

Active & Passive Avoidance Monitoring

for
Rats & Mice



PACS-30 Avoidance Enclosure

Columbus Instruments' Passive/Active Avoidance System model PACS-30 provides an automated approach to avoidance conditioning for up to 30 rats or mice. The avoidance enclosure is divided into two compartments. Unconditioned Stimulus (UCS) in the form of electric shock and Conditioned Stimulus (CS) in the form of cue lights and sound are provided on each side of the avoidance box. The central dividing wall provides either an open doorway (for active testing) or a guillotine style automated doorway (for passive testing) between the compartments. An array of IR photocells detect animal presence and inter-compartment transfer.

A comprehensive program is included that allows for configuration of all forms of avoidance testing. Data is stored in a non-editable format that can be exported as a CSV File for subsequent analysis by almost any statistical analysis software (Excel or similar).

The avoidance box cage and passive door are constructed from black polycarbonate, ABS plastic and stainless steel. All of which are chemically resistant and extremely durable. Each compartment provides a space measuring: 9" x 9.5" x 9.25" (23 x 24 x 24 cm). All of the electronic components remain outside and do not come into contact with the subject. The cage, door, and feces tray can be washed and submerged.



C o l u m b u s I n s t r u m e n t s

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Active Avoidance Mode

Description:

Used in the active mode, the PACS-30 is designed to condition an animal to escape an electrical shock by reacting to a light and/or sound pre-stimulus. Each trial begins with a user defined exploration period which allows the subject to become familiar with its environment. The subject is then given either a conditioned light stimulus or sound stimulus. If the subject responds to the stimulus by transferring to the other compartment, it avoids being given an electrical shock. If the subject remains in the same compartment it is given an electrical shock until it either transfers to the other compartment or a user-defined maximum shock duration is exceeded. Multiple trials may be run consecutively following user-defined inter-trial period.

The conditioning parameters are highly flexible and can be saved to files allowing the user to store and retrieve a variety of different conditioning protocols. Among the parameters which can be set by the user are the light intensity and duration, the sound intensity, frequency and duration, the shock intensity and duration, the length of the initial exploration period, the length of the inter-trial interval and the maximum length of each trial.

Active Mode Parameters:

Exploration Duration:

The time allotted the subject to explore its surroundings before the trial begins. The exploration duration is in the minutes:seconds format and can be set from 00:00 to 59:59. Once this duration has expired the trial begins.

Maximum Trial Duration:

The maximum amount of time allotted for the trial. The trial durations parameter is in the min:sec format and can be set from 00:00 to 59:59. A trial is not complete until it has run for the duration specified by this parameter or a transfer has been made.

Inter-Trial Interval:

Allows a rest time between trials to be specified. This parameter is in the min:sec format and can be set from 00:00 to 59:59. The first intertrial interval, if greater than 00:00, occurs after the first trial. Optional punishment for Inter-Trial Transfers.

Total Number of Trials:

The total number of trials to be repeated in an experiment. The maximum number of trials is 999.

CS Light Intensity:

The brightness of the light stimulus. This value can be set from 0 to 150 Lux and can be used to provide continuous background or ambient light. A Lux meter is included for calibration and validation purposes.

CS Light Start Time:

The starting time for the conditioned stimulus (CS) light. This starting time is measured as an offset from the beginning of the trial. This parameter is in the min:sec format and can be set from 00:00 to 59:59. A setting of 03:00, for example, would start the light stimulus 3 minutes after the start of the trial.

CS Light Duration:

The total duration the CS light is to be enabled. This parameter is in the minutes:seconds format and can be set from 00:00 to 59:59.

CS Sound Start Time:

The starting time for the conditioned stimulus (CS) sound. This starting time value represents the time from the start of the trial. This parameter is in the min:sec format and can be set from 00:00 to 59:59. A setting of 03:00, for example, would start the light stimulus 3 minutes after the start of the trial.

CS Sound Frequency:

The frequency of the sound stimulus. This parameter can be set from 0.2 to 13.0 KHz in 100Hz increments.

CS Sound Intensity:

The intensity of the sound stimulus. It can be set from mute to 115 dB. A decibel meter is included for calibration and validation of the sound cue.

CS Sound Duration:

The total duration the CS sound stimulus is to be enabled. This parameter is in the minutes:seconds format and can be set from 00:00 to 59:59.

UCS Grid Start Time:

The starting time for the unconditioned stimulus (UCS) electrical shock. This starting time value represents the time from the start of the trial. This parameter is in the min:sec format and can be set from 00:00 to 59:59. A setting of 03:00, for example, would start the light stimulus 3 minutes after the start of the trial.

UCS Grid Intensity:

The current flow through the subject when the electrical stimulus grid is enabled. This parameter can be set from 0.0mA to 1.0mA in 0.1mA increments. A setting of 0.0mA disables the electrical stimulus grid.

UCS Grid Duration:

The total time the electrical stimulus grid is enabled if no transfer is made. This parameter is in the min:sec format and can be set from 00:00 to 59:59.



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Passive Avoidance Mode

Description:

Used in the passive mode, the PACS-30 is designed to condition against an animal's desire to hide in the dark when exposed to an aversive light source. A computer controlled door is placed between the two avoidance enclosure compartments. Each trial begins with a user-defined exploration period which allows the subject to become familiar with its environment. The subject is then given a conditioned light stimulus. If the subject retreats into the darkened compartment it is given an electrical shock. The computerized door may be either set to close upon transfer, subjecting the subject to the full duration of electrical shock set by the user, or kept open allowing the subject to transfer back into the illuminated compartment avoiding further shock. If the subject does not react to the conditioned light stimulus by transferring into the dark compartment it avoids presentation of electrical shock.

