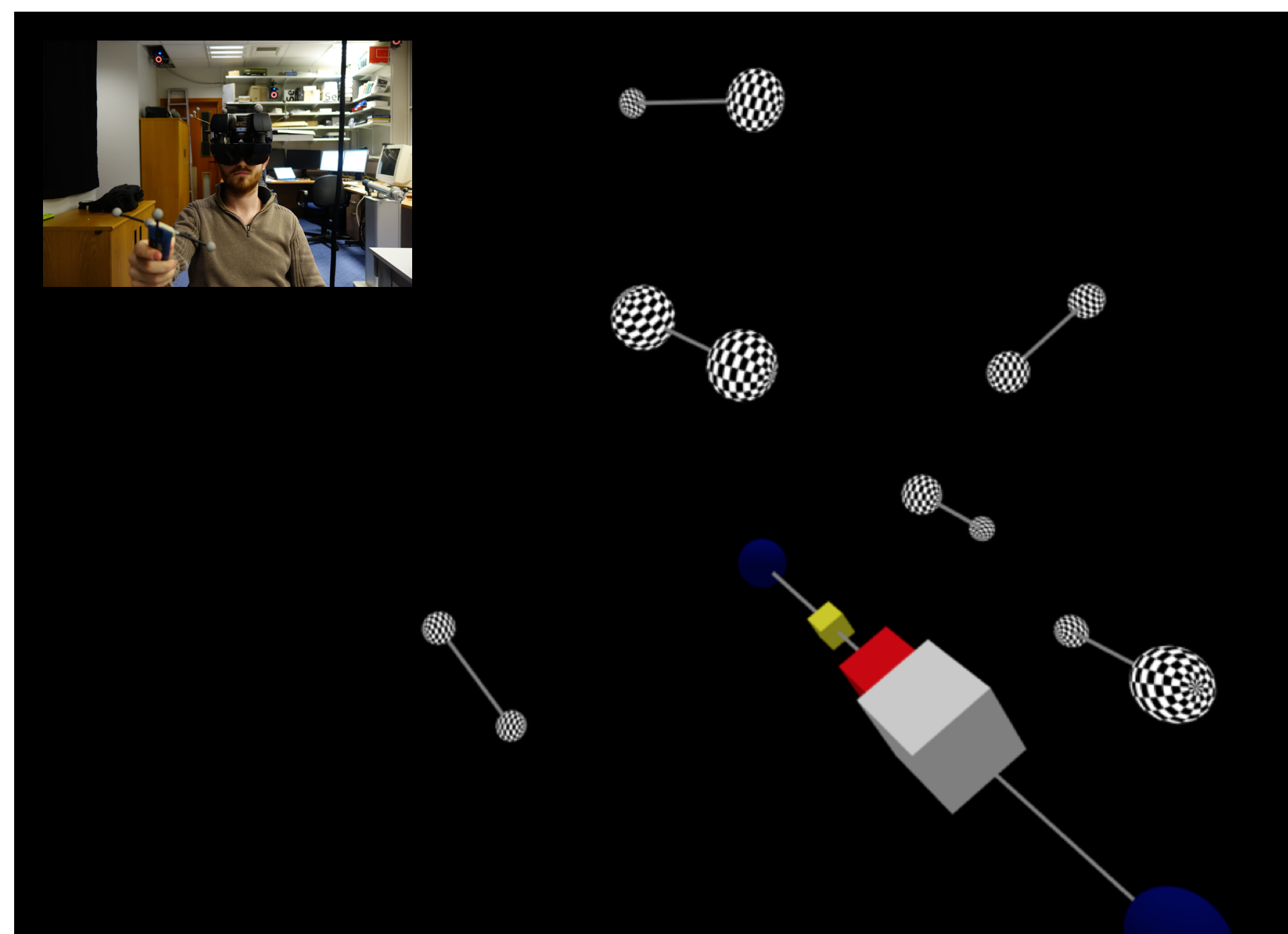


Sensory cues used to determine 3D world stability

Peter Scarfe and Andrew Glennerster

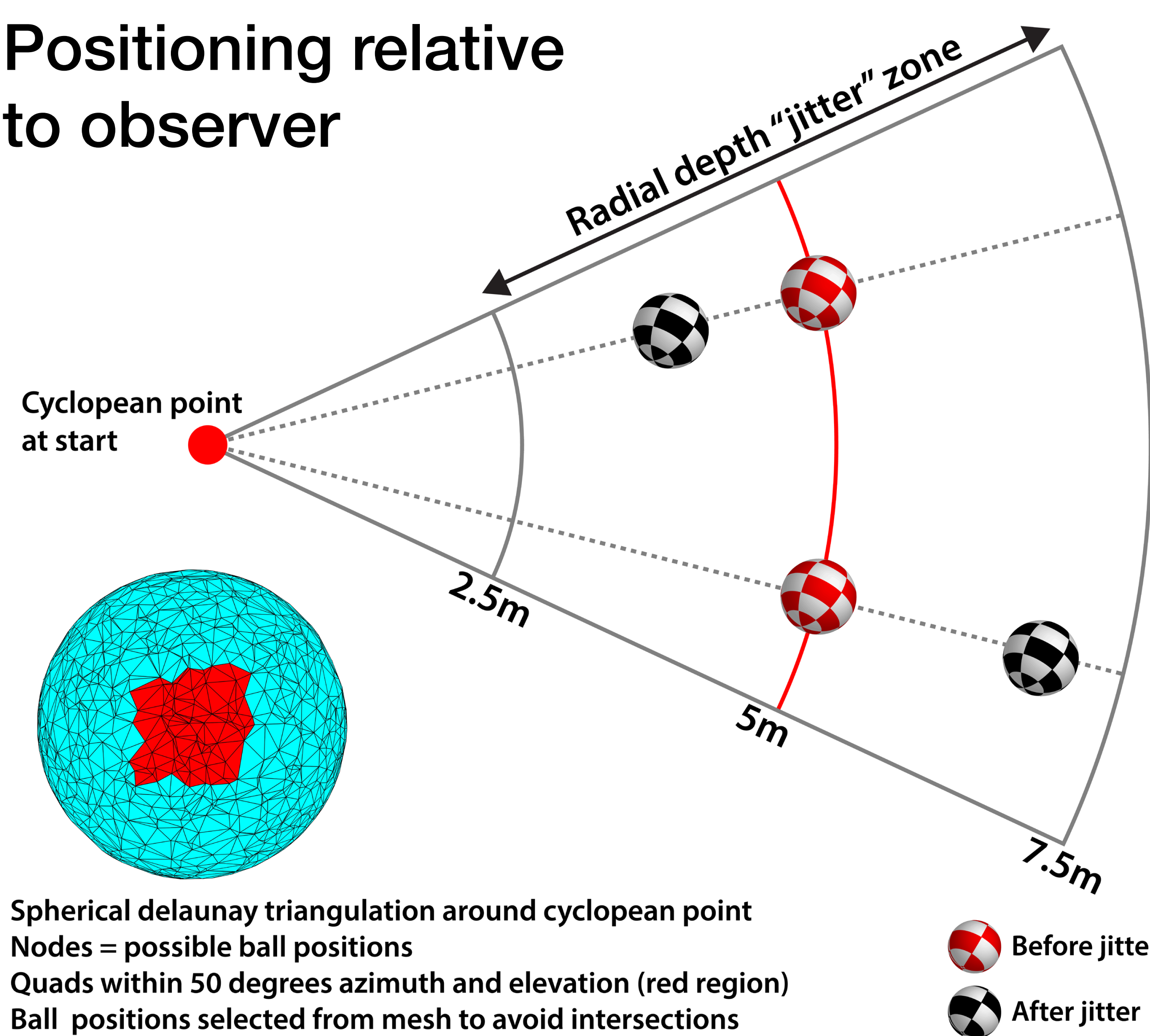
Introduction and Methods



How well can people detect when the 3D structure of the world around them has changed?

