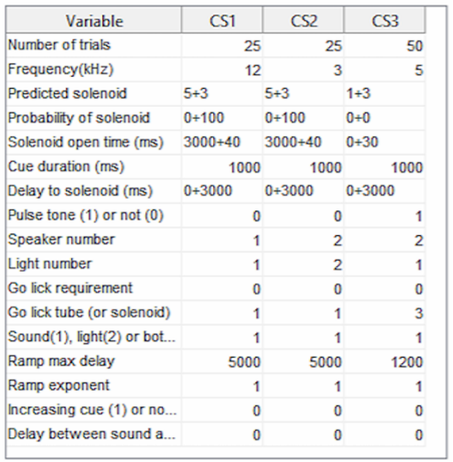
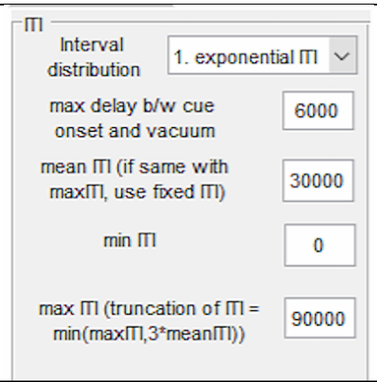
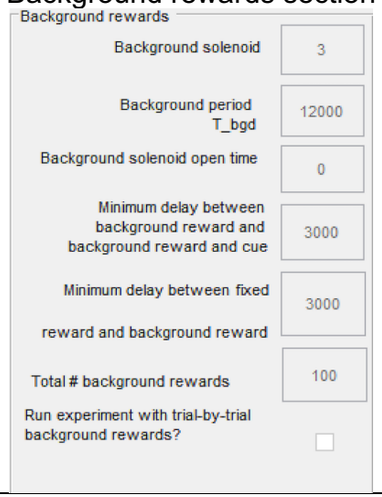
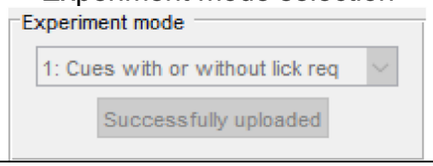
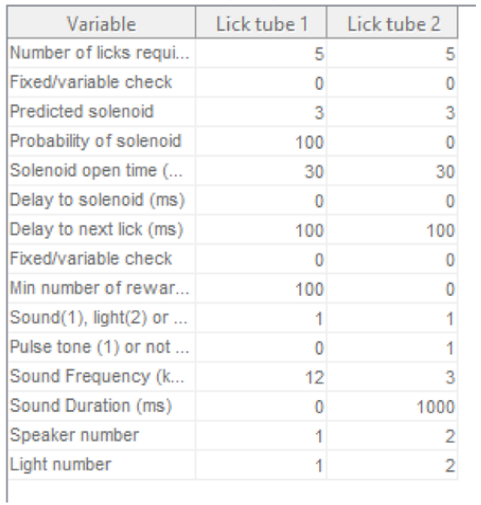
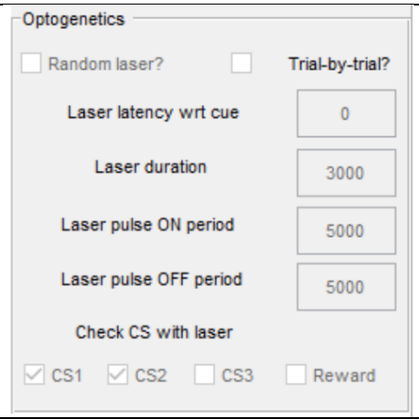
GUI section	MATLAB saved parameter [# of items for this parameter]	Corresponding Arduino parameter	Description
CS properties window 	numtrials[3]	numtrials[0-2]	Number of trials for CS1-3
	CSfreq[3]	CSfreq[0-2]	Sound frequencies for auditory cues (in kHz)
	CSsolenoid[6]	CSsolenoid[0-5]	Designated two solenoids for each of the three cues
	CSprob[6]	CSprob[0-5]	Solenoid open probability
	CSopentime[6]	CSopentime[0-5]	Solenoid open time
	CSdur[6]	CSdur[0-2]	Cue durations
	CS_t_fxd[6]	CS_t_fxd[0-5]	Fixed delay from cue to solenoids
	CSpulse[3]	CSpulse[0-2]	Whether CS is a pulsed cue or not, 0=not pulsed, 1=pulsed
	CSspeaker[3]	CSspeaker[0-2]	CS1-3 speaker number
	golickreq[3]	golickreq[0-2]	For cue-action-reward task, number of lick requirements met on selected tube to obtain the second solenoid for each cue
	golicktube[3]	golicktube[0-2]	designated lick tube for cue-action-reward task
	CSsignal[3]	CSsignal[0-2]	CS signal type, 1=sound, 2=light, 3=both
	CSlight[3]	CSlight[0-2]	CS1-3 light number
	CSrampmaxdelay[3]	CSrampmaxdelay[0-2]	ramp max delay for ramp timing task for CS1-3
	CSrampexp[3]	CSrampexp[0-2]	ramp exponential factor for ramp timing task for CS1-3
	CSincrease[3]	CSincrease[0-2]	Increasing or decreasing frequency for CS1-3
	delaybetweensoundandlight[3]	delaybetweensoundandlight[0-2]	Time between sound and light cue if both are delivered for CS1-3, if>0 sound precedes light; if=0, they occur at the same time; if<0 light precedes sound cue
Inter-trial Interval Section	meanITI	meanITI	average inter-trial-interval(ITI) for exponential trials
	maxITI	maxITI	max ITI for exponential ITI trials, equals to truncation of ITI = min(maxITI, 3*meanITI)
	minITI	minITI	minimum ITI for uniform distribution trials

