Sham odor-responsive population: t-stats
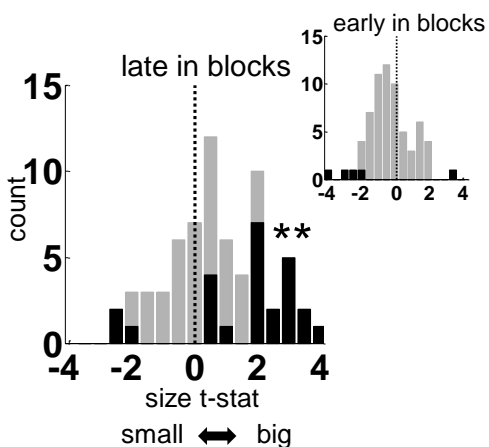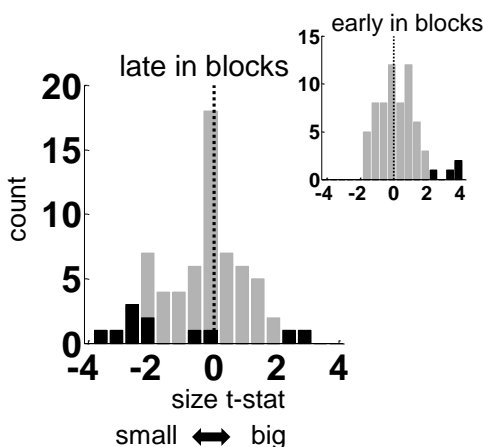
A

