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Y Maze - Spontaneous Alternation

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Protocol status: Working

We use this protocol and it's working

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Abstract

The following protocol is used to assess spatial working memory using the Y Maze (spontaneous alternation) at the University of Alabama at Birmingham's Neuroscience Behavioral Assessment Core.

Guidelines

Use of this protocol needs approval by user's Institutional Animal Care and Use Committee (IACUC) or equivalent ethics committee.

Materials

1. Chlorhexidine
2. Paper towels
3. Open field boxes (appropriately sized for test subject)
4. Ethovision version 17 software

Before start

You will need a test mouse whose behavior is not included in the experiment to calibrate detection settings.

Set Up



Set Up

- 1 Bring animals into testing room for habituation (at least 30 minutes prior to start of experiment)
- 2 Set up maze
 - 2.1 Clean the maze
 - Spray with chlorohexidine and wipe out
- 3 Plug the EthoVision XT Version 17 software dongle in the computer
 - Shines a red light when connected
- 4 Open EthoVision XT Version 17 software
- 5 Start new experiment
 - 5.1 Name the file
 - 5.2 Indicate where file will be saved
- 6 Experiment Settings
 - 6.1 Select live tracking
 - Indicate which camera will be used
 - Center the arena under the camera
 - 6.2 Select center point detection
 - 6.3 Select the number of arenas that you will be using
 - 6.4 Units should be cm, s, and deg

7 Arena settings

7.1 Grab a background image from the camera

- Ensure the maze is in its intended area moving it after this step will affect the analysis
- Mark placement with tape so you can return it to the exact same location if it is moved while cleaning between trials

7.2 Draw scale

- Measure the bottom arm of the Y
- Draw a scale bar over the area that you measured and indicate its length (cm)

7.3 Click the arena in the list on the right

- Select the closed polygon tool
- Trace the outside barrier of the entire maze

8 Draw zones

8.1 Select zone

- Rename "Arm 1"
- Used closed polygon tool to trace one arm of the maze

8.2 Add a zone

- Rename "Arm 2"
- Used closed polygon tool to trace another arm

8.3 Add a zone

- Rename "Arm 3"
- Used closed polygon tool to trace the last arm

8.4 Validate setup

- If you have any overlapping zones, they will be considered invalid and must be redrawn

9 Trial Control Settings

9.1 Begin condition should be on the start button with the condition of center-point being in the arena

9.2 Stop track with the condition being after 5 minutes



10 Detection Settings

10.1 Click advanced settings

10.2 Dynamic response

10.3 Indicate if subject is darker or lighter than the background

10.4 Place test subject in arena

10.5 Click and drag to create a box around the subject

- The software will create an automatic threshold around the subject that moves with it

10.6 Fine-tune it with the scrub bar to make it fit around the subject perfectly

11 Trial list

11.1 Add enough trials for each subject

12 Acquisition

12.1 Software will load the first trial

12.2 Put a subject in starting area

- At the outside edge of one of the baseline arms
- Keep starting area consistent across subjects

13 Press record

- The program will run for 5 minutes and automatically stop

13.1 Remove subject



13.2 Clean enclosure with chlorhexidine

13.3 Repeat for all trials

14 Data Profile

14.1 Ensure that it is pulling data from all trails

15 Analysis Profile

15.1 Distance traveled

- Arena
- Statistics - total only

15.2 Velocity

- Arena
- Averaging interval – 1
- Statistics – mean

15.3 Zone alternation

- Select all 3 zones
- Alternations
- Max alternations
- Direct revisits
- Indirect revisits
- Trial statistics – frequency

16 Results

16.1 Statistics and charts

16.2 Calculate to generate a file with the analysis parameters chosen



16.3 Export and save

- 17 Ensure the video files are exported and saved. If there is a problem, the analysis can be repeated from the video file.

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