring their [pupil size](#). This finding suggests that the reliability with which an individual will make an upcoming decision is at least partly determined by pupil-linked 'arousal' or alertness, and furthermore, can potentially be deciphered on the fly. This new information could prove valuable for future research aimed at enhancing the precision of [decision making](#) in real time."

More information: Peter R. Murphy, Joachim Vandekerckhove, Sander Nieuwenhuis. Pupil-Linked Arousal Determines Variability in Perceptual Decision Making. *PLoS Computational Biology*, 2014, [DOI: 10.1371/journal.pcbi.1003854](#)

Provided by Public Library of Science

Citation: Study: Pupil size shows reliability of decisions (2014, September 18) retrieved 11 May 2024 from <https://medicalxpress.com/news/2014-09-pupil-size-reliability-decisions.html>

| |
|--|
| <p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p> |
|--|