Supplementary Materials

1. *Data collection – mating system and parental care moderator terms*

We searched *ISI Web of Science, Scopus* and *Google Scholar* using the search terms: “species name” AND “mating system” for mating system and “species name” AND “parental care” for parental care. For birds, we also searched the online reference database *Birds of the World* (birdsoftheworld.org; accessed via an ANU library subscription in 2019) by searching “species name”. We noted whether the mating system of the species was characterised by ‘multiple mating’ or ‘monogamy’, and whether the species provided ‘maternal’, ‘paternal’, ‘biparental’, ‘cooperative’ or ‘no care’. However, after data collection we decided to drop parental care from subsequent analysis because 1) we did not have enough data for enough species to run our proposed meta-regression models and 2) data quality was questionable. The location of data collected for both parental care and mating system (and body sizes for SSD) are provided in the data file ‘sexual\_selection.xlsx’ here: <https://osf.io/bwjyt/>

1. *Excluding studies and effect sizes*

After full-text screening, we were left with a total of n=247 studies. However, n=29 studies were excluded from this initial inclusion list because behaviours did not really fit into personality categorisation, or were missing some key data required to calculate effect sizes. Another n=8 studies were excluded before analysis was conducted because studies were missing data required to calculate effect sizes, producing NAs. This left us with a total of n=210 studies in our final dataset.

Before analysis, we removed n=2 effect sizes (both from the same study on invertebrates) that were extremely large outliers. We also had n=24 effect sizes in our dataset that were more physiological than behavioural (i.e. breathing rate, max. heart rate after capture etc.). We decided to remove these effect sizes before running models, which reduced the total number of effect sizes, but did not change the number of studies or species in our final dataset.

While we decided not to email authors for missing data (i.e. sample sizes, error type, additional information), we did obtain sample sizes for males and females in study P077 via email correspondence with a co-author of the study.

Additionally, there were 3 studies in our dataset (P172, P210 and P231) that we were concerned might have issues with data duplication/unreliability. LMH checked the retraction database *retractiondatabase.org* regularly during data analysis to check if these studies had been either retracted or flagged for concern. As of 31 August 2020, none of the 3 studies had been retracted, nor had any other concerns been raised, so we decided to keep these studies in our final dataset.

1. *Score data*

We performed data transformations on latency data and proportional data in order to meet assumptions about normality. However, we were unable to adjust score data, and therefore assumed that scores were normally distributed. Scores did not make up a large proportion of our effect size dataset, but we decided to run contrast meta-analysis models to check whether data composed of scores were significantly different from the rest of our dataset. Summaries of these models are shown in Table S6.

*Score data - invertebrates*

Effect sizes calculated from scores were significantly different from the rest of the dataset (including transformed latency and proportion data) for mean differences in personality for invertebrates only (intercept: =0.30, 95% CIs: 0.02, 0.57, *t* = 2.12, *p*=0.03; score: = -0.29, 95% CIs: -0.57, -0.02, *t* = -2.11, *p*=0.04). Invertebrates had the most score data of any taxonomic group (n=61 effect sizes). We therefore decided to exclude these scores from our invertebrate dataset and rerun our models. Study ID of these removed studies were P081, P103, P142, P153, P172, P199 and P210. All invertebrate model tables and figures report data *after* scores were removed.

1. *Calculating I2*

We extracted *I*2 from our meta-analytic intercept-only models (see Table S1) using the following equation:

Where is the total variance, is the phylogenetic variance, is the between-study variance, is the species-specific variance, is the study-specific variance (observation-level random effect), and is the remaining within-study sampling variance (random effects) (*69*). Further, we can then partition *I*2 to calculate study-level *I*2 and species-level *I*2 (*I*2s and *I*2u, respectively) (*69*):

*I*2s = / ,

*I*2u = /

Finally, we can determine the strength of phylogenetic variance using the equation:

Where = 0 there is no phylogenetic signal, but when = 1 there is a strong effect of phylogeny on heterogeneity (*69*).

