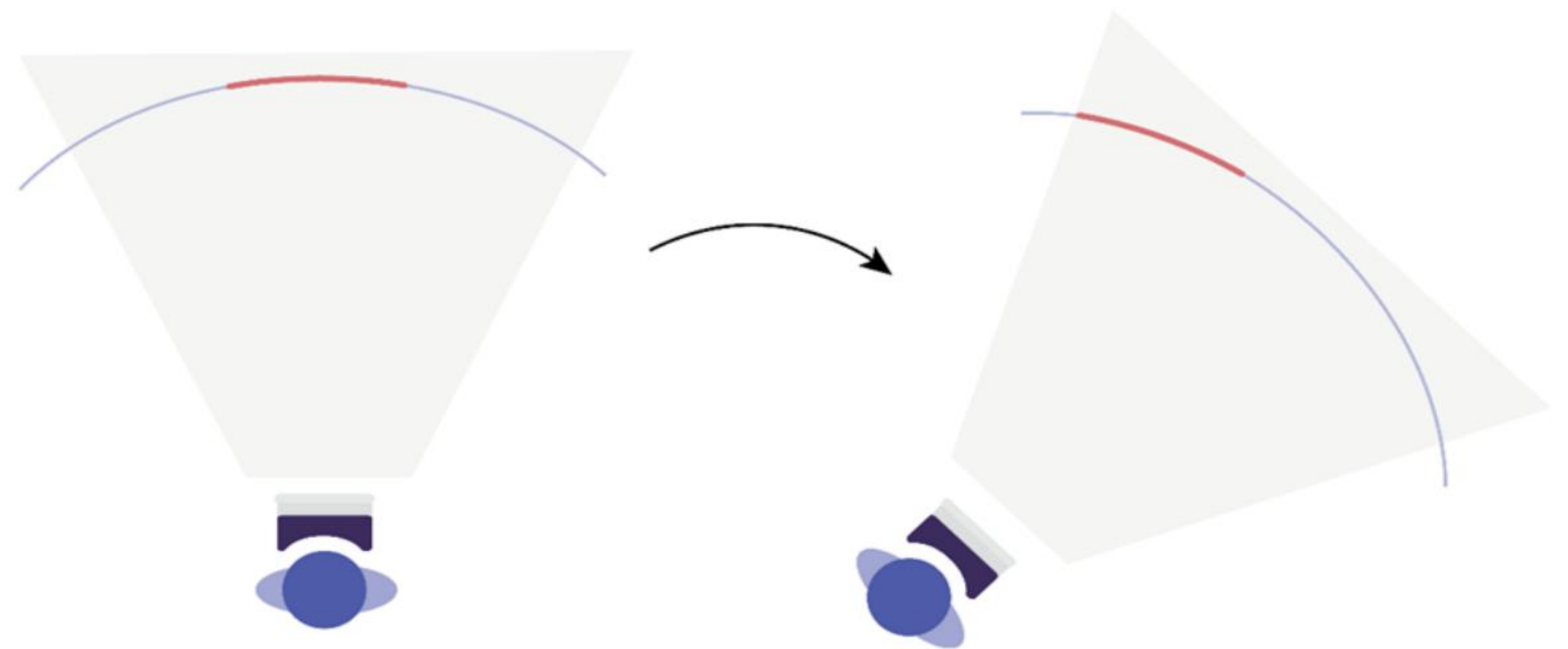


Display Rotation for Reducing Motion Sickness Caused by Using VR in Vehicles

Zhanyan Qiu, Mark McGill, Katharina Pöhlmann, Stephen Brewster
Glasgow Interactive Systems Section, Computing Science, University of Glasgow

Introduction

Using VR with head-locked content in vehicles can cause motion sickness. We delivered visual cues of physical motion through the position of virtual displays, implicitly conveying motion without the need for additional distracting visual cues.



Top view of visual cue movement. The red line in the figure is the task plane.