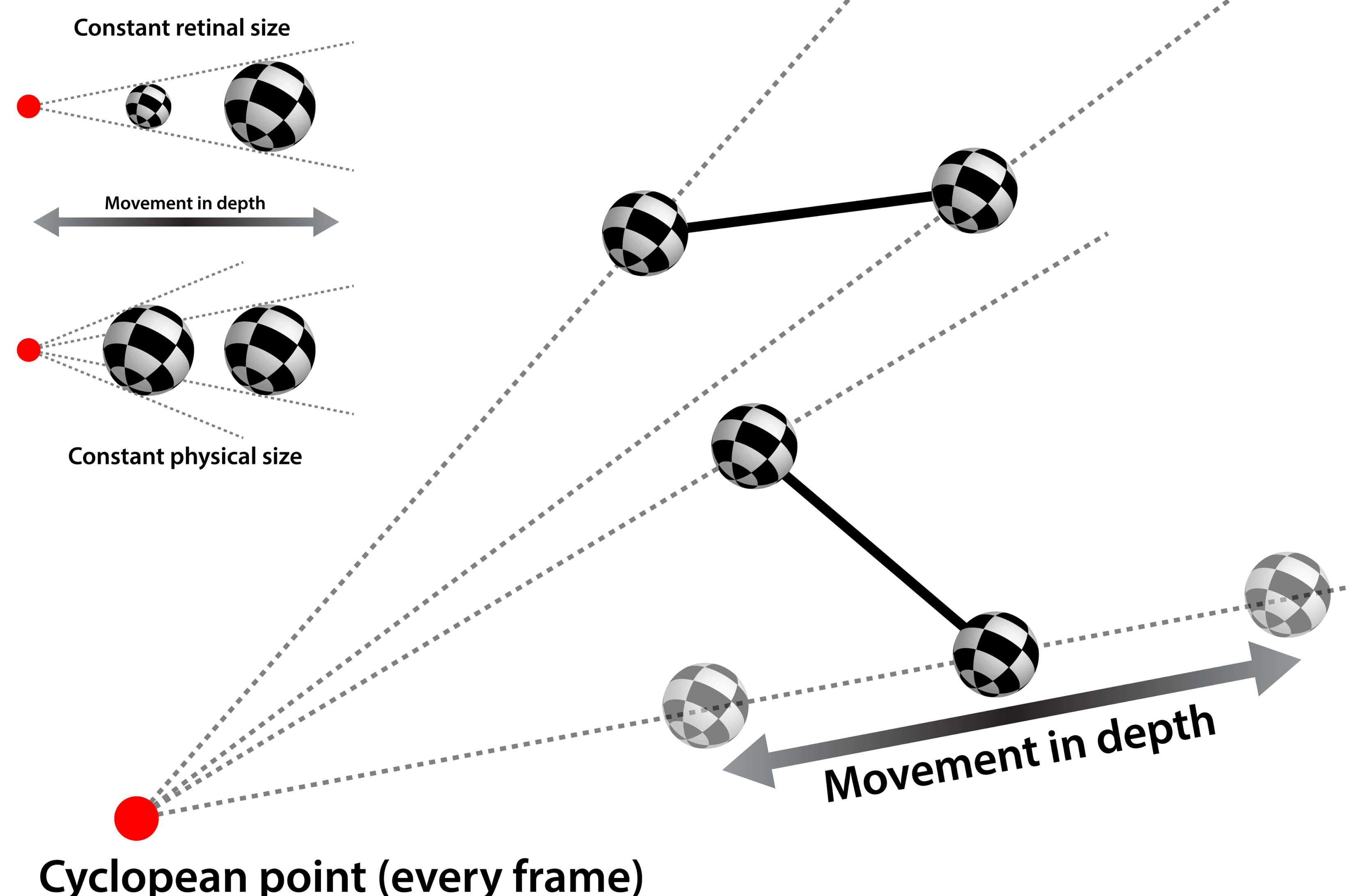
What cues do people use to do this?

Positioning relative to observer



Sphere movement

Lines of sight



Task: Point at the sphere which moved

Number of objects: One to Four "Quads"

