Fear Conditioning IMPC_FEA_001

Purpose

This procedure is used for measuring aversive learning and memory. A neutral conditioned stimulus (CS) such as steady tone is paired with an aversive unconditioned stimulus (US) such as one or more mild foot shocks. After conditioning, the spatial context or the CS (tone) elicits a central state of fear in the absence of the US (shock) that is expressed as reduced locomotor activity or total lack of movement (freezing). Immobility time is used as a measure of learning/memory performances.

Experimental Design

- **Minimum number of animals**: 7M + 7F
- **Age at test**: Week 11
- **Sex**: We would expect the results of this test to show sexual dimorphism

Equipment

- Fear conditioning chambers
- Arenas and components for cue and conditioning phases
- Computer with recording software
- Olfactory substance

Procedure

1. **Day 1: Conditioning**
   a. Transport animals to the testing area.
   b. Set up conditioning arenas in the chambers ensuring that shocker, tone delivery and camera / beam break system are working correctly. If using video tracking equipment, ensure camera lenses are free of dust.
   c. Remove the animals from their cages and place in the arenas. Animals are conditioned using the training protocol which consists of a baseline period, audible tone, a single foot shock that co-terminates with the tone, and a period with no stimuli at the end.
   d. Remove animals from arenas and place back in home cage. Clean arenas.

2. **Day 2: Context**
   a. To be performed 24 hours after conditioning.
   b. Transport animals to the testing area.
   c. Set up conditioning arenas in the chamber as on day 1 except for shocker and tone delivery system which are not used.
   d. Remove animals from their cages and place in the arena. No CS or US stimuli are presented.
e. Remove animals from arenas and place back in home cage. Clean arenas.

3. Day 2: Cue
   a. To be performed performed from 2 - 24 hours after the context protocol.
   b. Set up cue arenas using different floors, walls, olfactory cues and / or lighting from the conditioning context. Ensure that tone delivery and camera / beam break system are working correctly.
   c. Remove animals from their cages and place in the arena. Animals are exposed to a baseline period without any stimulus followed by the presentation of the tone.
   d. Remove animals from arenas and place back in home cage. Clean arenas.

4. At the end of the cue protocol animals are placed back into their holding room and data is analyzed by collecting the number of freezing episodes and the total freezing /immobility time.

Parameters and Metadata

**Conditioning Baseline Freeze Count**  IMPC_FEA_001_001  |  v1.0

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

**Description:** conditioning_baseline_freeze_count

**Conditioning Baseline Freezing Time**  IMPC_FEA_002_001  |  v1.0

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

**Unit Measured:** s

**Description:** conditioning_baseline_freezing_time

**Conditioning Baseline % Freezing Time**  IMPC_FEA_003_001  |  v1.1
simpleParameter

Description: conditioning_baseline_freezing_time

Derivation: \( \text{mul}(\text{div}('IMPC\_FEA\_002\_001', 'IMPC\_FEA\_033\_001'), 100) \)

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**Conditioning Baseline Average Motion Index** IMPC\_FEA\_004\_001 | v1.0

simpleParameter

Description: conditioning_baseline_average_motion_index

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**Conditioning Baseline Minimum Motion Index** IMPC\_FEA\_005\_001 | v1.0

simpleParameter

Description: conditioning_baseline_minimum_motion_index
**Conditioning Baseline Maximum Motion Index**  IMPC_FEA_006_001 | v1.0

*simpleParameter*

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

**Description:** conditioning_baseline_maximum_motion_index

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**Context Freeze Count**  IMPC_FEA_007_001 | v1.0

*simpleParameter*

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

**Description:** context_freeze_count

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**Context Freezing Time**  IMPC_FEA_008_001 | v1.0

*simpleParameter*

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

**Unit Measured:** s

**Description:** context_freezing_time

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**Context % Freezing Time**  IMPC_FEA_009_001 | v1.1

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**Context Average Motion Index**  IMPC_FEA_010_001 | v1.0

