

Supplementary Material ESM1 for

Behavioural traits modulate the use of heterospecific social information for nest site selection: experimental evidence from a wild bird population

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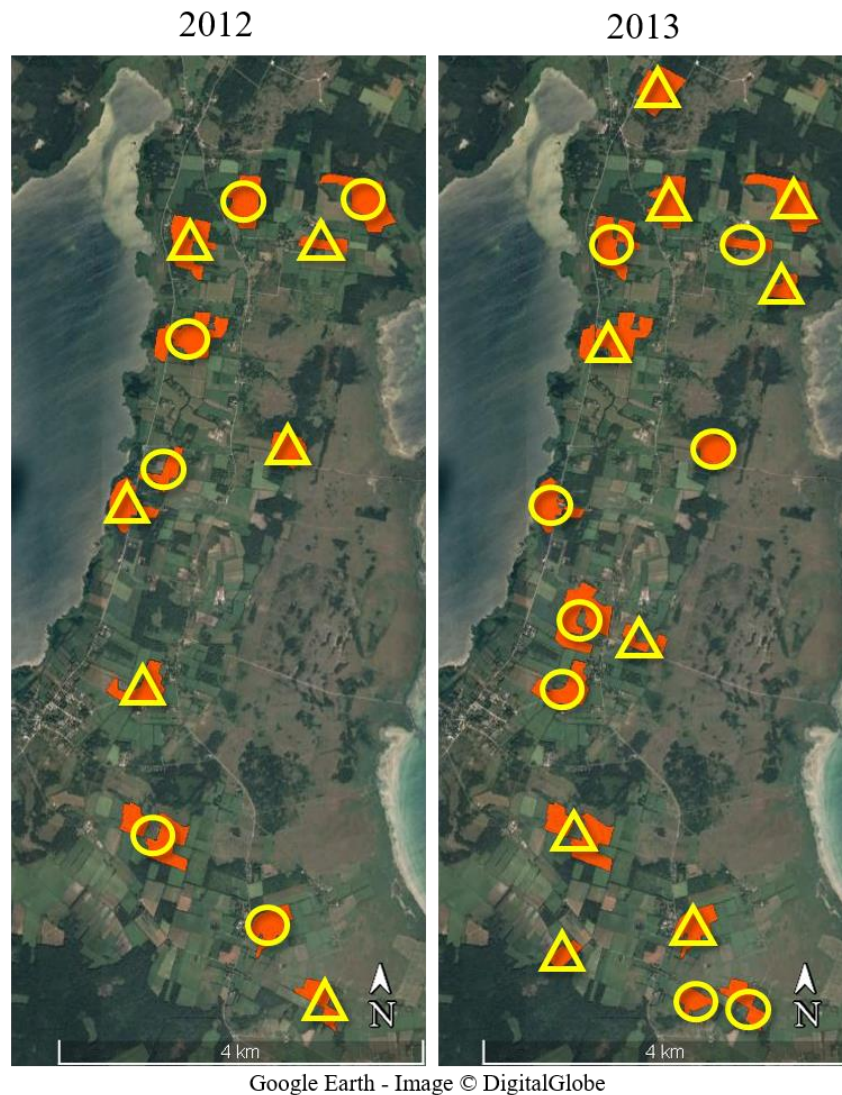


Figure S1. Symbols associated with nest boxes occupied by tits in 2012 and 2013

The symbol associated with tits was randomised among experimental forest patches (12 patches in 2012, 17 in 2013), and alternated between 2012 and 2013 in each patch. Switching the symbol associated with tits between years for a given patch allowed us to control for potential across-year experience effects. Indeed, even though we retained only individuals whose symbol choice was naive (i.e. first choice) in 2013 (see text), we could not exclude a potential influence of individuals' experience with symbols if they were not captured in the first year of the study (2012), e.g. if they failed breeding before capture. Details on the average copying behaviour as well as great tit densities, breeding phenology, reproductive investment and morphology in 2012 and 2013 are provided in Table S2.

