

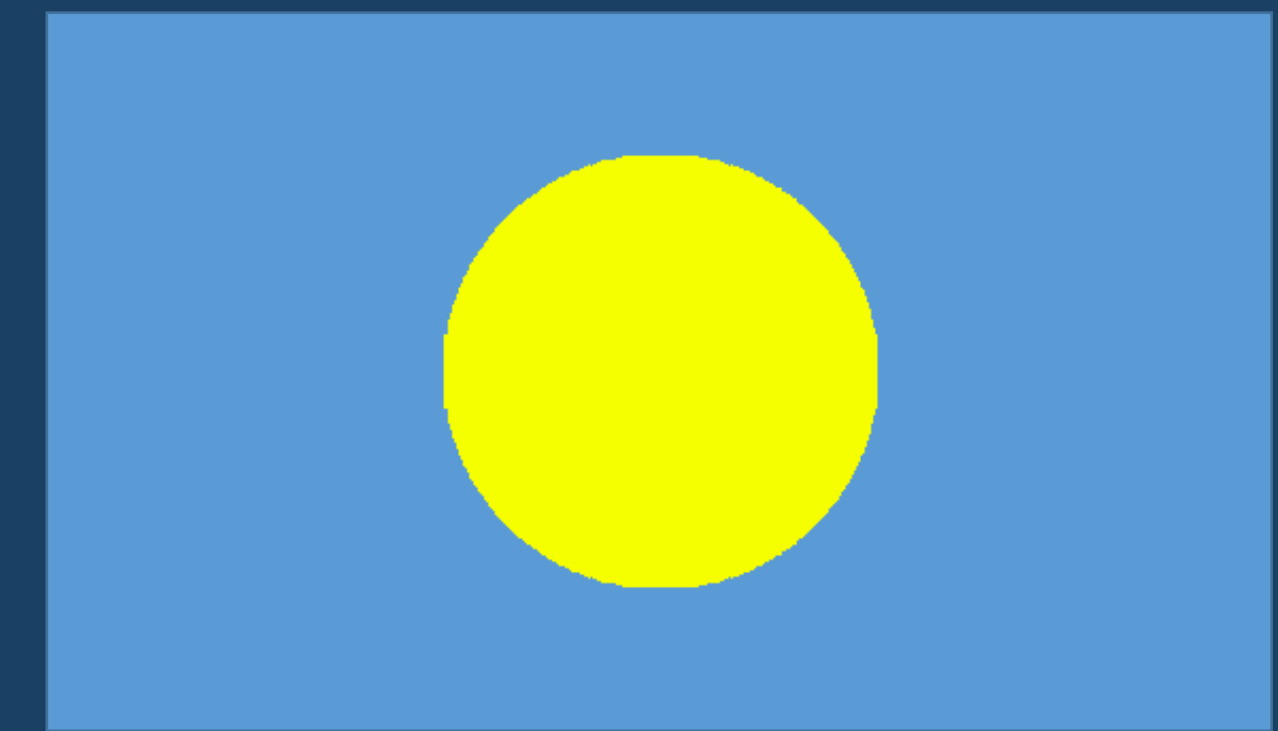
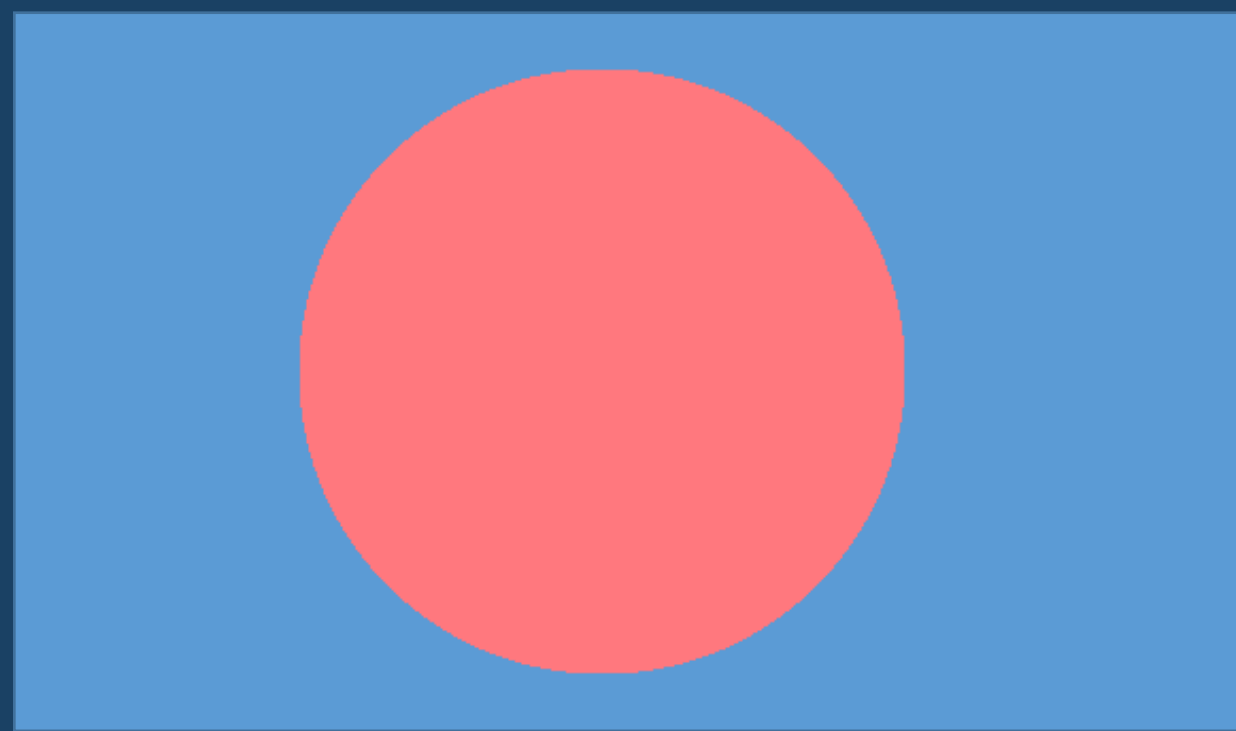
# Quality of reactions to peripherally presented stimuli while driving