**Description:** context_average_motion_index

**Context Minimum Motion Index**  IMPC_FEA_011_001 | v1.0

**Description:** context_minimum_motion_index

**Context Maximum Motion Index**  IMPC_FEA_012_001 | v1.0

**Description:** context_freezing_time

Unit Measured: %

Derivation: \( \text{mul} \left( \text{div}('IMPC\_FEA\_008\_001', 'IMPC\_FEA\_049\_001') \right, 100) \)
Description: context_maximum_motion_index

Cue Baseline Freeze Count  IMPC_FEA_013_001 | v1.0
simpleParameter

Description: cue_baseline_freeze_count

Cue Baseline Freezing Time  IMPC_FEA_014_001 | v1.0
simpleParameter

Unit Measured: s

Description: cue_baseline_freezing_time

Cue Baseline % Freezing Time  IMPC_FEA_015_001 | v1.1
simpleParameter

Description: cue_baseline_freezing_time
Unit Measured: %

Description: cue_baseline_freezing_time

Derivation: \(\text{mul} \left( \frac{\text{IMPC\_FEA\_014\_001}}{\text{IMPC\_FEA\_057\_001}}, 100 \right)\)

Cue Baseline Average Motion Index IMPC\_FEA\_016\_001 | v1.0

Description: cue_baseline_average_motion_index

Cue Baseline Minimum Motion Index IMPC\_FEA\_017\_001 | v1.0

Description: cue_baseline_minimum_motion_index

Cue Baseline Maximum Motion Index IMPC\_FEA\_018\_001 | v1.0

Description: cue_baseline_maximum_motion_index
Description: cue_baseline_maximum_motion_index

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Cue Tone Freeze Count IMPC_FEA_019_001 | v1.0

seriesParameter


Description: cue_tone_freeze_count

Increments: Minimum 1

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Cue Tone Freezing Time IMPC_FEA_020_001 | v1.0

seriesParameter


Unit Measured: s

Description: cue_tone_freezing_time

Increments: Minimum 1

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Cue Tone % Freezing Time IMPC_FEA_021_001 | v1.1

simpleParameter

Unit Measured: %

Description: cue_tone_freezing_time

Derivation:
mul(div(sumOfIncrements('IMPC_FEA_020_001',1), 'IMPC_FEA_060_001'), 100)

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**Cue Tone Average Motion Index**  IMPC_FEA_022_001 | v1.0

seriesParameter


Description: cue_tone_average_motion_index

Increments: Minimum 1

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**Cue Tone Minimum Motion Index**  IMPC_FEA_023_001 | v1.0

seriesParameter


Description: cue_tone_minimum_motion_index

Increments: Minimum 1

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**Cue Tone Maximum Motion Index**  IMPC_FEA_024_001 | v1.0

seriesParameter
Description: cue_tone_maximum_motion_index

Increments: Minimum 1

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**Conditioning: Date and time** IMPC_FEA_025_001 | v1.0

Description: conditioning_date_and_time

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**Conditioning: Room acclimation time** IMPC_FEA_026_001 | v1.0

Unit Measured: min

Description: conditioning_room_acclimation_time

Options: 30, 60,
**Conditioning: White house light level in arena** IMPC_FEA_027_001 | v1.0

*procedureMetadata*

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**Unit Measured:** Lux

**Description:** conditioning_white_house_light_level_in_arena

**Options:** 26, 100, 200, 40,

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**Conditioning: Olfactory cue** IMPC_FEA_028_001 | v1.0

*procedureMetadata*

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**Description:** conditioning_olfactory_cue

**Options:** Alcohol, None,

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**Conditioning: Mouse arena shape** IMPC_FEA_029_001 | v1.0

*procedureMetadata*

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</table>

**Description:** conditioning_mouse_arena_shape

**Options:** Rectangle, Square,
**Conditioning: Mouse arena dimension** IMPC_FEA_030_001 | v1.0

**procedureMetadata**

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

**Unit Measured:** cm

**Description:** conditioning_mouse_arena_dimension

**Options:** 30.5 L X 24.1 W X 24.5 H cm, 16.6 L X 17 W X 25 H cm, 25 L x 21 W x 19 H cm, 25 x 25 x 19 cm, 17 x 17 x 25 cm, 30.5 cm L X 24.1 cm W X 21 cm H, 16 x 14 x 12 cm,

