Eye-Tracking in Practice: A First Analysis of a Study on Human Postures

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with
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Outline

Primary Research Question

- Does judging the action capabilities of another person depend on one's own experiences?
- Background: Action anticipation must be present when interacting with others (e.g., to avoid collisions, pass something on to someone, etc.)
- Motivated by research in the Kinesiology and Health Science Department at Utah State University (USU)

Participants

- Several preliminary test participants (2 presented here)
- Group 1: 20 students with minimal experience with actions that require stability (e.g., yoga, gymnastics, . . .) from the undergraduate Psychology pool at USU
- Group 2: 20 students with extensive yoga experience from advanced yoga classes at USU

Anticipated Outcomes

- Those with extensive yoga experience will judge an actor to be more stable than those without stability-specific experience
- The visual information used to judge stability will differ between different groups of individuals with unique action experiences

Apparatus and Tasks

- 22 pictures of a single actor holding a posture
- All postures shown to each participant in random order
- Participants have to judge the stability of each posture, i.e., how long the person could hold the posture
- Answers: $<$ 1 sec, 1–10 sec, 11 sec – 1 min, 1 min – 1 hour, $>$ 1 hour
- Participants wear an ASL portable eye-tracking device for entire study

Postures 1 to 6 (out of 22)

Secondary Research Questions

- At which body parts, i.e., areas of interest, do the participants look in each posture?
- How long and how often do they look at the body parts in each posture?
- Are these viewing patterns associated with the stability assessment?

Final Data Collection

- 880 answers to stability assessment (22 postures $\times$ 20 participants $\times$ 2 groups)
- 40 recordings from eye tracker (one for each participant)

Data Extraction and Processing

- Extract information from the eye tracking videos via the EyeTrackR R package (introduced in previous presentation by Chunyang Li)
- Define Areas Of Interest (AOIs) for each posture

