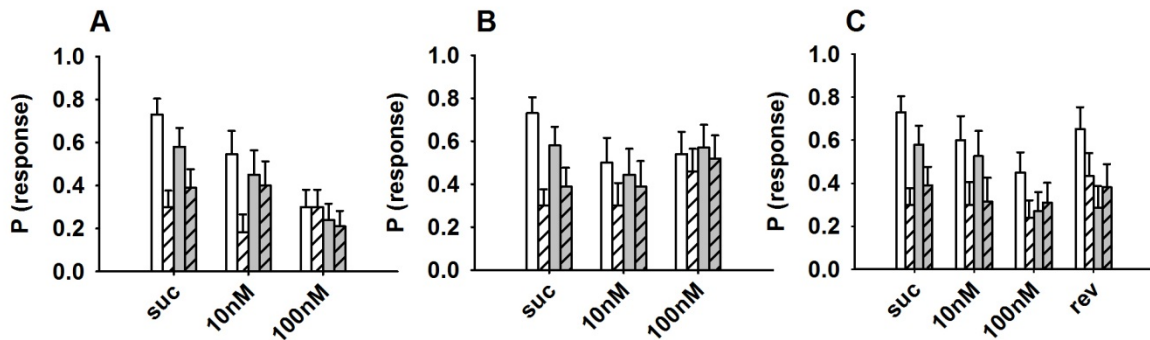
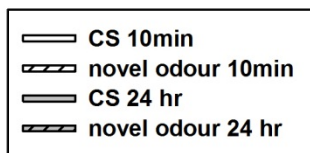
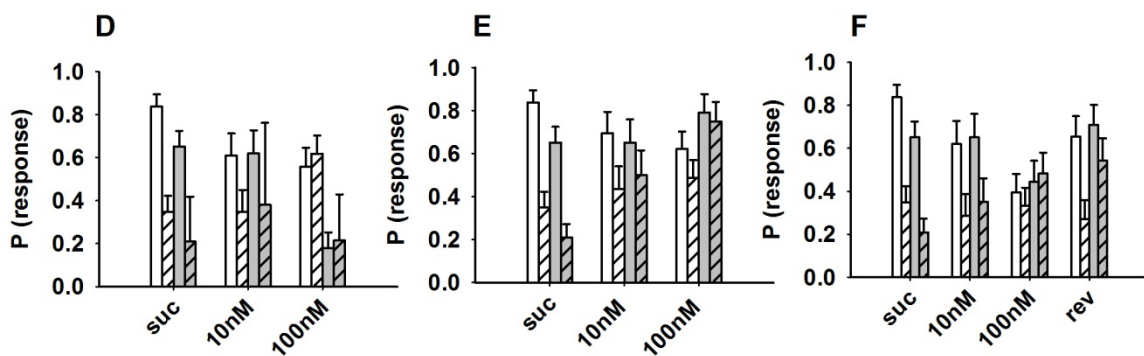


Supplementary Figure 1

MASSED TRAINING



SPACED TRAINING



Supplemental Figure 1: Response rates to both conditioned and novel odours as presented in Figs 2 and 3. Response to the correct, conditioned odour 10 min (white bar) and 24 h (grey bar) after conditioning is shown alongside responses to the novel odour presented at the same timepoints (10 min, white striped bar; 24 h, grey striped bar). Sample sizes are reported in Table 4. Note: the control data are the same in each panel. In general, after massed training, the control bees were more likely to respond to the conditioned odour than the novel odour at the 10 min timepoint ($P > 0.001$) but not the 24 h timepoint ($P = 0.101$). After spaced training, sucrose bees picked the conditioned odour significantly more often than the novel odour at both timepoints (STM, $P > 0.001$, LTM $P > 0.001$). (A) Imidacloprid affected the specificity of the response at 10 min ($\chi^2 = 33.9$, $P > 0.001$), as the bees did not select the correct odour significantly more often than the novel odour (10nM, $P = 0.07$, 100nM $P = 1.000$). (B) Coumaphos and coumaphos combined with imidacloprid (C) also affected the specificity of the response to the test odors at 10 min (coumaphos: $\chi^2 = 22.0$, $P = 0.024$, 10nM, $P = 0.187$; 100nM, $P = 0.543$; combined: $\chi^2 = 30.8$, $P = 0.009$, 10nM, $P = 0.061$, recovery, $P = 0.113$). (D) Imidacloprid and coumaphos (E) reduced response specificity during the 10 min and 24 h tests spaced training (imidacloprid: $\chi^2 = 37.65$, $P > 0.001$, 10nM, STM, $P = 0.070$, LTM, $P = 1.00$; 100nM, STM, $P = 0.112$, LTM, $P = 0.731$; coumaphos: ($\chi^2 = 59.7$, $P > 0.001$, 10nM, STM, $P = 0.064$, LTM, $P = 0.320$; 100nM, STM, $P = 0.440$, LTM, $P = 0.729$). (F) Combined imidacloprid and coumaphos impair odor-specific

memory after spaced training ($\chi^2 = 67.4$, $P > 0.001$). Specificity of STM was impaired by the 100nM dose, but not the 10nM dose, and bees allowed to recover from the 100nM dose recovered their ability to discriminate between the odours (10nM $P = 0.021$, 100nM $P = 0.382$, recovery $P = 0.003$). LTM specificity was also impaired by the 100nM dose, and this effect did not appear to be reversible (10nM $P = 0.047$, 100nM $P = 0.553$, recovery $P = 0.202$).