preferred direction

anti-preferred direction

B

Figure S1. Outcome selectivity in ventral striatum of sham lesioned rats, as measured by t-stats for each neuron.
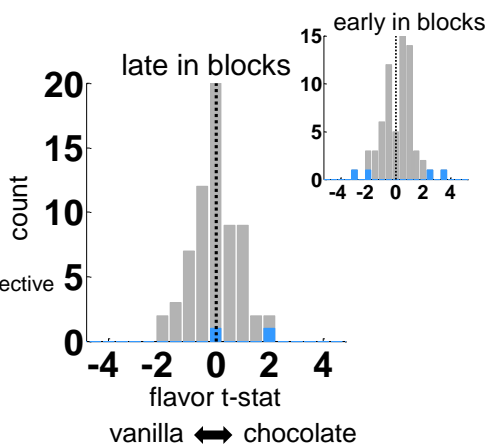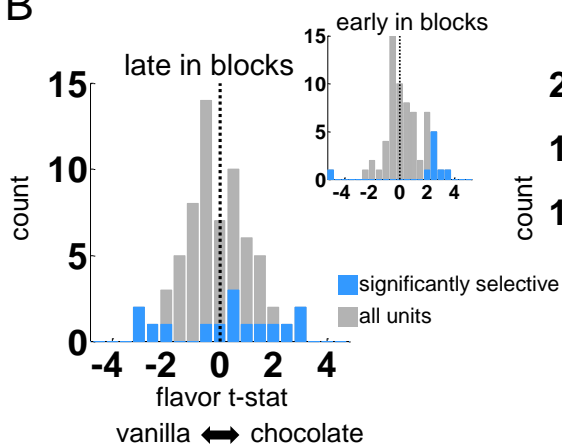
A. Shown are size-selectivity t-stats measuring the degree to which each neuron differentiated between cues predicting the large vs. small size outcome during the odor epoch, separately for the preferred (left panels) and anti-preferred (right panels) directions. Insets show indices early in blocks immediately following size shifts. "Late in blocks" was defined as after the first 20 trials of blocks; "early in blocks" as before the first 20. Dark-coded units are for units showing a significant effect of size or an interaction of size with flavor. .
**, $p < 0.01$, the average t-stat of the population was significantly shifted to the right.
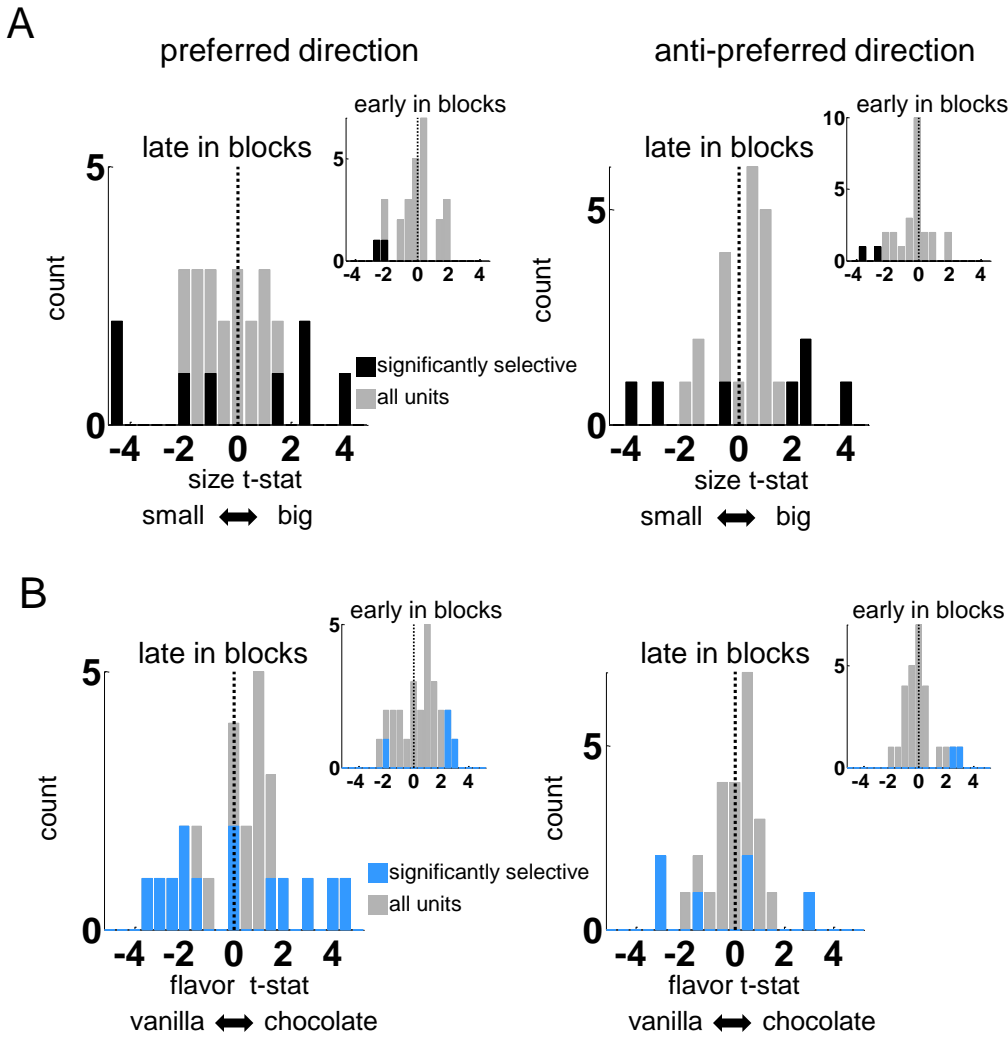
B. Shown are flavor-selectivity t-stats with the same conventions as in A., with insets showing the indices in the trials immediately after flavor shifts.