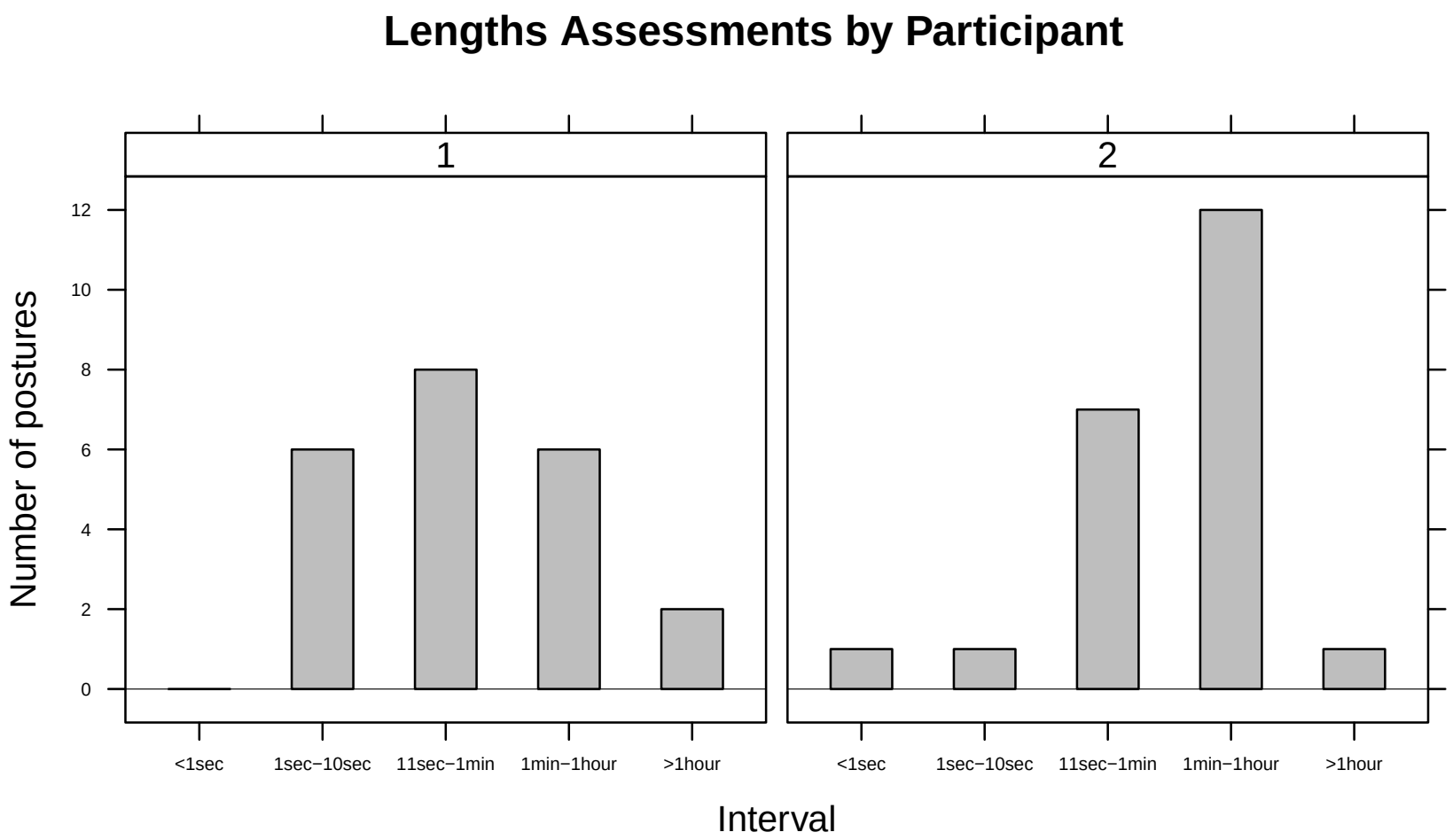
Future Statistical Analysis

- What are **within groups** similarities /differences (if any) of the viewing patterns for each posture / for all postures?
- What are **between groups** similarities / differences (if any) of the viewing patterns for each posture / for all postures?

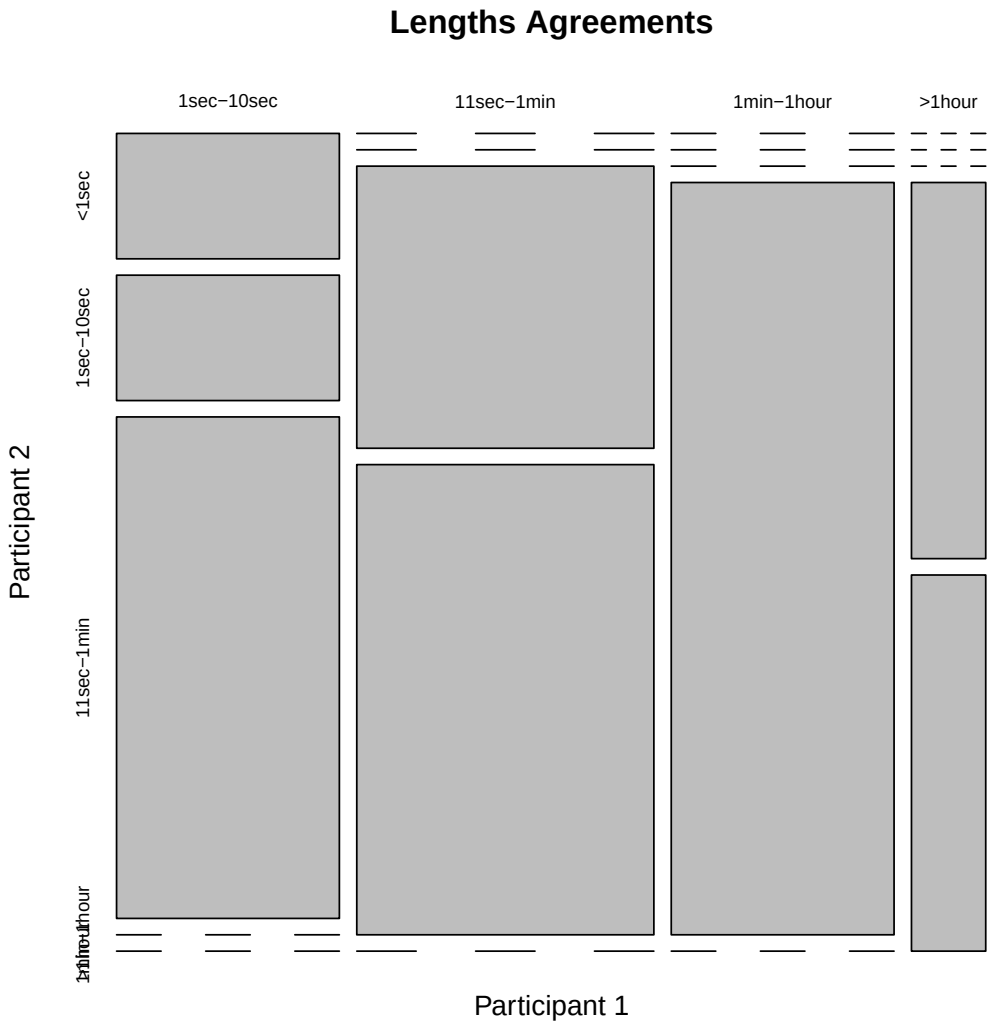
Results for Two Test Participants

- Agreement on stability assessment in 50% of postures (11 out of 22)
- 1 level difference for remaining 50% of postures

