

vi 60\_35mi n4cuetest cameras

\--OUTPUTS:

^ACTIVE=1           \SET TO 1 TO EXTEND RETRACTABLE LEVER  
 ^feeder=2  
 ^PUMP=8  
 ^CUELIGHT=4  
 ^SPEAKER=6  
 ^HOUSELIGHT=5  
 ^Shock = 3  
 ^CAMERA=7

^Lever = 1  
 ^INACTIVE = 2  
 ^FOODCUP = 3

\ List Data Variables Here

\A is the response counter  
 \B is the number of rewards  
 \C is the timer  
 \D is the number of inactive responses  
 \E is the number of foodcup responses  
 \F is the number of responses in the first 5 minutes of the session  
 \G is the time (in minutes) when the shocks will occur  
 \H is the number of inactive responses in the first 5 minutes of the session  
 \I is the number of foodcup responses in the first 5 minutes of the session  
 \R is the array into which the # of presses per 10 seconds will be placed  
 \S is the array into which the # of inactive presses per 10 seconds will be placed  
 \W is the array into which the # of foodcup responses per 10 seconds will be placed  
 \J is the shock counter  
 \K is the shock period (the first 10 sec of the first shock period is 0, the the first shock period of the second shock is 9, the second shock of the second period is 10, etc...)  
 \L is the counter that says when data collection in a given shock should stop  
 \M is the interval from the beginning of the cue until the shock  
 \P is session parameters  
 \U is the time a reward will be given  
 \V is the list of possible VI ITIs  
 \X is the time (in seconds and undisplayable) until the next reward availability  
 \Y is the time until the next reward availability  
 \Z is the counter for the VI schedule (which vi value it should be)

LIST V = 27,	103,	45,	88,	28,	42,	63,	64,	55,	106,
47,	56,	4,	68,	24,	60,	64,	110,	2,	5,
80,	108,	62,	96,	54,	73,	22,	53,	69,	16,
26,	38,	91,	111,	2,	59,	60,	78,	73,	25,
66,	69,	114,	103,	76,	92,	85,	35,	65,	25,
102,	113,	34,	114,	71,	88,	79,	28,	78,	115,
93,	47,	48,	26,	88,	12,	30,	93,	55,	36,
42,	19,	16,	60,	35,	5,	55,	87,	25,	74,
71,	82,	22,	113						

\50,	13,	32,	37,	41,	92,	44,	3,	119,	22,	50,
24,	48,	42,	101,	38,	114,	34,	104,	10,	7,	101,
101,	55,	95,	23,	45,	88,	44,	37,	83,	56,	8,
8,	64,	61,	6,	107,	63,	85,	29,	91,	113,	96,
113,	23,	22,	66,	27,	64,	46,	46,	118,	85,	16,
98,	43,	4,	2,	67,	95,	108,	63,	12,	3,	72,
84,	11,	93,	34,	33,	103,	96,	109,	46,	114,	99,
117,	18,	43,	26,	105,	57,	113,	73,	71,	6,	40,