OFC-lesion odor-responsive population: t-stats

A

B

Development of size-selective activity after size switch

Sham

OFC lesion
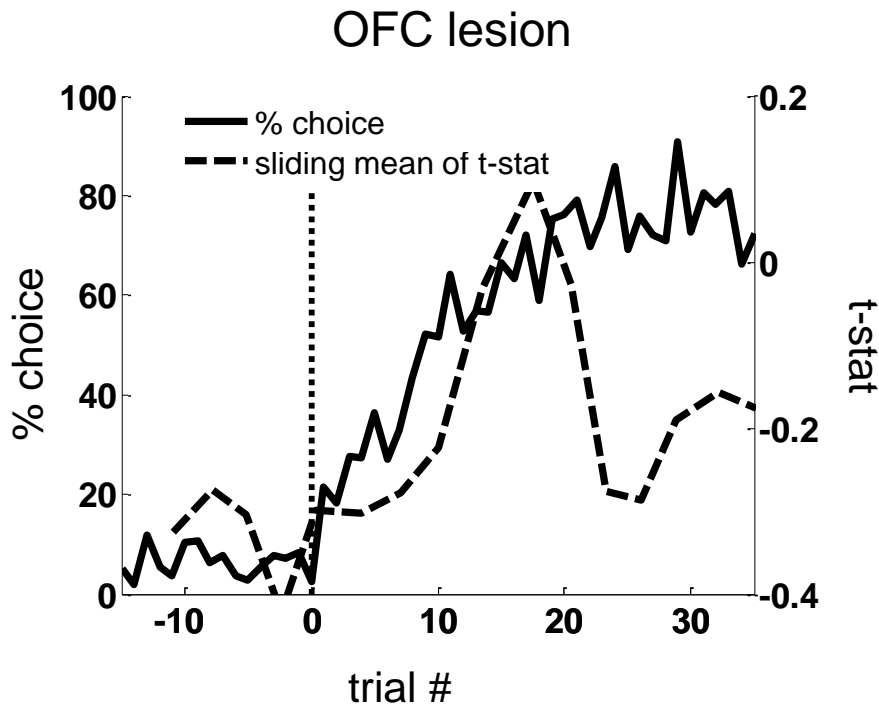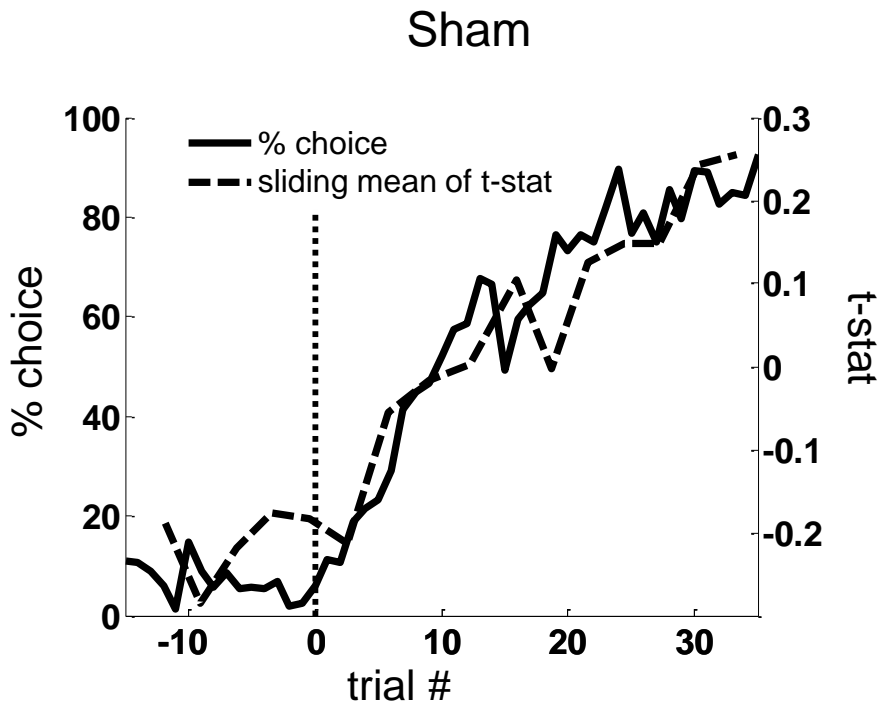
Figure S3. The development of size-selectivity of VS neural population compared to choice percentage in the same sessions and blocks.