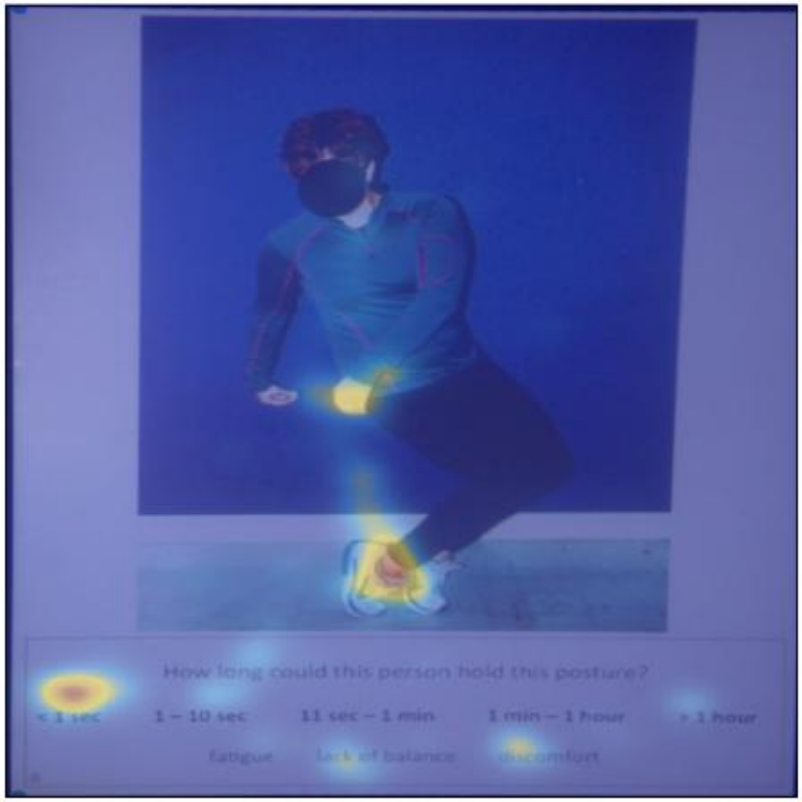
Stability Assessment Distributions



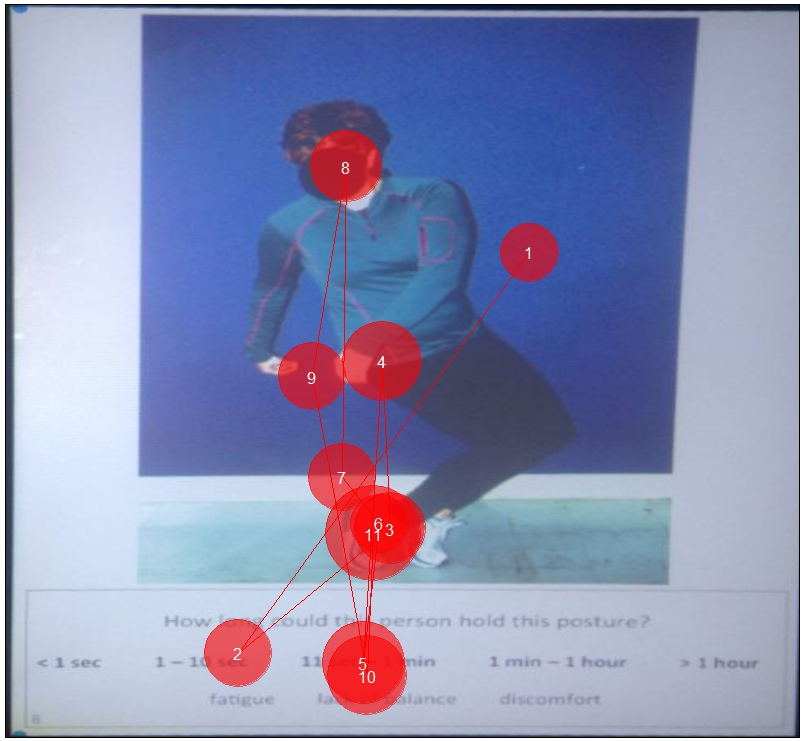
Stability Assessment Comparison

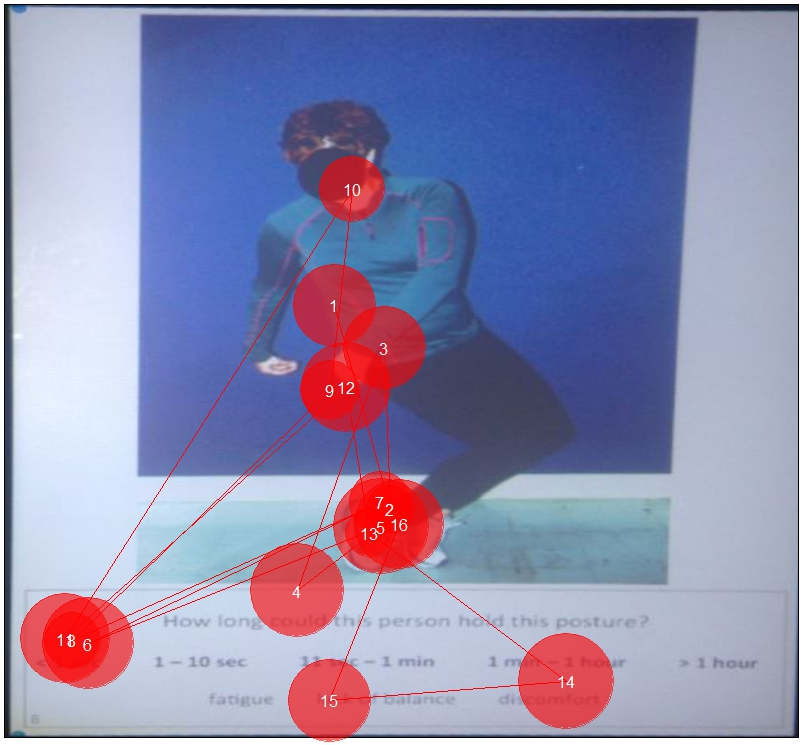