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113,	109,	10									
\29,	114,	94,	96,	113,	22,	42,	107,	79,	78,	37,	
22,	109,	98,	31,	36,	61,	105,	13,	4,	66,	45,	
99,	47,	48,	35,	115,	8,	35,	45,	116,	18,	103,	
90,	53,	26,	62,	110,	118,	78,	58,	119,	15,	44,	
98,	38,	93,	90,	15,	38,	92,	2,	15,	92,	1,	
90,	8,	34,	62,	111,	107,	14,	38,	11,	33,	45,	
7,	108,	43,	53,	60,	7,	59,	89,	99,	48,	74,	
100,	83,	55,	63,	97,	24,	27,	110,	3,	67,	35,	
40,	7,	72									
\day I	24,	46,	43,	32,	58,	106,	51,	7,	110,	104,	
39,	44,	32,	23,	42,	40,	102,	92,	48,	21,	75,	
73,	110,	22,	8,	94,	114,	87,	31,	55,	15,	31,	
102,	105,	73,	36,	11,	42,	25,	54,	93,	32,	29,	
49,	37,	13,	79,	110,	78,	50,	115,	100,	42,	99,	
29,	9,	63,	5,	18,	74,	105,	100,	112,	66,	84,	
12,	50,	3,	102,	89,	119,	31,	90,	96,	76,	68,	
52,	45,	108,	41,	58,	75,	111,	6,	8,	97,	50,	
26,	112,	33,	24								
\day II	40,	56,	77,	78,	61,	18,	93,	98,	23,	6,	
89,	45,	77,	53,	49,	101,	13,	14,	107,	115,	35,	
64,	94,	28,	96,	46,	19,	104,	40,	47,	53,	9,	
75,	60,	14,	63,	45,	34,	11,	37,	90,	90,	13,	
5,	113,	52,	91,	48,	43,	90,	52,	108,	82,	89,	
3,	3,	99,	12,	58,	75,	64,	55,	20,	86,	112,	
11,	116,	59,	106,	101,	44,	78,	6,	49,	14,	22,	
101,	109,	108,	29,	30,	96,	94,	61,	39,	10,	42,	
100,	74,	93,	68								
\day III	114,	78,	17,	23,	18,	16,	48,	76,	112,	71,	
95,	110,	51,	19,	59,	25,	25,	78,	57,	75,	68,	
70,	4,	84,	99,	90,	112,	96,	113,	32,	115,	80,	
76,	4,	88,	13,	83,	111,	15,	24,	25,	21,	65,	
87,	111,	84,	7,	83,	106,	63,	116,	2,	12,	44,	
50,	107,	110,	7,	9,	49,	45,	56,	116,	30,	70,	
9,	31,	88,	7,	26,	7,	68,	53,	98,	111,	94,	
15,	23,	85,	6,	75,	102,	64,	23,	95,	109,	40,	
66,	24,	23,	39								
\day IV	69,	98,	91,	30,	2,	102,	118,	11,	99,	119,	
52,	48,	11,	52,	48,	46,	61,	97,	80,	4,	14,	
104,	26,	94,	117,	26,	103,	35,	103,	109,	118,	1,	
112,	29,	25,	111,	53,	42,	10,	36,	47,	117,	90,	
30,	33,	12,	84,	62,	83,	75,	43,	17,	14,	15,	
104,	13,	61,	53,	86,	9,	8,	56,	54,	6,	101,	
91,	42,	11,	63,	33,	15,	113,	4,	1,	72,	97,	
31,	88,	49,	115,	87,	80,	79,	55,	38,	18,	77,	
100,	109,	39,	114								
\day V	109,	71,	46,	89,	116,	67,	26,	36,	115,	89,	
95,	75,	53,	5,	30,	111,	71,	58,	40,	69,	29,	
29,	52,	8,	101,	76,	73,	2,	63,	15,	62,	26,	
4,	36,	59,	69,	90,	107,	59,	19,	84,	95,	13,	
19,	69,	2,	70,	109,	80,	85,	97,	109,	112,	23,	
36,	91,	116,	106,	27,	28,	1,	46,	45,	27,	110,	
48,	25,	92,	27,	96,	96,	8,	9,	71,	106,	50,	
31,	110,	98,	37,	27,	7,	74,	40,	6,	52,	110,	
28,	52,	73,	77								
\day VI	40,	9,	9,	87,	25,	40,	45,	72,	79,	94,	
94,	104,	35,	91,	89,	57,	108,	38,	109,	9,	60,	
24,	19,	1,	38,	101,	65,	39,	89,	52,	40,	94,	
50,	96,	1,	103,	19,	63,	27,	84,	118,	102,	104,	
21,	16,	92,	4,	102,	4,	112,	118,	1,	38,	86,	
27,	72,	99,	25,	51,	40,	72,	21,	59,	68,	106,	
13,	62,	47,	17,	23,	95,	72,	118,	36,	101,	82,	