**Conditioning: Mouse arena colour** IMPC_FEA_031_001 | v1.0

**procedureMetadata**

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

**Description:** conditioning_mouse_arena_colour

**Options:** Metallic, White and Clear, Clear, White, Metallic, clear,

**Conditioning: Mouse arena floor** IMPC_FEA_032_001 | v1.0

**procedureMetadata**

**Req. Analysis:** false  
**Req. Upload:** true  
**Is Annotated:** false
Conditioning: Length of time baseline  IMPC_FEA_033_001 | v1.0

**Description:** conditioning_length_of_time_baseline

**Options:** 240, 150, 120,

Conditioning: Tone stimulus intensity (dB; conditioned stimulus)  IMPC_FEA_034_001 | v1.0

**Description:** conditioning_tone_stimulus_intensity_db_conditioned_stimulus

**Options:** 85, 80, 75, 77, 70,
Conditioning: Tone stimulus frequency (Hz; conditioned stimulus) IMPC_FEA_035_001 | v1.0


** Unit Measured: kHz

** Description: conditioning_tone_stimulus_frequency_hz_conditioned_stimulus

** Options: 10, 2.8, 4, 2,

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Conditioning: Length of time tone stimulus IMPC_FEA_036_001 | v1.0


** Unit Measured: s

** Description: conditioning_length_of_time_tone_stimulus

** Options: 20, 30,

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Conditioning: Shock stimulus intensity (unconditioned stimulus) IMPC_FEA_037_001 | v1.1

Unit Measured: mA

Description: conditioning_shock_stimulus_intensity_unconditioned_stimulus

Options: 0.4, 0.5, 0.75,

Conditioning: Length of time shock stimulus

Unit Measured: s

Description: conditioning_length_of_time_shock_stimulus

Options: 0.5, 1, 2,

Conditioning: Length of time no stimulus

Unit Measured: s

Description: conditioning_length_of_time_no_stimulus

Options: 120, 150,
**Conditioning: Total time**  IMPC_FEA_040_001 | v1.0

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

**Unit Measured:** s

**Description:** conditioning_total_time

**Options:** 380, 300,

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**Context: Date and time**  IMPC_FEA_041_001 | v1.0

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

**Description:** context_date_and_time

**Options:** Conditioning +24h,

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**Context: Room acclimation time**  IMPC_FEA_042_001 | v1.0

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

**Unit Measured:** min
**Description:** context\_room\_acclimation\_time

**Options:** 30, 60,

**Context:** White house light level in arena  
IMPC\_FEA\_043\_001 | v1.2

**Description:** context\_white\_house\_light\_level\_in\_arena

**Options:** 26, 100, 200, 40,

**Context:** Olfactory cue  
IMPC\_FEA\_044\_001 | v1.0

**Description:** context\_olfactory\_cue

**Options:** Alcohol, None,

**Context:** Mouse arena shape  
IMPC\_FEA\_045\_001 | v1.0
procedureMetadata

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

**Description:** context_mouse_arena_shape

**Options:** Rectangle, Square,

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**Context:** Mouse arena dimension  IMPC_FEA_046_001 | v1.0

**Unit Measured:** cm

**Description:** context_mouse_arena_dimension

**Options:** 30.5 cm L X 24.1 cm W X 24.5 cm H, 16.6 cm L X 17 cm W X 25 cm H, 25 L x 21 W x 19 H cm, 25 x 25 x 19 cm, 17 x 17 x 25 cm, 30.5 cm L X 24.1 cm W X 21 cm H, 16 x 14 x 12 cm,

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**Context:** Mouse arena colour  IMPC_FEA_047_001 | v1.0

**Description:** context_mouse_arena_colour

**Options:** Metallic, White and Clear, Clear, White, Metallic, clear,
**Context: Mouse arena floor**  IMPC_FEA_048_001 | v1.0

**Description:** context_mouse_arena_floor

**Options:** Metal grill, Steel rods,

---

**Context: Total time**  IMPC_FEA_049_001 | v1.0

**Unit Measured:** s

**Description:** context_total_time

**Options:** 360, 300,

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**Cue: Date and time**  IMPC_FEA_050_001 | v1.0