Posture 8: 1sec-10sec vs $<$1sec, but similar viewing patterns [Heatmaps]

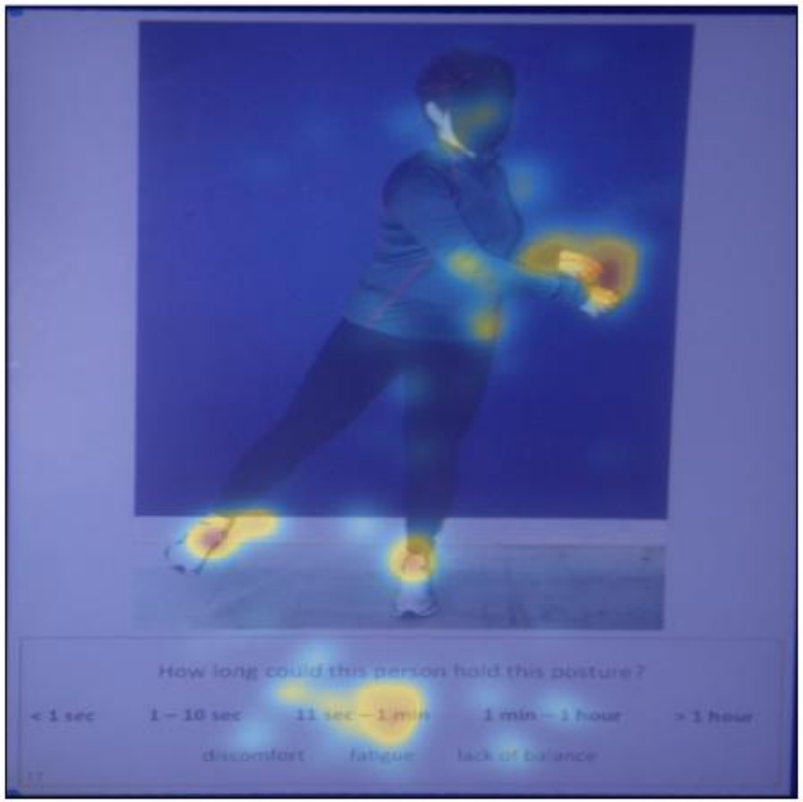


Posture 8: 1sec-10sec vs $<$1sec, but similar viewing patterns [Scanpaths]