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37,	6,	42,	99,	17,	86,	28,	111,	91,	38,	73,
72,	74,	64,	39,							
\day VII	83,	79,	35,	116,	2,	94,	70,	18,	11,	72,
6,	61,	39,	11,	102,	37,	26,	66,	109,	20,	71,
90,	119,	37,	92,	17,	2,	82,	90,	1,	15,	28,
50,	83,	114,	119,	84,	93,	94,	44,	93,	29,	91,
30,	32,	83,	2,	27,	49,	62,	110,	93,	30,	11,
32,	58,	100,	114,	48,	19,	47,	1,	56,	7,	63,
82,	69,	13,	48,	22,	119,	6,	109,	68,	38,	73,
109,	7,	81,	90,	44,	17,	110,	96,	66,	94,	95,
82,	28,	77,	88,							
\day VIII	15,	80,	97,	2,	88,	24,	105,	64,	99,	56,
37,	27,	9,	72,	100,	24,	9,	54,	86,	33,	16,
24,	104,	19,	16,	66,	114,	11,	50,	58,	70,	23,
96,	66,	75,	29,	72,	87,	56,	16,	85,	103,	49,
93,	97,	83,	19,	82,	70,	44,	33,	3,	118,	66,
96,	32,	76,	22,	103,	49,	21,	75,	44,	91,	97,
64,	92,	32,	97,	26,	109,	48,	17,	63,	105,	77,
10,	51,	114,	60,	3,	117,	77,	14,	24,	118,	87,
44,	69,	25,	57,							
\day IX	27,	75,	86,	31,	85,	73,	31,	84,	5,	5,
5,	29,	26,	94,	26,	80,	6,	10,	92,	14,	22,
54,	61,	5,	12,	92,	10,	26,	11,	29,	112,	90,
36,	44,	46,	12,	80,	3,	64,	2,	119,	46,	42,
72,	107,	114,	72,	33,	96,	69,	107,	94,	119,	49,
80,	27,	69,	114,	23,	118,	56,	4,	65,	97,	50,
93,	77,	92,	2,	83,	30,	29,	81,	68,	111,	115,
76,	65,	11,	115,	114,	9,	115,	76,	65,	115,	72,
80,	15,	38,	116,							
\day X	71,	16,	82,	40,	12,	16,	44,	101,	80,	48,
57,	40,	49,	82,	108,	45,	5,	38,	56,	115,	61,
102,	91,	85,	11,	31,	43,	30,	16,	45,	95,	20,
111,	113,	96,	44,	39,	37,	70,	92,	2,	79,	27,
60,	85,	58,	65,	28,	70,	52,	101,	31,	75,	117,
55,	42,	111,	39,	13,	77,	118,	83,	35,	1,	54,
92,	48,	75,	5,	116,	29,	96,	63,	115,	5,	28,
108,	36,	28,	18,	30,	45,	76,	26,	107,	1,	77,
117,	104,	27,	113,							
\contextttest	1,	86,	104,	118,	54,	22,	74,	60,	52,	74,
110,	88,	25,	54,	23,	50,	13,	116,	103,	37,	43,
57,	74,	112,	45,	113,	54,	80,	2,	87,	101,	88,
61,	102,	25,	95,	106,	89,	23,	22,	21,	61,	81,
107,	87,	18,	52,	119,	49,	38,	95,	114,	52,	52,
109,	19,	30,	34,	34,	67,	75,	67,	90,	23,	102,
88,	17,	8,	99,	48,	15,	80,	28,	109,	19,	5,
29,	113,	61,	17,	58,	42,	67,	10,	1,	44,	18,
36,	79,	12,	58,							

DIM P = 13 \Session parameters

DIM G = 10 \Times when shocks will be delivered (in minutes)(this really has 7 slots)

DIM R = 90 \array for active response data for each time period [formula is ((g+1)\*9)-1 since there are 9 time periods in every shock presentation) (unless P(2) is changed, then it's ((g+1)\*P[2])-1

DIM S = 90 \array for inactive response data for each time period

DIM W = 90 \array for food cup response data for each time period

\the Gs are the times (in minutes) of the shock events, however, this is somewhat complicated. Here are the rules (well, they

\aren't rules but they are definitely guidelines)

\1 Make sure that the first trial occurs after the initial context test period (ie:

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that  $G(0) \geq (P(1)/60)$   
 \2 (and this is really important) Realize that these times are not the times when things will go on in the session but the  
 \ time from the end of the last trial when things will occur. IE:  $G(1) = 10$ ,  $G(2) = 20$  will not start trials at 10 and 20  
 \ minutes into the session. It will start trials at 10 minutes into the session and 20 minutes after the end of trial 1  
 \ (probably at minute 31 or 32)  
 \3 Just to drive this home once again, if you have a values of 10, 10, 10 for your intervals and each trial is 2 min long,  
 \ the trials will occur at 10, 22, and 34 minutes into the session  
 \4 To really drive this home, there are no checkpoints watching to make sure you type in the right values (for example, to  
 \ make sure that all of your trials occur within the session), so if you have 2 min trials and 6 intervals of 9 each in  
 \ a 60 min session, the trials won't occur at 9, 18, 27, 36, 45, and 54; they will occur at 9, 20, 31, 42, 53 and the last  
 \ one won't occur at all  
 \5 This one is technically about the trial lengths. Make sure that  $P(2)*P(3)=P(4)+P(5)+P(6)$ . Otherwise your cues and data  
 \ collection periods will drift apart after the first trial

DISKVARs = A, B, D, E, F, H, I, K, R, S, W

\ Starts the house light and run the VI program with VI displays and reward displays (also delivers pellets).