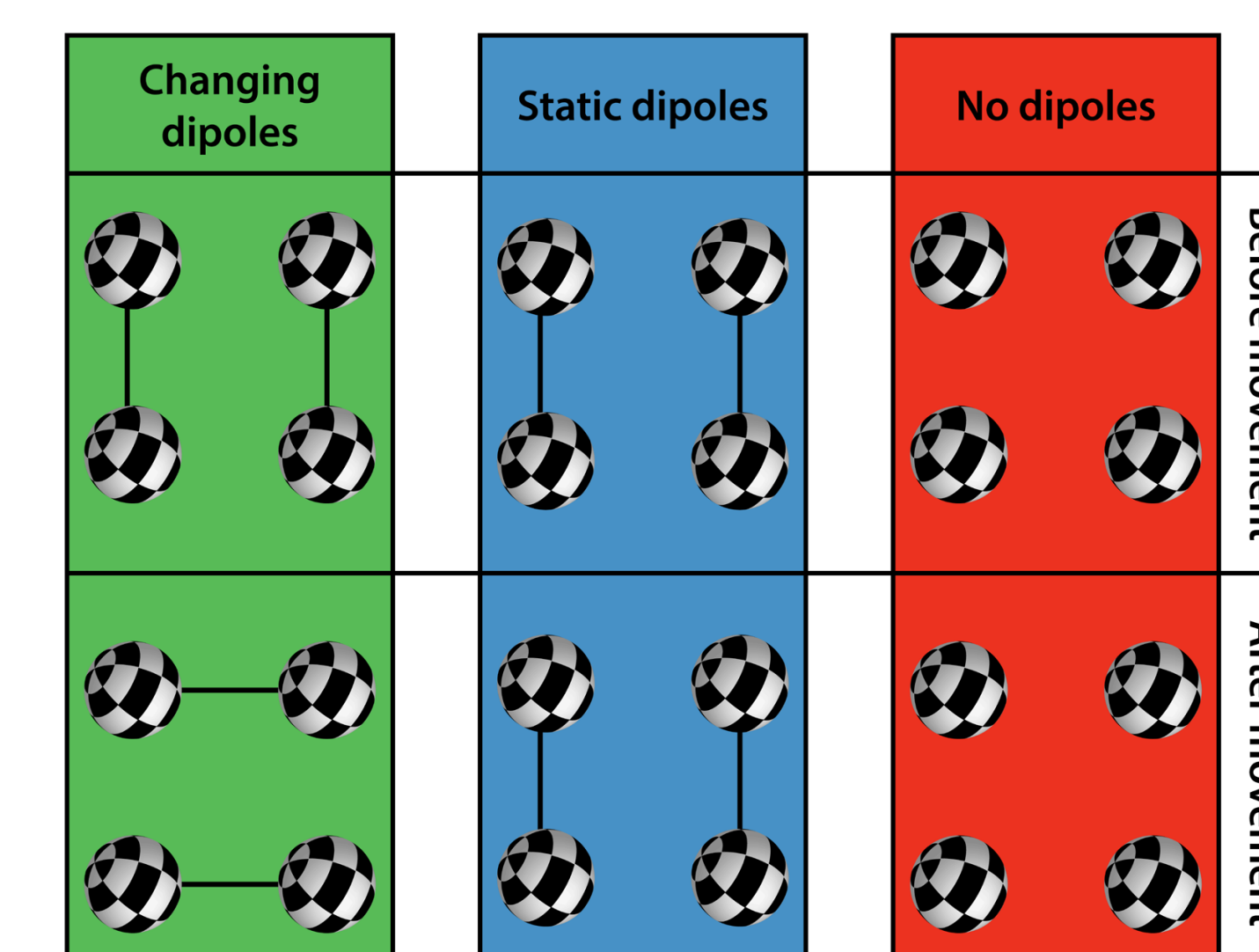
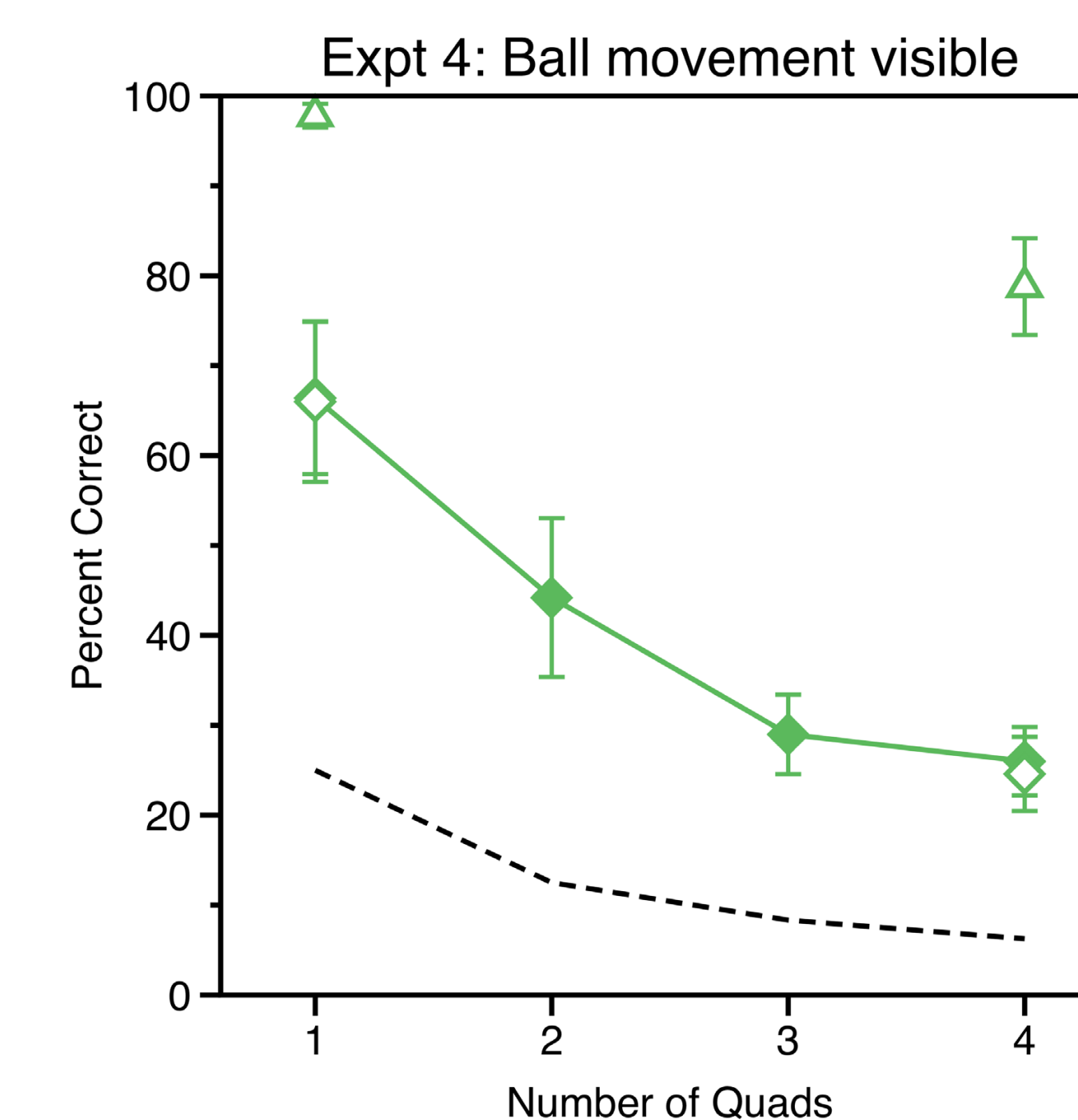
