

Anete Pausus\*, Laura Strautina, Peteris Cikmacs and Gunta Krumina

Department of Optometry and Vision Science,  
University of Latvia, Kengaraga street 8, Riga, Latvia, LV-1063

\*anete.pausus@lu.lv

## Introduction

Blur is an important dimension of the image quality. It is important to increase the knowledge about the perception of blur because of its relevance to visual acuity, control of accommodation and other visual functions. The aim of our study was to find out how the blur adaptation influences the blur sensitivity and to evaluate the effect of prolonged visual load on the blur sensitivity because of its connection to accommodative functions. We evaluated different blur perception thresholds before and after at least 5 hour long visual load at near distance to evaluate the effect of visual load to blur sensitivity in our study.

## Method

### Subjective blur perception thresholds:

- Just noticeable blur – while image blur level was gradually increased
- Clear image perception – while image blur level was gradually decreased



Blur simulation – Gaussian blur filter

### Stimuli:

3 different sizes of Landolt rings: 5, 7 and 10 min of arc.

### Measurement sessions:

- Morning session (around 9:00 – 10:00) – after night rest, before work
- Afternoon session (around 16:00 – 17:00) – after at least 5 h work that includes near vision tasks – writing, reading, work with computer.

### Subjects:

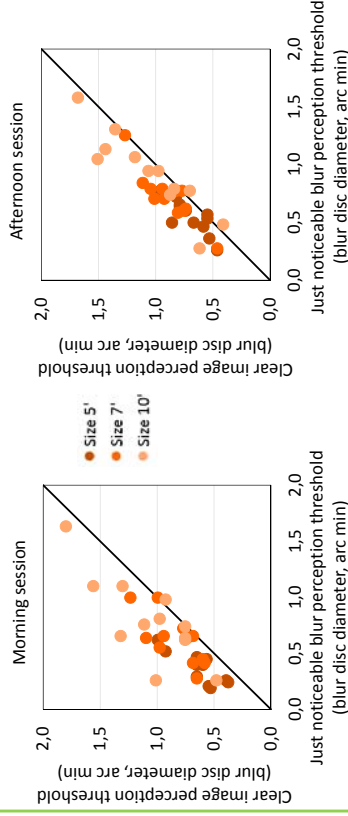
- 12 participants (11 woman, 1 man)
- Age 24 – 29 years
- Visual acuity at least 1,0 dec units

## Acknowledgements

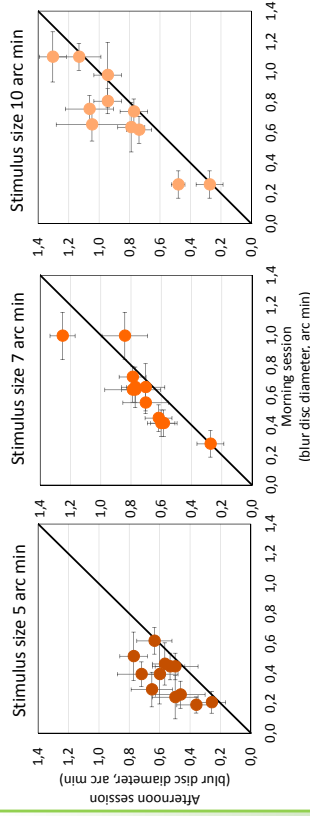
Supported by ESF project Nr. 2013/0021/1DP/1.1.2.0/13/APIA/VIAA/001

## Results

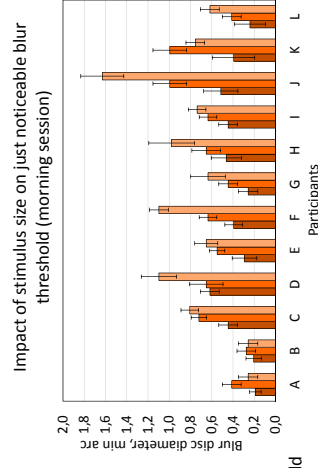
### Difference between just noticeable blur and clear image perception thresholds



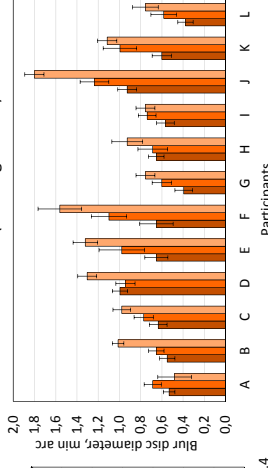
### Just noticeable blur threshold change during the day



### Impact of stimulus size on blur perception



### Impact of stimulus size on clear image perception threshold (morning session)



## Conclusions

- As it is expected clear image perception threshold is higher than just noticeable blur perception threshold due to blur adaptation during the experiment. For our participants clear image perception threshold was on average higher by  $79 \pm 51\%$ ,  $44 \pm 40\%$  and  $55 \pm 82\%$  for 5, 7 and 10 min arc stimuli, respectively, than just noticeable blur threshold.
- Just noticeable blur and clear image perception thresholds are significantly affected by size of stimuli (optotype) used in the experiment. Blur perception threshold increases with the size of stimulus, thus blur tolerance increases.
- Just noticeable blur perception threshold increased during the day. Statistically significant changes were not observed in clear image perception threshold
- It is necessary to continue study to include dynamical measurements of accommodation during experiment.