The Novel Object Task

Apparatus

The object recognition task is conducted in the open field box (72 x 72 cm). The floor and three walls are made from 2 cm thick plywood that has been painted white with non-toxic Tempura paint. The fourth wall is made of clear Plexiglas so that the mice can be observed from the front of the apparatus as well as from the top. Black lines painted on the floor divide the open field into 16 18 x 18 cm squares. The centre square (36 x 36 cm) is formed from the four inner squares and this square is highlighted with a red marker. A sheet of clear Plexiglas covers the floor.

All animal testing is conducted under dim lighting conditions via a 60-Watt red light bulb. A video camera suspended above the center of the open field records all behaviors for later analysis. Behavioral analysis was conducted using the computerized event-recorder program Hindsight for MS-DOS version 1.5.

Procedure

Prior to testing all mice are habituated to the open field arena for 5 min 24 hours. Mice are carried to the test room in their home cages and run individually. Mice are moved from their home cage to the testing apparatus and back using. After each 5 min trial, the mice are returned to their home cages and the apparatus was cleaned with 70 % ethyl alcohol and permitted to dry between trials.

There are two different ways of conducting the novel object test, each of which focuses on a different type of memory depending on the time lapse between training to the novel objects and testing. The first method involves a short duration between introduction of the novel objects and testing. Testing day consists of two trials. During the first trial, two objects (01 and 02) are placed in diagonal corners opposite each other. The mouse is scooped up from its home cage in a yogurt container and placed in the middle of the open field arena. Each mouse is allowed to explore the arena and objects for 5 min. At the end of the trial the mouse is removed from the apparatus using the yogurt container and returned to its home cage. After a 15 min inter-trial interval the mouse is returned to the open field (trial 2). The arena now contains the familiar object (02 from trial 1) in the same location as trial 01 and a new object (N) that replaces 01. The same behaviors recorded for trial 1 are recorded for 5 min for trial 2.

The second type of novel object recognition task which is a test of long term memory involves a 24 hour period between trial 1 and trial 2. All other methodology remains the same.

Metal objects of various shapes ranging in size from about 2 x 2 x 2 cm to 2 x 4 x 6 cm (jar lids, bolts, nuts) are used as objects. Object 1 (to be replaced in trial 2) was counter balanced for each group of animals. Object 2 (to remain the same for trial 2) was the same for all mice, to eliminate the possibility of aversion of preference to the object. The new object (N) was similar in size to 01 to reduce preference for either object. All objects and the apparatus were cleaned using 70 % ethyl alcohol to eliminate olfactory stimuli.
Behaviors Scored
The behaviors scored (Brown et al, 1999, Podhorna & Brown, 2002) include:

1. Line Crossing: frequency with which the mice crossed one of the grid lines with all four paws.
2. Rearing: frequency with which the mice stood on their hind legs in the maze.
3. Rearing Against a Wall: frequency with which the mice stood on their hind legs against a wall of the open field.
4. Stretch Attend Postures: frequency with which the animal demonstrated forward elongation of the head and shoulders followed by retraction to the original position.
5. Grooming: frequency and duration of time the animal spent licking or scratching itself while stationary.
6. Approaches to Each Object: directing the nose to the object at a distance of < 1 cm and/or touching it with the nose.
7. Time Spent with Each Object: sniffing or climbing the object.

References