**Description:** cue_date_and_time
Cue: White house light level in arena  IMPC_FEA_051_001 | v1.1

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

**Unit Measured:** Lux

**Description:** cue_white_house_light_level_in_arena

**Options:** 0, 16, 14-18,

---

Cue: Olfactory cue  IMPC_FEA_052_001 | v1.0

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

**Description:** cue_olfactory_cue

**Options:** 5% acetic acid, Vanillin, Cinnamon, None,

---

Cue: Mouse arena shape  IMPC_FEA_053_001 | v1.0

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

Options: A frame ceiling, Cylinder, Rectangle,

Cue: Mouse arena dimension IMPC_FEA_054_001 | v1.0


Unit Measured: cm

Description: cue_mouse_arena_dimension

Options: 30.5 cm L X 24.1 cm W X 24.5cm H, 20 cm dia X 30 cm H, 25 L x 21 W x 19 H cm, 25 x 25 x 19 cm, 17 x 17 x 25 cm, 30.5 cm L X 24.1 cm W X 21 cm H, 17 x 10 x 10 cm,

Cue: Mouse arena colour IMPC_FEA_055_001 | v1.0


Description: cue_mouse_arena_colour

Options: Black and white, Red, Clear, Beige, black and white, Milky white,

Cue: Mouse arena floor IMPC_FEA_056_001 | v1.0

procedureMetadata
Description: cue_mouse_arena_floor

Options: PVC, Plexi glass, Polyethylene, Perspex,

---

**Cue: Length of time baseline** IMPC_FEA_057_001 | v1.0

**Unit Measured:** s

**Description:** cue_length_of_time_baseline

**Options:** 120,

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**Cue: Tone stimulus intensity (conditioned stimulus)** IMPC_FEA_058_001 | v1.1

**Unit Measured:** dB

**Description:** cue_tone_stimulus_intensity_conditioned_stimulus

**Options:** 85, 80, 75, 77, 70,
Cue: Tone stimulus frequency (Hz; conditioned stimulus)  
MPC_FEA_059_001 | v1.0

Procedure Metadata

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

Unit Measured: kHz

Description: cue_tone_stimulus_frequency_hz_conditioned_stimulus

Options: 10, 2.8, 4, 2,

Cue: tone response measurement time  IMPC_FEA_060_001 | v1.0

Procedure Metadata

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

Unit Measured: s

Options: 120, 180,

Cue: Length of time no stimulus  IMPC_FEA_061_001 | v1.0

Procedure Metadata

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

Unit Measured: s
Description: cue_length_of_time_no_stimulus

Options: 120, 0, 220,

---

**Cue: Total time** IMPC_FEA_062_001 | v1.0

*procedureMetadata*

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

Unit Measured: s

Description: cue_total_time

Options: 480, 300, 420, 240,

---

**Mouse arenaID** IMPC_FEA_063_001 | v1.0

*procedureMetadata*

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

Description: mouse_arenaid

Options: Arena 1, Arena 2, Arena 3, Arena 4, Arena 5, Arena 6, Arena 7, Arena 8,

---

**Equipment ID** IMPC_FEA_064_001 | v1.0

*procedureMetadata*
Description: equipment_id
Options: Machine A, Machine B, Machine 1, Machine 2,

Equipment Manufacturer IMPC_FEA_065_001 | v1.0
Description: equipment_manufacturer
Options: Med Associates, Ugo Basile, San Diego Instruments, O'hara CO Ltd.,

Equipment Model IMPC_FEA_066_001 | v1.0
Description: equipment_model
Options: MED-FVC-SCT-M, Freeze monitor, FearCS Mouse-46152, MED-VFC2-SCT-M, 46000, TimeFZ1, MED-VFC-NIR-M SOP #1, MED-VFC-NIR-M SOP #2, MED-VFC-NIR-M SOP #3,
Tracking Method IMPC_FEA_067_001 | v1.0

Description: tracking_method

Options: Video tracking, Beam break,

Software IMPC_FEA_068_001 | v1.0

Description: software

Options: Med Associates Video Freeze, Anymaze, Freeze Monitor, TimeFZ1,

Sound generator manufacturer IMPC_FEA_069_001 | v1.0

Description: sound_generator_manufacturer

Options: Med Associates, Ugo Basile, San Diego Instruments, O'hara CO Ltd.,
**Sound generator model** IMPC_FEA_070_001 | v1.0