Posture 17: 11sec-1min vs 1min-1hour, and different viewing patterns [Heatmaps]



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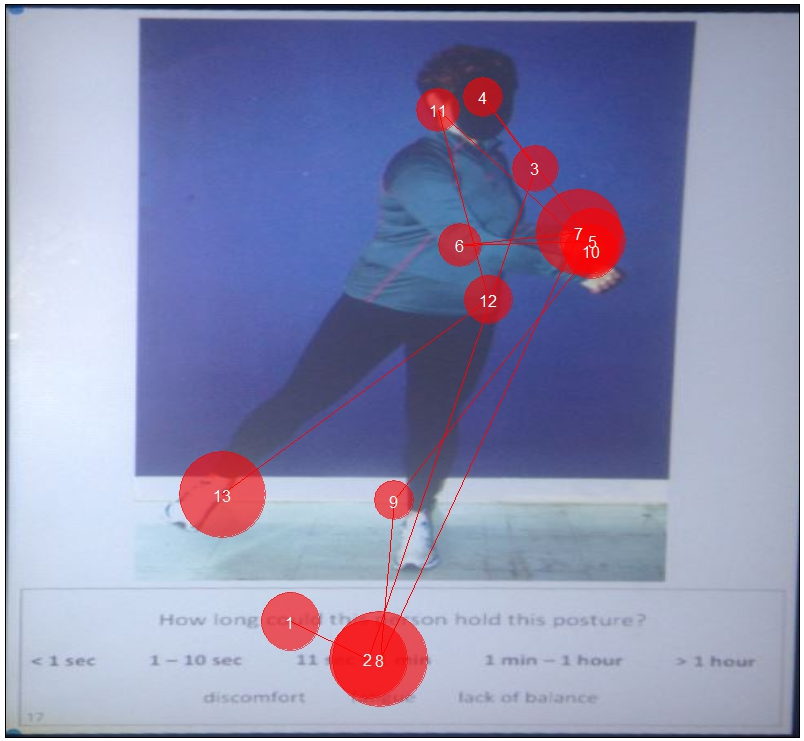
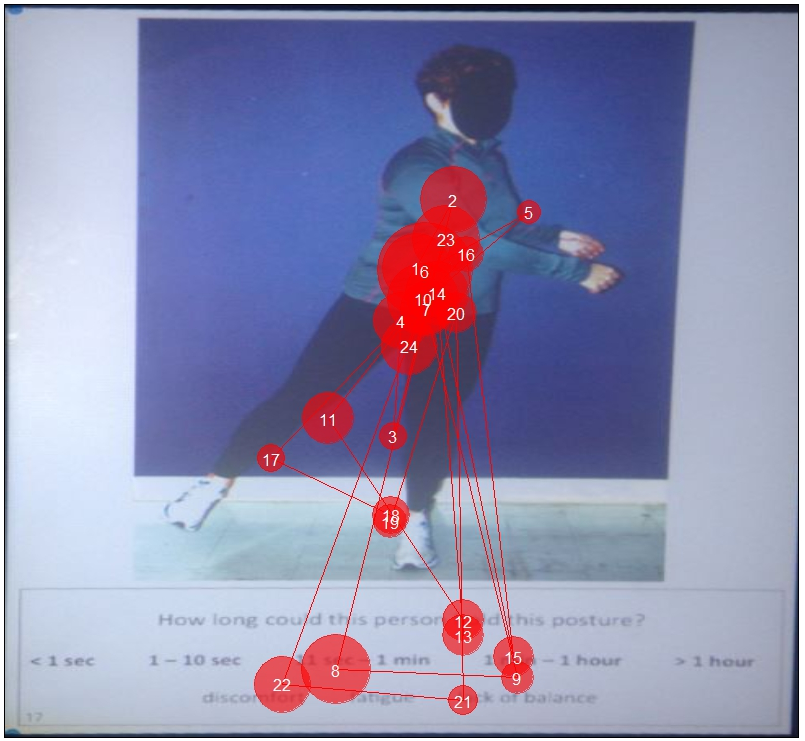
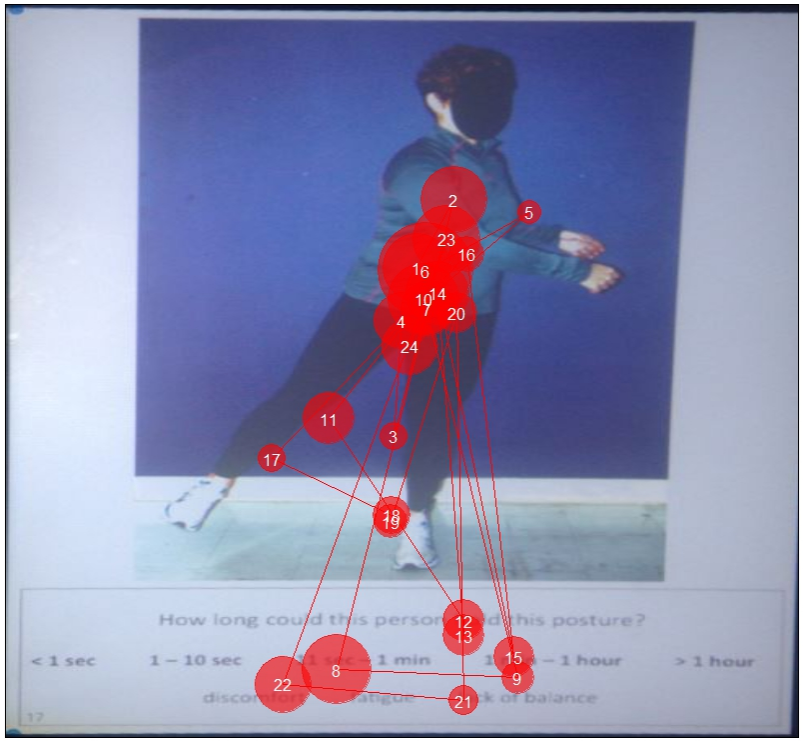
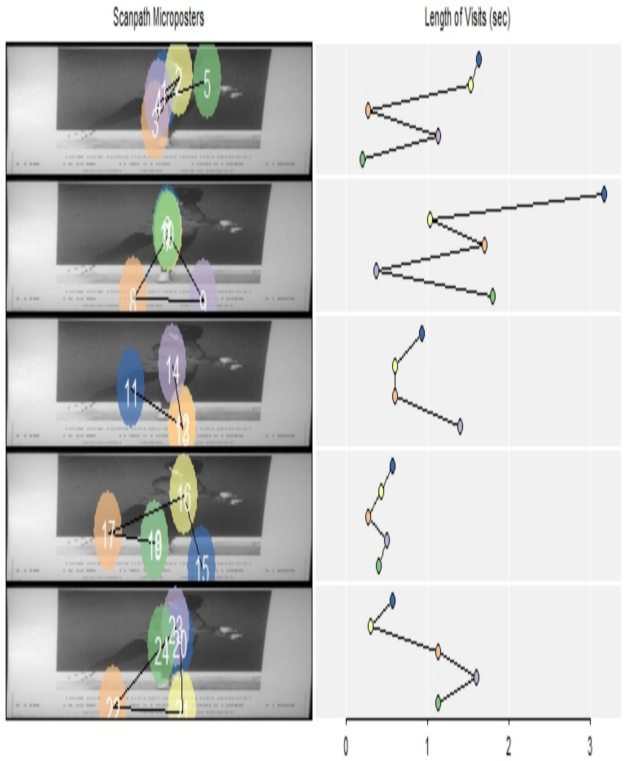