1. *Exploratory analysis*

We extracted information on factors that differed among studies where we had an *a priori* expectation that they might moderate the magnitude and/or direction of the effect size. For mating system, we followed methods similar to those used to obtain SSD measures. Where mating system was not reported in the research article, we searched *Web of Science*, *Scopus* and *Google Scholar* using the search terms: “species name” AND “mating system”. For birds, we first searched the online reference database *Birds of the World* (birdsoftheworld.org; accessed via an ANU library subscription in 2019). Initially we wanted to categorise mating system into the following: “monogamous”, “polyandrous”, “polygynous”, or “promiscuous”. However, it was difficult to find studies that agreed on mating system definitions for many species, so we collapsed our mating system categories into just “monogamous” or “multiple mating”. The location of data collected for mating system is provided in the data file ‘sexual\_selection.xlsx’.

1. *Exploratory analysis - results*

*Mating System*

Monogamous and multiple mating systems were not significantly different from each other for means or variability for any of the taxonomic groups.

*Age*

Adults and juveniles were not significantly different from each other for means or variability for any of the taxonomic groups.

*Population*

Fish from the wild had greater differences in variability than fish from lab populations (intercept: =-0.09, 95% CIs: -0.18, -0.01, *t* = -2.11, *p*=0.04; lab: =0.08, 95% CIs: -0.02, 0.19, *t* = 1.55, *p*=0.12), but not for mean personality differences, and not for any other taxonomic group.

*Study environment*

Studies conducted in the lab were significantly different to field studies for mammals (intercept: =0.24, 95% CIs: -0.10, 0.57, *t* = 1.38, *p*=0.17; lab: = -0.30, 95% CIs: -0.56, -0.04, *t* = -2.26, *p*=0.02), but not for variability, and not for any other taxonomic group.

*Study type*

Effect sizes from observational studies were significantly different from experimental studies for mammals (intercept: =0.00, 95% CIs: -0.21, 0.22, *t* = 0.04, *p*=0.97; observation: = 0.38, 95% CIs: 0.12, 0.64, *t* = 2.81, *p*=0.005), but not for variability, and not for any other taxonomic group for which comparisons could be made.

1. **D** *matrices – results*

*Intercept only models*

Regardless of whether the correlation between personality traits was set to either *r* = 0.3, 0.5 or 0.8 (i.e. to control for traits that were measured on the same individuals within the same study), there remained no significant sex difference between either the mean or the variability for personality overall, for any of the five taxonomic groups (see Table S7). We therefore interpreted our initial intercept only models without **D** matrices (Table S1).

*Personality trait models - mean differences*

Female birds were more social than males, while male reptiles/amphibians were more explorative than females (at each of the levels of rho; see Table S8 for *r* = 0.8). These significant sex differences, and their direction, were consistent with those from models without any **D** matrix (Table S2). However, male invertebrates were more active than females when *r* = 0.3, when *r* = 0.5, and when *r* = 0.8 (Table S8). This significant sex difference, for invertebrates, was not found in our initial MLMR personality models (but was marginally significant, see Table S2). However, since we also observed significant publication bias in our invertebrate data (Table S4), we therefore decided to interpret and report our more conservative mean model estimates.

*Personality trait models - variability*

Adjusting the levels of rho for variability did not significantly change the results obtained from initial MLMR personality models for any of the taxonomic groups. Importantly, female fish remained significantly more variable than males for aggressive behaviour, regardless of the level of rho (Table S8).

*SSD and personality traits*

Adjusting the levels of rho for both means and for variability did change some effect sizes and made them more significant, but only for some traits, and only for some taxonomic groups (reptiles / amphibians, and invertebrates). However, our reptiles / amphibians taxonomic group didn’t have enough data to support meta-regression models, and our invertebrate group had significant publication bias (Table S4), so we chose to interpret and present our more conservative models that did not include **D** matrices.

