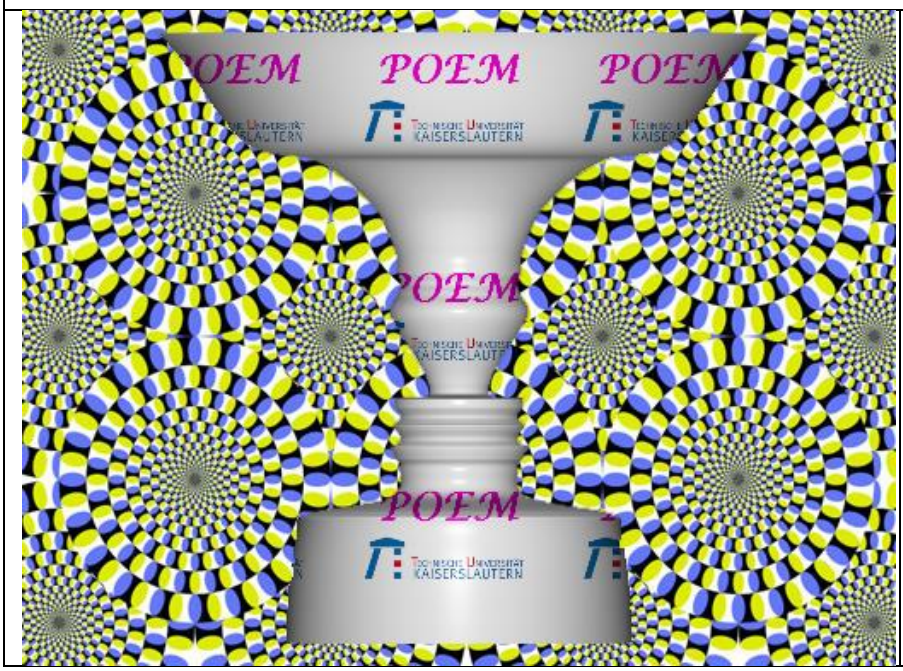
Final Summary of POEM



Project Number: 293901
Period: 01-09-2013 to 31-08-2015

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Objective:
Finding eye movement based correlates of perceptual organization

Website:
http://www.sowi.uni-kl.de/fileadmin/wpsy/public/POEM/POEM.htm

- *A pictorial summary results*

Figure-1: Saccade response time (RT) was modulated by having the participants make a quick eye-movement toward a target (green dot) that was in a location congruent or incongruent with the group ("bigger circle formed by orange dots). The underlying logic for the choice of this methodology is as follows: the stronger grouping factor will be more salient or will "grab" more attention and would have a greater influence on the participants eye movement when they look towards a target that is located in a regular grouped structure as compared to located on its opposite side. The neutral condition with no regular structure served as a baseline.