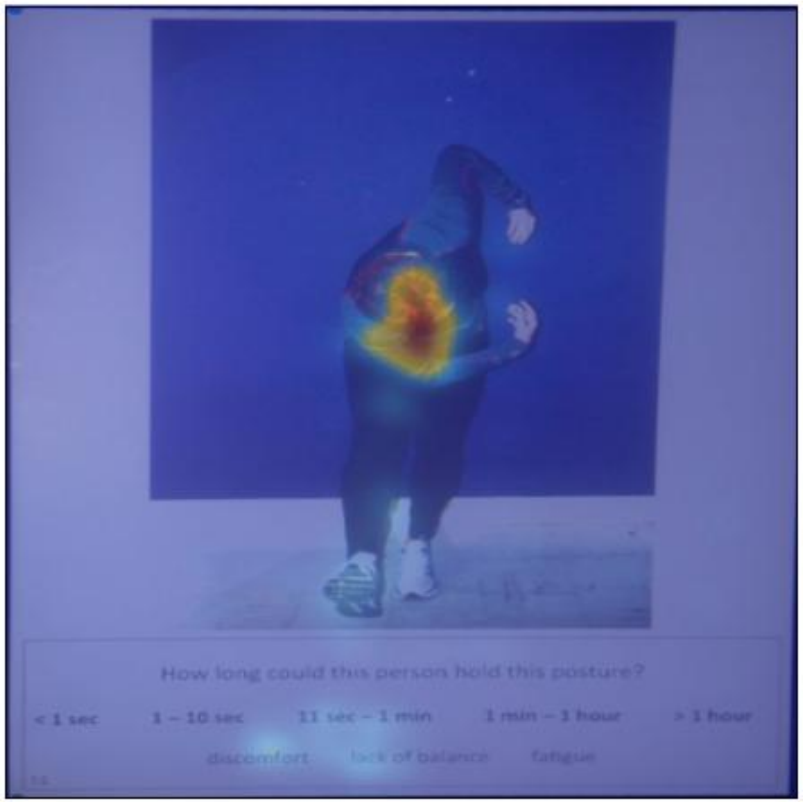


Posture 17: Scanpaths vs Linked Scanpath Microposter

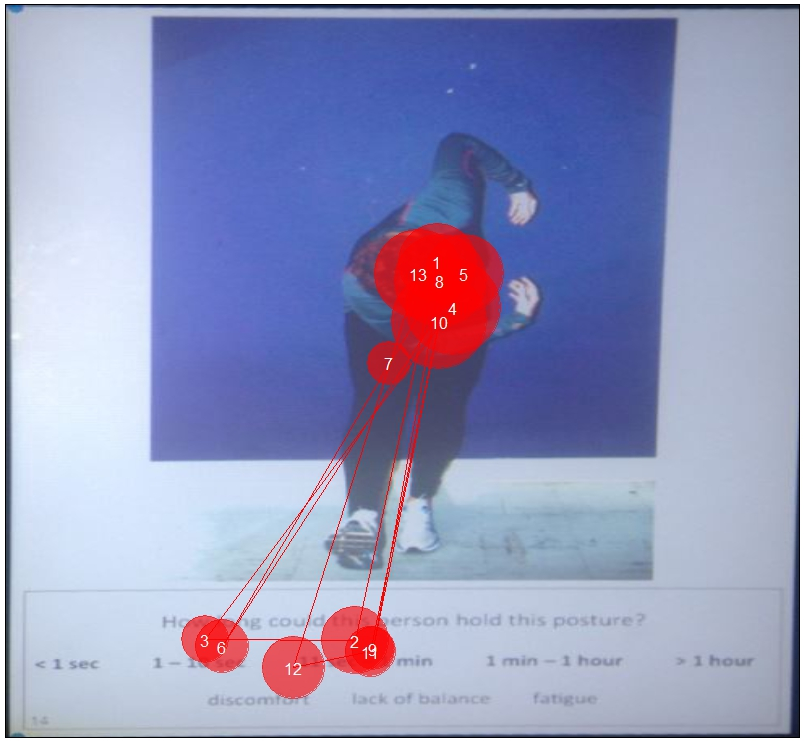


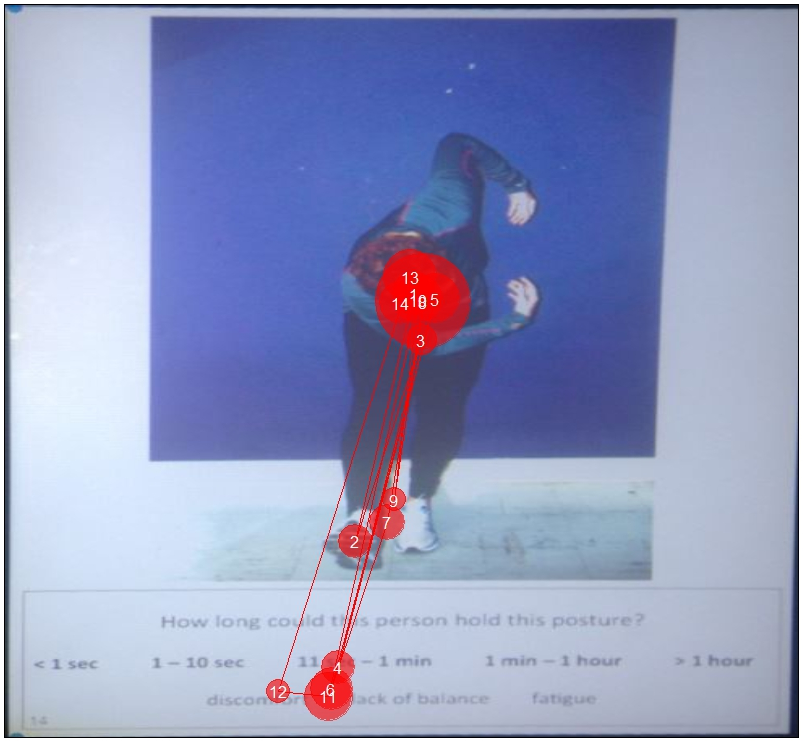


Posture 14: 11sec-1min (both) and similar viewing patterns [Heatmaps]



