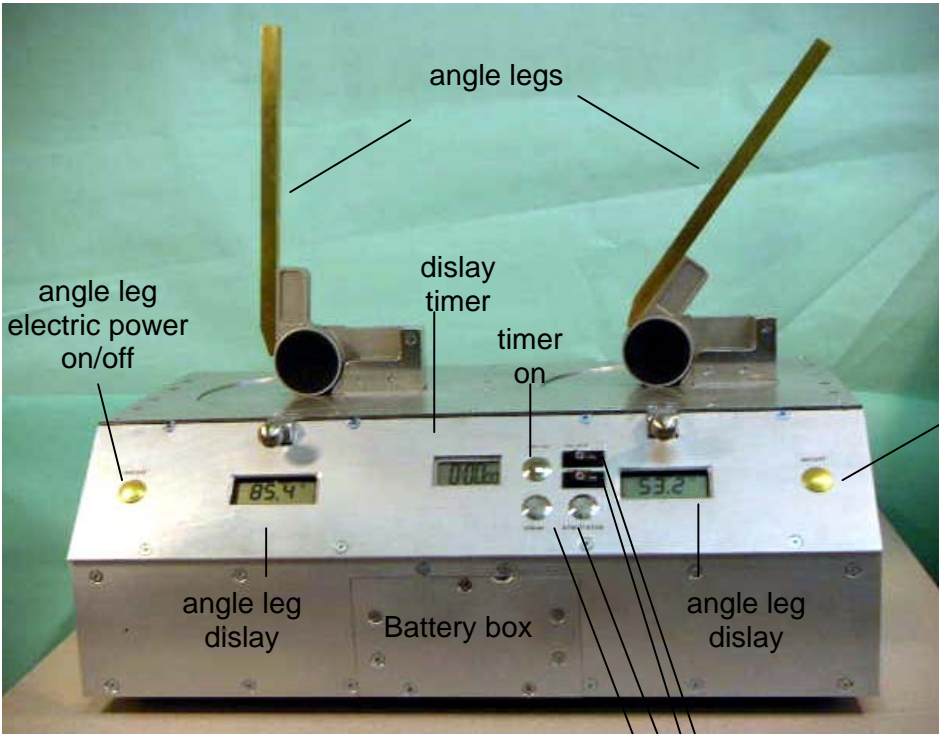
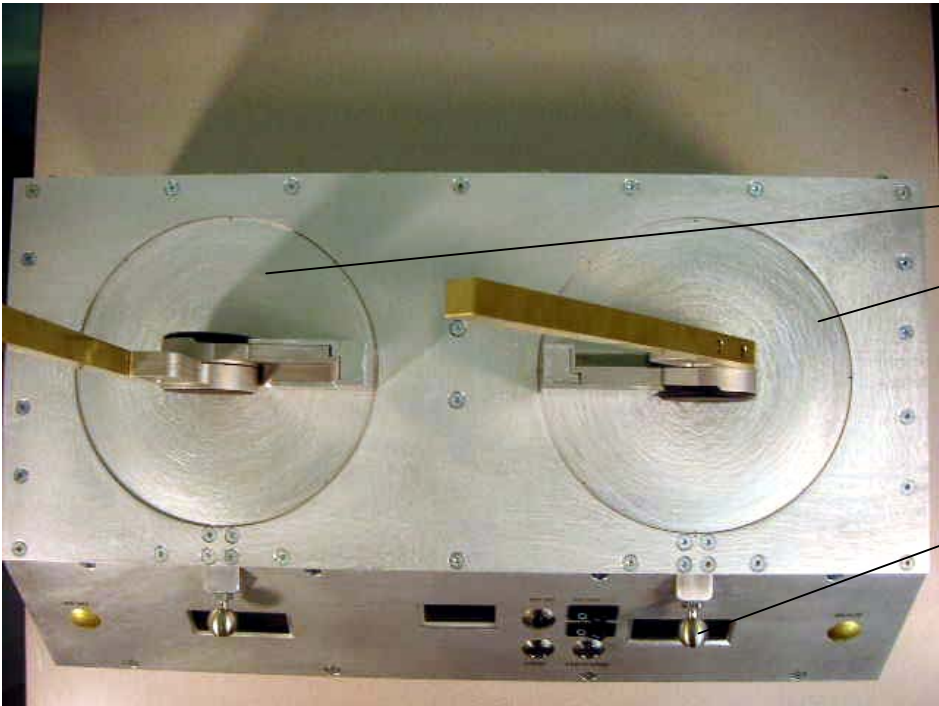


HAPTIMETER

Technical Instructions/ Manual



- power timer on/off
- power beep on/off
- timer start/ stop
- timer clear



**Start digital angle degree measurement:**

1. press both on/off buttons for angle measure (left and right side button).
2. after 1 second the current value of the angle is shown on the display.
3. You can change the position of angle leg while the unit is switched on (see Changing Angle Leg Positions).

