Time as its own representation

Ishan Singhal

Department of Cognitive Science, Indian Institute of Technology Kanpur, India

This talk will outline two properties of mental time, (1) temporal correspondence and (2) temporal mirroring. These properties will be used to formulate a constrain on the format of mental representations of time. Further, the talk will discuss evidence from two studies that empirically test these properties in behavioural experiments. Evidence will be presented for a temporal correspondence in visual representations of figure-ground perception. Figure-ground segregation can be induced by relative flicker frequency differences while participants view ambiguous displays, and (temporal) correspondingly, when participants themselves have segregated a region as figure/ground, their temporal sensitivity for that same region changes. As evidence for temporal mirroring, a duration estimation study will be discussed, where perceived duration of an interval is mirrored by timing of perceptual events within that interval. Taken together, the talk will highlight the possibility of time being its own representation.

Symposium 14

A multidisciplinary approach for the modulation of the human subjective time experience

Argiro Vatakis[1], Knut Drewing[2], Heiko Hamann[3], Jean Botev[4], Pieter Simoens[5] and Yara Khaluf[6]

[1]Multisensory and Temporal Processing Laboratory (MultiTimeLab), Department of Psychology, Panteion University of Social and Political Sciences, Athens, Greece

[2]HapLab, Giessen University, Giessen, Germany

[3]University of Konstanz, Konstanz, Germany

[4]University of Luxembourg, Luxembourg, Belgium

[5]IDLab, Ghent University, Ghent, Belgium

[6]Information Technology Group, Wageningen University & Research, Wageningen, the Netherlands

Symposium Abstract

Our ability to estimate time is critical in every aspect of our life, from everyday tasks like coordinating our limbs to walk safely, to uniquely human activities like

planning our children's future. Subjective time, however, is not isomorphic to physical duration and can be distorted by a wide variety of factors. Furthermore, the subjective feeling of time expanding is often tied with major phenomenological and perceptual side effects that may yield a beneficial impact on our behavior, allowing us to avoid fatal or catastrophic events, deal with life-threating situations, and modify our actions by directing our attention to the issues most relevant for our survival. Although such phenomenological distortions are yet to be fully understood and predicted by current timing models, basic research on timing has produced a wealth of knowledge on timing modulations and their behavioral effects. ChronoPilot is a multidisciplinary, European-funded effort aiming to develop a prototype technology to extend or compress human subjective time adaptively. This will be implemented through mixed reality technologies and collaborative settings (humans, humans and robots), where people will be presented with visual, auditory, and haptic stimulation patterns that directly or indirectly influence their subjective time. Further improving our understanding and models of timing and the complementing technological means to modulate time, we believe will have a profound impact on both technology and society. This symposium aims to inform the timing community of the progress of the ChronoPilot effort by bringing together researchers from different disciplines on the common effort of modulating human subjecting time.

Extending basic research findings on timing to more complex, ecologically valid settings

Eirini Balta, Andreas Psarrakis and Argiro Vatakis

Multisensory and Temporal Processing Laboratory (MultiTimeLab), Department of Psychology, Panteion University of Social and Political Sciences, Greece

Research has shown that timing is modulated by cognitive load [1], making duration judgments a measure of load, alongside subjective assessments and physiological measurements (e.g., [2]). Yet, it is unclear whether similar findings can be obtained in less controlled, real-world environments. By employing air traffic controllers working under real conditions, we tested whether tasks with different levels of cognitive load will affect their timing behaviour and physiological state. Initial results are consistent with the basic research findings. That is, we found that as cognitive load increased, temporal intervals were underestimated and passage of time judgments showed that time felt as passing faster. Changes in the levels of task demands also affected the cardiac and electrodermal activity. Such