Posture 14: 11sec-1min (both) and similar viewing patterns [Scanpaths]





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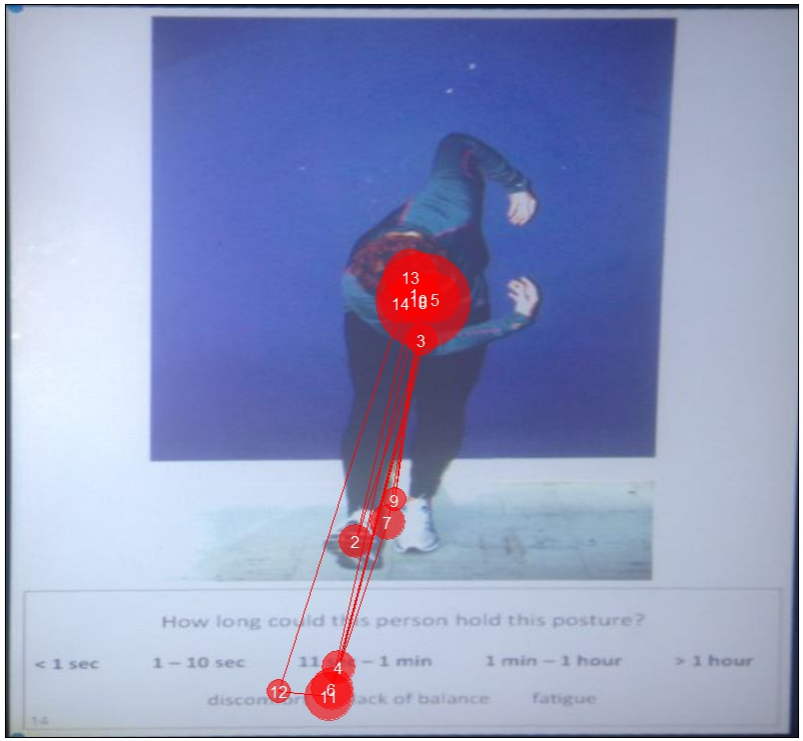

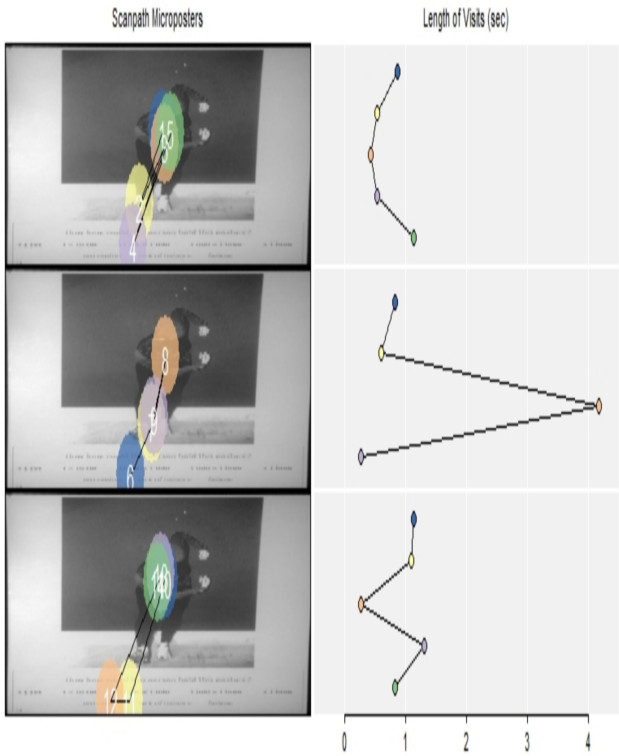

Conclusions from Test Participants

- Eye tracker provides detailed information at which body parts the participants look
- Too early to draw any quantitative conclusions beyond EDA

Status of Main Study

- IRB approval obtained
- Setup finalized
- Ready to start data collection from real participants

- . . . **to be continued at JSM 2018!**

- **Questions ?!? —**

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