

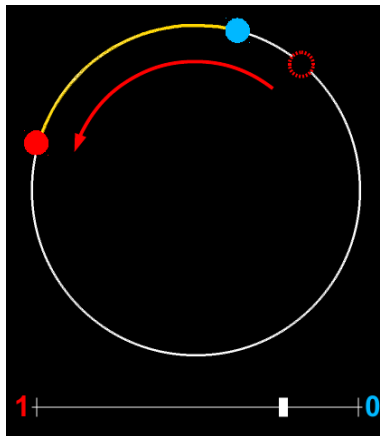
Instruction

The experiment will last approximately 60 minutes. It will consist of 2 blocks. Each block is subdivided in 2 consecutive sessions. Each session takes approximately 12 minutes, and is subdivided in 200 trials.

Task overview

In this game, you will see a **Target** that moves along a circle (Fig. 1), in both clockwise and counterclockwise direction. On the same circle, you will also observe a **Robot**. Your task will be to control the Robot by changing how much it responds to Target movements. Underneath the circle is a slider (Fig. 1 & Fig. 2). Move the cursor towards “1” to increase the adjustment of the Robot towards the Target's last move. At “1”, the Robot catches up fully with the Target's position. Move the cursor towards “0” to decrease Robot's adjustment. At “0”, the Robot stays put, unresponsive to the Target's last move.

Your task is to ensure that the Robot is always as close as possible to the Target's SUBSEQUENT position. Occasionally, the Target might partly reverse its last movement.



[Fig. 1] Target and Robot

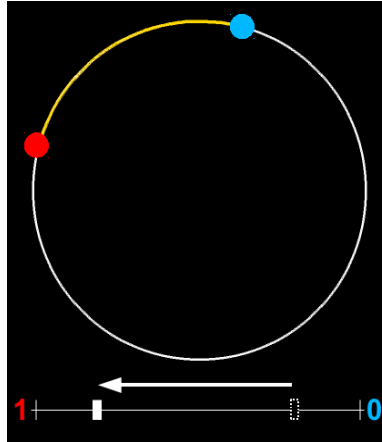
The game is divided into “blocks”. The way the Target moves (e.g. partly reverse its last movement) will generally differ across blocks. But within a block (two consecutive sessions), the Target uses a fixed strategy to move along the circle. This strategy will NEVER depend on what you do. Specifically, Target movements are autonomous, unaffected by Robot movements. For instance, the Target will not deliberately try to stay away from the Robot.

A block consists of two consecutive sessions. You will have a short break between sessions. When you finish the first block (session 1 and 2), you will move on to the second block (session 3 and 4). Again, the way the Target moves (e.g. partly reverse its last movement) will generally differ across blocks. But within a block (two consecutive sessions), the Target uses a fixed strategy to move along the circle.

At the end of the experiment, you will be able to win a show-up reward and bonus depending on your performance in the game. The chances of winning increase with your success in making the Robot track the subsequent movements of the Target. The better you manage to track the Target in the subsequent trial, the higher the chances.

You will be given the opportunity to practice. After the experiment is over, we will ask a few questions about this task and your psychological and educational background. The practice block consists of 100 trials and lasts for approximately 6 minutes.

Task protocol and interface



[Fig.2] Slider is shown to decide the Robot's adjustment for tracking the Target

Task Protocol:

1. At the beginning of a trial, you will see the Target $T(t-1)$ moves to a new place $T(t)$ (Fig. 1).
 - The red dot in the screen indicates the Target.
 - The blue dot in the screen indicates the Robot.
 2. After the Target moves, the circle segment between the Target and Robot is highlighted with yellow (Fig. 2). Then, you have a chance to change the Robot's adjustment for tracking the Target, if you wish (A slider is shown below on the screen. For details, see "input" below.).
 3. You then see the Robot moves toward the Target, according to the adjustment you decided.
 4. We then proceed to the subsequent trial soon.
- * Please note that, the above process goes quite rapidly; one trial finishes approximately in 3 seconds.

Input:

In every trial, if you wish to change the Robot's adjustment for tracking the Target, you can change it by moving the cursor on the slider, right after the Target moves and the circle segment between the Target and the Robot is highlighted with yellow (Fig. 2). Higher the value of the speed is, closer the Robot moves to the Target.

- At "1", the Robot fully catches up the Target.
- At "0", then the Robot stays put, unresponsive to the Target's last move.

You change the place of cursor with a track-ball (or a mouse in pilot/practice experiments). If you roll the tracking-ball to the left/right side, the cursor moves to the left/right side.

- The left-right direction of the slider bar may vary every 10 trials. In a certain trial, "1" might be located on the left side of the slider and "0" is on the right side (Fig. 1 and Fig. 2), however, they might be reversed in another trial.
- When the slider is reversed, the slider becomes grey for a while, right before the next Robot movement.
- The starting value of the cursor is the value you decided in the last trial. (0.5 in the first trial.)

(Time limit) Please move the cursor on the slider within 2.25 seconds.

- The slider will be locked after 2.25 seconds (then the Robot moves).
- You may leave the cursor to the starting value if you do not wish to change the speed.

Reward scheme:

- The following reward scheme may look a little bit complicated; all you need to know however, is that it incentivizes you to navigate the Robot close to what you think is the best estimates for the position of Target in the subsequent trial, $T(t+1)$.
- As such, you really do not need to remember the details of the math of the scheme.

In each session, you will be rewarded for THREE randomly chosen trials.

In each of these trials, you have a chance to win TWO dollars. The probability of winning is determined by the accuracy of your navigating Robot R to the subsequent position of Target $T(t+1)$, as follows,

$$\text{Probability (win)} = \max[0, 100 - 0.04 \cdot (T(t+1) - R)^2](\%) \text{ Unit for T and R: degree.}$$

The following table shows how the probability of winning changes with your Robot navigation. **The closer your Robot is to the Target in the subsequent trial, the larger the probability of winning is.**

Difference with Target and Robot	Chance of winning TWO dollars
0	100%
20 degrees	84%
30 degrees	64%
40 degrees	36%
50 degrees	0%
60 degrees	0%

[Table] Probability of winning the bonus of TWO dollars
*30 degrees is equivalent to 1/12 of a circle, 60 degrees is 1/6.

To determine whether you won in a given trial, we generate a random variable with uniform distribution between 0 and 100. If the drawn value is smaller than the probability determined by the above equation, you will be awarded. Otherwise you earn nothing (for that trial).

Again, with this rule, your best strategy is simple: simply navigate the Robot to what you think is the best estimate of the subsequent position of the Target.

At the end of the whole experiment, we will pay the cumulative earnings from the selected trials in all blocks (plus the standard show-up reward).

- Rewards are not paid for the practice block.

Thank you and good luck!