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43rd European Conference on Visual Perception (ECVP) 2021 Online

Welcome Address

Welcome to the 43rd European Conference on Visual Perception (ECVP2021)! The tradition of holding an annual European Conference on Visual Perception has its origins in the "Workshop on Sensory and Perceptual Processes" that was held in Marburg, Germany in 1978 and organised by Dick Cavonius, John Mollon, Ingo Rentschler and Lothar Spillmann. The following year, a second meeting was held in Noordwijkerhout in the Netherlands and that established the practice of holding an ECVP meeting in a different European town or city and organised by academics and researchers in the local University. Uniquely, ECVP has no permanent organisation and, as a consequence, each meeting has been different and reflective of the ideas and interests of the local organisers. But the underlying goal has remained the same: i.e. to provide a forum for the presentation and discussion of new developments in our understanding of human, animal and machine vision, and an occasion where empirical, theoretical and applied perspectives of visual processing are presented and open for lively discussion.

At those early meetings, most of the presentations were from researchers in the UK, Germany, Belgium, France, Italy and the Netherlands but very soon ECVP became a truly international meeting with participants from all over the world. As a result of Richard Gregory's friendship with Adam Gelbtuch and his publishing company Pion, ECVP established a close link with the journal Perception, and the journal has published the ECVP Abstracts from nearly every meeting since the 1980's. There have also been many changes to ECVP in the 43 years since that first meeting - changes in the topics of greatest interest as well as changes in the technologies that have allowed us to study perception in different ways.

However, the Covid-19 epidemic created possibly the most significant challenge that ECVP has ever faced - the decision of whether to hold the 2021 meeting ONLINE. At the end of March 2021 (just five months before the start of the meeting), a group of ~40 individuals (including many who shared their experiences as past organisers of ECVP) met on Zoom to discuss the pro and cons of holding an online ECVP. There were many different opinions but one thing became obvious – no single individual could possibly organise such a meeting in such a short amount of time. The result - a group of 11 of us (the "Team") offered to plan and organise an online ECVP2021.

As none of us had previously organised an online meeting, there were many challenges. One of our first decisions was to restrict the timing of the talk sessions to just three hours in the afternoon (CEST) so that these could be heard live by attendees from the west coast of the USA to Australia and New Zealand. Second, we wanted the talk presentations to be given live (rather than recorded) in order to make the meeting more like the friendly and positive atmosphere of previous ECVP meetings. Third, the decision not to charge conference fees meant that the website (www.ecvp2021.org), registration and abstract submission systems, Zoom channels, online poster platforms etc., had to be created and maintained directly by members of the organising team and their respective institutions.

We initially thought that the conference might attract ~500 Abstract submissions and we thought that there would be some 800-1000 registrations. As it turned out, there were nearly 650 Abstract submissions and over 1900 registrations. After an extensive review process conducted by the session chairs and scientific

committee, the meeting hosted 150 talks, 3 Keynote speaker lectures, 2 symposia, a "Showtime!", a "Gathertown" meeting place and a total of 490 posters.

You will see below the abstracts of the scientific presentations. All of the abstracts were carefully evaluated according to pre-defined criteria by experts in the respective fields of research. We are extremely grateful to our session chairs and co-chairs and to all our colleagues who donated their time and energy to make ECVP2021 possible. We would also like to thank our exhibitors and sponsors for their financial contributions and in particular Sage Publications (publishers of Perception and i-Perception) for their on-going and generous support of ECVP.

The organising Team of the 43rd ECVP invites you to engage in the open-science interaction that is available to all, either by viewing the Abstracts in the electronic booklet below, or by interacting with the online materials that remain available via www.ecvp2021.org, www.ecvp.eu and our OSF video platform: https://osf.io/8tb9x/

Brian Rogers, on behalf of the ECVP 2021 Organising Team:

Tiziano Agostini, Marco Bertamini, Claus-Christian Carbon, Cristina de la Malla, Dražen Domijan, Mark Greenlee, Michael Herzog, Brian Rogers, Katherine Storrs, Ian Thornton & Sunčica Zdravković.