**Supplementary Tables**

**Table S1.** Intercept-only random effects meta-analysis model output for each of the five taxonomic groups comparing males and females for mean differences (SMD) and for variability (lnCVR). Table also shows *I*2 measures of heterogeneity for each of the random effects included in the models. Q scores are another test of heterogeneity, but we only report *I*2.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Birds** | | | | | |
| ***SMD*** | | | | | |
| Q=2804.93 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *I2* | *95% CIs* | *n* |
| Study ID | 0.59 | 0.77 | 0.73 | 0.63, 0.80 | 50 |
| Species Name | 0 | 0.01 | 0 | 0, 0 | 106 |
| Obs | 0.16 | 0.40 |  |  | 483 |
| Phylo |  |  | 0 | 0, 0 |  |
| Total |  |  | 0.93 | 0.90, 0.95 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | -0.14 | -0.36, 0.09 | -1.17 | -1.82, 1.57 | 0.24 |
| ***lnCVR*** |  |  |  |  |  |
| Q=3820.60 | P<0.0001 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *I2* | *95% CIs* | *n* |
| Study ID | 0.01 | 0.12 | 0.02 | 0.01, 0.02 | 50 |
| Species Name | 0.36 | 0.60 | 0.44 | 0.37, 0.51 | 106 |
| Obs | 0.40 | 0.63 |  |  | 483 |
| Phylo |  |  | 0.47 | 0.39, 0.54 |  |
| Total |  |  | 0.94 | 0.94, 0.95 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | -0.14 | -0.65, 0.37 | -0.56 | -1.94, 1.64 | 0.58 |
| **Fish** | | | | | |
| ***SMD*** | | | | | |
| Q=1385.84 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *I2* | *95% CIs* | *n* |
| Study ID | 0.04 | 0.21 | 0.14 | 0.09, 0.19 | 44 |
| Species Name | 0.04 | 0.20 | 0.13 | 0.07, 0.20 | 22 |
| Obs | 0.13 | 0.36 |  |  | 493 |
| Phylo |  |  | 0.19 | 0.11, 0.29 |  |
| Total |  |  | 0.70 | 0.66, 0.73 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | -0.04 | -0.35, 0.28 | -0.24 | -1.00, 0.93 | 0.81 |
| ***lnCVR*** |  |  |  |  |  |
| Q=924.06 | P<0.0001 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *I2* | *95% CIs* | *n* |
| Study ID | 0.01 | 0.09 | 0.04 | 0.03, 0.06 | 44 |
| Species Name | 0.00 | 0.00 | 0 | 0, 0 | 22 |
| Obs | 0.08 | 0.29 |  |  | 493 |
| Phylo |  |  | 0 | 0, 0 |  |
| Total |  |  | 0.49 | 0.46, 0.52 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | -0.04 | -0.09, 0.01 | -1.44 | -0.64, 0.56 | 0.15 |
| **Inverts** | | | | | |
| ***SMD*** | | | | | |
| Q=2678.23 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *I2* | *95% CIs* | *n* |
| Study ID | 0.90 | 0.95 | 0.70 | 0.60, 0.79 | 37 |
| Species Name | 0 | 0 | 0 | 0, 0 | 36 |
| Obs | 0.31 | 0.56 |  |  | 422 |
| Phylo |  |  | 0 | 0, 0 |  |
| Total |  |  | 0.96 | 0.94, 0.97 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.30 | -0.02, 0.62 | 1.82 | -1.89, 2.48 | 0.07 |
| ***lnCVR*** |  |  |  |  |  |
| Q=1459.70 | P<0.0001 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *I2* | *95% CIs* | *n* |
| Study ID | 0.04 | 0.20 | 0.20 | 0.13, 0.28 | 37 |
| Species Name | 0 | 0.06 | 0.02 | 0.01, 0.02 | 36 |
| Obs | 0.11 | 0.33 |  |  | 422 |
| Phylo |  |  | 0.02 | 0.01, 0.03 |  |
| Total |  |  | 0.76 | 0.74, 0.79 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.00 | -0.11, 0.10 | -0.04 | -0.77, 0.76 | 0.97 |
| **Mammals** | | | | | |
| ***SMD*** | | | | | |
| Q=2218.15 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *I2* | *95% CIs* | *n* |
| Study ID | 0.10 | 0.31 | 0.23 | 0.16, 0.29 | 61 |
| Species Name | 0.08 | 0.29 | 0.19 | 0.13, 0.26 | 45 |
| Obs | 0.16 | 0.39 |  |  | 674 |
| Phylo |  |  | 0.24 | 0.16, 0.33 |  |
| Total |  |  | 0.78 | 0.75, 0.81 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.08 | -0.28, 0.45 | 0.44 | -1.10, 1.27 | 0.66 |
| ***lnCVR*** |  |  |  |  |  |
| Q=1074.96 | P<0.0001 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *I2* | *95% CIs* | *n* |
| Study ID | 0.03 | 0.18 | 0.17 | 0.12, 0.22 | 61 |
| Species Name | 0.05 | 0.22 | 0.25 | 0.18, 0.34 | 45 |
| Obs | 0.03 | 0.19 |  |  | 674 |
| Phylo |  |  | 0.43 | 0.31, 0.53 |  |
| Total |  |  | 0.60 | 0.55, 0.65 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.07 | -0.20, 0.34 | 0.51 | -0.64, 0.79 | 0.61 |
| **Reptiles / Amphibians** | | | | | |
| ***SMD*** | | | | | |
| Q=163.37 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *I2* | *95% CIs* | *n* |
| Study ID | 0.03 | 0.17 | 0.15 | 0.06, 0.28 | 11 |
| Species Name | 0 | 0.01 | 0 | 0, 0 | 10 |
| Obs | 0.05 | 0.23 |  |  | 95 |
| Phylo |  |  | 0 | 0, 0 |  |
| Total |  |  | 0.45 | 0.36, 0.54 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.07 | -0.08, 0.22 | 0.94 | -0.52, 0.67 | 0.35 |
| ***lnCVR*** |  |  |  |  |  |
| Q=77.72 | P=0.89 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *I2* | *95% CIs* | *n* |
| Study ID | 0 | 0.02 | 0 | 0, 0 | 11 |
| Species Name | 0 | 0.02 | 0 | 0, 0.01 | 10 |
| Obs | 0 | 0 |  |  | 95 |
| Phylo |  |  | 0.65 | 0.34, 0.87 |  |
| Total |  |  | 0.01 | 0.00, 0.01 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.05 | -0.04, 0.14 | 1.13 | -0.06, 0.15 | 0.26 |