S. S. 1,  
 S1,

1": SET P(0) = 35; \session length in minutes 7, 2, 1  
 SET P(1) = 300; \number of seconds in the first data block (in this case, contextual pressing)  
 SET P(2) = 9; \this is the number of time periods in each shock presentation (if you change this, you need to change DIM H)  
 SET P(3) = 10; \length of shock data periods in seconds  
 SET P(4) = 30; \length of precue period  
 SET P(5) = 30; \length of cue  
 SET P(6) = 0.5; \length of shock  
 SET P(7) = 30; \length of post cue period  
 SET P(10) = 0; \  
 SET P(11) = P(0)+1; \This is used to make sure trials we don't want never happen  
 SET P(12) = P(2) \* P(3);  
 SET P(13) = P(4) + P(5) + P(7);

SET G(0) = 6; \G(0)time of first shock in minutes  
 SET G(1) = 3; \this makes sure that no extra trials occur  
 SET G(2) = 6; \this makes sure that no extra trials occur  
 SET G(3) = 10; \this makes sure that no extra trials occur  
 SET G(4) = P(11); \this makes sure that no extra trials occur  
 SET G(5) = P(11); \this makes sure that no extra trials occur  
 SET G(6) = P(11);  
 SET G(7) = P(11);  
 SET G(8) = P(11);  
 SET G(9) = P(11);  
 SET G(10) = P(11);

\13, 6, 3, 5, 3, 11, 9, 11, 3, 10  
 \5, 11, 2, 11, 7, 11, 3, 10, 6, 5  
 \13, 8, 12, 3, 3, 10, 11, 7, 2, 2

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\5,      6,      10,      2,      8,      3,      3,      10,      12,      8
\6,      13,     12,     9,      8,      7,      2,      3,      8,      5

\day 1 10,      2,      8,      10,      5,      4,      6,      11,      11,      5
\day II 5,      2,      2,      8,      11,      9,      11,      2,      11,      7
\day III 8,      2,      4,      12,      5,      3,      12,      6,      9,      9
\day IV 10,      3,      13,      9,      7,      6,      3,      7,      4,      5
\day V 6,      6,      2,      10,      12,      12,      12,      4,      3,      4
\day VI 9,      2,      9,      4,      10,      8,      5,      11,      5,      9
\day VII 10,      7,      6,      4,      9,      4,      12,      6,      4,      7
\day VIII 7,      11,      3,      4,      8,      10,      10,      4,      4,      7
\day IX 12,      3,      7,      3,      12,      5,      11,      5,      12,      3
\day X 7,      11,      11,      2,      3,      12,      13,      2,      3,      5

\cue test 6,      3,      6,      10,      8,      6,      4,      4,      12,      9

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IF P(12) = P(13) [@T, @F]
@T: ----> S2
@F: SHOW 1, MATH, 0, 2, DOES, 0, 3, NOT, 0, 4, WORK, 0 ----> STOPKILL

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S2,
#START: ON ^HOUSELIGHT; ON ^ACTIVE ----> S3

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S3,
0.01": LIST Y = V(Z); SET U = Y + C; SET X = Y*1"; SHOW 1, RF TM, U ----> S4
\ this sets the VI timer

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S4,
X#T: ----> S5
\this waits until the time is up and then awaits a response

```

```

S5,
#R^Lever: ADD B; SHOW 5, Rewards, B; ON ^feeder; Z1 ----> S3
0.01": SHOW 1, RF TM, 0 ----> SX
\this delivers a reward after a press and it also zeros out the reward timer so you
know reward is available

```

```

\*****
\      Response Counter & Screen Update
\*****

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S. S. 2,
S1,
#START: SHOW 4, Responses, A, 5, Rewards, B ----> S2

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S2,
#R^Lever: ADD A; SHOW 4, Responses, A ----> SX \this is the overall session counter
#R^INACTIVE: ADD D ----> SX
#R^FOODCUP: ADD E; SHOW 3, Foodcup, E ----> SX

```

```

\ This runs the switching of data periods during pre, during and post periods of
shock
\G is the time (in minutes) when the shocks will occur
\R is the array into which the # of presses per 10 seconds will be placed
\J is the shock counter
\K is the shock period (the first 10 sec of the first shock period is 0, the the
first shock period of the second shock is 9, the second shock of the second period

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is 10, etc...)