The solid lines show the average percentage of choice of the side on which the large reward was delivered after the block switch (marked by the vertical dotted line). Only free-choice trials that occurred at each trial position of the block were included. The dashed lines show a sliding average of the t-statistic for the comparison of ten forced-choice trials towards the side on which the large reward was delivered after the block switch versus the corresponding ten forced choice trials towards the same side when the small reward was delivered. The sliding average was aligned with the average trial number, relative to the block switch, across which it was measured. The upper panel shows this comparison for the control group, the lower panel for the OFC-lesion group. Only cue-responsive neurons were included.

SUPPLEMENTARY TABLES

		Sham rats				Lesion rats			
		SH01	SH02	SH03	SH04	LE01	LE02	LE04	LE05
1. choc->choc vs. van->van	F	1.0	0.6	0.8	3.2	5.0	0.3	0.9	0.0
	df	1,21	1,22	1,28	1,4	1,29	1,4	1,12	1,12
	p	0.33	0.43	0.37	0.15	0.033	0.60	0.36	0.87
2. choc->van vs. van->choc	F	0.5	6.2	0.5	0.6	2.8	5.3	0.7	0.5
	df	1,21	1,22	1,28	1,4	1,29	1,4	1,12	1,12
	p	0.47	0.021	0.50	0.49	0.10	0.084	0.42	0.50
3. reaction time: flavor	F	2.1	2.1	1.1	0.4	0.5	1.4	0.2	0.0
	df	1,22	1,23	1,29	1,5	1,30	1,5	1,13	1,13
	p	0.17	0.16	0.31	0.54	0.50	0.29	0.65	0.90
4. reaction time: flavor X number	F	0.1	0.1	0.7	10.2	0.3	1.0	0.9	1.0
	df	1,22	1,23	1,29	1,5	1,30	1,5	1,13	1,13
	p	0.81	0.73	0.41	0.024	0.59	0.36	0.36	0.35
5. percent correct: flavor	F	2.9	1.6	0.1	0.0	0.4	2.6	1.1	0.9
	df	1,22	1,23	1,29	1,5	1,30	1,5	1,13	1,13
	p	0.10	0.21	0.79	0.88	0.53	0.17	0.32	0.36
6. percent correct: flavor X number	F	1.5	1.4	0.1	0.0	0.0	0.3	0.0	0.3
	df	1,22	1,23	1,29	1,5	1,30	1,5	1,13	1,13
	p	0.24	0.26	0.73	0.89	0.89	0.59	0.89	0.60

Supplementary Table 1: Flavor effects in individual rats. Listed are the results from mixed ANOVAs conducted on sessions from each individual rat separately, in order to test for individual flavor preferences. For rows 1 and 2, ANOVAs were run on difference in choice rates across block transitions, with the planned comparisons shown. For rows 3 and 4, ANOVAs on reaction time were run, with effects of flavor (row 3) and flavor X number (row 4) shown. For rows 5 and 6, ANOVAs on percent correct were run, with effects of flavor (row 5) and flavor X number (row 6) shown. Using an alpha criterion corrected for multiple comparisons (Bonferroni-corrected alpha of 0.05/8 = 0.0063), none of these flavor effects were significant. LE03 could not be tested because it had only two recording sessions. df = degrees of freedom.

		Planned comparisons (each tests whether indices are significantly shifted from zero):			
		preferred direction		anti-preferred direction	
	time X direction	early in blocks	late in blocks	early in blocks	late in blocks
F	20.9	5.9	14.2	4.1	3.7
df	1,65	1,65	1,65	1,65	1,65
p	$<10^{-4}$	**<0.05** (small-preferring)	**<0.001** (big-preferring)	**<0.05** (big-preferring)	0.06 (small-preferring)

Supplementary Table 2: Number selectivity as measured by t-statistic in cue-selective neurons recorded in sham rats, statistics. Listed are the results of a within-subjects ANOVA on number-selectivity t-statistics across cue-selective neurons, with factors time (early or late in blocks) and direction (preferred or anti-preferred). df = degrees of freedom.