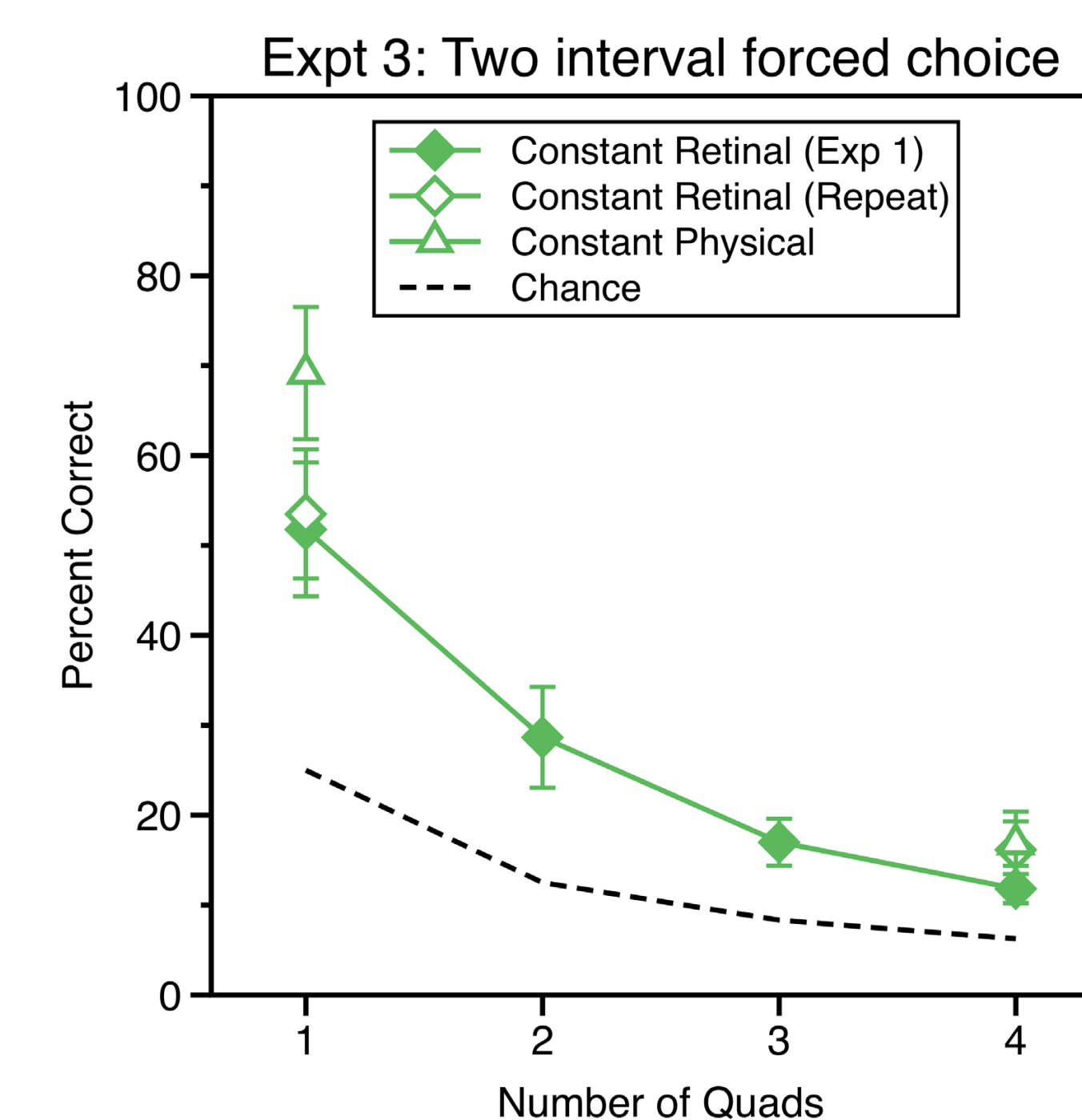