Variable	CS1	CS2	CS3
Number of trials	25	25	50
Frequency(kHz)	12	3	5
Predicted solenoid	5+3	5+3	1+3
Probability of solenoid	0+100	0+100	0+0
Solenoid open time (ms)	3000+40	3000+40	0+30
Cue duration (ms)	1000	1000	1000
Delay to solenoid (ms)	0+3000	0+3000	0+3000
Pulse tone (1) or not (0)	0	0	1
Speaker number	1	2	2
Light number	1	2	1
Go lick requirement	0	0	0
Go lick tube (or solenoid)	1	1	3
Sound(1), light(2) or bot...	1	1	1
Ramp max delay	5000	5000	1200
Ramp exponent	1	1	1
Increasing cue (1) or no...	0	0	0
Delay between sound a...	0	0	0

	expitiflag	intervaldistribution	exponential ITI indicator, unticked(0) = uniform, ticked(1) = exponential
	maxdelaycuetovacuum	maxdelaycuetovacuum	maximum delay to vacuum after cue turns on. Change this if different cues have different delays to reward
Background rewards section 	backgroundsolenoid	backgroundsolenoid	designated background solenoid number
	T_bgd	T_bgd	background reward period, 1/lamba (ms)
	r_bgd	r_bgd	background solenoid open time (ms)
	mindelaybdgtocue	mindelaybgdtocue	minimum delay between a background solenoid and the next cue (ms)
	mindelayfxdtocue	mindelayfxdtocue	minimum delay between fixed solenoid to the next background solenoid (ms)
	trialbytrialbgdsolenoidflag	trialbytrialbgdsolenoidflag	flag to run experiment with background solenoid rates changing on a trial-by-trial basis if==1
	totPoisssolenoid	totPoisssolenoid	total number of background rewards to give per session
Experiment mode selection 	experimentmode	experimentmode	signal which experiments to run. If experiment mode==1, run with cues; if==2, only give background Poisson rewards; if==3, give lick dependent rewards etc.

