Open Field IMPC_OFD_001

Purpose

The Open Field test is used to assess anxiety and exploratory behaviors. It is based on the natural tendency of an animal to explore and to protect itself using avoidance which translates to a normal animal spending more time in the periphery of the Open Field arena than in the center (the most anxiogenic area).

Experimental Design

- **Minimum number of animals**: 7M + 7F
- **Age at test**: Week 9
- **Sex**: We would expect the results of this test to show sexual dimorphism

Procedure

1. Animals are transported to the testing room (or ideally an antechamber) and left undisturbed for 30 minutes before the test.
2. Ensure that lighting conditions are as desired (150-200 lux) and that all equipment is working correctly:
   1. If using a beam break system, ensure that beams are not interrupted before putting the mouse and if measuring vertical activity (rears), check that height of the infrared frame for rears is correctly set.
   2. If using a videotracking system, set detection parameters appropriate for the coat color of the mice.
   3. For analysis, each openfield arena is divided into a peripheral zone measuring 8 cm from the edge of the arena walls, and a central zone around 40% of the total surface of the arena.
3. Testing is conducted during the light phase of the cycle with 1 hour gap from the light/dark change. Testing should be conducted during the same period of day.
4. Wipe the apparatus clean and allow time for it to dry
5. Each mouse is placed in the middle of a peripheral zone of the arena facing the wall and allowed to explore freely the apparatus, with the experimenter out of the animal's sight.

*If more than one mouse can be tested in parallel, in adjacent open field arenas and mice are video-tracked, it is important to ensure that the tracking of each mouse starts as soon as the mouse is released to make data comparable.*

*Males and females must be run in separate tests; ideally males are tested first, then followed by females*
6. At the end of the 20 min run, animals are labeled (if necessary) and put back into their home cage.
7. After each run, any feces are removed and the arena is thoroughly wiped.
8. Analysis of the recording is done to measure the activity of each mouse in each of the zones per 5 minute bins.

Notes

1. Please ensure that the mice are not handled prior to the test, except handling for cage change.
2. Ear clipping should be done after the test if necessary.

Data QC

1. Verify total time of run.
2. Coherence between latency, number of entries and time in the center; e.g. it is not possible to have zero entries and have spent some time spent in the center.

Parameters and Metadata

**Distance travelled** IMPC_OFD_005_001 | v1.2

*seriesParameter*

*Req. Analysis:* false  
*Req. Upload:* true  
*Is Annotated:* true

*Unit Measured:* cm

*Description:* distance_travelled

*Increments:* 5, 10, 15, 20,

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**Number of Rears** IMPC_OFD_006_001 | v1.1

*seriesParameter*

*Req. Analysis:* false  
*Req. Upload:* false  
*Is Annotated:* true

*Description:* number_of_rears
Increments: 5, 10, 15, 20,

Whole arena resting time IMPC_OFD_007_001 | v1.1


Unit Measured: s

Description: whole_arena_resting_time

Whole arena permanence IMPC_OFD_008_001 | v1.1


Unit Measured: s

Description: whole_arena_permanence

Whole arena average speed IMPC_OFD_009_001 | v1.1

**Unit Measured**: cm/s

**Description**: whole_arena_average_speed

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**Periphery distance travelled** IMPC_OFD_010_001 | v1.1

*simpleParameter*

**Req. Analysis**: false  **Req. Upload**: true  **Is Annotated**: true

**Unit Measured**: cm

**Description**: periphery_distance_travelled

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**Periphery resting time** IMPC_OFD_011_001 | v1.1

*simpleParameter*

**Req. Analysis**: false  **Req. Upload**: true  **Is Annotated**: true

**Unit Measured**: s

**Description**: periphery_resting_time

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**Periphery permanence time** IMPC_OFD_012_001 | v1.1

*simpleParameter*

**Req. Analysis**: false  **Req. Upload**: true  **Is Annotated**: true
Unit Measured: s
Description: periphery_permanence_time