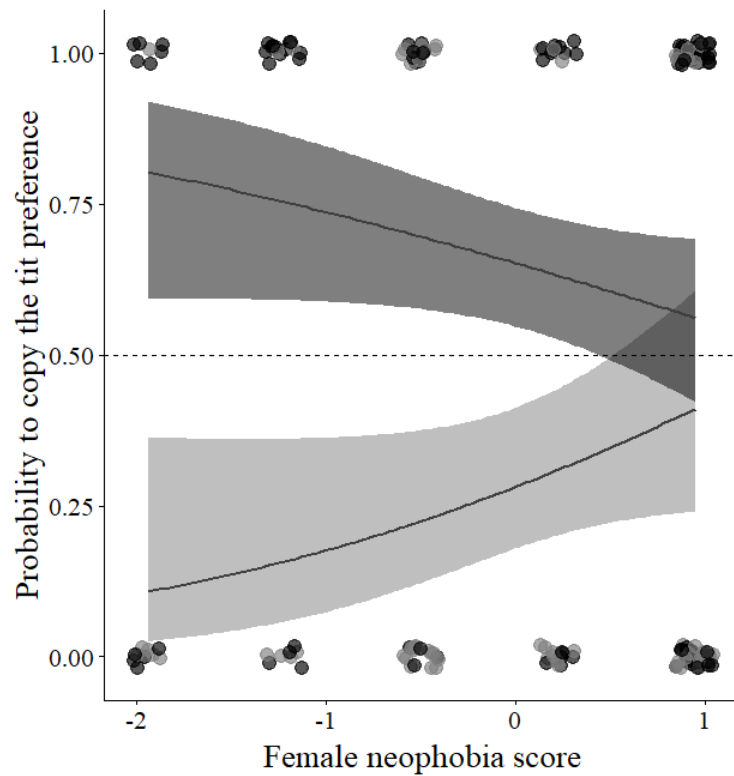


Figure S2. Probability for flycatchers to copy tit apparent preference depending on female neophobia score (5 levels) and tit early reproductive investment (low clutch/brood size: light grey; high clutch brood size; dark grey). Tit early reproductive investment, considered as a continuous variable in the model, was here categorized for illustration into two equivalent groups (values below or above the median). Data points show actual choices (copy = 1 / reject = 0). The predicted means (lines) and corresponding 95%CI (shaded areas) were derived from the final model for the mean value of the bias in the proportion of empty nest boxes with the symbol associated to tits.

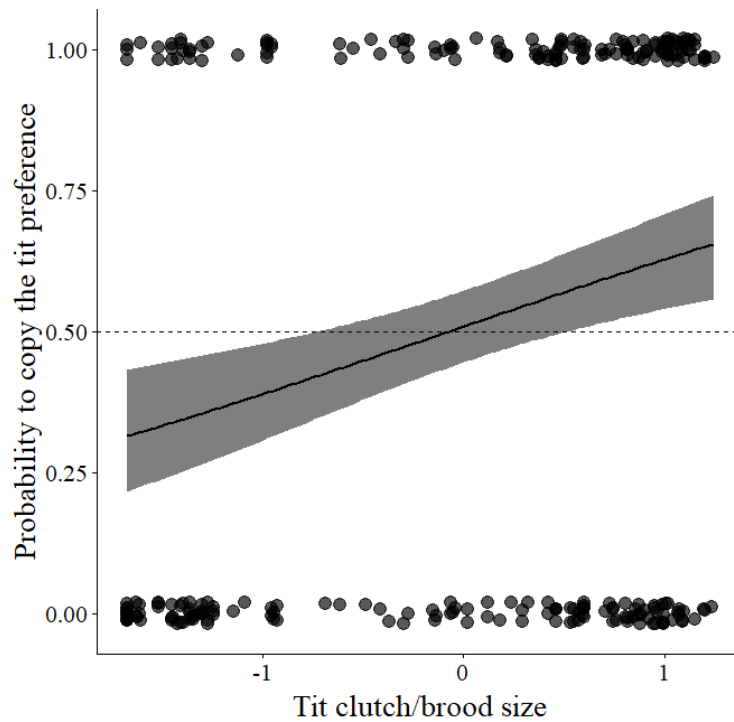


Figure S3. Probability for flycatchers to copy tit apparent preference depending on tit early reproductive investment (clutch/brood size, scaled). Data points show the actual choices (copy = 1 / reject = 0). The predicted mean (line) and corresponding 95%CI (shaded area) were derived from the model including only tit clutch/brood size and the bias in the proportion of empty nest boxes with the symbol associated to tits (mean value taken here).