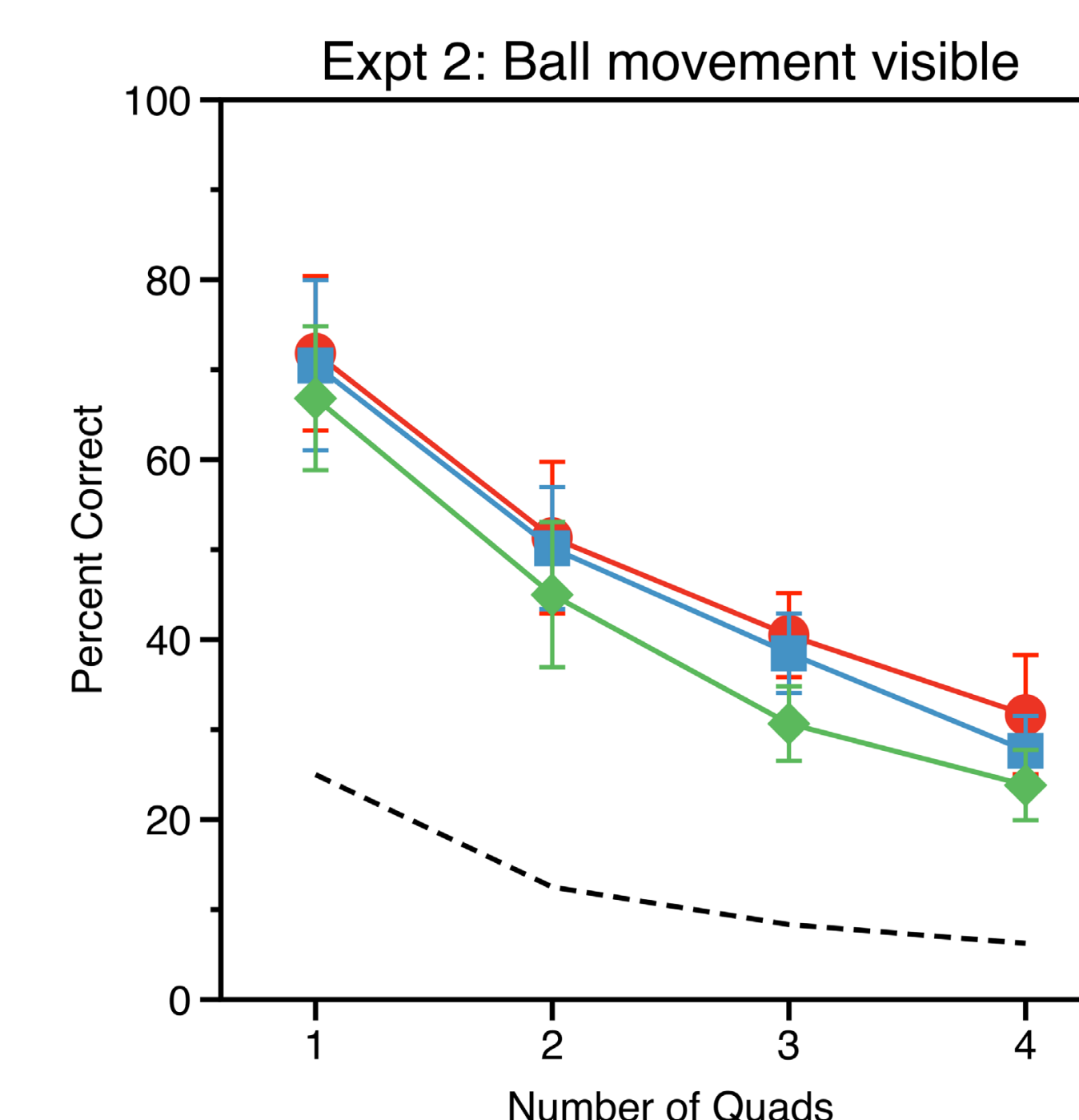
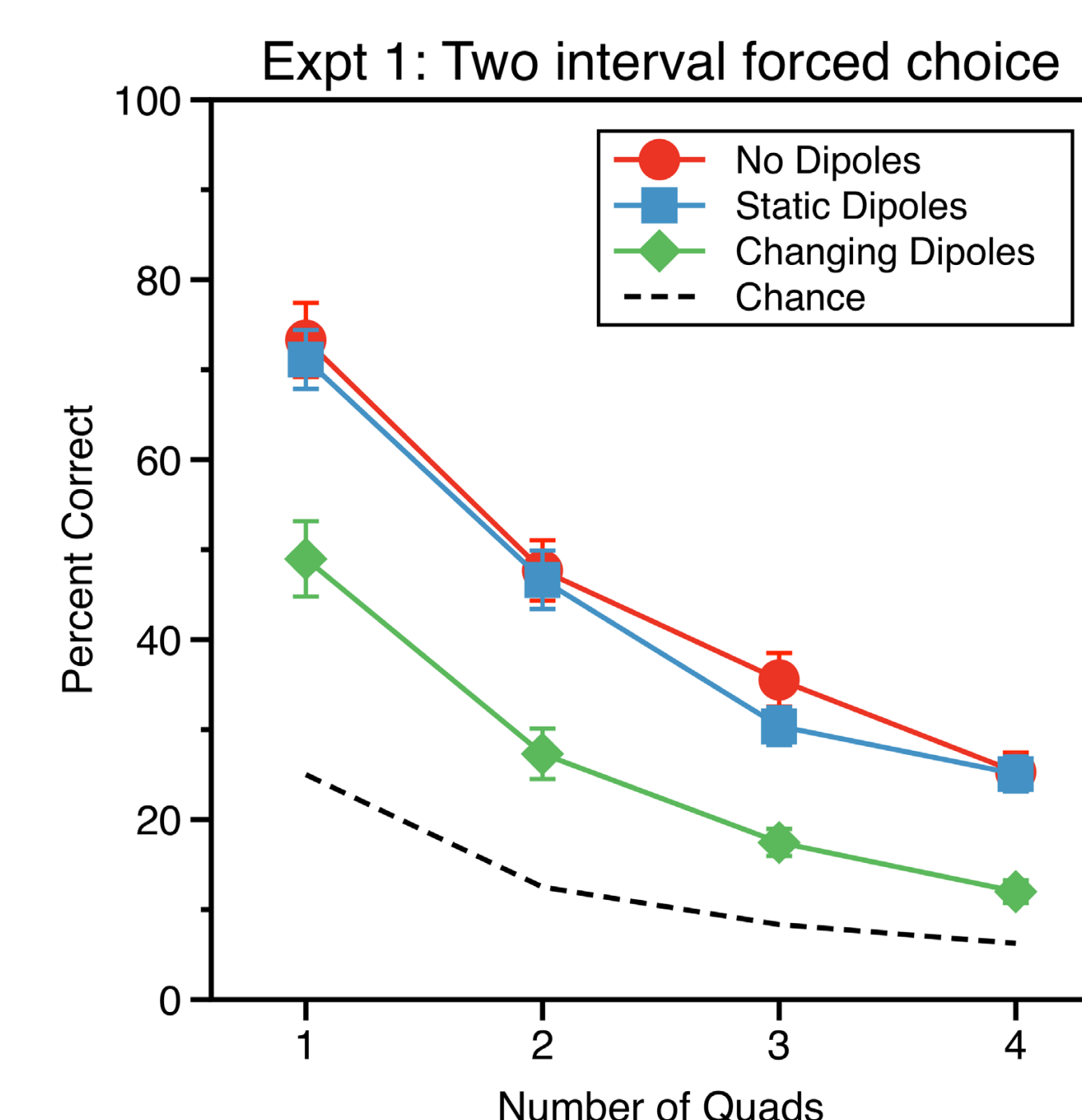
