# Tricking your cerebellum with a reaching task

## Exercise 1 – Perturbation & after-effect

# General structure + grading

- TASK 1: Implementation of new aspects in reaching experiment (3 points [*])

- TASK 2: Analysis of experiment on unbiased(!) subjects (3 points [*])

- TASK 3: Discussion, full-text, < 200 words (3 points [*])

- 'TASK 4': Try out your ideas, just state what you did and why it was interesting to you (1 point [y/n])

* solid -> 3 , missed detail -> 2, right direction -> 1, nothing related -> 0,
→ max. 10 points for each exercise, max. 40 points in total

# What you submit

- Get together in teams of two and ideally keep these teams for all 4 exercises.

- Decide which of you will correspond with me (Jens Seemann) in Slack via 'direct message'.

- One text document per team (filename: Reaching_Task_2025_Ex**1_member1_member2):**

  Task 1: Just c/p the relevant sections of code, that I can have a quick look

  Task 2: Calculations, tables and/or plots with captions.

  Task 3: Answer at least all given questions briefly (< 200 words total).

  Task 4: One sentence on what you did. One sentence why it was interesting to you.

- + Executable copy of your code ([filename '_code'])

- Deadline: 1 week, right before the next exercise

- I will reply to your message with the grading for each task: e.g. [3 2 2 1]
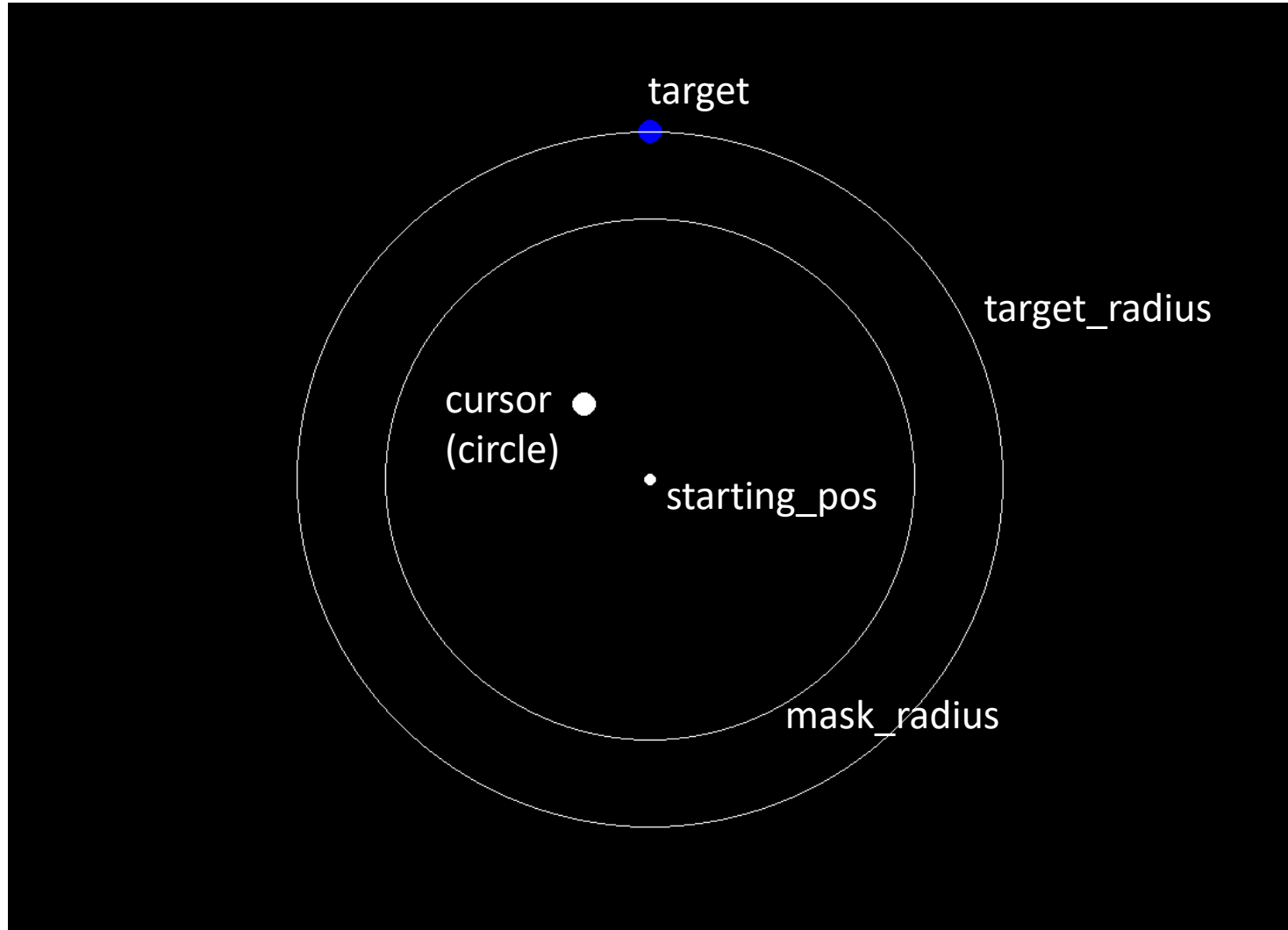
# Prism goggles experiment
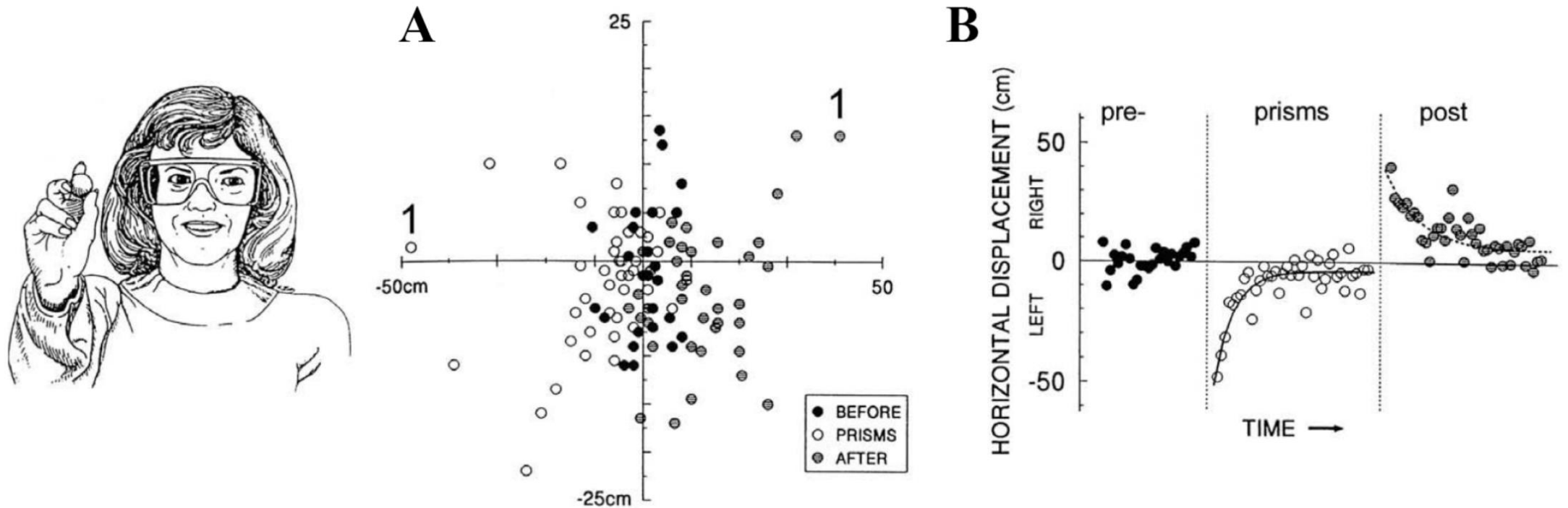