The conditioning parameters are all highly flexible and can be saved to files allowing the user to store and retrieve a variety of different conditioning protocols. Among the parameters which can be set by the user are the light intensity and duration, the shock intensity and duration, the length of the initial exploration period, and the maximum length of the trial.

Passive Mode Parameters:

Exploration Duration:

The time allotted the subject to explore its surroundings before the trial begins. The exploration duration is in the min:sec format and can be set from 00:00 to 59:59.

CS Light Intensity:

The brightness of the light stimulus. This value can be set from 0 to 150 Lux and can be used to provide continuous background or ambient light. A Lux meter is included for calibration and validation purposes.

CS Light Start Time:

The starting time for the conditioned stimulus (CS) light. This starting time is measured as an offset from the beginning of the trial. This parameter is in the min:sec format and can be set from 00:00 to 59:59. A setting of 03:00, for example, would start the light stimulus 3 minutes after the start of the trial

Maximum Trial Duration:

The maximum amount of time allotted for the trial. The trial durations parameter is in the min:sec format and can be set from 00:00 to 59:59.

UCS Grid Intensity:

The maximum current flow through the subject when the electrical stimulus grid is enabled. This parameter can be set from 0.0mA to 1.0mA. A setting of 0.0mA disables the electrical stimulus grid.

UCS Grid Duration:

The total time the electrical stimulus grid is enabled if no transfer is made. This parameter is in the min:sec format and can be set from 00:00 to 59:59. The electrical stimulus grid is enabled only if the subject has not transferred into the opposite side and the Maximum Trial Duration has not elapsed

Close Door Upon Transfer:

Select whether the center door is to close after subject transfers to the dark side.

Inescapable Shock:

Select if you would like to punish the subject when a transfer has been made regardless of the compartment the subject resides when/if the door has been closed.

Active Avoidance Mode Results

Data resulting from an Active Avoidance Test Include:

Transfer Latency: presented in the format mm:ss.ss referenced from these four temporal markers:
Start of Trial
Onset of Sound
Onset of Light
Onset of Shock

Transfer Scoring:

Avoidance- Animal transfers in advance shock presentation
Escape- Animal transfers during shock
Prelim(inary)- Animal transfers in advance of CS onset
No Transfer- Animal fails to relocate

Passive Avoidance Mode Results

Data resulting from a Passive Avoidance Test Include:

Transfer Latency: presented in the format mm:ss.ss referenced from one temporal marker:
Start of Trial



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Experiment Mode : **Active Avoidance**

Exploration Duration : 00:01:00

Total Number of Trials : 30

Maximum Trial Duration : 00:00:10

Inter Trial Interval : 00:00:50

CS Light Intensity : 0

CS Light Start Time : 00:00:00

CS Light Duration : 00:00:00

CS Sound Intensity : 4

CS Sound Frequency : 2900

CS Sound Start Time : 00:00:00

CS Sound Duration : 00:00:10

UCS Grid Intensity (mA) : 0.5

UCS Grid Start Time : 00:00:06

UCS Grid Duration : 00:00:04

Punish Inter-Trial Transfers :

Experiment Mode : **Passive Avoidance**

Exploration Duration : 00:01:00

Maximum Trial Duration : 00:02:00

CS Light Intensity : 10

UCS Grid Intensity (mA) : 0.5

UCS Grid Duration : 00:00:05

Close Door Upon Transfer :

Inescapable Shock :

PACS Shuttle Box v3.13 : Rat-03.SDA

File Setup Run Tools Help

PACS 30 Active Experiment Data File

12/12/07 12:00:02 Data File: Rat-03.SDA Box: 1

Trial Duration: 00:10
 Inter-trial Interval: 00:50
 Total # of Trials : 20

Stimulus	Intensity	Start Time	Duration
CS Light:	0	00:00	00:00
CS Sound 2.9 kHz:	4	00:00	00:10
UCS Grid (mA):	0.5	00:06	00:04

Trial Num.	Transfer Type	Elapsed Time (Seconds) Start	To Light	From: Sound	Shock	Intertrial Transfers
1	Avoid	00:01.30	00:01.30	00:01.30	-----	1
2	Avoid	00:04.42	00:04.42	00:04.42	-----	0
3	Escape	00:07.31	00:07.31	00:07.31	00:01.31	3
4	Avoid	00:00.74	00:00.74	00:00.74	-----	0
5	Avoid	00:03.05	00:03.05	00:03.05	-----	0
6	Escape	00:06.81	00:06.81	00:06.81	00:00.81	0
7	Escape	00:07.25	00:07.25	00:07.25	00:01.25	1
8	Avoid	00:01.69	00:01.69	00:01.69	-----	0
9	Escape	00:06.25	00:06.25	00:06.25	00:00.25	1
10	Avoid	00:03.30	00:03.30	00:03.30	-----	1
11	Avoid	00:05.42	00:05.42	00:05.42	-----	0
12	Avoid	00:04.17	00:04.17	00:04.17	-----	1
13	Escape	00:06.36	00:06.36	00:06.36	00:00.36	0
14	Avoid	00:03.84	00:03.84	00:03.84	-----	0
15	Escape	00:06.56	00:06.56	00:06.56	00:00.56	0
16	Avoid	00:02.23	00:02.23	00:02.23	-----	0
17	Escape	00:06.55	00:06.55	00:06.55	00:00.55	0
18	Avoid	00:05.05	00:05.05	00:05.05	-----	0
19	Escape	00:06.55	00:06.55	00:06.55	00:00.55	1

Export to CSV Page 1 Close



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