Lick for rewards properties window 	reqlicknum[2]	reqlicknum[0-1]	number of licks required on side lick tube 1 and 2 to receive reward from middle lick tube
	licksolenoid[2]	licksolenoid[0-1]	associated solenoid number for licking lick tube 1 and 2
	lickprob[2]	lickprob[0-1]	probability of solenoid opening upon completing required licks on side lick tube 1 and 2
	lickopentime[2]	lickopentime[0-1]	solenoid open time (ms)
	delaytoreward[2]	delaytoreward[0-1]	delay to solenoid/reward after the last required lick
	delaytolick[2]	delaytolick[0-1]	delay to start counting the next lick after reward consumption
	minrewards[2]	minrewards[0-1]	minimum number of rewards to give for each session
	signaltolickreq[2]	signaltolickreq[0-1]	cue type signaling lick requirement met, 1=sound, 2=light, 3=both
	soundsignalpulse[2]	soundsignalpulse[0-1]	whether the cue signal is pulsed or not, 0=not pulsed, 1=pulsed
	soundfreq[2]	soundfreq[0-1]	auditory signal frequency (in kHz)
	sounddur[2]	sounddur[0-1]	both sound and light cue duration (ms)
	lickspeaker[2]	lickspeaker[0-1]	speaker number for auditory cues
	variableratioflag[2]	variableratioflag[0-1]	flag for variable ratio schedule for lick requirements, if=1, then the task is a variable ratio schedule, if=0, fixed ratio schedule
	variableintervalflag[2]	variableintervalflag[0-1]	flag for variable interval schedule for lick requirements, if=1, variable interval schedule task, if=0, fixed interval schedule
	fixedsidecheck[2]	fixedsidecheck[0-1]	for delay discounting task, if=0, selected lick tube is not a fixed side, give rewards opening time varies from 0-60ms, if=1, selected lick tube is a fixed side with opening of 30ms.
	licklight[2]	licklight[0-1]	light number for light cues
Laser / Optogenetics section	laserlatency	laserlatency	laser latency with respect to cue (ms)
	laserduration	laserduration	laser on duration (ms)

Variable	Lick tube 1	Lick tube 2
Number of licks requi...	5	5
Fixed/variable check	0	0
Predicted solenoid	3	3
Probability of solenoid	100	0
Solenoid open time (...	30	30
Delay to solenoid (ms)	0	0
Delay to next lick (ms)	100	100
Fixed/variable check	0	0
Min number of rewar...	100	0
Sound(1), light(2) or ...	1	1
Pulse tone (1) or not ...	0	1
Sound Frequency (k...	12	3
Sound Duration (ms)	0	1000
Speaker number	1	2
Light number	1	2

	randlaserflag	randlaserflag	flag to run sessions with laser turning on randomly if==1
	laserpulseperiod	laserpulseperiod	period for which laser is on in a cycle (ms)
	laserpulseoffperiod	laserpulseoffperiod	period for which laser is off in a cycle (ms); If equal to laserpulseperiod, duty cycle is 50%
	lasertrialbytrialflag	lasertrialbytrialflag	flag to turn laser on a trial-by-trial basis
	CS1lasercheck	CS1lasercheck	laser-on flag for CS1, 1==laser on, 0==laser off
	CS2lasercheck	CS2lasercheck	laser-on flag for CS1, 1==laser on, 0==laser off
	CS3lasercheck	CS3lasercheck	laser-on flag for CS1, 1==laser on, 0==laser off
	Rewardlasercheck	Rewardlasercheck	laser-on flag for reward, 1==laser on, 0==laser off

*Order of the parameters saved in MATLAB/Arduino generally follows this chart with some exceptions of newly added parameters saved at the end.
*Brown inked parameters were not demonstrated in the behavioral tasked listed in the paper, but can be useful for other tasks and manipulations.