[Martin 96]
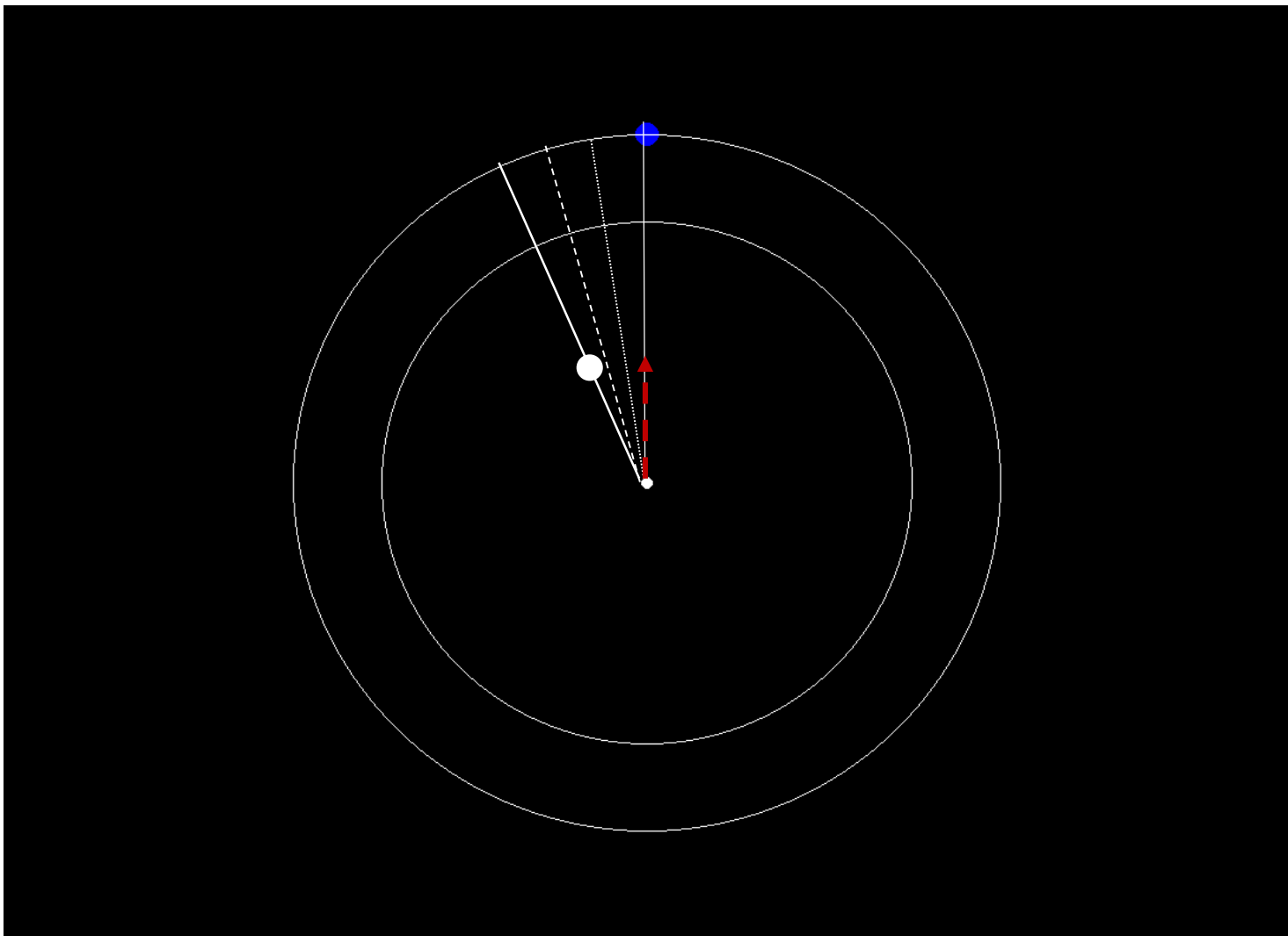
# Reaching task

# Playing field

# Exercise 1

- TASK 1: Implementation of perturbation
  - Implement a **sudden** clockwise perturbation of 30°
  - Implement a **gradual** counterclockwise perturbation of 3°(10 steps, 3 attempts each)
- TASK 2: Analysis of experiment on unbiased subjects
  - Calculate the signed **error_angles** between target and circle cursor, **exclude** slow attempts where ,MOVE FASTER' appeared.
  - **Plot** the error angles over all attempts and **highlight** the experiment's segments
  - What's the motor variability (MV) in the unperturbed segements?
  - Run the experiment a second time with mask_mode=false. What do you **observe** in subject's movements in the now unmasked part?
- TASK 3: Discussion of your results
  - What do you see when perturbation is introduced? Is there an after-effect? What is the difference between gradual and sudden perturbation? Why is it important to mask the last part of the trajectory?

