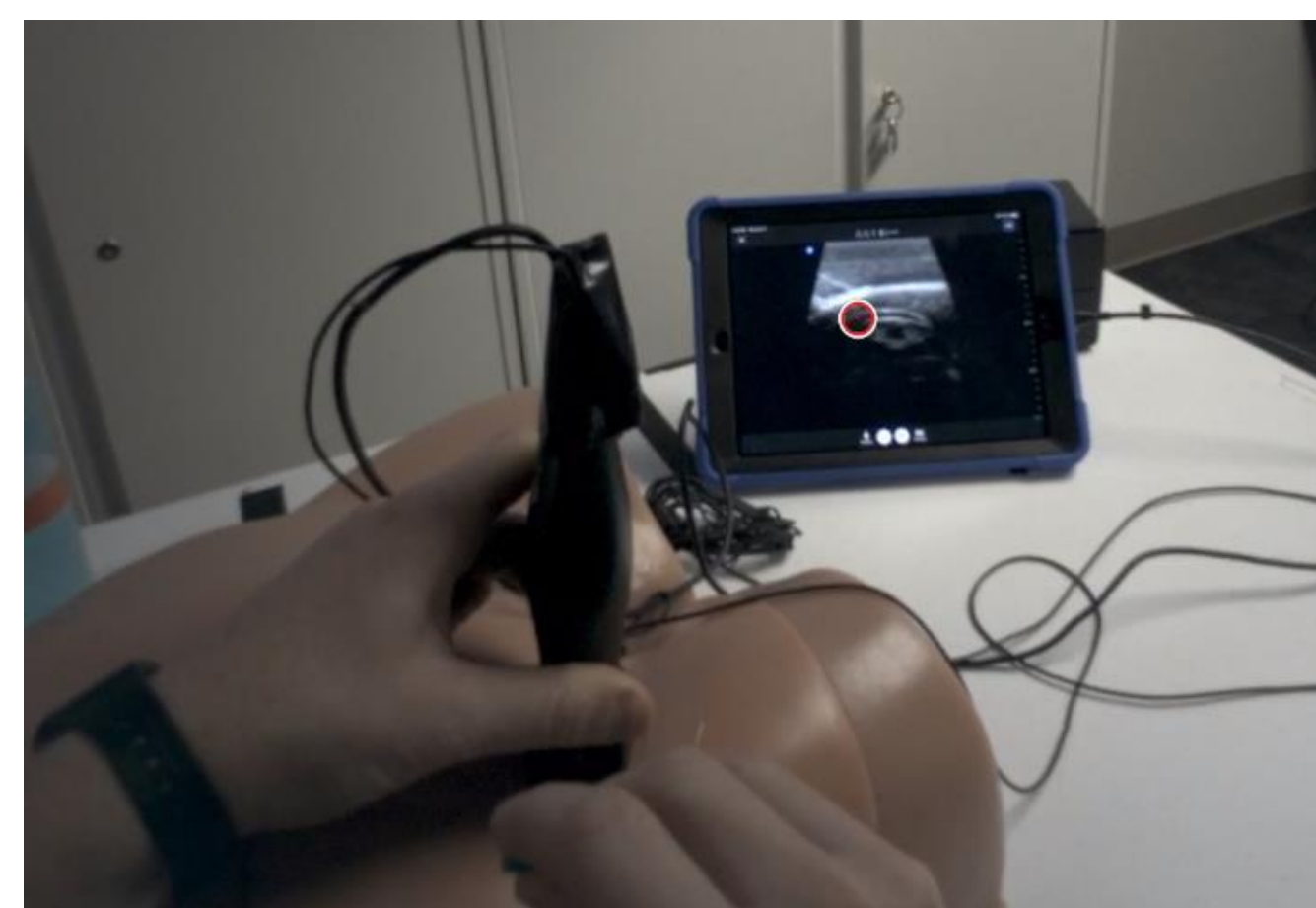




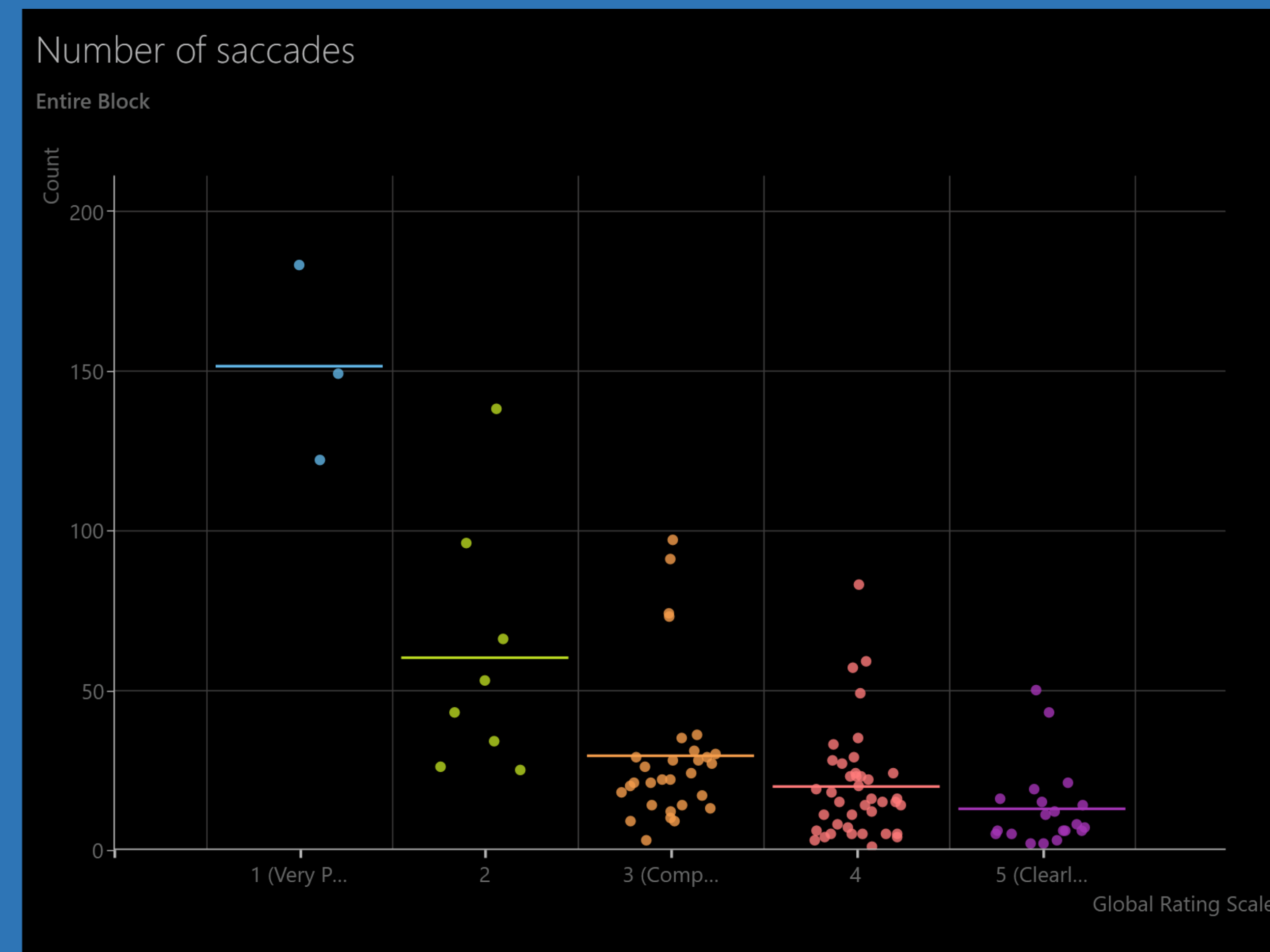
Background:

- **Ultrasound-guided regional anesthesia (UGRA)** requires precise hand-eye coordination [1].
- Objective assessment of skill acquisition and proficiency in UGRA is limited [2].
- Eye-tracking metrics can assess cognitive load, stress, and visual attention.
- **Hypothesis:** Eye-tracking metrics discriminate UGRA proficiency and skill acquisition in anesthesiology trainees.



