

Neuroplasticity

Name: _____

Date: _____

Background:

In this experiment you will be exploring the ability of our brains to adapt in response to environmental changes, new experiences, incoming signals, or changes in information arriving through our senses.

The visual distortion goggles used in this experiment alter your vision, changing the angle at which you perceive objects in space. When the goggles are placed, the prism changes the light signals reaching the eye, showing us a different location of the target.

Instructions:

Read the experiment method below. Before starting, try on the visual distortion goggles and observe what happens.

Then, write down a hypothesis - what do you predict will happen across the trials as you attempt to hit the target?

Work in groups to collect data. At the end, reflect on your results, answering the questions below.

Materials

- 1 x visual distortion goggles
- 1 x target on the floor
- 1-3 x bean bags

Hypothesis

What do you predict will happen across the trials as you attempt to hit the target with and without the goggles? Why?



Method

1. Read the full method and then write a hypothesis in the box below (page 2).
2. Set up a target on the floor and gather your goggles and bean bags.
3. All students can take turns to be participants and experimenters, or you can divide yourselves in two groups: 1) the participants, 2) the experimenters.
4. Participant 1 stands 10 feet from the target (without the goggles!). This distance can be adjusted as needed but should be the same across all participants, so make sure to mark your location so that all participants have equal distances.
5. Participant 1 throws (underhand) the first bean bag at the target, repeating the throws until they hit the target.

NOTE: The beanbags sometimes may slide off the target. Decide as a group the rules for what you will consider a 'hit'. Is it when the beanbag stays on the target or does it count as a hit if the bean bag slides off the target after hitting it?

6. Experimenters count the number of trials that it takes until the participant hits the target. Experimenters write on the 'Trial 1' column the number of trials it took until participant 1 hits the target. (E.g. if the participant only hit the target on his 4th attempt, you should write 4 on this column). There is a maximum of 10 trials per participant, if they do not hit the target after 10 attempts, the score will be 10.
7. Participant 1 puts on visual distortion goggles and repeats steps 4-5, throwing the bean bags at the target until they hit it. Experimenters write on column labelled 'trial 2' the number of trials it took for the participant to hit the target correctly with the goggles on (with up to 10 trials).
8. In trial 3, participant 1 removed the goggles and repeats the experiment, attempting to throw the bean bags at the target again. Experimenters take note of the number of trials it took for them to hit the target correctly (with up to 10 trials).
9. Repeat steps 2-6 with all the other participants. Calculate total scores and averages for the different trials in the table and analyze your results.
10. Discuss your results as a group and answer the questions below.



Results

Take note of the number of trials it took for each participant to hit the target correctly across the three different trials (1-without goggles / 2-with goggles / 3-after removing goggles). There is a maximum of 10 trials per participant, if they do not hit the target after 10 attempts, the score will be zero.

TRIALS	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	TOTAL	AVERAGE
Trial 1 (before goggles)							
Trial 2 (with goggles)							
Trial 3 (after goggles)							

Observations and conclusions

1. What changes did you observe across the trials? Were there any changes in the accuracy of the throws?

2. What happened to the accuracy when participants removed the goggles in trial 3?



3. Did the results support your hypothesis? How?

4. What parts of the brain do you expect are most involved during this activity?

5. Why do you think it is important that our brains have this plasticity ability?