**Table S2.** Multi-level meta-regression model output for each of the five taxonomic groups with personality trait type as a moderator variable. Here we compare mean differences (SMD) and variability (lnCVR) between males and females for each of the five personality trait types. F scores are tests of how well the moderator, trait type, explains variance.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Birds** | | | | | |
| ***SMD*** | | | | | |
| QE=2670.89 | P<0.0001 |  | | | |
| F=3.76 | P=0.002 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.59 | 0.77 | 50 |  |  |
| Species Name | 0 | 0.01 | 106 |  |  |
| Obs | 0.16 | 0.40 | 483 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.14 | -0.43, 0.15 | -0.93 | -1.90, 1.62 | 0.35 |
| Aggression | -0.14 | -0.43, 0.14 | -0.97 | -1.90, 1.62 | 0.33 |
| Boldness | -0.19 | -0.44, 0.06 | -1.50 | -1.95, 1.56 | 0.13 |
| Exploration | 0.09 | -0.18, 0.36 | 0.66 | -1.67, 1.85 | 0.51 |
| **Sociality** | **-0.68** | **-1.16, -0.21** | **-2.81** | **-2.48, 1.12** | **0.005\*\*** |
| ***lnCVR*** |  |  |  |  |  |
| QE=3711.80 | P<0.0001 |  |  |  |  |
| F=1.17 | P=0.32 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.31 | 0.55 | 50 |  |  |
| Species Name | 0 | 0 | 106 |  |  |
| Obs | 0.39 | 0.62 | 483 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | 0.05 | -0.24, 0.34 | 0.36 | -1.61, 1.71 | 0.72 |
| Aggression | -0.07 | -0.39, 0.25 | -0.41 | -1.74, 1.60 | 0.68 |
| Boldness | -0.01 | -0.23, 0.22 | -0.04 | -1.66, 1.65 | 0.97 |
| Exploration | -0.25 | -0.50, 0.01 | -1.92 | -1.91, 1.41 | 0.06 |
| Sociality | 0.14 | -0.38, 0.66 | 0.53 | -1.58, 1.86 | 0.60 |
| **Fish** | | | | | |
| ***SMD*** | | | | | |
| QE=1347.79 | P<0.0001 |  | | | |
| F=1.80 | P=0.11 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.03 | 0.17 | 44 |  |  |
| Species Name | 0.10 | 0.32 | 22 |  |  |
| Obs | 0.13 | 0.37 | 493 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.16 | -0.65, 0.33 | -0.63 | -1.28, 0.97 | 0.53 |
| Aggression | -0.05 | -0.52, 0.42 | -0.22 | -1.17, 1.06 | 0.83 |
| Boldness | -0.16 | -0.63, 0.32 | -0.65 | -1.27, 0.96 | 0.52 |
| Exploration | -0.05 | -0.54, 0.44 | -0.20 | -1.17, 1.07 | 0.84 |
| Sociality | -0.40 | -1.53, 0.73 | -1.55 | -1.53, 0.73 | 0.12 |
| ***lnCVR*** |  |  |  |  |  |
| QE=915.16 | P<0.0001 |  |  |  |  |
| F=1.14 | P=0.34 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.01 | 0.10 | 44 |  |  |
| Species Name | 0 | 0 | 22 |  |  |
| Obs | 0.08 | 0.29 | 493 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.03 | -0.16, 0.09 | -0.49 | -0.65, 0.58 | 0.63 |
| **Aggression** | **-0.13** | **-0.25, -0.01** | **-2.10** | **-0.74, 0.49** | **0.04\*** |
| Boldness | -0.02 | -0.11, 0.06 | -0.54 | -0.63, 0.59 | 0.59 |
| Exploration | -0.03 | -0.65, 0.58 | -0.50 | -0.65, 0.58 | 0.62 |
| Sociality | 0.07 | -0.56, 0.69 | 0.72 | -0.56, 0.69 | 0.47 |
| **Inverts** | | | | | |
| ***SMD*** | | | | | |
| QE=2657.20 | P<0.0001 |  | | | |
| F=1.46 | P=0.02 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.92 | 0.96 | 37 |  |  |
| Species Name | 0 | 0 | 36 |  |  |
| Obs | 0.32 | 0.56 | 422 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | 0.33 | -0.04, 0.70 | 1.77 | -1.89, 2.55 | 0.08 |