(The unit switches off automatically to preserve the batteries after 5 min of inactivity – without angle change. )

**Start timer:**

Please start the timer using the following sequence:

1. switch **a** to “1” (optional: switch **b** to “1” to activate “Beep”)  
(12:00 is displayed)
2. press the button **c** to calibrate the timer (see figure) 0:00<sub>00</sub> should be displayed.
3. start the timer by pressing button **d** (when the test subject touches an angle leg (or both simultaneously) the timer begins)
4. stop the timer with button **d**
5. clear timer display with button **e**

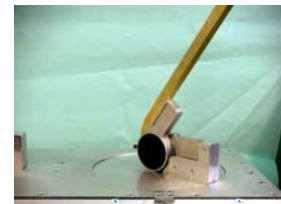
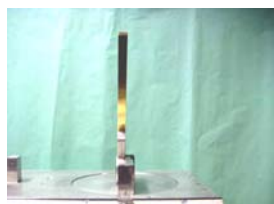
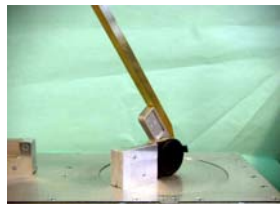
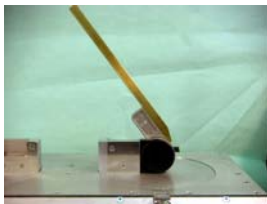
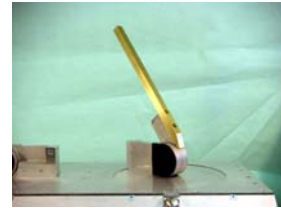
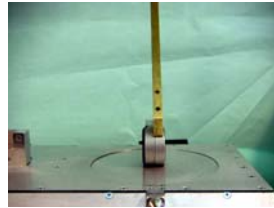
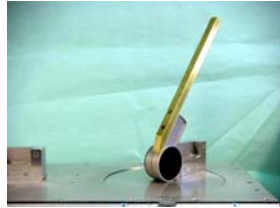
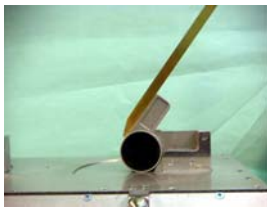


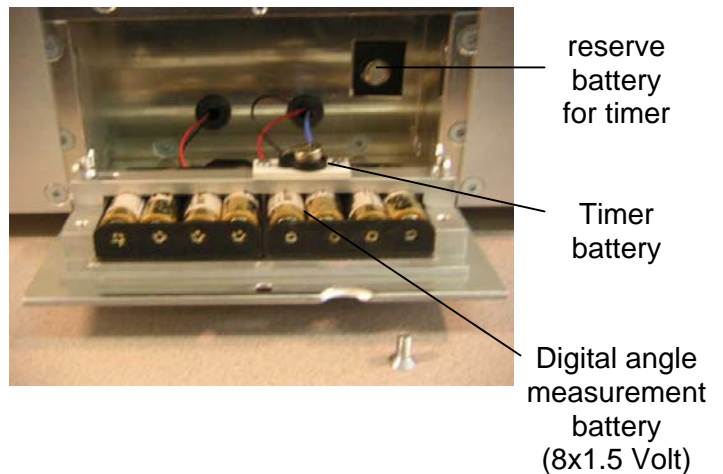
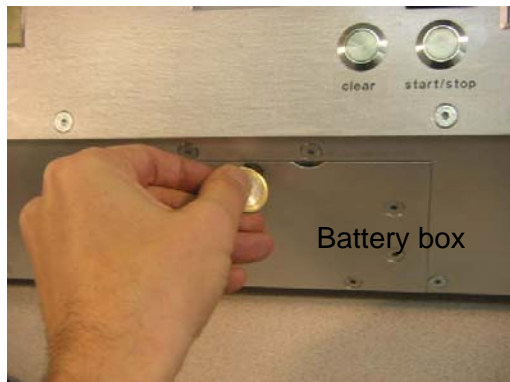
**Changing the Angle Leg Position:**