Periphery average speed  IMPC_OFD_013_001 | v1.1
simpleParameter


Unit Measured: cm/s
Description: periphery_average_speed

Center distance travelled  IMPC_OFD_014_001 | v1.1
simpleParameter


Unit Measured: cm
Description: center_distance_travelled

Center resting time  IMPC_OFD_015_001 | v1.1
simpleParameter

**Unit Measured:** s

**Description:** center_resting_time

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**Center permanence time** IMPC_OFD_016_001 | v1.1

simpleParameter

**Req. Analysis:** false  
**Req. Upload:** true  
**Is Annotated:** true

**Unit Measured:** s

**Description:** center_permenence_time

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**Center average speed** IMPC_OFD_017_001 | v1.0

simpleParameter

**Req. Analysis:** false  
**Req. Upload:** true  
**Is Annotated:** true

**Unit Measured:** cm/s

**Description:** center_average_speed

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**Latency to center entry** IMPC_OFD_018_001 | v1.1

simpleParameter
Unit Measured: s

Description: latency_to_center_entry

Number of center entries IMPC_OFD_019_001 | v1.1

Description: number_of_center_entries

Distance travelled - total IMPC_OFD_020_001 | v1.2

Unit Measured: cm

Description: distance_travelled_total

Derivation: sumOfIncrements('IMPC_OFD_005_001', 4)

Number of rears - total IMPC_OFD_021_001 | v1.3
number_of_rears_total

sumOfIncrements('IMPC_OFD_006_001', 4)

Percentage center time IMPC_OFD_022_001 | v1.2

simpleParameter

percentage_center_time

mul(div('IMPC_OFD_016_001', 'IMPC_OFD_008_001'), 100)

Equipment ID IMPC_OFD_023_001 | v1.0

equipment_name

Equipment manufacturer IMPC_OFD_024_001 | v1.1
Description: equipment_manufacturer

Options: TSE Systems, MED Associates Inc, San Diego, O'hara CO Ltd., Panlab, Noldus, Accuscan, Columbus Instruments, Biobserve, Omnitech,

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Equipment model IMPC_OFD_025_001 | v1.0

Description: equipment_model

Options: ActiMot / MoTil, MED-OFA-RS, 2325-0248, TijmeOF9, LE8822, Unknown, ActiMot / MoTil 480 x 480 mm, VMX 1.4b, Opto-Varimex 4, SuperFlex Fusion,

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Central zone surface area IMPC_OFD_026_001 | v1.1

Unit Measured: % of total area

Description: central_zone_surface_area

Options: 40, 42, 41, 39,
Light intensity in the centre of the arena  IMPC_OFD_027_001 | v1.0

procedureMetadata


Unit Measured: Lux

Description: light_intensity_in_the_centre_of_the_arena

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Number of animals per cage  IMPC_OFD_028_001 | v1.0

procedureMetadata


Description: number_of_animals_per_cage

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Color of arena  IMPC_OFD_029_001 | v1.0

procedureMetadata


Description: color_of_arena

Options: Black, Transparent, White, Grey, White (floor)/Dark grey(walls),
**Height of the wall** IMPC_OFD_030_001 | v1.0

- **Req. Analysis:** false  
  - **Req. Upload:** false  
  - **Is Annotated:** false

**Unit Measured:** cm

**Description:** height_of_the_wall

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**Distance from light source: if direct illumination** IMPC_OFD_031_001 | v1.1

- **Req. Analysis:** false  
  - **Req. Upload:** false  
  - **Is Annotated:** false

**Unit Measured:** cm

**Description:** distance_from_light_source_if_direct_illumination

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**Periphery zone** IMPC_OFD_032_001 | v1.2

- **Req. Analysis:** false  
  - **Req. Upload:** true  
  - **Is Annotated:** false

**Unit Measured:** cm

**Description:** periphery_zone
Options: 8, 7.6, 7.35, 9.39, 7.5, 7.9,

Type of analysis IMPC_OFD_033_001 | v1.1
procedureMetadata


Description: type_of_analysis

Options: Wide beam break, Video tracking,

Arena Size IMPC_OFD_034_001 | v1.0
procedureMetadata


Description: arena_size

Options: 45x45, 43.2x43.2, 40.5x40.5, 40x40, 44x44, 42x42, 44.5x44.5, 50x50,

Experimenter ID IMPC_OFD_035_001 | v1.1
procedureMetadata


Description: experimenter
Disinfectant  IMPC_OFD_036_001  |  v1.1
procedureMetadata


