

Supplementary Material 2

Table S1. Contrasts in PER probability between the control and ethanol-fed bees at each odor mixture, based on the GAMM model of CJB. Formula: $PER \sim \text{group} + s(\text{odor_num}, \text{by} = \text{group}, k = 4) + s(\text{individual}, \text{bs} = "re")$. The column "mix" indicates consecutive tested odor mixtures (proportions of the appetitively conditioned odor octanone).

SE – Standard Error, CL – Confidence Limits (95% confidence level), OR – Odds Ratio with confidence intervals (95%)

Mix	Estimate	SE	CL low	CL high	t	p	OR	OR low	OR high
0	-1.5802	1.1094	-3.7585	0.5982	-1.4244	0.1548	0.2059	0.0233	1.8188
2	-0.1056	0.6039	-1.2914	1.0803	-0.1748	0.8613	0.8998	0.2749	2.9454
3	-0.0241	0.4627	-0.9326	0.8844	-0.0520	0.9585	0.9762	0.3935	2.4216
4	-0.0940	0.4459	-0.9695	0.7815	-0.2109	0.8330	0.9103	0.3793	2.1846
6	0.4282	0.4153	-0.3872	1.2436	1.0311	0.3029	1.5345	0.6789	3.4682

Table S2. Analysis of Variance Table for the hemolymph ethanol model. Formula: $\log(1+\text{EtOH}) \sim \text{group} + \text{family} + \text{plate} + \text{pool size}$.

df – degrees of freedom, SS – Sum of Squares, MS – Mean Square

	df	SS	MS	F value	p
Group	4	3.06822	0.76706	13.5852	2.432e-07
Family	3	0.33562	0.11187	1.9814	0.1303
Plate	1	0.10136	0.10136	1.7952	0.1870
Individuals	1	0.10549	0.10549	1.8683	0.1785
Residuals	45	2.54083	0.05646		

Table S3. Full pairwise Tukey-adjusted contrasts between the control and ethanol-fed honeybees from the hemolymph ethanol model.

SE – Standard Error, CL – Confidence Limits (95% confidence level)

Contrast	Estimate	SE	CL low	CL high	t	p
C - T120	-0.399265	0.106824	-0.70280	-0.09572	-3.73758	0.004528
C - T240	-0.303452	0.117270	-0.63667	0.02976	-2.58763	0.08984
C - T30	-0.652956	0.093568	-0.91882	-0.38708	-6.97839	1.08e-07
C - T60	-0.491236	0.093832	-0.75785	-0.22461	-5.23524	3.99e-05
T120 - T240	0.095812	0.130559	-0.27516	0.46679	0.73386	0.947406
T120 - T30	-0.253691	0.106047	-0.55502	0.04763	-2.39223	0.136176
T120 - T60	-0.091971	0.109208	-0.40228	0.21833	-0.84216	0.915906
T240 - T30	-0.349503	0.119904	-0.69020	-0.00880	-2.91485	0.041833
T240 - T60	-0.187783	0.120513	-0.53021	0.15464	-1.55819	0.531242
T30 - T60	0.161719	0.095374	-0.10928	0.43272	1.69562	0.446855

Table S4. Probabilities, SEs, and CIs for the learning acquisition model. Formula: PER ~ CS_type * order + (1 | individual).

SE – Standard Error, Asymp. CL – Asymptotically estimated Confidence Limits (95% confidence level)

CS_type	Order	Probability	SE	Asymp. CL low	Asymp. CL high
CS ⁺	1	0.000372	0.000303	0.000075	0.001836
CS ⁻	1	0.003800	0.001626	0.001642	0.008773
CS ⁺	2	0.028676	0.008853	0.015588	0.052172
CS ⁻	2	0.001660	0.000857	0.000603	0.004562
CS ⁺	3	0.232140	0.048552	0.150571	0.340198
CS ⁻	3	0.000833	0.000522	0.000244	0.002839
CS ⁺	4	0.368785	0.062620	0.256417	0.497453
CS ⁻	4	0.000173	0.000189	0.000020	0.001475
CS ⁺	5	0.373050	0.063180	0.259493	0.502574
CS ⁻	5	0.000373	0.000305	0.000075	0.001851
CS ⁺	6	0.526619	0.067325	0.395861	0.653826
CS ⁻	6	0.000868	0.000543	0.000254	0.002957
CS ⁺	7	0.741634	0.053393	0.624416	0.832106
CS ⁻	7	0.000617	0.000430	0.000157	0.002418
CS ⁺	8	0.703506	0.057831	0.579480	0.803365
CS ⁻	8	0.000387	0.000316	0.000078	0.001921

Table S5. Analysis of robustness of the main model to the changes in the coding of outcome variable. Both models' formula: PER ~ group + s(odor_num, by = group, k = 4) + s(individual, bs = "re").

	PER coded as: full = 1, partial or no response = 0	PER coded as: full or partial response = 1, no response = 0
Smooth terms		
Control smooth	$\chi^2 = 65.53, p < 0.001$	$\chi^2 = 65.37, p < 0.001$
Group (ethanol) smooth	$\chi^2 = 84.95, p < 0.001$	$\chi^2 = 83.95, p < 0.001$
Individual smooth	$\chi^2 = 100.80, p < 0.001$	$\chi^2 = 189.57, p < 0.001$
Parametric coefficients		
Intercept	$\beta = -2.26, SE = 0.27, z = -8.44, p < 0.001$	$\beta = -1.33, SE = 0.27, z = -5.04, p < 0.001$
Group (ethanol)	$\beta = -2.28, SE = 0.42, z = -0.66, p = 0.511$	$\beta = 0.10, SE = 0.37, z = 0.27, p = 0.784$
Model fit		
Deviance explained	51.6%	50.9%
Adjusted R ²	0.503	0.508