Pull the locking pin and rotate the angle leg to the new position (see 45° black marks on the panel)

**The following 8 Positions are possible for each angle leg (see figures):**



**Changing the Batteries:**

For each digital angle you need 4 x 1.5 Volt AA Batteries or Rechargeable Batteries (1.3 Volt).

When the battery indicator  appears, measurements are still possible for approx. 1-2 hours. When the indicator blinks, the batteries must be replaced. Measurements are no longer possible.

**Attention:**

When inserting the batteries take care that the polarisation is correct.

The unit is automatically switched on after the insertion of the batteries. For checking of the display, all segments of the angle display appear for approx. 20 seconds. The current angle is then displayed.

A reserve Battery for the timer is inside the box (Dec. 2005).

**Technical Specifications for Angle Measurement Legs:**

Measuring range: 0° - 220°

Measuring accuracy:  $\pm 0.1^\circ$

Read-out resolution: 0.1°

Operating time: Approx. 100h (4x 1.5V Batteries)

Automatic switch-off: after 5 min without activity

The digital angle measure device is produced by: Robert Bosch GmbH, D-70745 Leinfelden-Echterdingen, Germany

**Terminology:**

We termed e.g. “right side tasks“ if the right hand of the test subjects is to adjust the right angle leg (from the test subject’s point of view) to match the given position of the left angle leg. That means, in this case, the left angle leg is the nominal value.

**Position of the test subject:**

The test subject is to sit in a comfortable position (arms free and with no body contact to the instrument) behind the Haptimeter. Only the experimenter should see the displays. The best position between test subject and the Haptimeter is displayed in the following image. (On a normal table the Haptimeter is generally too high! ( See image)

Please remember that not all people are of the average height! Especially younger test subjects are not as large and require an adjustment to the positioning of the Haptimeter!

**Haptimeter Protocol**

In the following examples we have described our experiences with the Haptimeter in clinical studies.

You can change these aspects or use them in your studies as is required.

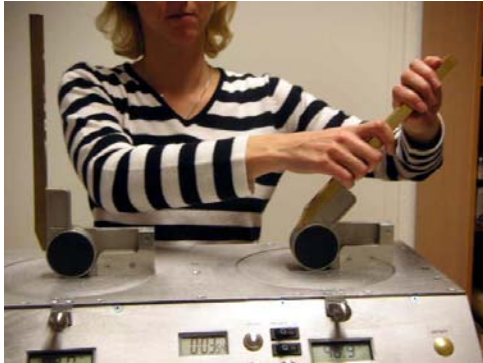
**Start position:**

The test subject sits on the back side of the Haptimeter and the experimenter sits in front. (see figure).

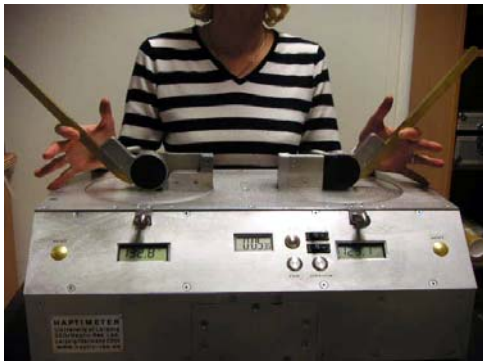


We explained to the test subject the different tasks and let them try each task type one time.

We explained to the test subject that the following haptic procedures are not allowed (see figures).



(“distance measurement”)



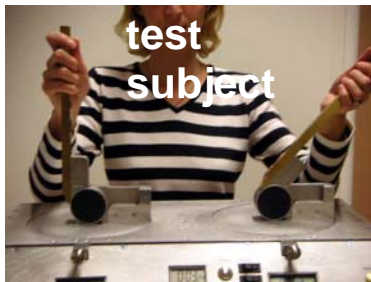
We allowed in our studies only the haptic exploration of the angle leg. The subjects' under arms were free, not supported in any way and unrestricted .

