

Contextual effects in human temporal estimation: knowing when and what to time

Ljubica Jovanovic

Visual Neuroscience Group, School of Psychology, University of Nottingham

Humans can discriminate temporal intervals in a vast range of durations, extract temporal patterns, organize, and execute complex motor behaviors. To understand human time perception, we need to be able to describe and understand these different manners in which humans encode and employ temporal information. In the work presented here, we asked how different cues about *when* and *what* to time affect human temporal estimation, by means of psychophysics and pharmacological manipulation.

In the first set of studies, we investigated how cues for *when* an event of interest started affected perceived elapsed time between two moments. The two hallmarks of time perception, the scalar variability of time and the regression to the mean, were found both when the interval to be timed was cued beforehand, or revealed retrospectively. Nevertheless, the temporal context affected the estimates more, and sensitivity of duration discrimination was lower when duration estimation was based on retrospective cues. The difference between the two types of time estimation was further explored in a study in which the dopamine availability of healthy individuals was manipulated (Acute Phenylalanine/Tyrosine Depletion). The dopamine manipulation affected temporal estimation in the pre-cued condition, but had no effect on retrospective temporal estimation, supporting the hypothesis that these two manners of estimating durations rely at least partly on different mechanisms.

Next, we asked how knowing *what* to time affects the perceived time of events. We asked participants to report when they perceived a visual event (target), and estimated the disruption from a distractor event, that was presented before or after the target, with a variable time between them. The target was either revealed at the end of the trial or cued beforehand, and in the latter case, was cued by either color or temporal order. The findings revealed mandatory interactions between the perceived time of events and other events presented in their temporal proximity. In addition, they confirm the close relationship between the perceived time of events and the manner in which we attend to the events of interest.