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- Problem:** Distraction caused by focusing the navigation system while driving.
- Idea:** Development and evaluation of a new navigation system, in which focusing on a display while driving is not needed anymore.
- Aim:** Investigate the quality of peripheral perception of different circular stimuli while operating a vehicle in order to find out which color, size and presentation time led to the most adequate and fast reaction.



## Theory

- Yellow is perceived best in the periphery (30 degrees) of the visual field (Chodin, 1877).
- Larger stimuli are perceived better than smaller ones (Noorlander, 1983; Victor, Jarlengrip, 2005).
- Both results are based on a presentation time of 500 ms.

## Variables

### Independent variables:

- 3 colors (blue, red, yellow)
- 3 sizes (Ø 5cm, 7cm, 10cm)
- 3 presentation times (250ms, 500ms, 750ms)

### Dependent variables:

- Reaction times on presented stimuli
- Number of reaction errors

## Experimental Setup

- Subjects drove on three different routes in a driving simulator for 30 minutes
- Subjects reacted to stimuli of different color, size and presentation times by pressing the corresponding button
- Stimuli were presented on two displays positioned on the left and right side of the steering wheel. Displays had an excentricity of 30°
- Participants were instructed to focus on the street to ensure that stimuli were perceived peripherally (checked using a headmounted eye tracker)
- Reaction times were calculated from stimulus-presentation to button-press