Table S2. Differences between the two years of the study (2012 and 2013) in flycatcher heterospecific copying behaviour, flycatcher settlement date and tit breeding variables. Estimates are means $\pm$ SD.

	2012	2013
% of flycatcher pairs copying tit apparent preference	59.1 %	39.3 %
Flycatcher settlement day	May 10 th $\pm$ 4.0 days	May 14 th $\pm$ 4.4 days
Great tit laying date	May 2 nd $\pm$ 9.1 days	May 13 th $\pm$ 5.5 days
Overall great tit density in the forest patch (proportion of boxes where great tits laid eggs, even if they subsequently deserted or failed)	0.44 $\pm$ 0.11	0.27 $\pm$ 0.06
Great tit density in the forest patch at the time of flycatcher settlement	0.35 $\pm$ 0.10	0.24 $\pm$ 0.06
Average great tit clutch size in the forest patch when complete	8.5 $\pm$ 2.2	8.1 $\pm$ 2.0
Great tit clutch/brood size in the forest patch at the time of flycatcher settlement	7.1 $\pm$ 1.5	2.9 $\pm$ 2.8
Great tit adult body mass	18.2 $\pm$ 0.99 g	18.3 $\pm$ 1.03 g
Great tit adult body condition (body mass / tarsus length)	0.80 $\pm$ 0.04 g. mm ⁻¹	0.80 $\pm$ 0.04 g. mm ⁻¹

Table S3. Output of the full models for each behavioural trait and sex. For age, the estimate is given for yearling individuals (older individuals being the reference). Dev.symbol corresponds to the deviation from 0.5 of the actual proportion of empty boxes matching the tit apparent preference within a patch on the day of choice (see text). P-values below the risk α of 0.05 are shown in bold.