\L is the counter that says when data collection in a given shock should stop  
 \P is session parameters P(2) = the number of time periods in each shock presentation

S. S. 3,

S1,  
 1": SET J = 0; SET K = 0; SET L = P(2); SET R(K) = 0; SET G(J) = G(J)\*1'; SET  
 P(3) = P(3)\*1" ----> S2  
 \sets the time of the next shock event and sets the number of periods in the next shock event

S2,  
 #START: ----> S3 \zeros everything out to start and turn the value for period length into an actual time

S3,  
 G(J)#T: ----> S4 \when the shock event comes, start counting the periods

S4,  
 P(3)#T: ADD K; SET R(K) = 0; \move to the next shock period after the time for the present period ends  
 IF K = L [@T, @F]  
 @T: ADD J; SET G(J) = G(J)\*1'; SET L = L + P(2); SET R(K) = 0; Z2 ----> S3  
 \if it is the end of the shock event, reset the shock timer for the next shock  
 @F: ADD P(10) ----> SX \if there are shock periods left, keep going

\length of precue period SET P(4) = 30;  
 \length of cue SET P(5) = 30;  
 \length of shock SET P(6) = 0.5;  
 \length of post cue period SET P(7) = 30;

S. S. 4,

S1,  
 1": SET M = (P(5) - P(6))\*1"; SET P(4) = P(4)\*1"; SET P(6) = P(6)\*1"; SET P(7) = P(7)\*1" ----> S2  
 \sets up time from beginning of cue until shock

S2,  
 #START: ----> S3

S3,  
 G(J)#T: ON ^CAMERA ----> S4 \when the shock event comes, start counting the periods

S4,  
 P(4)#T: ON ^SPEAKER ----> S5

S5,  
 M#T: ----> S6

S6,  
 P(6)#T: OFF ^SPEAKER; OFF ^CAMERA;  
 IF P(7) > 0 [@T, @F]  
 @T: ----> S7  
 @F: ----> S3

S7,  
 P(7)#T: ----> S3

```
\ This is the part that add counts to the shock period counter
S. S. 5,
S1,
  #START: ----> S2

S2,
  G(J)#T: ----> S3          \when the shock event comes, start recording
counts for each period

S3,
  #R^Lever: ADD R(K) ----> SX          \This adds counts to the counter for each
period an each response (advanced in S. S. 3)
  #R^INACTIVE: ADD S(K) ----> SX
  #R^FOODCUP: ADD W(K) ----> SX
  #Z2: ----> S2              \closes out the counter if it's the end of the
shock period
```

```
\This is meant to store the data for the first 5 minutes (or whatever value P(1) is
given)
S. S. 6,
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```
S1,
  #START: SET F = 0; SET P(1) = P(1)*1" ----> S2
```

```
S2,
  P(1)#T: ----> S3
  #R^Lever: ADD F ----> SX
  #R^INACTIVE: ADD H ---->SX
  #R^FOODCUP: ADD I ----> SX
```

```
S3,
  3000": ----> SX \This doesn't mean anything, just a way to keep the program in
stasis
```

```
\*****
\          PELLET CONTROL TIMER
\ (Includes K1-pulse for delivering a free pellet)
\*****
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```
S. S. 7,
S1,
  #Z1: ----> S2
```

```
S2,
  0.05": OFF ^feeder ----> S1
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```
S. S. 8, \ Increment time "C" with resolution 1 seconds and show it in the program
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```
S1,
  #START: ----> S2
```

```
S2,
  1": ADD C; SHOW 2, Present, C ----> SX
```

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S. S. 10,

S1,

1": SHOW 1, W, 0 ---->S2

S2,

#START: SET P(0) = P(0)\*1' ----> S3 \this set the time for the end of the session, W stands for worries, and we have none, actually it is a diagnostic thing to make sure all the variables load before starting the program

S3,

P(0)#T: OFF ^HOUSELIGHT; OFF ^ACTIVE; OFF ^SPEAKER; OFF ^CUELIGHT ---->  
STOPABORTFLUSH