**Description:** sound_generator_model

**Options:** VFC-100, other, 46000-165, CL-101B,

---

**Sound-proof box dimension** IMPC_FEA_071_001 | v1.0

**Description:** sound_proof_box_dimension

**Options:** 71 cm L X 63.5 cm W X 35.5 cm H, 71 cm L X 59.7 cm W X 31.7 cm H, other, 47 cm L X 35 cm W X 49 cm H, 40 cm L X 53 cm W X 58 cm H,

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**Experimenter ID** IMPC_FEA_072_001 | v1.0

**Description:** experimenter_id
**Experimenter ID day 2**  IMPC_FEA_073_001 | v1.0

**Description:** experimenter_id_day_2

**Experimenter ID day 2 cue**  IMPC_FEA_074_001 | v1.0

**Description:** experimenter_id_day_2_cue

**Date equipment last calibrated (shock)**  IMPC_FEA_075_001 | v1.0

**Description:** date_equipment_last_calibrated_shock

**Date equipment last calibrated (tone)**  IMPC_FEA_076_001 | v1.0

**Description:** date_equipment_last_calibrated_tone
**Freeze definition** IMPC_FEA_077_001 | v1.1

*procedureMetadata*

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

**Unit Measured:** s

**Description:** freeze_definition

**Options:** 1, 2, 0.25,

**Conditioning:** Near infra red light arena IMPC_FEA_078_001 | v1.0

*procedureMetadata*

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

**Description:** conditioning_near_infra_red_light_arena

**Options:** On,

**Context:** Near infra red light arena IMPC_FEA_079_001 | v1.0

*procedureMetadata*
Cue: Near infra red light arena  IMPC_FEA_080_001 | v1.0

Conditioning: Start time of baseline  IMPC_FEA_081_001 | v1.0

Conditioning: Start time of each tone stimulus  IMPC_FEA_082_001 | v1.0
**Conditioning: Start time of each tone stimulus**  
IMPC_FEA_0  
83_001 | v1.0

**Conditioning: Start time of each shock stimulus**  
IMPC_FEA_0

**Conditioning: Start time of no stimulus**  
IMPC_FEA_084_001 | v1.0
**Cue: Start time of baseline** IMPC_FEA_085_001 | v1.0

*procedureMetadata*

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

**Unit Measured:** s

**Description:** cue_start_time_of_baseline

---

**Cue: Start time of each tone stimulus** IMPC_FEA_086_001 | v1.0

*procedureMetadata*

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

**Unit Measured:** s

**Description:** cue_start_time_of_each_tone_stimulus

---

**Cue: Start time of no stimulus** IMPC_FEA_087_001 | v1.0

*procedureMetadata*

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

**Unit Measured:** s

**Description:** cue_start_time_of_no_stimulus
**Cue: arena rotation**  IMPC_FEA_088_001 | v1.0

**procedureMetadata**

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

**Description**: cue_arena_rotation

**Options**: 90 degrees, None,

---

**Conditioning Tone Freeze Count**  IMPC_FEA_089_001 | v1.0

**simpleParameter**

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

**Description**: conditioning_tone_freeze_count

---

**Conditioning Tone Freezing Time**  IMPC_FEA_090_001 | v1.0

**simpleParameter**

- **Unit Measured**: s

**Description**: conditioning_tone_freezing_time
**Conditioning Tone % Freezing Time**

*IMPC_FEA_091_001 | v1.1*

*simpleParameter*

**Unit Measured:** %

**Description:** conditioning_tone_freezing_time

**Derivation:** \( \text{mul} \left( \text{div}('\text{IMPC_FEA_090_001}', '\text{IMPC_FEA_036_001'}), 100 \right) \)

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**Conditioning Tone Average Motion Index**

*IMPC_FEA_092_001 | v1.0*

*simpleParameter*

**Description:** conditioning_tone_average_motion_index

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**Conditioning Tone Minimum Motion Index**

