**Same-Different Task Training Tutorial – Go/Nogo Appetitive Training**

**Initial Setup**

Day 1: Weigh gerbils and shave (tag). Begin Controlled Water Access (CWA).

Day 2: Put gerbil in cage and allow to find waterspout. Should learn to drink comfortably without distraction.

1. Launch Appetitive Training Menu
2. Select Same-Diff Stage 1
3. Select appropriate speaker calibration file 🡪 PureToneCalibration
4. GUI will pop up
5. Specify tone duration, ISI, dB SPL, and Pump rate (ml/min)
   1. All stimulus setting can be set to 0.
   2. Fully attenuate the speaker via the rack.

**Stage 1A**

1. Launch Appetitive Training Menu
2. Select Same-Diff Stage 1
3. Select appropriate speaker calibration file 🡪 PureToneCalibration
4. GUI will pop up
5. Specify tone duration, ISI, dB SPL, and Pump rate (ml/min)
6. During this stage of training, the gerbil will approach the water spout and the sound will play when the gerbil is drinking.
7. Start with the speaker fully attenuated and after the gerbil is drinking steadily from the spout, slowly decrease the attenuation by hand such that the level of sound gradually increases. Water and sound should be presented simultaneously now.

Stimuli: Sequential presentations of a specific tone. The one randomly changes to a different frequency every trial (when the gerbil stops drinking and goes back on spout).

*Sessions: 1*

**Stage 1B**

1. Launch Appetitive Training Menu
2. Select Same-Diff Stage 1
3. Select appropriate speaker calibration file 🡪 PureToneCalibration
4. GUI will pop up
5. Specify tone duration, ISI, dB SPL, and Pump rate (ml/min)
6. As the gerbil is drinking, pause the sound (manual override) and then resume once the gerbil appears frustrated. Gradually extend the pause periods as well as frequency of the pausing so the only reliable prediction for water is the sound. Try to first pair sound off when gerbil is off the spout. “Good performance is when the gerbil is quick to leave the spout after the stimulus has stopped.”

*Sessions: 1-3*

**Stage 2A**

1. Launch Appetitive Training Menu
2. Select Same-Diff Stage 2
3. Select appropriate speaker calibration file 🡪 PureToneCalibration
4. GUI will pop up
5. Specify tone duration, ISI, dB SPL, and Pump rate (ml/min)
6. The operator will be controlling the onset of the sound and reward. Initiate the sound and reward with the manual override trigger just before the gerbil makes contact to the spout. Once they are doing well with leaving and approaching the spout you can stop rewarding for each return, or initiate sound and reward 1-2 sec after gerbil has returned to the spout and is checking it. If the gerbils are starting to make the association they will check and quickly leave the spout if the stimulus does not turn on, or quickly leave once the stimulus has turned off.

*Sessions: 1-2*

**Stage 2B**

1. Launch Appetitive Training Menu
2. Select Same-Diff Stage 2
3. Select appropriate speaker calibration file 🡪 PureToneCalibration
4. GUI will pop up
5. Specify tone duration, ISI, dB SPL, and Pump rate (ml/min)
6. Turn on the sound when gerbils are farther away from the spout. Create a daily criteria of how far they have to be from spout before turning on the sound, shaping their behavior such that they immediately run to the opposite side of the cage when the sound turns off.

*Sessions: 1-5*

**Stage 3A**

1. Launch Epsych Launch Pad
2. Select Run Behavior Experiment
3. Open Configuration File 🡪 SameDifferent\_Test.config
4. Update Function Definitions
   1. Timer Functions
      1. Start Timer Function: ep\_TimerFcn\_Start\_TwoInterval\_SanesLab
      2. RunTime Timer Fucntion: ep\_TimerFcn\_RunTime\_TwoInterval\_SanesLab
   2. Box Figure: Appetitive\_SameDifferentTwoInterval\_GUI
5. Select “Run”
6. Select appropriate speaker calibration file 🡪 PureToneCalibration
7. GUI will pop up
8. Specify tone duration, ISI, dB SPL, and Pump rate (ml/min)
9. Attach the nose poke to the bars opposite the spout. Place the gerbil in the cage, and closely watch their activity. As they approach the nose poke or touch the outside of the nose poke, initiate reward by using the override contact (this will only need to be done twice at most and only done to encourage the gerbil to return to explore the nose poke). Gradually increase poke duration to 0.1, 0.2, and then 0.05 increments up to 0.4 sec. Once in nose poke for durations >300 ms with hit rate ~85%, then ready to move on to next stage.
10. Can add Nogo during this stage too

*Sessions: 1-3*

Possible that the gerbil will become frustrated and will accumulate up to 15-20 repeated "NOGO" trials before trying to re-poke or stop responding. Give a few "GO" trials to help motivate if they are on the verge of giving up. The **gerbil will eventually figure out that poking twice will produce a "GO" stimulus (maximum NOGO set to 1)**. **Increase the maximum NOGO to 2, then to 3 (or eventually 4).** The number of "NOGO" trials should vary enough that the gerbil has to pay attention to the stimulus in order to get a reward. Once ithis point is reached you **can lower the reward rate to 1.35-0.50 ml/min with a 1 sec reward period (0.033 - 0.008 ml per reward)**. **Once FA is below 30% and HR is 100-90%, you can begin assessing threshold. Once criterion is reached, can test animals on a range of "GO" stimuli.**