	Models with male age and behavioural trait				Models with female age and behavioural trait			
	Estimate $\pm$ SE	z-value	p-value		Estimate $\pm$ SE	z-value	p-value	
Full model with aggressiveness score				N=224	N=271			
Intercept	-0.42 $\pm$ 0.20	-2.10	0.04		0.00 $\pm$ 0.17	0.02	0.98	
Age	0.51 $\pm$ 0.33	1.54	0.12		0.06 $\pm$ 0.27	0.24	0.81	
Aggressiveness	-0.88 $\pm$ 0.32	-2.80	0.01		-0.07 $\pm$ 0.16	-0.47	0.64	
Tit clutch/brood (c/b) size	0.90 $\pm$ 0.23	3.84	< 10⁻³		0.69 $\pm$ 0.20	3.45	< 10⁻³	
Tit density	0.00 $\pm$ 0.21	0.02	0.98		-0.22 $\pm$ 0.19	-1.16	0.25	
Dev.symbol	0.19 $\pm$ 0.17	1.13	0.26		0.41 $\pm$ 0.15	2.67	0.01	
Aggressiveness : Age	1.01 $\pm$ 0.42	2.44	0.01		0.29 $\pm$ 0.29	1.01	0.31	
Aggressiveness : Tit c/b size	0.31 $\pm$ 0.23	1.37	0.17		-0.13 $\pm$ 0.17	-0.74	0.46	
Aggressiveness : Tit density	-0.09 $\pm$ 0.23	-0.37	0.71		-0.24 $\pm$ 0.17	-1.35	0.18	
Age : Tit c/b size	-0.60 $\pm$ 0.40	-1.48	0.14		-0.53 $\pm$ 0.30	-1.77	0.08	
Age : Tit density	0.02 $\pm$ 0.43	0.05	0.96		0.59 $\pm$ 0.31	1.89	0.06	
Full model with boldness score				N=142	N=173			
Intercept	0.09 $\pm$ 0.23	0.37	0.71		-0.22 $\pm$ 0.21	-1.06	0.29	
Age	0.44 $\pm$ 0.43	1.02	0.31		0.59 $\pm$ 0.36	1.65	0.10	
Boldness	-0.62 $\pm$ 0.32	-1.92	0.05		-0.26 $\pm$ 0.21	-1.22	0.22	
Tit c/b size	0.81 $\pm$ 0.30	2.73	0.01		0.78 $\pm$ 0.25	3.10	< 10⁻²	
Tit density	-0.12 $\pm$ 0.27	-0.46	0.65		0.06 $\pm$ 0.23	0.25	0.80	
Dev.symbol	0.12 $\pm$ 0.20	0.62	0.53		0.24 $\pm$ 0.18	1.29	0.20	
Boldness : Age	1.04 $\pm$ 0.51	2.06	0.04		0.73 $\pm$ 0.36	2.04	0.04	
Boldness : Tit c/b size	-0.22 $\pm$ 0.37	-0.61	0.55		0.05 $\pm$ 0.19	0.24	0.81	
Boldness : Tit density	0.33 $\pm$ 0.31	1.06	0.29		-0.04 $\pm$ 0.19	-0.21	0.84	
Age : Tit c/b size	-0.28 $\pm$ 0.51	-0.55	0.58		-0.40 $\pm$ 0.39	-1.04	0.30	
Age : Tit density	0.64 $\pm$ 0.64	1.01	0.31		0.23 $\pm$ 0.39	0.58	0.56	
Full model with neophobia score				N=142	N=173			
Intercept	-0.11 $\pm$ 0.24	-0.46	0.65		-0.19 $\pm$ 0.21	-0.91	0.36	
Age	0.34 $\pm$ 0.45	0.76	0.45		0.52 $\pm$ 0.36	1.45	0.15	
Neophobia	0.34 $\pm$ 0.25	1.34	0.18		-0.03 $\pm$ 0.21	-0.16	0.88	
Tit c/b size	1.04 $\pm$ 0.32	3.21	< 10⁻²		0.86 $\pm$ 0.26	3.28	< 10⁻²	
Tit density	-0.09 $\pm$ 0.26	-0.34	0.74		-0.04 $\pm$ 0.24	-0.15	0.88	
Dev.symbol	0.12 $\pm$ 0.20	0.58	0.56		0.22 $\pm$ 0.18	1.19	0.23	
Neophobia : Age	-0.76 $\pm$ 0.48	-1.57	0.12		0.17 $\pm$ 0.38	0.45	0.66	
Neophobia : Tit c/b size	-0.28 $\pm$ 0.28	-1.01	0.31		-0.55 $\pm$ 0.23	-2.39	0.02	
Neophobia : Tit density	0.03 $\pm$ 0.24	0.12	0.91		0.33 $\pm$ 0.22	1.49	0.14	
Age : Tit c/b size	-0.82 $\pm$ 0.60	-1.37	0.17		-0.37 $\pm$ 0.39	-0.95	0.34	
Age : Tit density	0.55 $\pm$ 0.62	0.89	0.37		0.27 $\pm$ 0.41	0.68	0.50	

Table S4. Outputs of the full and final behaviour-specific models with both male and female behavioural trait and age combined. For age, the estimates are given for yearling individuals (older individuals being the reference). Dev.symbol corresponds to the deviation from 0.5 of the actual proportion of empty boxes matching the tit apparent preference within a patch on the day of choice (see text). P-values below the risk α of 0.05 are shown in bold. We only tested interactions that were significant in the sex-specific models.

