

# Brain's clock influenced by senses

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Humans use their senses to help keep track of short intervals of time according to new research, which suggests that our perception of time is not maintained by an internal body clock alone.

Scientists from UCL (University College London) set out to answer the question "Where does our sense of time come from?" Their results show that it comes partly from observing how much the world changes, as we have learnt to expect our sensory inputs to change at a particular 'average' rate. Comparing the change we see to this average value helps us judge how much time has passed, and refines our internal timekeeping.

Dr Maneesh Sahani, from the UCL Gatsby Computational Neuroscience Unit, and an author of the paper said: "There are many proposals for how an internal clock might work, but no one has found a single part of the brain that keeps track of time. It may be that there is no such place, that our perception of time is distributed across the brain and makes use of whatever information is available."

Published online in [Current Biology](#) today, the study includes two key experiments. In one experiment 20 participants watched small circles of light appear on a screen twice in a row, and were asked to say which appearance lasted longer. When the circles were accompanied by a mottled pattern programmed to change randomly, but with a regular average rate, participants' judgments were better - suggesting that they used the rate of change in the patterns to judge the passing of time.

In another experiment the authors asked participants to judge how long the mottled patterns themselves lasted, but varied the rates at which those patterns changed. When the patterns changed faster, participants judged them to have lasted longer -- again showing that sensory change shapes our sense of time.

"Our sense of time is affected by outside stimuli, and is therefore highly mutable, which is something that resonates with people's feeling about the passing of time," said Dr Sahani.

"It is possible to bias people's perception of time, which does not fit with the idea of a rigid internal brain clock. The answer to why this happens is that part of our perception of time is based on changing sensory input from the outside world, which we can use to improve our judgements of time in an environment where rate of change is likely to be reliable," added Dr. Misha Ahrens, the first author of the study and a UCL graduate student when the study was conducted.

**More information:** "Observers exploit stochastic models of sensory change to help judge the passage of time" is published in *Current Biology*.

Provided by University College London

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