Description: disinfectant

Start Time  IMPC_OFD_037_001  |  v1.1
procedureMetadata


Description: start_time

Arena ID  IMPC_OFD_038_001  |  v1.0
procedureMetadata


Description: arena_id
Software Version  IMPC_OFD_039_001 | v1.0

**Description:** software_version

**Options:** 06.15 / 07.01, Topscan Lite, Image OF, Actitrack system, Ethovision XT v8.5, Versamax 4.2, TSE ActiMot Vers. 08.00, Activity Monitor V6.02, Opto-Varimex 4 AutoTrack System 4.97, TimeOFCR4, Viewer3, Opto-Varimex AutoTrack 4.x, Opto-Varimex AutoTrack 5.x, Activity Monitor V7.0.5.10, Fusion v6.3, Ethovision XT v15,

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Arena Material  IMPC_OFD_040_001 | v1.0

**Description:** arena_material

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Date equipment last calibrated  IMPC_OFD_041_001 | v1.2

**Description:**

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Whole arena resting time series  IMPC_OFD_001_001 | v1.1

**Description:**
Whole arena average speed series  IMPC_OFD_002_001 | v1.2

Periphery distance travelled series  IMPC_OFD_003_001 | v1.2

Periphery resting time series  IMPC_OFD_004_001 | v1.2
Periphery permanence time series  IMPC_OFD_042_001 | v1.2

Periphery average speed series  IMPC_OFD_043_001 | v1.3
Center distance travelled series IMPC_OFD_044_001 | v1.3

seriesParameter


Unit Measured: cm

Increments: 5, 10, 15, 20,

Center resting time series IMPC_OFD_045_001 | v1.3

seriesParameter


Unit Measured: s

Increments: 5, 10, 15, 20,

Center permanence time series IMPC_OFD_046_001 | v1.2

seriesParameter


Unit Measured: s

Increments: 5, 10, 15, 20,
Center average speed series  IMPC_OFD_047_001  | v1.2

seriesParameter

- **Req. Analysis**: false  
- **Req. Upload**: false  
- **Is Annotated**: true

**Unit Measured**: cm/s

**Increments**: 5, 10, 15, 20,

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Number of center entries series  IMPC_OFD_048_001  | v1.1

seriesParameter

- **Req. Analysis**: false  
- **Req. Upload**: false  
- **Is Annotated**: true

**Increments**: 5, 10, 15, 20,

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Light beam barrier height (Z axis)  IMPC_OFD_049_001  | v1.1

procedureMetadata

- **Req. Analysis**: true  
- **Req. Upload**: false  
- **Is Annotated**: false

**Unit Measured**: cm

**Description**: height of the Z axis light beam used to determine when mouse is rearing

**Options**: 8.6, 6.8, 8.0, 7.5,
**Percentage center movement time** IMPC_OFD_050_001 | v1.0

**simpleParameter**

Req. Analysis: false  
Req. Upload: false  
Is Annotated: true

Unit Measured: %

Description: percentage_center_movement_time

Derivation:
\[
\text{mul} \left( \frac{\text{sub('IMPC_OFD_016_001', 'IMPC_OFD_015_001')}}{\text{IMPC_OFD_008_001}}, 100 \right)
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**Resting definition threshold** IMPC_OFD_051_001 | v1.0

**procedureMetadata**

Req. Analysis: false  
Req. Upload: false  
Is Annotated: false

Description: Parameter measuring how the equipment defines a 'resting' animal

Options: Stationary for > 1 second, Stationary for any time, Within grid for > 2 seconds,

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**Rearing definition threshold** IMPC_OFD_052_001 | v1.0

**procedureMetadata**

Req. Analysis: false  
Req. Upload: false  
Is Annotated: false

Description: Parameter measuring how the equipment defines a 'rearing' animal

Options: No threshold, 1 second,