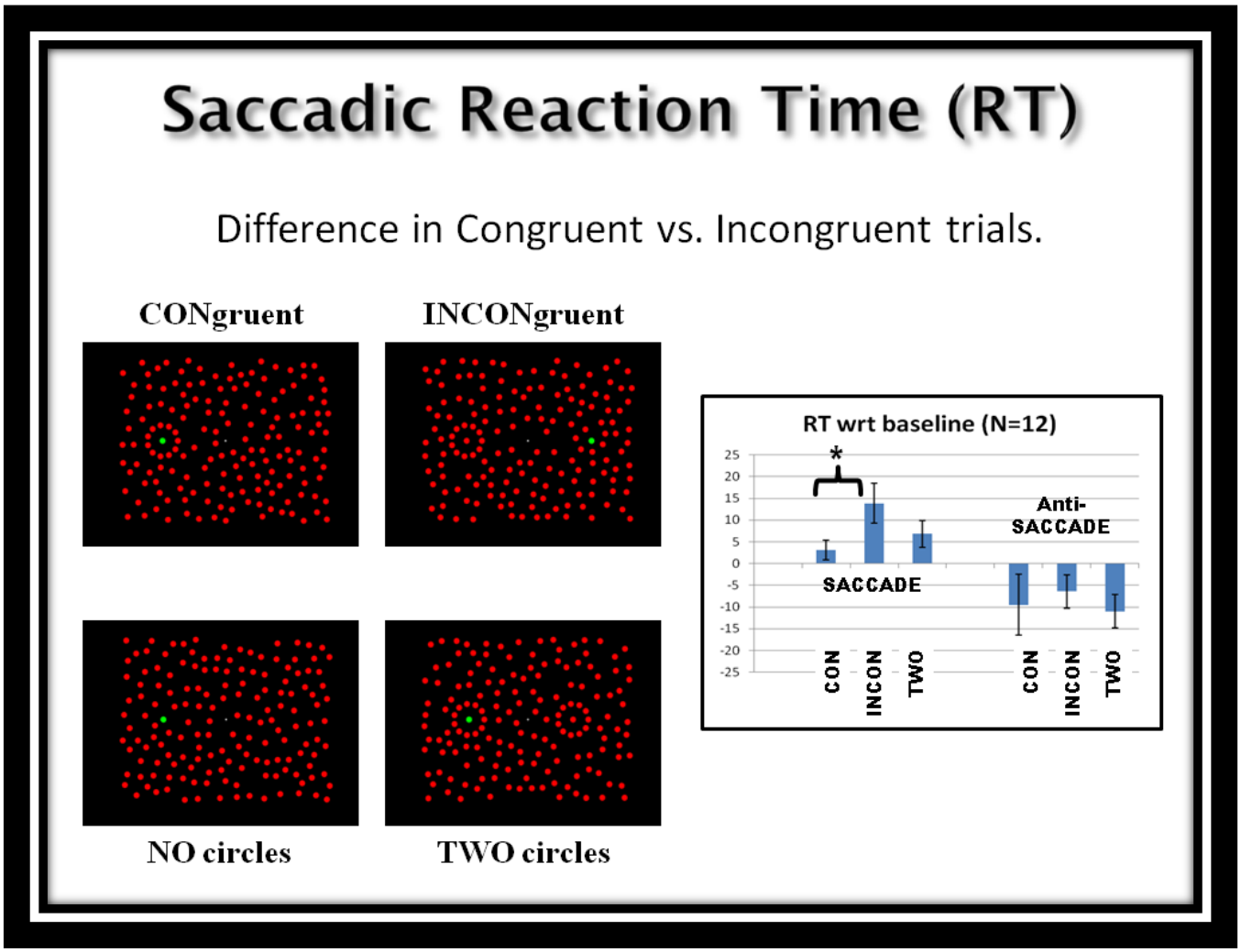
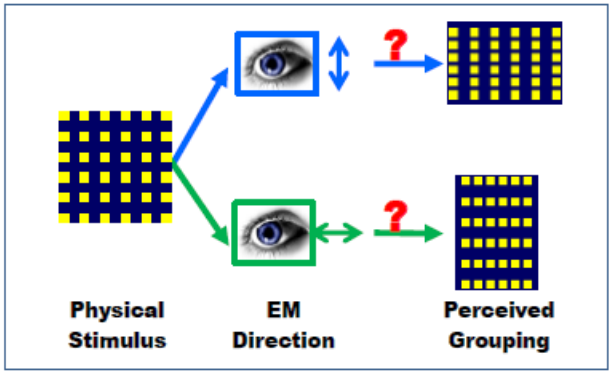


Figure-2: First study showed that perceptual grouping influences goal-directed eye movements (EM). Here, we investigated whether an explicit EM made prior to performing a perceptual organization task can affect perceived grouping. The results show that the perceived orientation of grouping (horizontal/vertical) of a grid of dots can be influenced by the direction of prior volitional EM. That is, a prior vertical EM biased participants to report that an equally spaced ambiguous array of dots was arranged in vertical columns more often than horizontal rows.

The factors were 5 levels of grouping (vertical-strong, -weak, ambiguous, horizontal-weak, -strong; shown on X-axis of the results plot) and 3 EM (vertical (blue), no EM (red), horizontal (green)).

There was a significant main effect of level of grouping ($F(4,56)=66.11$, $p < .0001$) and EM direction ($F(2,28)=7.72$, $p < .01$) and no interaction between the two.