| Aggression | 0.35 | -0.36, 1.06 | 0.97 | -1.95, 2.65 | 0.33 |
| Boldness | 0.31 | -0.05, 0.67 | 1.70 | -1.91, 2.53 | 0.09 |
| Exploration | 0.00 | -0.44, 0.45 | 0.02 | -2.23, 2.37 | 0.98 |
| Sociality | 0.39 | -0.38, 1.16 | 1.00 | -1.93, 2.71 | 0.32 |
| ***lnCVR*** |  |  |  |  |  |
| QE=1427.81 | P<0.0001 |  |  |  |  |
| F=1.03 | P=0.40 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.03 | 0.18 | 37 |  |  |
| Species Name | 0 | 0 | 36 |  |  |
| Obs | 0.09 | 0.30 | 422 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.06 | -0.19, 0.08 | -0.83 | -0.82, 0.70 | 0.40 |
| Aggression | 0.17 | -0.10, 0.43 | 1.22 | -0.63, 0.96 | 0.22 |
| Boldness | -0.04 | -0.15, 0.08 | -0.61 | -0.79, 0.72 | 0.55 |
| Exploration | 0.07 | -0.12, 0.26 | 0.73 | -0.70, 0.84 | 0.47 |
| Sociality | 0.27 | -0.14, 0.68 | 1.29 | -0.59, 1.12 | 0.20 |
| **Mammals** | | | | | |
| ***SMD*** | | | | | |
| QE=2158.51 | P<0.0001 |  | | | |
| F=1.40 | P=0.22 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.13 | 0.36 | 61 |  |  |
| Species Name | 0.07 | 0.26 | 45 |  |  |
| Obs | 0.15 | 0.39 | 674 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.17 | -0.56, 0.23 | -0.84 | -1.38, 1.05 | 0.40 |
| Aggression | 0.10 | -0.27, 0.48 | 0.55 | -1.10, 1.31 | 0.59 |
| Boldness | 0.15 | -0.20, 0.50 | 0.85 | -1.05, 1.35 | 0.39 |
| Exploration | 0.05 | -0.31, 0.41 | 0.26 | -1.56, 1.25 | 0.79 |
| Sociality | 0.09 | -0.29, 0.47 | 0.46 | -1.12, 1.30 | 0.64 |
| ***lnCVR*** |  |  |  |  |  |
| QE=1044.60 | P<0.0001 |  |  |  |  |
| F=0.26 | P=0.93 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.03 | 0.18 | 61 |  |  |
| Species Name | 0 | 0 | 45 |  |  |
| Obs | 0.09 | 0.30 | 674 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | 0.10 | -0.20, 0.41 | 0.67 | -0.64, 0.85 | 0.50 |
| Aggression | 0.11 | -0.20, 0.42 | 0.69 | -0.64, 0.85 | 0.49 |
| Boldness | 0.06 | -0.22, 0.34 | 0.43 | -0.67, 0.79 | 0.67 |
| Exploration | 0.04 | -0.25, 0.34 | 0.28 | -0.69, 0.78 | 0.78 |
| Sociality | 0.06 | -0.25, 0.37 | 0.39 | -0.68, 0.80 | 0.70 |
| **Reptiles / Amphibians** | | | | | |
| ***SMD*** | | | | | |
| QE=151.82 | P<0.0001 |  | | | |
| F=1.29 | P=0.28 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.02 | 0.13 | 11 |  |  |
| Species Name | 0 | 0 | 10 |  |  |
| Obs | 0.06 | 0.24 | 95 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.05 | -0.45, 0.36 | -0.23 | -0.72, 0.63 | 0.82 |
| Aggression | -0.07 | -0.32, 0.19 | -0.52 | -0.66, 0.53 | 0.60 |
| Boldness | 0.12 | -0.09, 0.33 | 1.11 | -0.46, 0.70 | 0.27 |
| **Exploration** | **0.25** | **0.05, 0.45** | **2.44** | **-0.33, 0.83** | **0.02\*** |
| Sociality | -0.05 | -0.60, 0.50 | -0.18 | -0.82, 0.73 | 0.86 |
| ***lnCVR*** |  |  |  |  |  |
| QE=73.79 | P=0.89 |  |  |  |  |
| F=1.31 | P=0.27 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.04 | 0.20 | 11 |  |  |
| Species Name | 0 | 0 | 10 |  |  |
| Obs | 0 | 0 | 95 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.11 | -0.51, 0.29 | -0.53 | -0.67, 0.46 | 0.60 |
| Aggression | 0.33 | -0.05, 0.72 | 1.73 | -0.22, 0.89 | 0.09 |
| Boldness | 0.10 | -0.13, 0.33 | 0.83 | -0.36, 0.56 | 0.41 |
| Exploration | -0.10 | -0.35, 0.14 | -0.84 | -0.57, 0.36 | 0.40 |
| Sociality | -0.12 | -0.76, 0.52 | -0.38 | -0.87, 0.63 | 0.70 |