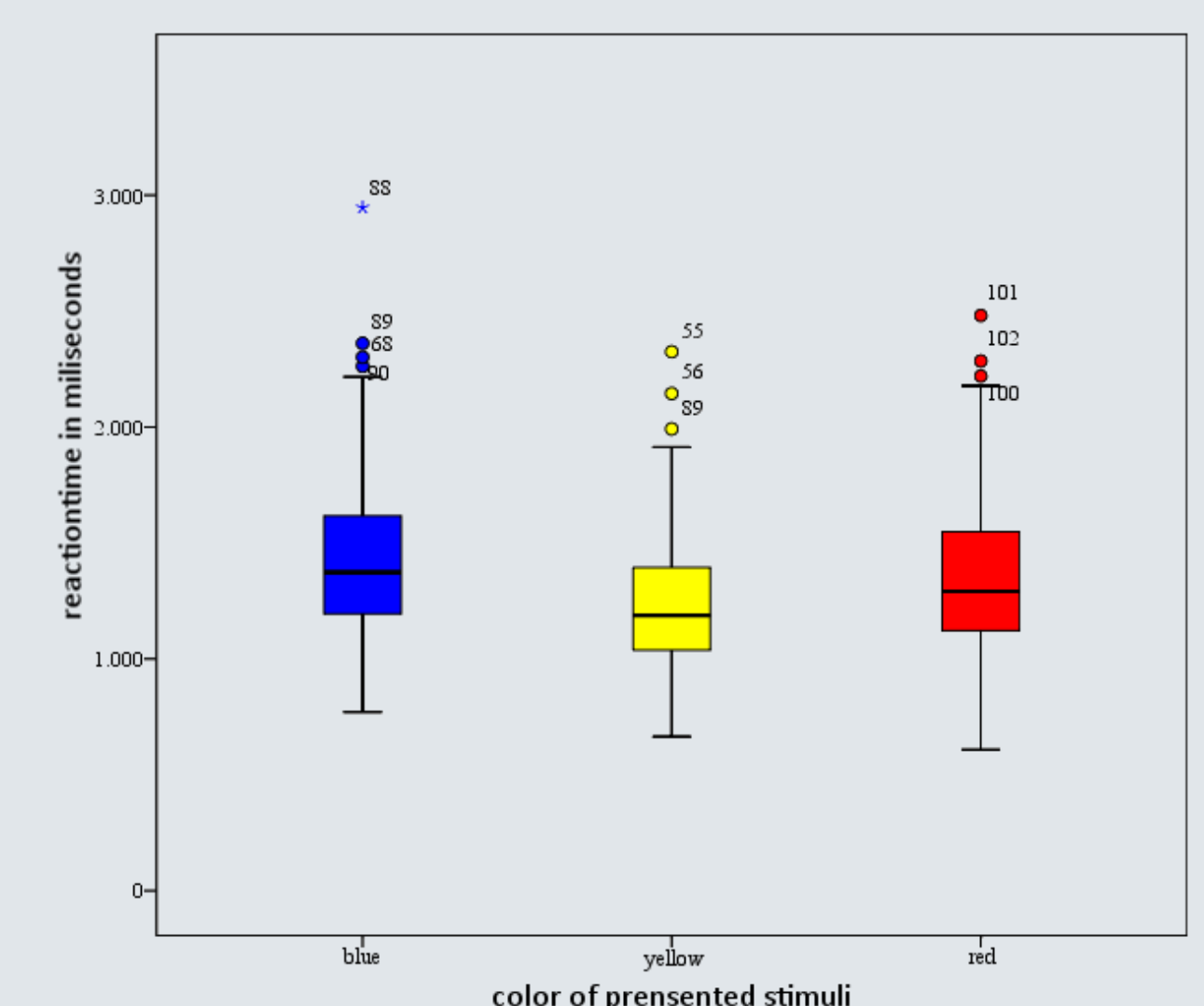
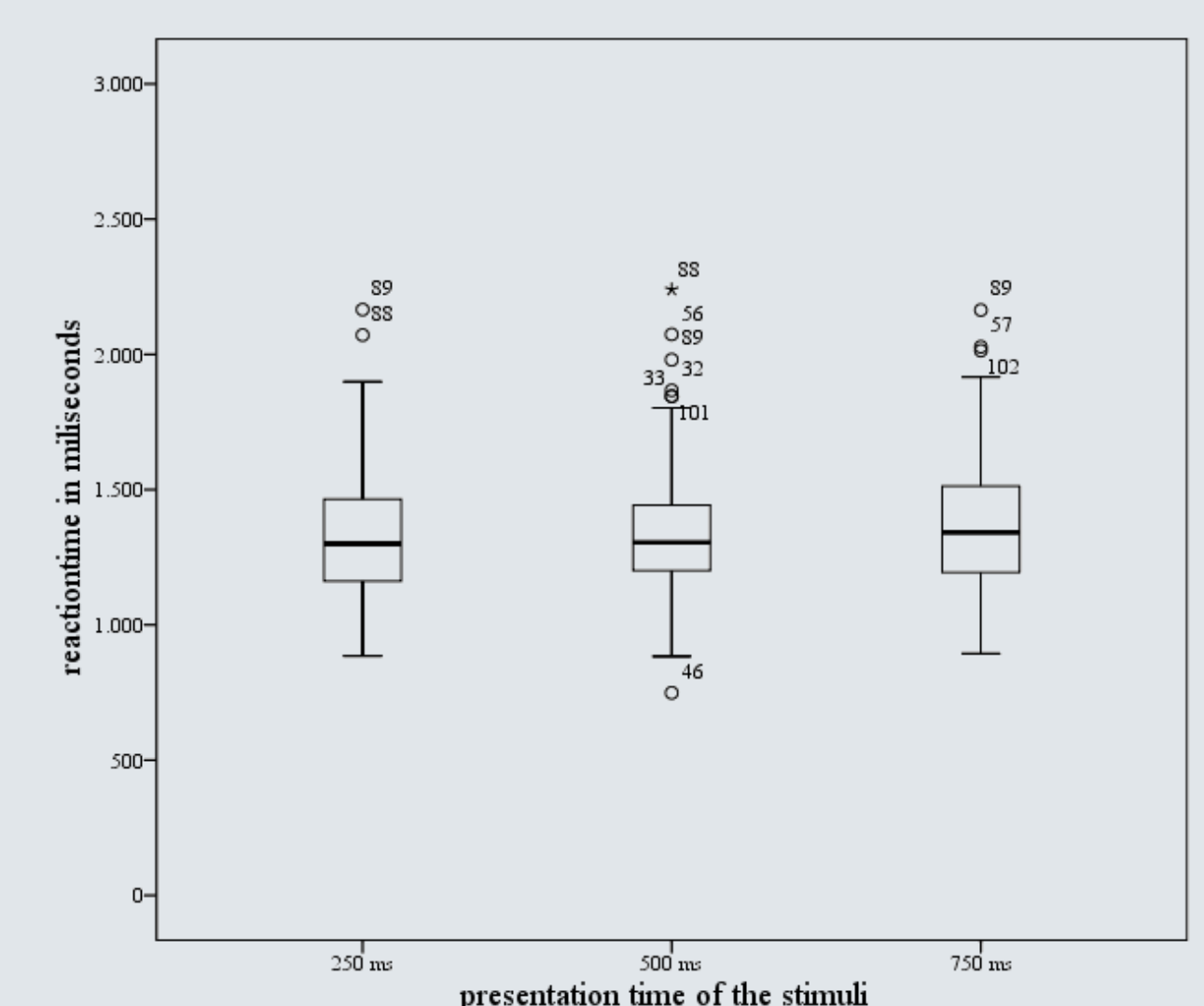
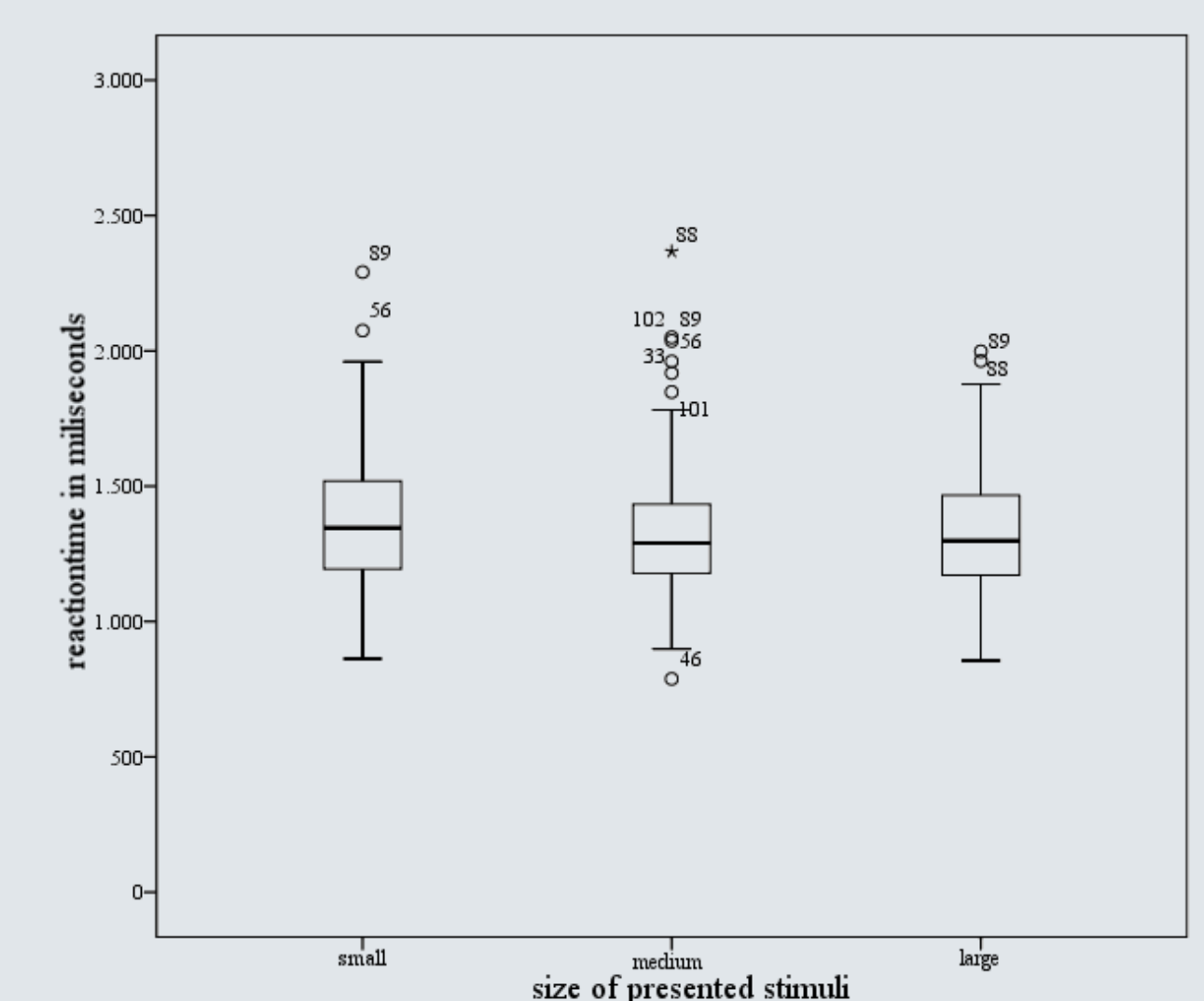


## Results

- 86% of all reactions were correct
- Reactions to bigger stimuli (7 cm to 10 cm) were significantly faster perceived than reactions to smaller stimuli (5 cm)
- Shorter presentation time of 250 ms lead to faster reactions than longer presentation times of 500 or 750 ms
- Fastest and most correct reactions were on yellow Stimuli

## Conclusions

- Peripherally presented stimuli can be used as clues for navigation systems.
- Results indicate that yellow stimuli with a minimum diameter of 7cm should be used for such a system.



## Literature

- Chodin, A. (1877). Über die Empfindlichkeit für Farben in der Peripherie der Netzhaut. *Graefes Archive for Clinical and Experimental Ophthalmology*, 23(3), 177-208.
- Noorlander, C., Koenderink, J. J., den Ouden, R. J., & Edens, B. W. (1983). Sensitivity to spatiotemporal colour contrast in the peripheral visual field. *Vision Research*, 23, 1-11.
- Victor, T.W., Jarlengrip, J. (2005): Method and system for presenting information. Technical Report PCT WO 2005/054786 A1, International Bureau: World Intellectual Property Organization, International application published under the patent cooperation treaty.