The test subject's eyes were closed during each testing phase. No verbal or visual feedback was given to the test subject about their results.

### Detail Description of the first trial from one protocol

The experimenter set all displays from “off” to “on” and tested the basic functions.

1. Instructions for the test subject and testing of all types of tasks were given.
2. experimenter had the experiment protocol in their hands/ on the table + pen.
3. The experimenter instructed the test subjects to close their eyes.
4. The experimenter positioned the angle leg for the first test (45°) right side angle
5. The experimenter noted the real nominal angle (example: 45.7°)
6. The experimenter brought the adjustable angle (left side angle) to a 90° position – the so called “start position”
7. The experimenter said “start” and the test subject began to move their arms.

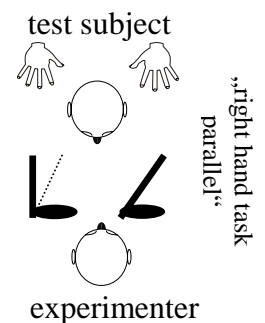


(start position for a right hand parallel task)

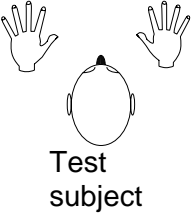





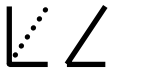


8. When one finger touched an angle leg the experimenter pressed the timer start button!
9. The test subject explored the right angle leg with the right hand and with their left hand the left angle leg. The test subject adjusted the angle leg to a parallel direction with their right hand. (We did not use a time limit allowing the test subject as much time as they wished to have.)
10. When the test subject had finished the trial they removed their hands from the machine – as they had been instructed to do before the experiment began!
11. The experimenter pressed the Stop button on the timer.
12. The experimenter noted the adjusted angle on the display as well as the exploration time.
13. The eyes of the test subjects were closed during this time.
14. The experimenter positioned the angle leg for the second test (33°) right side angle
15. The experimenter brought the adjustable angle (left side angle) to a 90° position
16. The experimenter said “start” and the test subject began to move their arms.

(Example of a protocol)

trial numb.	Nominal value	Adjusted nominal value (experimenter)	Reproduced value (test subject)	exploration time	Difference
1	45°	45.7°	52.2	2.14	
2	33°				
3	65°				
4	28°				
5	35°				