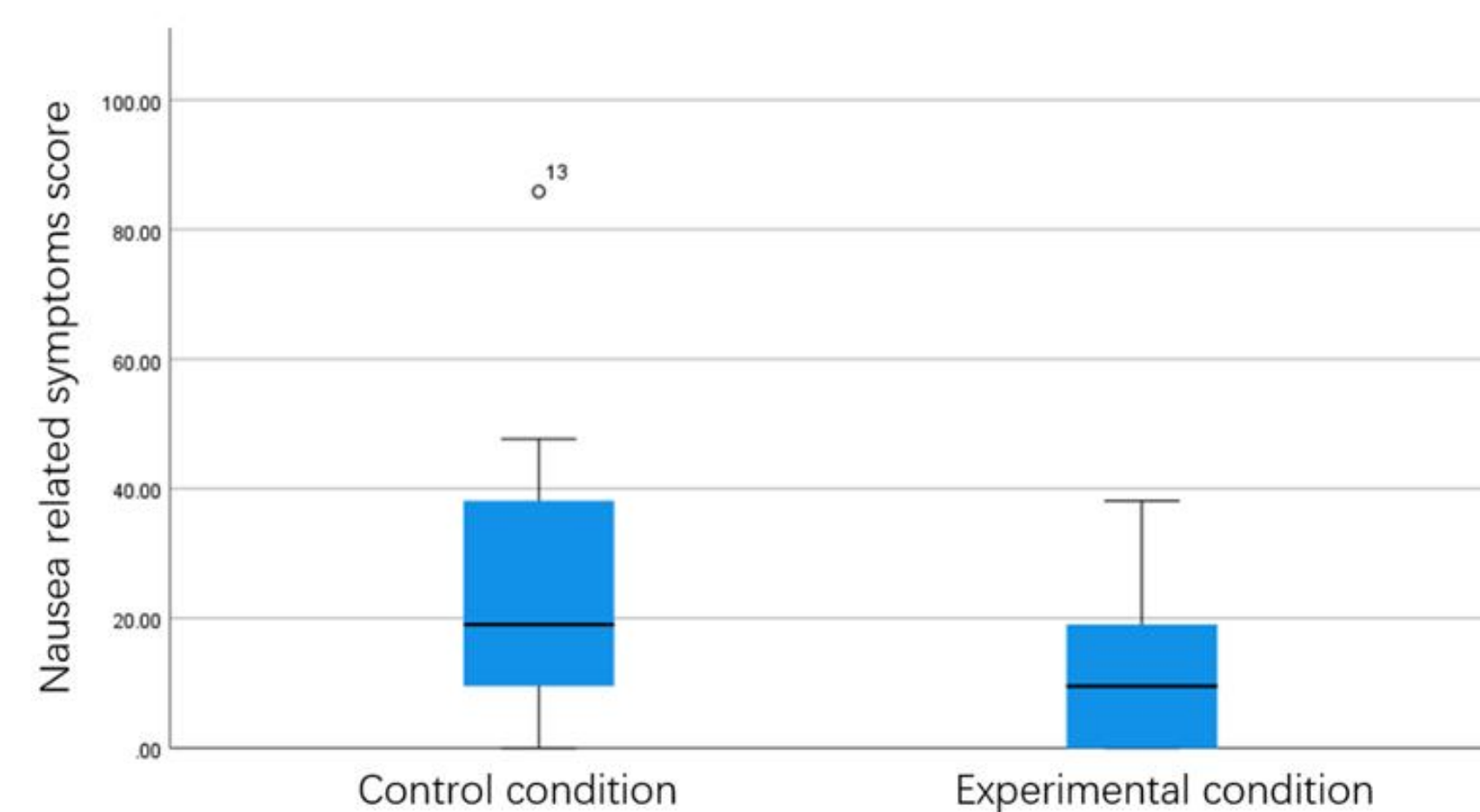


A participant experiencing rotational motions on the chair

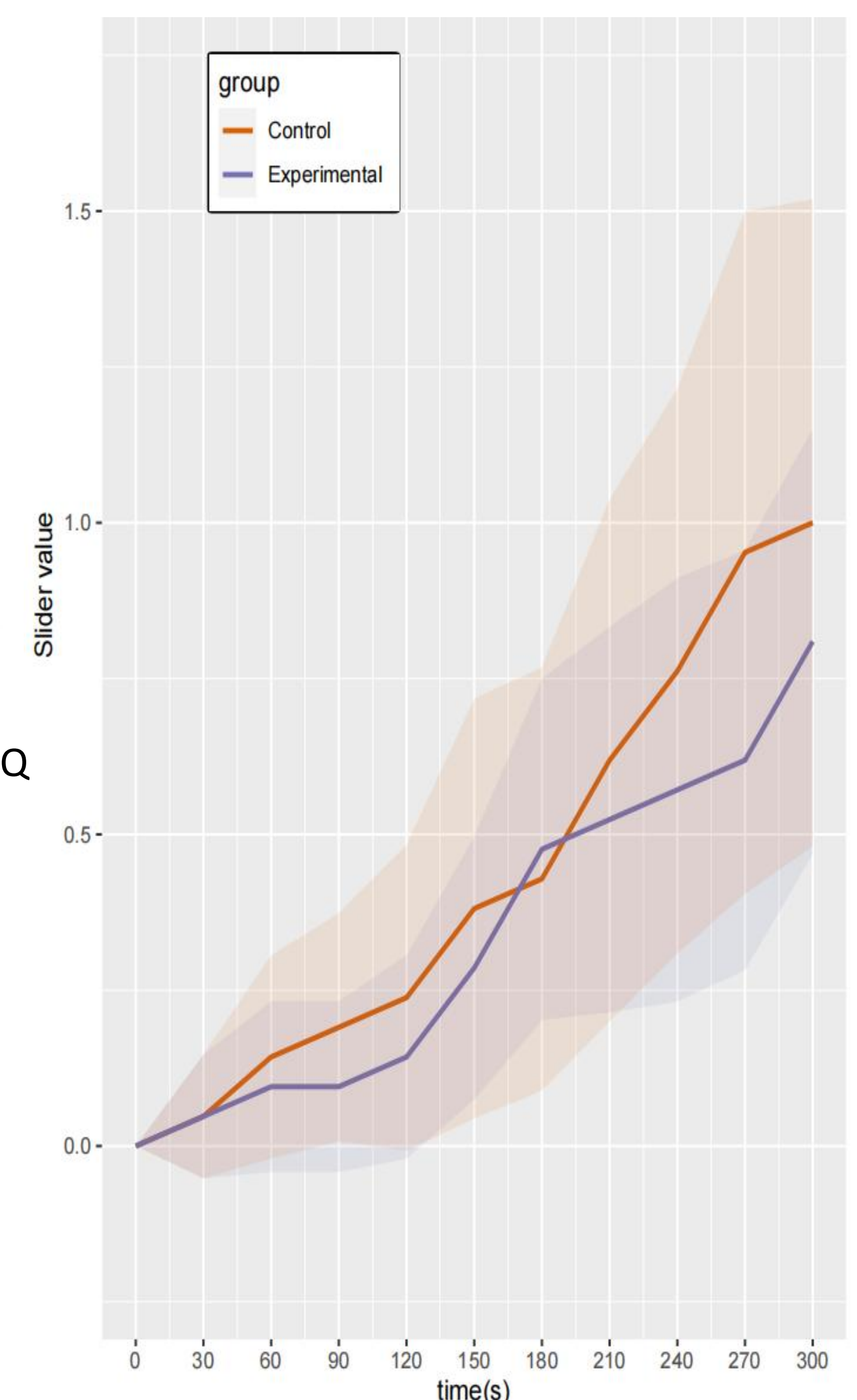
Experiment Design

We used a chair with a rotation motor to induce motion sickness and a Meta Quest 2 as the VR platform. Motion sickness was measured by: SSQ and a real-time motion sickness slider. We used a math task as an assessment of the participant's productivity.

We designed a proxy for a planar 2D virtual display as a visual cue. The display could present a rotational motion in the opposite direction of the chair rotation angle*0.3.



Nausea related symptoms score according to SSQ



Real-time motion sickness level

Results

Our design significantly reduced the nausea related symptoms of motion sickness.

Our results suggest that our designs could optimize the use of head-locked VR content for entertainment and productivity in vehicles and reduce the problems of motion sickness.

Contact

Zhanyan Qiu
Computing Science
University of Glasgow
Glasgow, United Kingdom
z.qiu.1@research.gla.ac.uk



viajero-project.org



GLASGOW INTERACTIVE SYSTEMS GROUP