# Sudden perturbation
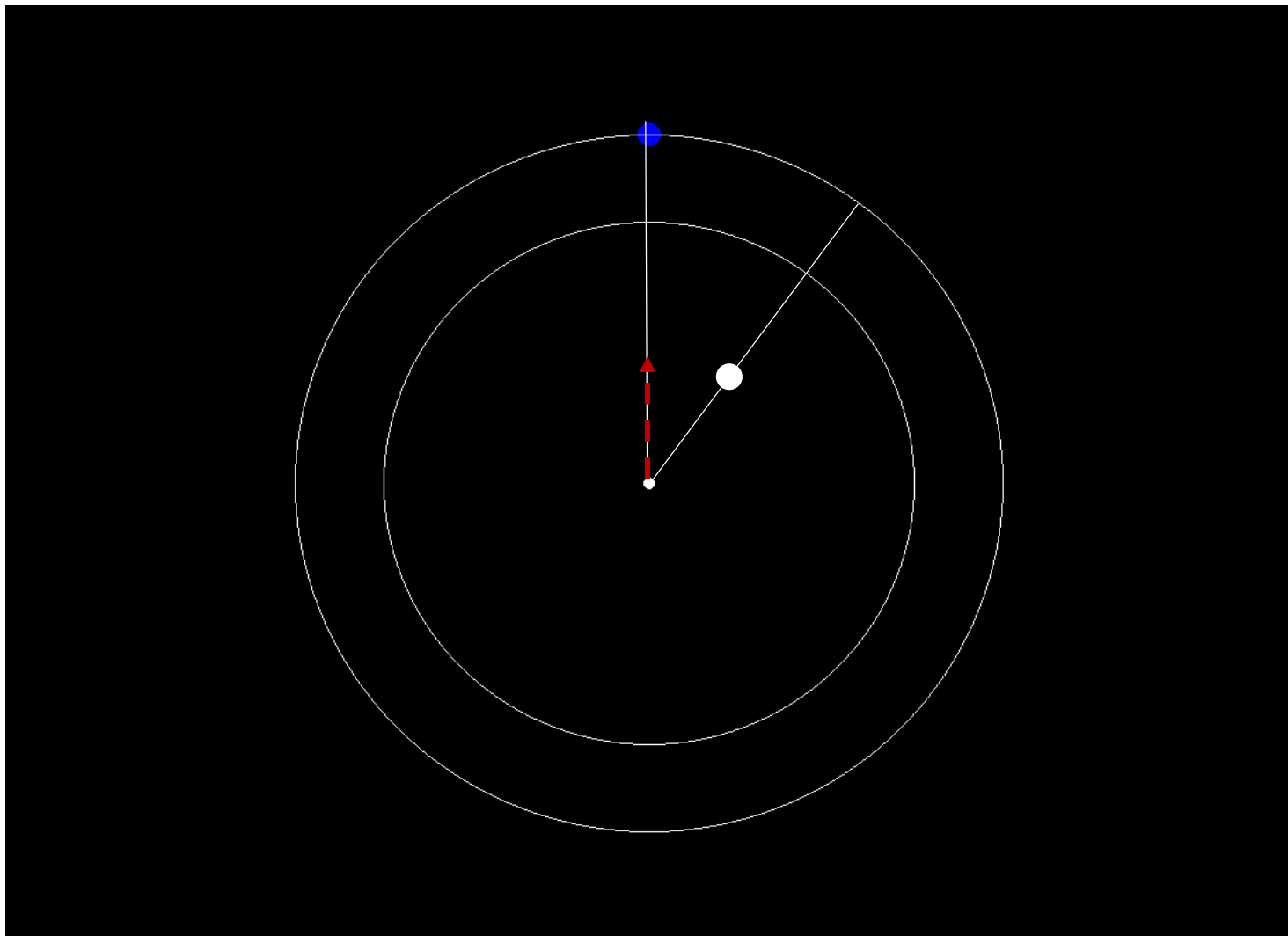
# Gradual perturbation

# Analysis