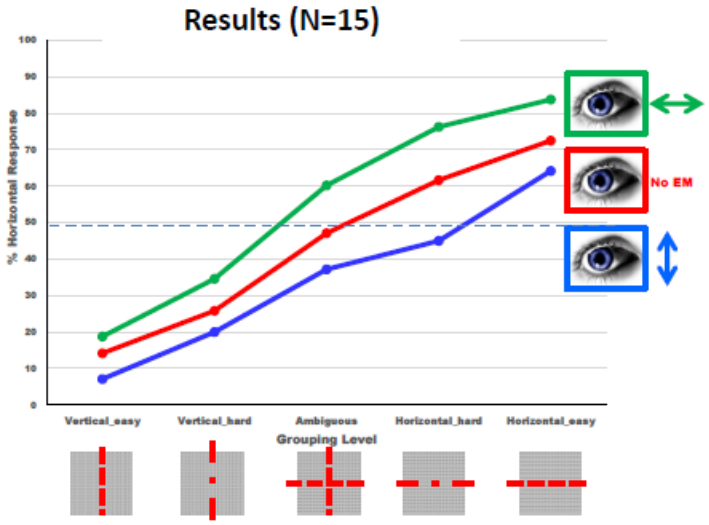
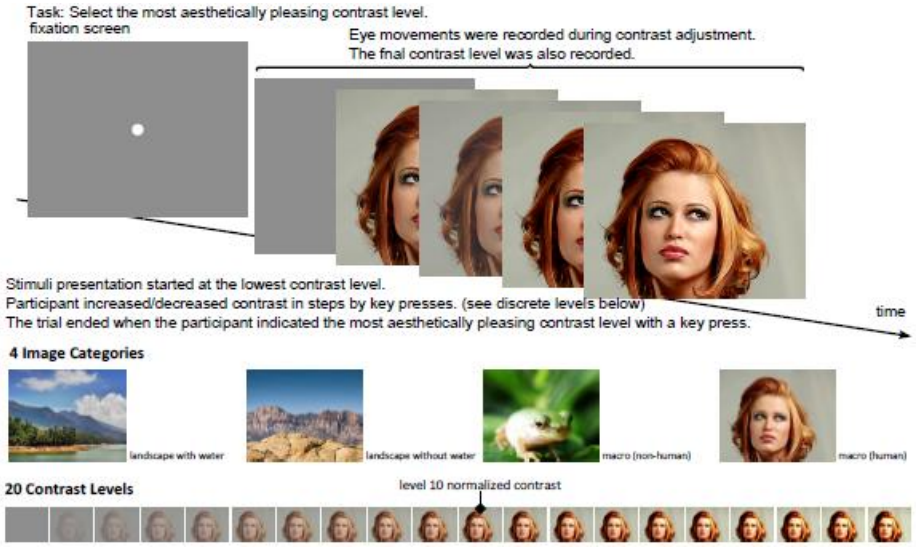


Figure-3: The goal was to find whether eye movements (EM) made during a task contain important task-relevant visual information. The task was to adjust the contrast of the image until it looked ***aesthetically pleasing*** to the participant. We used expert photographers and novices as participants. If EM fixations are meaningful to the task then experts should intrinsically select features differently from novices.

Stimuli: We used 100 images acquired from professional photographers (25 from each of the 4 categories – landscape with/without water, macro human/non-human. We created 20 contrast level for each image. The EM were recorded while the observer chose the most aesthetically pleasing contrast level by key presses.

Our data show that there were significant difference between the contrast level chosen by experts and novices. The visual features at points of fixation were used for training a classifier to distinguish experts from novices (See Figure-4).



