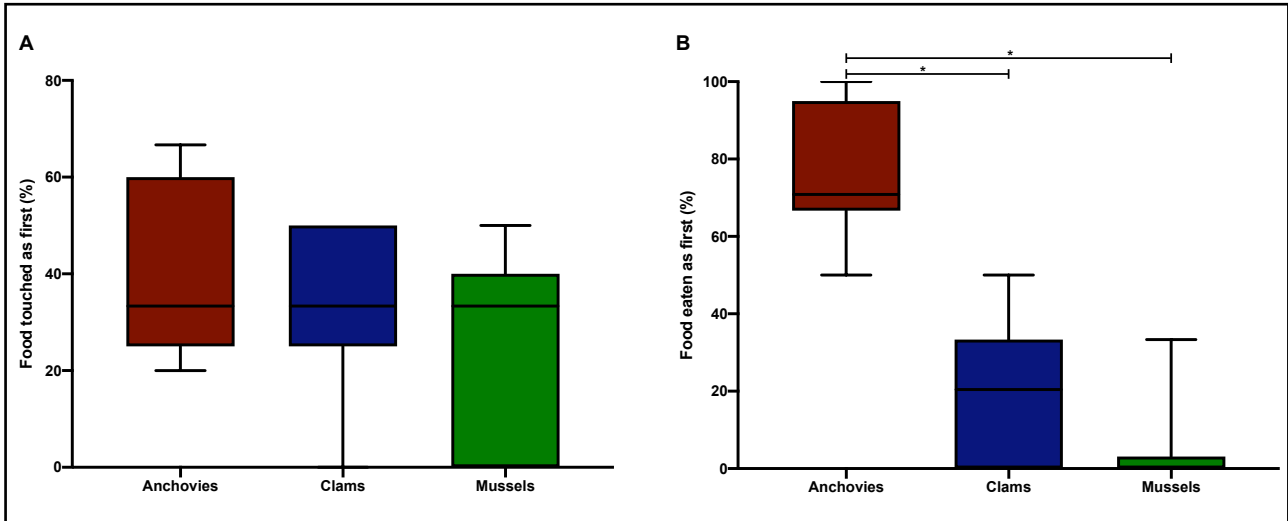
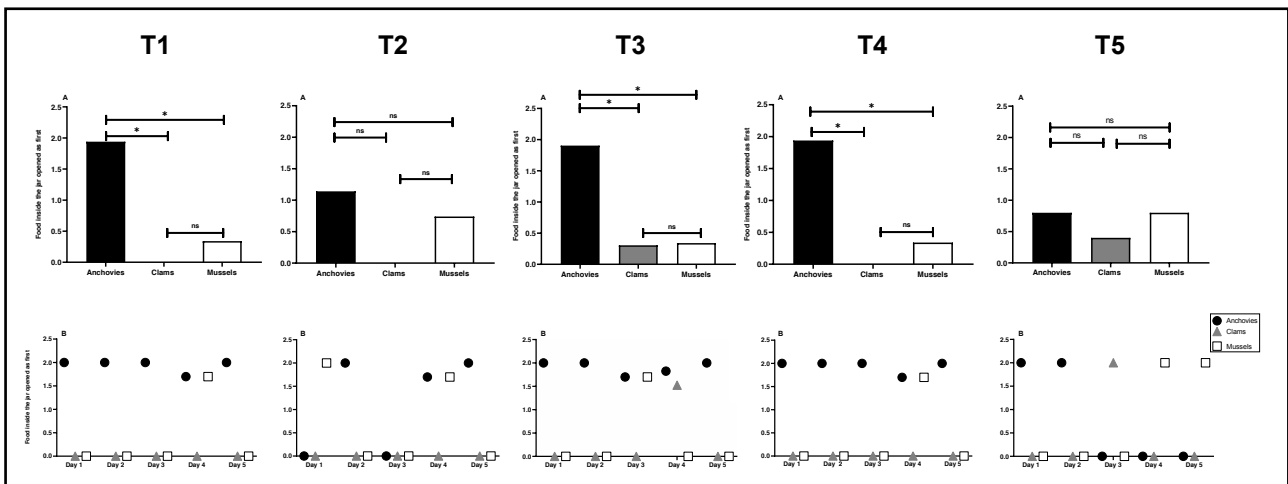




**Figure S1. Video frames of *O.vulgaris* under task.** Animal body weight 600g; jar diameter 5.5 cm, height 7.0 cm.



**Figure S2. First touch and food preference in *O. vulgaris*.** (A) Boxplot of the food that was touched first (Friedman test,  $p > 0.05$ ); (B) Boxplot of food that was eaten first (Friedman test,  $p < 0.05$ ). Wilcoxon matched pairs test significance is denoted with asterisks \* for  $p < 0.05$ .



**Figure S3. Food choice under different tasks in *O. vulgaris*.** T1 combined chemical and visual cues; T2 only visual cues; T3 only chemical cues; T4 real chemical and false visual cues; T5 negative control. (a) five day trend preferences; (b) single day preferences. Friedman test T1-T5, Chi-square = 38.460,  $p < 0.05$ . Data were log transformed, Wilcoxon matched pairs test significance is denoted with asterisks \* for  $p < 0.05$ .

**Table S1 - First touch during the food preference test (percentage).** Median (Me), Interquartile Range IQR: Q1 first quartile and Q3 third quartile, Mean (M), Standard deviation (SD), Standard error (SE), Friedman test.

|                  | Me    | IQR [Q1; Q3] | M     | SD    | SE   | Friedman test [Chi-square; p-value] |
|------------------|-------|--------------|-------|-------|------|-------------------------------------|
| <b>Anchovies</b> | 33.33 | 25.00; 55.00 | 40.00 | 18.73 | 7.08 | 1.524; 0.467                        |
| <b>Clams</b>     | 33.33 | 29.16; 45.00 | 33.09 | 17.22 | 6.51 |                                     |
| <b>Mussels</b>   | 33.33 | 12.50; 40.00 | 26.90 | 19.87 | 7.51 |                                     |

**Table S2 - Food preference test (percentage).** Median (Me), Interquartile Range IQR: Q1 first quartile and Q3 third quartile, Mean (M), Standard deviation (SD), Standard error (SE), Friedman test.

|                  | Me    | IQR [Q1; Q3] | M     | SD    | SE   | Friedman test [Chi-square; p-value] |
|------------------|-------|--------------|-------|-------|------|-------------------------------------|
| <b>Anchovies</b> | 66.67 | 66.67; 90.00 | 75.71 | 18.73 | 7.08 | 11.120; <b>0.004</b>                |
| <b>Clams</b>     | 20.00 | 0.00; 33.33  | 19.52 | 20.22 | 7.64 |                                     |
| <b>Mussels</b>   | 0.00  | 0.00; 0.00   | 4.76  | 12.60 | 4.76 |                                     |

**Table S3 - Food choice under different tasks in *Octopus vulgaris* (percentage).** Median (Me), Interquartile Range IQR: Q1 first quartile and Q3 third quartile, Mean (M), Standard deviation (SD), Standard error (SE), Friedman test. [Chi-square; p- value]

|                                               |                  | Me     | IQR [Q1; Q3]  | M     | SD    | SE    | Friedman test [Chi-square; p- value] |
|-----------------------------------------------|------------------|--------|---------------|-------|-------|-------|--------------------------------------|
| <i>T1 combined chemical and visual cues</i>   | <b>Anchovies</b> | 100.00 | 75.00; 100.00 | 90.00 | 22.36 | 10.00 | 8.400; <b>0.015</b>                  |
|                                               | <b>Clams</b>     | 0.00   | 0.00; 0.00    | 0.00  | 0.00  | 0.00  |                                      |
|                                               | <b>Mussels</b>   | 0.00   | 0.00; 25.00   | 10.00 | 22.36 | 10.00 |                                      |
| <i>T2 only visual cues</i>                    | <b>Anchovies</b> | 50.00  | 0.00; 100.00  | 50.00 | 50.00 | 22.36 | 3.500; 0.174                         |
|                                               | <b>Clams</b>     | 0.00   | 0.00; 0.00    | 0.00  | 0.00  | 0.00  |                                      |
|                                               | <b>Mussels</b>   | 0.00   | 0.00; 75.00   | 30.00 | 44.72 | 20.00 |                                      |
| <i>T3 only chemical cues</i>                  | <b>Anchovies</b> | 100.00 | 58.33; 100.00 | 83.33 | 23.57 | 10.54 | 7.625; <b>0.022</b>                  |
|                                               | <b>Clams</b>     | 0.00   | 0.00; 16.67   | 6.67  | 14.91 | 6.67  |                                      |
|                                               | <b>Mussels</b>   | 0.00   | 0.00; 25.00   | 10.00 | 22.36 | 10.00 |                                      |
| <i>T4 real chemical and false visual cues</i> | <b>Anchovies</b> | 100.00 | 75.00; 100.00 | 90.00 | 22.36 | 10.00 | 8.400; <b>0.015</b>                  |
|                                               | <b>Clams</b>     | 0.00   | 0.00; 0.00    | 0.00  | 0.00  | 0.00  |                                      |
|                                               | <b>Mussels</b>   | 0.00   | 0.00; 25.00   | 10.00 | 22.36 | 10.00 |                                      |
| <i>T5 negative control</i>                    | <b>Anchovies</b> | 0.00   | 0.00; 100.00  | 40.00 | 54.77 | 24.49 | 0.400; 0.819                         |
|                                               | <b>Clams</b>     | 0.00   | 0.00; 50.00   | 20.00 | 44.72 | 20.00 |                                      |
|                                               | <b>Mussels</b>   | 0.00   | 0.00; 100.00  | 40.00 | 54.77 | 24.49 |                                      |

**Table S4 - Maintain food preference during problem-solving tasks in *Octopus vulgaris* (percentage).** Median (Me), Interquartile Range IQR: Q1 first quartile and Q3 third quartile, Mean (M), Standard deviation (SD), Standard error (SE), Friedman test.

| Maintain food preference during problem-solving tasks in <i>O. vulgaris</i> _Figure 5 |           |        |                 |        |       |       |                                      |
|---------------------------------------------------------------------------------------|-----------|--------|-----------------|--------|-------|-------|--------------------------------------|
|                                                                                       |           | Me     | IQR [Q1;<br>Q3] | M      | SD    | SE    | Friedman test [Chi-square; p- value] |
| <i>T1 combined chemical and visual cues</i>                                           | Anchovies | 100.00 | 100.00; 100.00  | 100.00 | 0.00  | 0.00  | 10.000; <b>0.007</b>                 |
|                                                                                       | Clams     | 0.00   | 0.00; 0.00      | 0.00   | 0.00  | 0.00  |                                      |
|                                                                                       | Mussels   | 0.00   | 0.00; 0.00      | 0.00   | 0.00  | 0.00  |                                      |
| <i>T2 only visual cues</i>                                                            | Anchovies | 100.00 | 100.00; 100.00  | 80.00  | 44.72 | 20.00 | 8.000; <b>0.018</b>                  |
|                                                                                       | Clams     | 0.00   | 0.00; 0.00      | 0.00   | 0.00  | 0.00  |                                      |
|                                                                                       | Mussels   | 0.00   | 0.00; 0.00      | 0.00   | 0.00  | 0.00  |                                      |
| <i>T3 only chemical cues</i>                                                          | Anchovies | 100.00 | 83.33; 100.00   | 93.33  | 14.91 | 6.67  | 9.500; <b>0.009</b>                  |
|                                                                                       | Clams     | 0.00   | 0.00; 16.67     | 6.67   | 14.91 | 6.67  |                                      |
|                                                                                       | Mussels   | 0.00   | 0.00; 0.00      | 0.00   | 0.00  | 0.00  |                                      |
| <i>T4 real chemical and false visual cues</i>                                         | Anchovies | 100.00 | 100.00; 100.00  | 100.00 | 0.00  | 0.00  | 10.000; <b>0.007</b>                 |
|                                                                                       | Clams     | 0.00   | 0.00; 0.00      | 0.00   | 0.00  | 0.00  |                                      |
|                                                                                       | Mussels   | 0.00   | 0.00; 0.00      | 0.00   | 0.00  | 0.00  |                                      |
| <i>T5 negative control</i>                                                            | Anchovies | 0.00   | 0.00; 50.00     | 20.00  | 44.72 | 20.00 | 0.000; 1.000                         |
|                                                                                       | Clams     | 0.00   | 0.00; 50.00     | 20.00  | 44.72 | 20.00 |                                      |
|                                                                                       | Mussels   | 0.00   | 0.00; 50.00     | 20.00  | 44.72 | 20.00 |                                      |



**Table S5 - Time spent ( $\Delta t$ ) by *Octopus vulgaris* in problem-solving (second).** Median (Me), Interquartile Range IQR: Q1 first quartile and Q3 third quartile, Mean (M), Standard deviation (SD), Standard error (SE), Friedman test.

|                                               | Me      | IQR [Q1;<br>Q3]     | M      | SD      | SE     | Friedman test<br>[Chi-square; p-value] |
|-----------------------------------------------|---------|---------------------|--------|---------|--------|----------------------------------------|
| <i>T1 combined chemical and visual cues</i>   | 31.00   | 18.50;<br>47.25     | 52.1   | 62.96   | 19.91  | 9.055; 0.059                           |
| <i>T2 only visual cues</i>                    | 394.50  | 35.00;<br>1263.50   | 904    | 1320.97 | 660.49 |                                        |
| <i>T3 only chemical cues</i>                  | 25.00   | 13.00;<br>30.00     | 151.78 | 324.05  | 108.02 |                                        |
| <i>T4 real chemical and false visual cues</i> | 22.50   | 15.25;<br>147.50    | 120.25 | 176.43  | 62.38  |                                        |
| <i>T5 negative control</i>                    | 1932.00 | 1356.00;<br>2401.00 | 1824.5 | 1407.11 | 703.55 |                                        |