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influence on gaze guidance relates to object-scene relationships: objects that are semantically inconsistent with the scene within which they appear attract more fixations than consistent objects placed in the same context. One interpretation of this effect is that fixations are driven towards inconsistent objects because they are semantically more informative. We tested this hypothesis using contextualised meaning maps, a method that uses crowd-sourced ratings to measure the spatial distribution of context-sensitive meaning in images. In Experiment 1, we compared human fixations with predictions by contextualised meaning maps for images in which the semantic consistency between objects and scenes was manipulated. As expected, semantically inconsistent objects attracted more fixations than the consistent ones. However, contextualised meaning maps did not assign more meaning to image regions that contained semantic inconsistencies. In Experiment 2, a large number of raters evaluated the meaningfulness of a set of carefully-selected image regions. Surprisingly, the same scene locations were rated as slightly less meaningful when they contained inconsistent vs. consistent objects. Taken together, our results demonstrate that, at least in the context of this specific rating task, semantically inconsistent objects are experienced as less meaningful than their consistent counterparts, and that contextualised meaning maps do not capture one prototypical influence of semantic information on eye-movement guidance.

Oculomotor Indicators Associated with Task Performance in Different Language Groups

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Researchers converge in identifying oculomotor correlates, associated with greater performance: experienced subjects exhibit shorter fixations and longer saccades (Ashby, Rayner & Clifon, 2005), as well as greater stimulus coverage resulting from increased saccadic speed (Blinnikova, Izmalkova, 2016). Changes in oculomotor activity in various language-related tasks such as reading, lexical decision or word recognition can be associated both with belonging to a particular language group and with linguistic competence. In order to investigate the oculomotor patterns of successful performance in solving a lexical task in a foreign language, we compared samples of different linguistic backgrounds (Russian, Japanese, and Chinese speakers, n=64). The task consisted in searching for words through letter matrices, similar to a word search game. Efficiency and oculomotor indicators were registered with "SMI Gaze & Eye-tracking System". In the group of Russian respondents, higher efficiency is associated to longer saccades ($F(2, 366) = 3{,}65$, $p < 0{,}05$) with larger amplitudes ($F(2, 366) = 3{,}19$, $p < 0.05$). Japanese subjects demonstrate a decrease in saccade duration saccades ($F(2, 349) = 4.24$, $p < 0.5$) as their effectiveness increases. Chinese subjects demonstrating higher search effectiveness show a lower fixation count ($F(2, 393) = 6.97$, $p < 0.01$) and frequency ($F(2, 393) = 7.02$, $p < 0.01$) along with a smaller number ($F(2, 393) = 7.72$, $p < 0.01$) and frequency ($F(2, 393) = 7.68$, $p < 0.01$) of saccades. Thus, changes in oculomotor patterns associated with higher search efficiency are specific for each language group, depending on the requirements of task. [The research is supported by RFBR project # 20-013-00674.]

Speed-Accuracy Instructions modulate Saccadic Velocity in an Eye-Tracking version of the Trail-Making-Test

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Examining the eye movements of a person during their performance of a task offers a way to gain deeper insights into ongoing cognitive processes of that person. A body of work suggests that the peak velocity of a saccade is related to the cognitive demands of a task. Recently, we recorded eye movements of participants while they performed a version of a computerized Trail-Making-Test (TMT), a popular test of executive functions applied in neuropsychological contexts. During the test participants clicked through a sequence of numbers (TMT-A) or alternated between a sequence of numbers and letters (TMT-B) emphasizing either the speed or the accuracy of their responses. Since part A and part B generally differ in their task difficulty, we examined if the saccadic peak velocities were reflective of that difference. Our analyses revealed peak velocities were greater during performance of TMT-B but only when participants were emphasizing the speed of their responses. TMT-A performance yielded no such differences. We suggest that this is due to the combination of test part B with the speed task-set. The speed task-set might amplify the effect of task difficulty on the level of arousal which becomes visible in higher saccade peak velocities. In contrast, the accuracy task set might limit the effect of task-difficulty on arousal, to ensure an appropriate level of carefulness in task performance. Taken together, these findings highlight saccade velocities as a tool to uncover cognitive and physiological states in sensorimotor tasks.

An active model of human edge sensitivity: Extracting edges via fixational eye movements

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