		Planned comparisons (each tests whether indices are significantly shifted from zero):				
		preferred direction		anti-preferred direction		absolute value of indices late in blocks, preferred vs. anti-preferred
	time X direction	early in blocks	late in blocks	early in blocks	late in blocks	
F	0.7	3.4	0.2	0.8	0.0	9.6
df	1,64	1,64	1,64	1,64	1,64	1,64
p	0.39	0.07	0.62	0.37	0.99	**<0.01**

Supplementary Table 3: Flavor selectivity as measured by t-statistic in cue-selective neurons recorded in sham rats, statistics. Listed are the results of a within-subjects ANOVA on flavor-selectivity indices across cue-selective neurons, with factors time (early or late in blocks) and direction (preferred or anti-preferred). These results show that neurons do not in general prefer chocolate or vanilla in any condition. For the last column, the magnitude of the indices (absolute value) was compared between the preferred and anti-preferred directions late in blocks. This significant result demonstrates that neurons show greater selectivity to flavor on the preferred side. df = degrees of freedom.

	Planned comparisons (each tests whether indices are significantly shifted from zero):					Planned comparison: lesion vs. sham
		lesion		lesion		
		preferred direction		anti-preferred direction		
	time X direction group	early in blocks	late in blocks	early in blocks	late in blocks	late in blocks preferred direction lesion vs. sham
F	11.3	0.0	0.7	2.6	0.7	6.6
df	1,90	1,90	1,90	1,90	1,90	1,90
p	<0.01	0.94	0.41	0.11	0.42	<0.05

Supplementary Table 4: Number selectivity as measured by t-statistic in cue-selective neurons recorded in lesion vs. sham rats, statistics. Listed are the results of a mixed ANOVA on number-selectivity indices across cue-selective neurons in both groups, with factors group (sham or lesion), time (early or late in blocks), and direction (preferred or anti-preferred). An additional ANOVA comparing the magnitude of number indices (absolute value) late in the block in the preferred direction revealed that number indices were not significantly different in lesions vs. shams (sham: $\mu=1.4\pm0.12$; lesion: $\mu=1.5\pm0.24$, $F_{1,90}=0.2$, $p=0.64$). df = degrees of freedom.

	Planned comparisons (each tests whether indices are significantly shifted from zero):						
		lesion:		lesion:		absolute value of indices	
		preferred direction		anti-preferred direction			
	time X direction X group	early in blocks	late in blocks	early in blocks	late in blocks	late in blocks, preferred vs. anti-preferred @ lesion	late in blocks, (preferred vs. anti-preferred) X (sham vs. lesion)
F	0.1	2.1	0.8	0.0	0.2	6.9	11.6
df	1,89	1,89	1,89	1,89	1,89	1,89	1,89
p	0.73	0.15	0.38	0.98	0.63	<0.05	<0.001

Supplementary Table 5: Flavor selectivity as measured by t-statistic in cue-selective neurons recorded in lesion vs. sham rats, statistics. Listed are the results of a mixed ANOVA on flavor-selectivity indices across cue-selective neurons in both groups, with factors

group (sham or lesion), time (early or late in blocks), and direction (preferred or anti-preferred). In addition to the results in the table, there were no effects of group: main effect, $F_{1,89}$=0.1, p=0.74; group X time, $F_{1,89}$=0.4, p=0.55; group X direction, $F_{1,89}$=0.9, p=0.36. In the last two columns, the magnitude of flavor indices (absolute value) late in the block was tested, demonstrating that neurons in the lesion group, like shams, had significantly larger indices in the preferred direction, and also that lesions enhanced the degree to which neurons encode flavor, compared to shams. df = degrees of freedom.