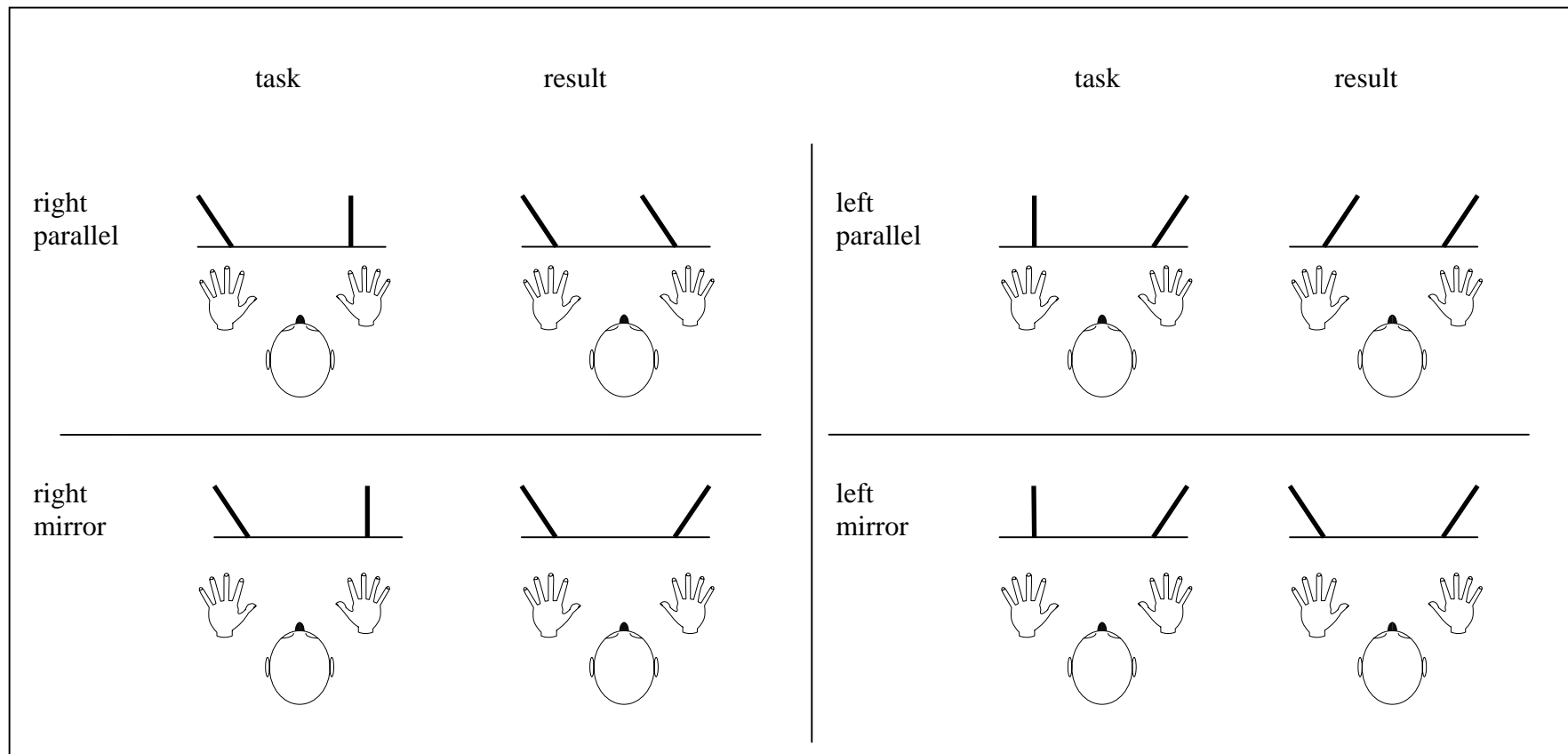


**Leipzig Protocol**

Subject A			Subject B	
Nominal Value	Task Type		Nominal Value	Task Type
45°	left-mirror-tasks	 <p>Test subject</p>	135°	right-parallel-tasks
22°			158°	
65°			125°	
15°			165°	
35°			145°	
135°	right-parallel-tasks	<p>↓</p> <p>Tasks sequence</p> <p>↓</p>	45°	left-mirror-tasks
158°			22°	
125°			65°	
165°			15°	
145°			35°	
45°	left-parallel-tasks		45°	left-parallel-tasks
22°			22°	
65°			65°	
15°			15°	
35°			35°	
135°	right-mirror-tasks		135°	right-mirror-tasks
158°			158°	
125°			125°	
165°			165°	
145°			145°	

Arrangement and order of the tasks for two subjects. The given angles (nominal values) are quoted in degrees.

Schematic description of the tasks. Upper line: The task angle has to be readjusted in a parallel way. Under line: The task angle has to be readjusted in a mirror-like way.



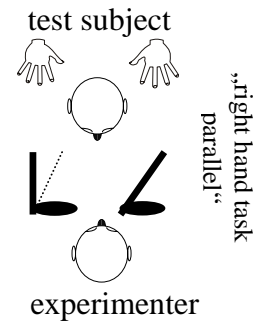
Test subject:

Name ..... Date of test: ..... Time of test: .....

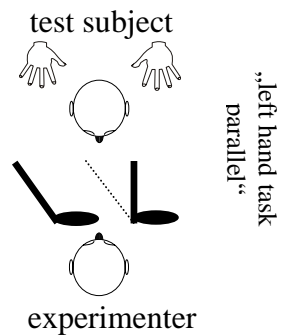
Age: ..... Diagnosis.....

Experimenter:.....

trial numb.	Nominal value	Adjusted nominal value (experimenter)	Reproduced value (test subject)	exploration time	Difference
1	45				
2	33				
3	65				
4	28				
5	35				

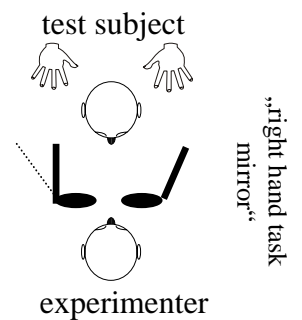


trial numb.	Nominal value	Adjusted nominal value (experimenter)	Reproduced value (test subject)	exploration time	Difference
1	135				
2	158				
3	125				
4	165				
5	145				