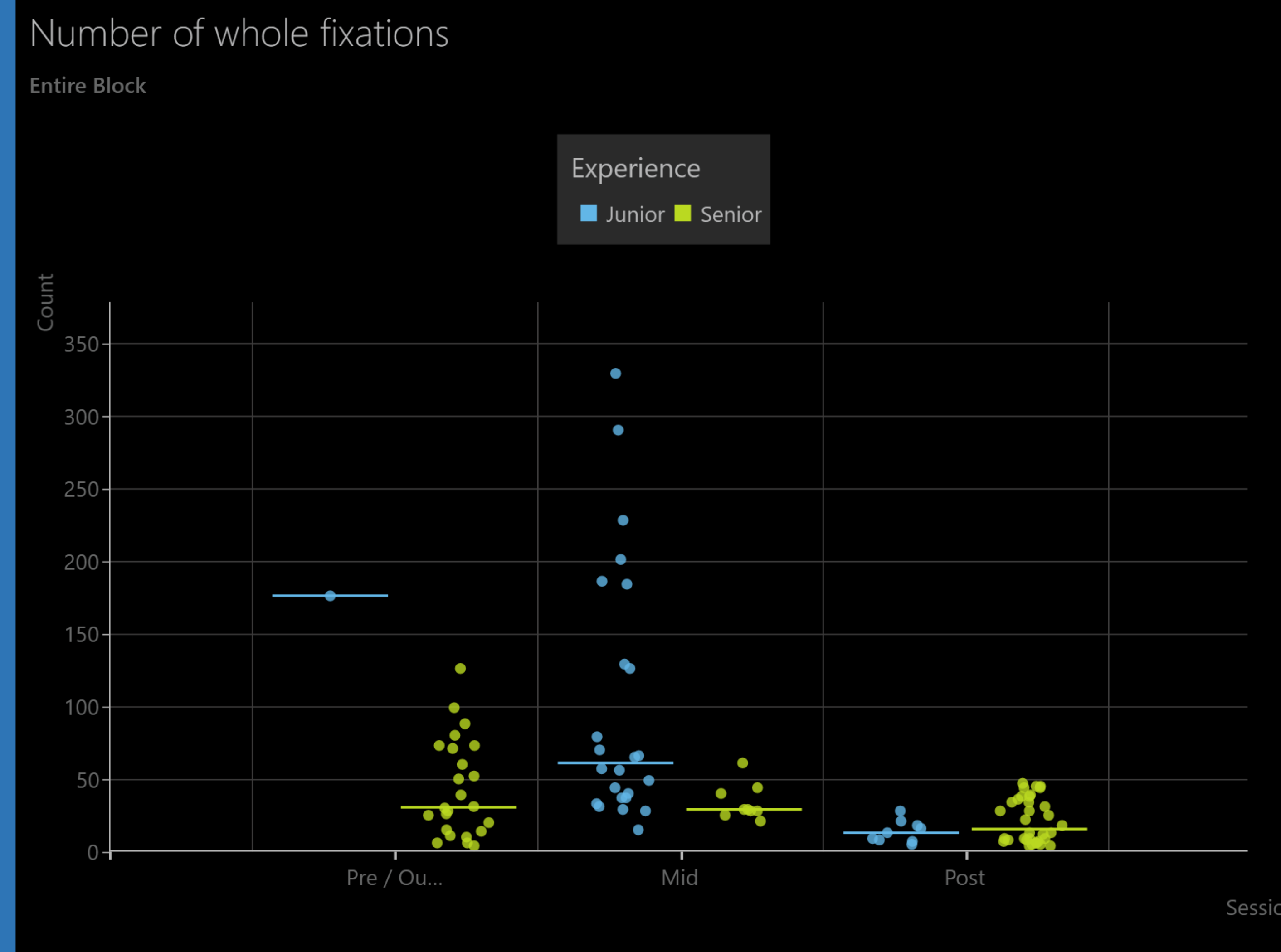
Methods:

- IRB approved (#15698) at Henry Ford Health.
- 12 anesthesiology trainees.
- Phantom-simulated UGRA procedures for interscalene, femoral, and sciatic popliteal blocks.
- **Tobii 3 Glasses** (Tobii Technologies, Ltd., Stockholm, Sweden) recorded gaze patterns, gaze stability, and fixation metrics using protocolized start and stop points.
- Trainees verbalized anatomical recognition and needle tip position.
- One investigator scored performance using a validated global rating scale. (3)



Increasing UGRA
proficiency
demonstrates a more
focused and efficient
gaze pattern.

Eye-tracking
metrics evolve
differently during a
UGRA rotation
between junior and
senior trainees



Results:

- Of the **174 recordings**, **102** met the criteria
 1. Before/out of the rotation (**n=25**)
 2. Midway through the rotation (**n=34**)
 3. At the end of the rotation (**n=43**).
- Average fixation time increased from **1074 ms (pre)** to **1079 ms (mid)**, and **1117 ms** (post-rotation).
- Saccade counts decreased from 30.29 -> 30.12 -> 28.45 (from pre -, to mid, to post-rotation, showing a focused and efficient gaze pattern (**Figure 2**)).
- The number of saccades, and fixation durations - significant differences among various levels of performance.
- Gaze patterns were clearer in the needling phase.

Conclusion:

Eye-tracking technology can provide objective evidence of improved proficiency and skill acquisition in UGRA.

Future studies can develop learning curves, evaluate individual skill acquisition, and study live UGRA procedures.

References:

