

Supplementary Information

A cognitive approach to better understand foraging strategies of the adult domestic hen

Degrande R.^a *, Cornilleau F.^a, Jardat P.^a, Ferreira V.H.B.^a, Lansade L.^a, Calandreau L.^a

^aCNRS, IFCE, INRAE, Université de Tours, PRC (Physiologie de la Reproduction et des Comportements), F-37380, Nouzilly, Indre-et-Loire, France

* Corresponding author: rachel.degrande@gmail.com

Table SI 1: Mean performance +/- SD (%) for each trial type at each stage. For each line, the p-value from the comparison with the chance level is detailed (Wilcoxon test). • = statistical tendencies ($P < 0.1$) considered when tested individuals are four.

Stage	Trial type	Mean (%)	Sd (%)	P (vs 50%)
Free-choice test, <i>M</i> -sessions	vPT	89.58	10.73	0.0023
	nvPT	43.05	12.22	0.073
	CT	92.36	7.5	0.0021
	ST	48.26	9.14	0.60
Free-choice test, <i>P</i> -sessions	vPT	94.45	11.42	0.0015
	nvPT	31.95	12.22	0.022
Group 1: Different object	vPT	95.83	6.97	0.031
	nvPT	29.17	18.07	0.057
Group 2: Forced-choice test, 2 first sessions	vPT	97.22	6.81	0.026
	nvPT	42.59	25.50	0.58
Group 2: Forced-choice test, 2 final sessions	vPT	91.67	9.62	0.095 •
	nvPT	83.33	7.85	0.098 •
Group 2: Forced-choice test, control sessions	CT	100	0	0.072 •
	ST	52.08	4.17	1 •

Table SI 2: Result for the post-hoc comparisons between each tested condition with a Tukey HSD post-hoc test, with the absolute value of Cohen's d effect size for each comparison. Performance nvPT trials was calculated over 2 sessions for each tested condition to get a relevant number of trials for the analysis (i.e. at least 12 trials). Cohen's d is commonly described as weak at and under 0.2, mean around 0.5 and strong at and over 0.8.

Test conditions compared		Difference	Lower	Upper	Adjusted P-value	Effect size (abs. Cohen's d)
Forced-choice, 2 last sessions	Forced-choice, 2 first sessions (group2)	-40.74	-74.25	-7.23	0.01	1.78
	Free-choice, <i>M</i> -sessions	-40.28	-70.25	-10.31	< .0001	3.33
	Free-choice, <i>P</i> -sessions	-51.39	-81.36	-21.41	< .0001	2.60
	Free-choice with another object (group1)	-54.17	-87.68	-20.66	< .0001	3.25
Forced-choice, 2 first sessions	Free-choice, <i>M</i> -sessions	0.46	-25.50	26.42	1.00	0.025
	Free-choice, <i>P</i> -sessions	-10.65	-36.61	15.31	0.76	0.455
	Free-choice with another object (group1)	-13.43	-43.40	16.55	0.70	0.561
Free-choice, Msessions	Free-choice, <i>P</i> -sessions	-11.11	-32.30	10.08	0.56	0.632
	Free-choice with another object (group1)	-13.89	-39.84	12.07	0.55	0.924
Free-choice, Psessions	Free-choice with another object (group1)	-2.78	-28.74	23.18	1.00	0.133

Table SI 3: Analysis of the effect of the individual identity and the trial type on the side chosen first, at each trial, during the *M-sessions* in free-choice conditions. Both the individual identity and the trial type have a significant impact on the side chosen first. The generalized mixed model table is not detailed (median of deviance residuals = -0.51). The results of post-hoc Kruskal Wallis are detailed for the variable Individual and the variable Trial type. The Dunn post-hoc test (Holm correction) is detailed to compare the side chosen first according to the trial type.

Kruskal-Wallis rank sum test	Chi2	df	p-value
Side chosen ~ Individual	162	11	<0.001
Side chosen ~ Trial type	17.68	3	<0.001

Dunn test with Holm correction

Group 1	Group 2	statistic	Adjusted p-value
CT	nvPT	-2.86	0.020
	vPT	-0.490	1
	ST	-3.44	0.0035
nvPT	vPT	2.37	0.054
	ST	-0.141	1
vPT	ST	-2.87	0.020

Table SI 4: Model selection for the effect of the trial configuration (ST, nvPT, vPT and ST), the visibility of the reward (visible or non-visible), and the presence of a tube with a visible content in the trial (CT, vPT or nvPT) or not (ST). The more accurate model has the smallest corrected Akaike Information Criterion value.

AICc model selection	K	AICc
Side chosen ~ trial type + individual	15	761.35
Side chosen ~ reward_visible + individual	13	757.67
Side chosen ~ content_visible + individual	13	770.13

Table SI 5: The generalized linear model table for the effect of the side of the reward and the visibility of the reward on the performance at each trial, whatever the trial type (individuals as random effects, binomial family).

Random effects	Variance	Std. Dev.
Individuals	0.23	0.48

Fixed Effects	Estimate	Std. Error	Z value	Pr(< z)
Intercept	0.77	0.17	4.46	<0.001
Side of the reward	-2.16	0.15	-14.05	<0.001
Visibility of the reward	3.46	0.20	17.10	<0.001

Figure SI 6: Detail of the number of time individuals choose to search the reward in one side or the other (percentage of success) depending on the trial type, the test condition, at the group level. There was a significant effect of the trial type on the side chosen first ($P < 0.05$ between CT-nvPT, CT-ST and vPT-ST), but no effect of the test condition. Thus, there was an effect of the side of the reward location on the performance, with a significant side bias for right over left in nvPT and ST but no significant difference in CT and vPT. For each boxplot, dots are the mean individual performances, vertical lines are standard deviation, and the horizontal line shows the median value.