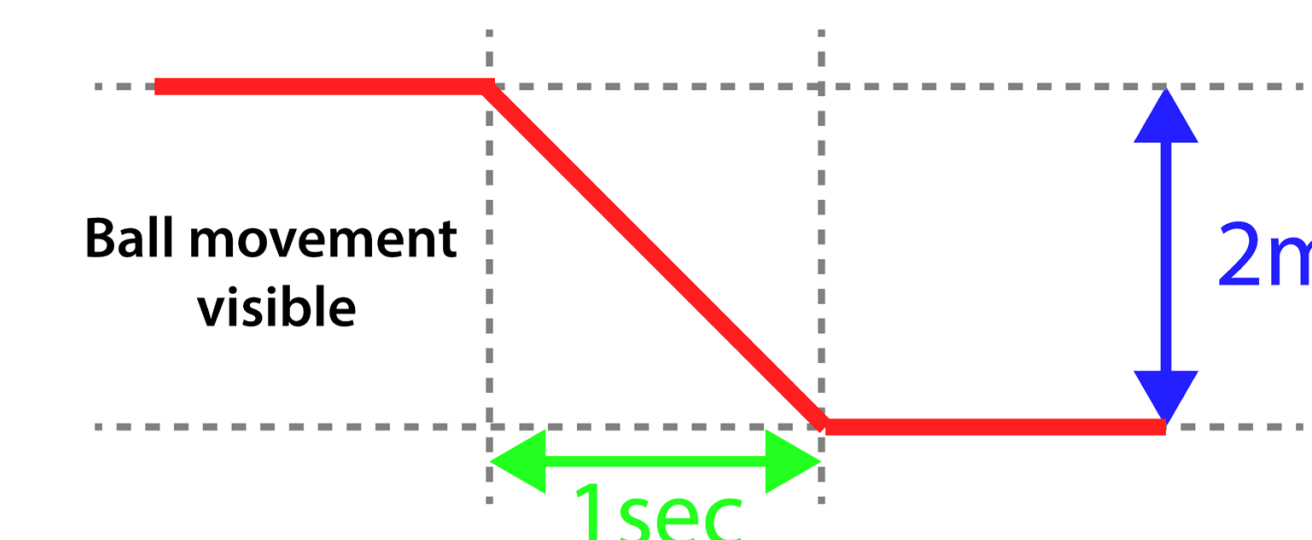
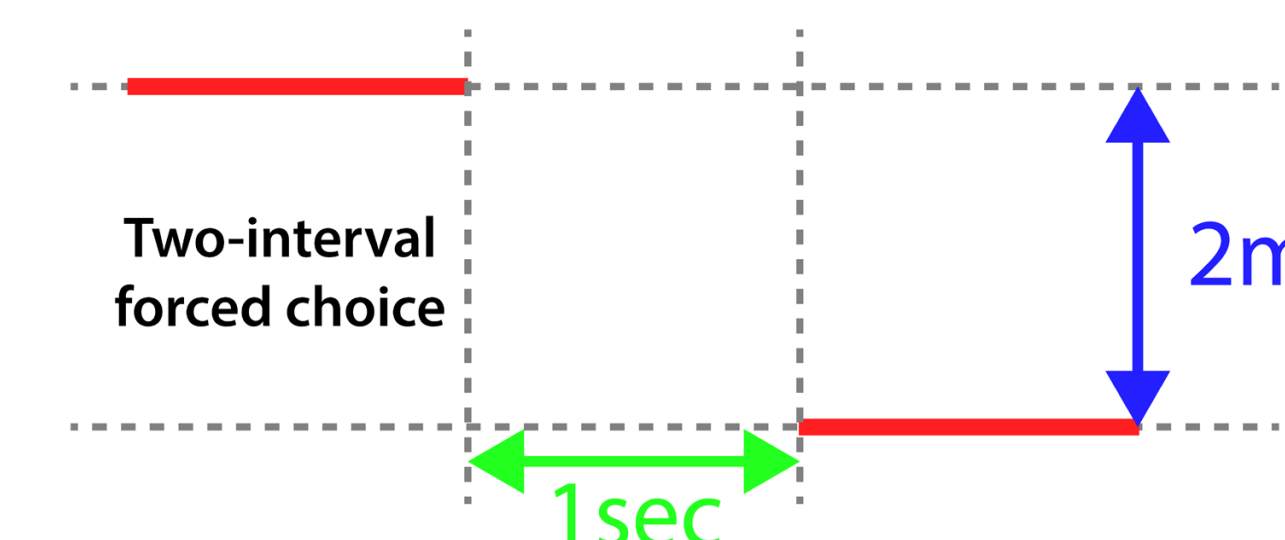
Dipoles: present or absent, constant or changing