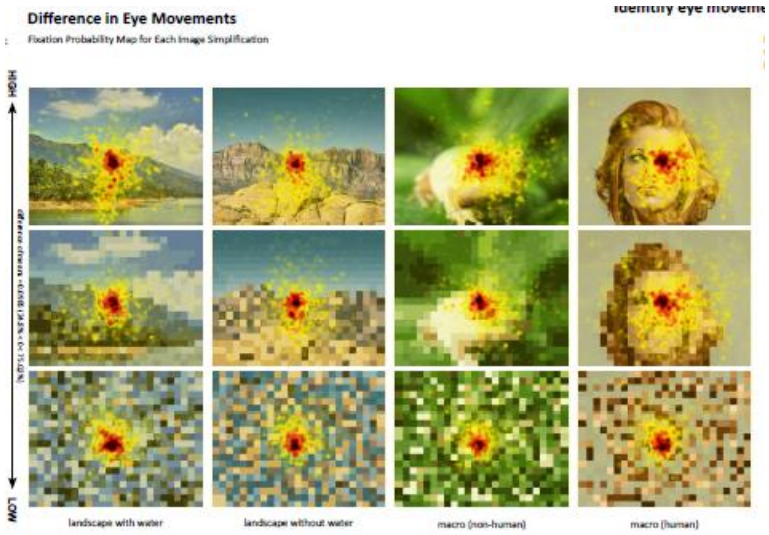
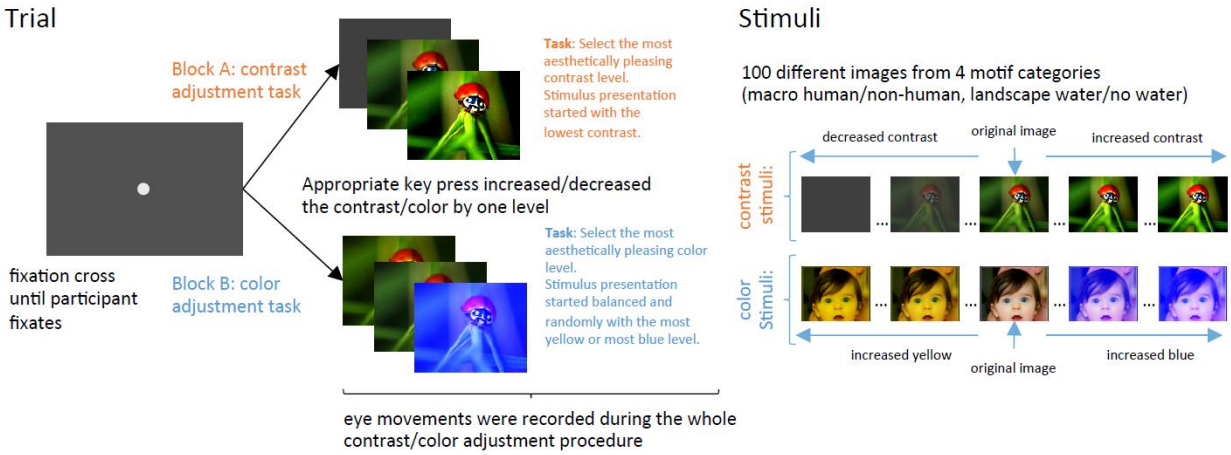


Figure-4: As mentioned in Figure-3, the goal was to find whether eye movements (EM) made during a task contain important task-relevant visual information. The task was to adjust the contrast/color of the image until it looked ***aesthetically pleasing*** to the participant. We used expert photographers and novices as participants. If EM fixations are meaningful to the task then experts should intrinsically select features differently from novices.

A support-vector machine was trained to classify EM-based features (luminance/color at fixation, luminance/color-variance in small/large region around fixation) into experts or novices. Classification accuracy was significantly above chance both for the contrast (60 %) and color (52 %) adjustment tasks. Luminance-features were significantly more discriminative during contrast than during color-adjustment, and vice-versa for color-features.



Results

results based on eye movement data from 4 experts and 4 novices

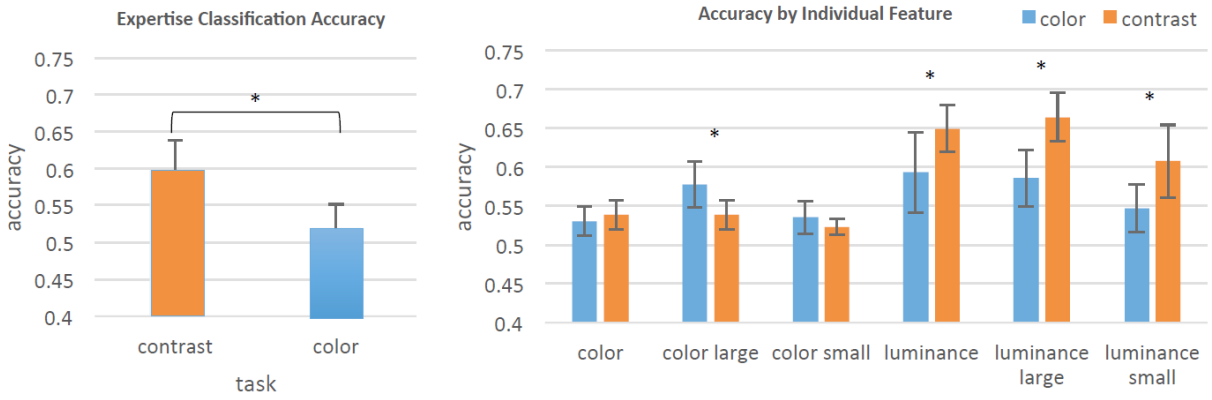


Figure-5: Inauguration of Public Lecture Series "Wahrnehmung" by The President of University of Kaiserslautern and Lord Mayor of Kaiserslautern inaugurated the event