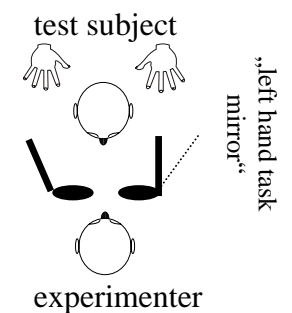


**Rotate the right angle to 180°!**

trial numb.	Nominal value	Adjusted nominal value (experimenter)	Reproduced value (test subject)	exploration time	Difference
1	135				
2	158				
3	125				
4	165				
5	145				



trial numb.	Nominal value	Adjusted nominal value (experimenter)	Reproduced value (test subject)	exploration time	Difference
1	135				
2	158				
3	125				
4	165				
5	145				



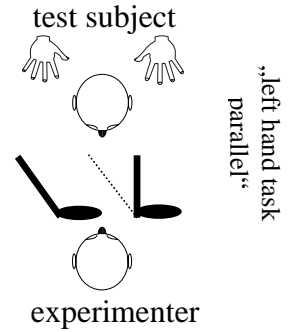
Test subject:

Name ..... Date of test: ..... Time of test: .....

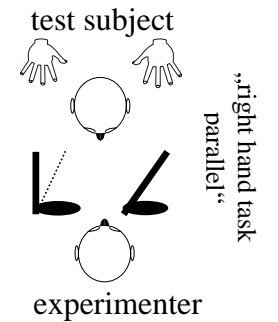
Age: ..... Diagnosis.....

Experimenter:.....

trial numb.	Nominal value	Adjusted nominal value (experimenter)	Reproduced value (test subject)	exploration time	Difference
1	135				
2	158				
3	125				
4	165				
5	145				

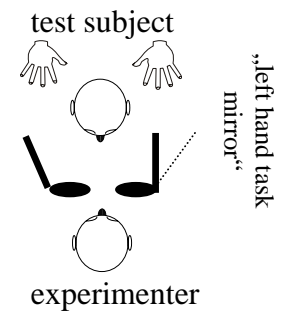


trial numb.	Nominal value	Adjusted nominal value (experimenter)	Reproduced value (test subject)	exploration time	Difference
1	45				
2	33				
3	65				
4	28				
5	35				

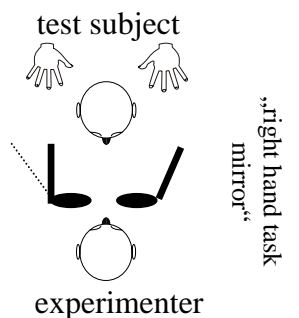


**Rotate the right angle to 180°!**

trial numb.	Nominal value	Adjusted nominal value (experimenter)	Reproduced value (test subject)	exploration time	Difference
1	135				
2	158				
3	125				
4	165				
5	145				

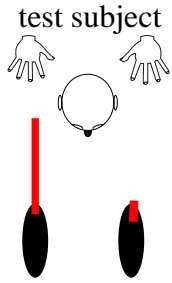


trial numb.	Nominal value	Adjusted nominal value (experimenter)	Reproduced value (test subject)	exploration time	Difference
1	135				
2	158				
3	125				
4	165				
5	145				

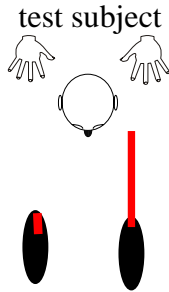


**Other position for test**

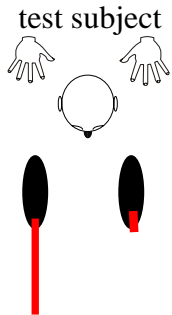
Task type A



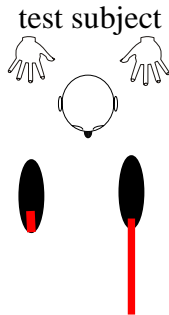
Task Type B



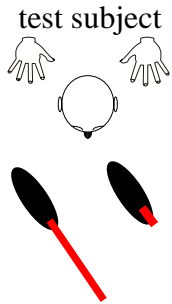
Task type C



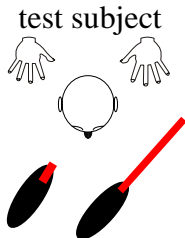
Task type D



Task type E



Task type F



and so on