**Trade-off between search costs and accuracy in a visual and manual search task**  
Ilja Wagner1, Jan Tünnermann2, Anna Schubö2, & Alexander Schütz2  
1 Justus Liebig University Giessen (Germany)  
2 Experimental & Biological Psychology, University of Marburg (Germany)

When choosing targets for saccadic eye movements, humans must balance the influence of different factors. For example, we recently demonstrated that humans trade-off their individual accuracy to discriminate object features against the prospective temporal costs of saccades, required to locate an object, in order to optimize performance in a visual search task (Wagner et al., 2022). Here we tested if this trade-off is specific for saccades, or if it generalizes to manual actions.

Participants were instructed to find one of two potential targets in two intermixed sets of distinct elements, and to discriminate a feature at that target. The two targets differed in two aspects: we manipulated the relative search costs, by varying the relative number of distractors in the two sets, and the relative difficulty of feature discrimination. Correct/incorrect discriminations were rewarded/penalized monetarily and participants were free to choose which target to search and report. Participants were given 6:30 min to gain as much reward as possible. We compared participants’ behavior and performance in two conditions of this task: one required visual search via eye movements, whereas the other required manual search via finger taps on a tablet computer.

We found that participants traded-off the discrimination accuracy and search costs of target options to maximize expected value in both conditions. However, behavioral analysis and computational modelling revealed that performance in the visual search task was more strongly constrained by noise in decisions about what target to search for and what information to sample while searching for the chosen target.

We conclude that the previously reported near-optimal trade-off between search costs and discrimination accuracy constitutes a general behavioral strategy for humans to optimize behavior. However, the slower time course of manual actions makes choice behavior less suspectable to noise, compared to fast-paced saccades.

**Acknowledgements:**   
This project was funded by the SFB/TRR 135 and the International Research Training Group, IRTG 1901, “The Brain in Action”, from the German Research Foundation (DFG).