*IMPC_FEA_093_001 | v1.0*

*simpleParameter*

**Description:** conditioning_tone_minimum_motion_index
Conditioning Tone Maximum Motion Index  IMPC_FEA_094_001 | v1.0

simpleParameter


Description: conditioning_tone_maximum_motion_index

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Conditioning Shock Average Motion Index  IMPC_FEA_095_001 | v1.0

simpleParameter


Description: conditioning_shock_average_motion_index

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Conditioning Shock Minimum Motion Index  IMPC_FEA_096_001 | v1.0

simpleParameter


Description: conditioning_shock_minimum_motion_index

-------------------------------------------------------------
Conditioning Shock Maximum Motion Index  IMPC_FEA_097_001  | v1.0

simpleParameter

**Description:** conditioning_shock_maximum_motion_index

Conditioning Post-shock Freeze Count  IMPC_FEA_098_001  | v1.0

simpleParameter

**Description:** conditioning_post_shock_freeze_count

Conditioning Post-shock Freezing Time  IMPC_FEA_099_001  | v1.0

simpleParameter

**Unit Measured:** s

**Description:** conditioning_post_shock_freezing_time
**Conditioning Post-shock % Freezing Time**  IMPC_FEA_100_001 | v1.1

*simpleParameter*

**Unit Measured:** %

**Description:** conditioning_post_shock_freezing_time

**Derivation:** \( \text{mul}(\text{div}(\text{IMPC_FEA_099_001}, \text{IMPC_FEA_039_001}), 100) \)

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**Conditioning Post-shock Average Motion Index**  IMPC_FEA_101_001 | v1.0

*simpleParameter*

**Description:** conditioning_post_shock_average_motion_index

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**Conditioning Post-shock Minimum Motion Index**  IMPC_FEA_102_001 | v1.0

*simpleParameter*

**Description:** conditioning_post_shock_minimum_motion_index
**Conditioning Post-shock Maximum Motion Index** IMPC_FEA_103_001 | v1.0

simpleParameter

**Description:** conditioning_post_shock_maximum_motion_index

**Freeze definition (minimum motion index)** IMPC_FEA_104_001 | v1.0

procedureMetadata

**Description:** freeze_definition_minimum_motion_index

**Options:** 18, 30, 20,

**Difference in Context and Conditioning Baseline % Freezing** IMPC_FEA_105_001 | v1.0

simpleParameter

**Description:** freeze_definition_minimum_motion_index

**Options:** 18, 30, 20,
Derivation:
\[
\text{sub}\left(\text{mul}\left(\text{div}'IMPC\_FEA\_008\_001', 'IMPC\_FEA\_049\_001'), 100\right), \text{mul}\left(\text{div}'IMPC\_FEA\_002\_001', 'IMPC\_FEA\_033\_001'), 100\right)\right)
\]

Difference in Cue Tone and Cue Baseline % Freezing

\[\text{IMPC\_FEA\_106\_001} \mid \text{v1.0}\]

\text{simpleParameter}

\text{Req. Analysis: false} \quad \text{Req. Upload: false} \quad \text{Is Annotated: true}

Derivation:
\[
\text{sub}\left(\text{mul}\left(\text{div}'IMPC\_FEA\_020\_001', 'IMPC\_FEA\_060\_001'), 100\right), \text{mul}\left(\text{div}'IMPC\_FEA\_014\_001', 'IMPC\_FEA\_057\_001'), 100\right)\right)
\]

Difference in Conditioning Post-shock and Conditioning Baseline % Freezing

\[\text{IMPC\_FEA\_107\_001} \mid \text{v1.0}\]

\text{simpleParameter}

\text{Req. Analysis: false} \quad \text{Req. Upload: false} \quad \text{Is Annotated: true}

Derivation:
\[
\text{sub}\left(\text{mul}\left(\text{div}'IMPC\_FEA\_099\_001', 'IMPC\_FEA\_039\_001'), 100\right), \text{mul}\left(\text{div}'IMPC\_FEA\_002\_001', 'IMPC\_FEA\_033\_001'), 100\right)\right)
\]

Cue: Length of time tone stimulus

\[\text{IMPC\_FEA\_108\_001} \mid \text{v1.0}\]
procedureMetadata


Unit Measured: s

Options: 20, 120,