	Full model output				Final model output			
	Estimate $\pm$ SE	z-value	p-value		Estimate $\pm$ SE	z-value	p-value	
Model with female and male aggressiveness scores, N=182								
Intercept	-0.42 $\pm$ 0.28	-1.53	0.13		-0.41 $\pm$ 0.22	-1.85	0.06	
Age _♀	-0.11 $\pm$ 0.36	-0.30	0.76					
Aggressiveness _♀	-0.14 $\pm$ 0.22	-0.61	0.54					
Age _♂	0.70 $\pm$ 0.40	1.74	0.08		0.65 $\pm$ 0.38	1.69	0.09	
Aggressiveness _♂	-1.00 $\pm$ 0.37	-2.69	0.01		-0.99 $\pm$ 0.35	-2.83	< 10⁻²	
Tit clutch / brood (c/b) size	0.65 $\pm$ 0.22	3.00	< 10⁻²		0.66 $\pm$ 0.18	3.78	< 10⁻³	
Tit density	0.04 $\pm$ 0.23	0.18	0.86					
Dev.symbol	0.49 $\pm$ 0.26	1.88	0.06		0.46 $\pm$ 0.22	2.13	0.03	
Aggressiveness _♀ : Aggressiveness _♂	0.15 $\pm$ 0.21	0.72	0.47					
Aggressiveness _♂ : Age _♂	0.89 $\pm$ 0.47	1.89	0.06		0.94 $\pm$ 0.42	2.22	0.03	
Model with female and male boldness scores, N=116								
Intercept	-0.08 $\pm$ 0.32	-0.24	0.81		-0.20 $\pm$ 0.28	-0.70	0.48	
Age _♀	1.16 $\pm$ 0.57	2.03	0.04		1.15 $\pm$ 0.56	2.07	0.04	
Boldness _♀	0.09 $\pm$ 0.35	0.27	0.79		0.10 $\pm$ 0.35	0.30	0.77	
Age _♂	-0.45 $\pm$ 0.59	-0.77	0.44		-0.28 $\pm$ 0.55	-0.51	0.61	
Boldness _♂	-0.89 $\pm$ 0.47	-1.87	0.06		-0.67 $\pm$ 0.34	-1.94	0.05	
Tit c/b size	1.02 $\pm$ 0.30	3.41	< 10⁻³		0.88 $\pm$ 0.25	3.59	< 10⁻³	
Tit density	-0.19 $\pm$ 0.30	-0.64	0.52					
Dev.symbol	0.36 $\pm$ 0.26	1.36	0.17					
Boldness _♀ : Boldness _♂	-0.16 $\pm$ 0.22	-0.72	0.47					
Boldness _♀ : Age _♀	1.24 $\pm$ 0.53	2.34	0.02		1.26 $\pm$ 0.56	2.24	0.03	
Boldness _♂ : Age _♂	1.50 $\pm$ 0.73	2.05	0.04		1.28 $\pm$ 0.63	2.02	0.04	
Model with female and male neophobia scores, N=116								
Intercept	-0.33 $\pm$ 0.30	-1.11	0.27		0.01 $\pm$ 0.21	0.05	0.96	
Age _♀	0.86 $\pm$ 0.48	1.77	0.08					
Neophobia _♀	0.13 $\pm$ 0.27	0.50	0.62		0.13 $\pm$ 0.23	0.56	0.57	
Age _♂	-0.04 $\pm$ 0.54	-0.07	0.94					
Neophobia _♂	0.09 $\pm$ 0.25	0.35	0.73					
Tit c/b size	0.94 $\pm$ 0.30	3.14	< 10⁻²		0.88 $\pm$ 0.24	3.67	< 10⁻³	
Tit density	0.00 $\pm$ 0.26	0.00	1.00					
Dev.symbol	0.31 $\pm$ 0.25	1.22	0.22					
Neophobia _♀ : Neophobia _♂	0.18 $\pm$ 0.24	0.75	0.45					
Neophobia _♀ : Tit c/b size	-0.58 $\pm$ 0.32	-1.83	0.07		-0.63 $\pm$ 0.31	-2.07	0.04	