Conclusion

- (1) The cue of most utility in determining 3D world stability was dynamic looming (Expt 4)
- (2) Altering the "view" in the changing dipoles condition disrupted performance (Expt 1 and 2)
- (3) Sensitivity to 3D coordinates alone does not predict these data

Experiment 1: A 3x4 ANOVA showed a significant effect of dipoles ($p < 0.001$), quads ($p < 0.001$) and a significant interaction ($p < 0.038$). The interaction arose due to no dipoles and static dipoles not differing for quad numbers 1, 2 and 4 (all other pairwise comparisons significant, $p < 0.05$ or less). **Experiment 2:** A 3x4 ANOVA showed a significant effect of dipoles ($p < 0.036$), quads ($p < 0.007$) and a non-significant interaction ($p = 0.99$). Only static dipoles and changing dipoles differ ($p < 0.004$). No dipoles and changing dipoles marginal ($p < 0.053$), no dipoles and static dipoles not ($p = 0.60$). **Experiment 3:** A 3x2 ANOVA showed a significant effect of condition ($p < 0.009$), quads ($p < 0.025$) and a significant interaction ($p < 0.01$). The interaction arose because all conditions do not differ for quad number = 4, but do for quad number = 1. For quad number = 1 constant physical size performance was significantly better than both other conditions ($p < 0.017$, $p < 0.006$), but the constant retinal size conditions did not differ ($p = 0.523$). **Experiment 4:** A 3x2 ANOVA showed a significant effect of condition ($p < 0.001$), quads ($p < 0.01$), non-significant interaction ($p = 0.739$). The constant physical size condition was significantly better than both others ($p < 0.001$), but the retinal size conditions did not differ ($p = 0.725$). Note: All statistics run with percentage correct converted to D-Prime.

Results and Discussion



Quad type