**Table S3.** Subset meta-analysis models for each of the taxonomic groups /personality trait types where we could include sexual size dimorphism (SSD) as a moderator.There were not enough data to run models for the trait type Sociality, or for any trait for Reptiles/Amphibians. Intercept shows mean difference between males and females when SSD is 0 (no sexual size dimorphism), with the slope for SSD showing the mean difference when males become larger than females (positive SSD).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Activity*** |  |  |  |  |
| **Inverts** |  |  |  |  |
| ***SMD*** |  |  |  |  |
| QE = 1069.50 | P<0.0001 |  |  |  |
| F=0.67 | P=0.41 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 2.23 | 1.49 | 18 |  |
| Species Name | 0 | 0.01 | 16 |  |
| Obs | 0.15 | 0.39 | 165 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | 0.31 | -0.42, 1.04 | 0.83 | 0.38 |
| SSD | -0.66 | -2.26, 0.93 | -0.82 | 0.70 |
| ***lnCVR*** |  |  |  |  |
| QE = 475.98 | P = 0.12 |  |  |  |
| F = 0.45 | P = 0.50 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.12 | 0.35 | 18 |  |
| Species Name | 0 | 0 | 16 |  |
| Obs | 0.05 | 0.23 | 165 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | -0.04 | -0.25, 0.17 | -0.36 | 0.72 |
| SSD | 0.27 | -0.53, 1.07 | 0.67 | 0.50 |
| **Mammals** |  |  |  |  |
| ***SMD*** |  |  |  |  |
| QE = 321.40 | P<0.0001 |  |  |  |
| F=5.46 | P=0.02 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.10 | 0.32 | 14 |  |
| Species Name | 2.13 | 1.46 | 12 |  |
| Obs | 0.21 | 0.45 | 84 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | 0.44 | -1.74, 2.62 | 0.40 | 0.69 |
| **SSD** | **-2.16** | **-3.99, -0.32** | **-2.34** | **0.02\*** |
| ***lnCVR*** |  |  |  |  |
| QE = 146.26 | P <0.0001 |  |  |  |
| F = 5.46 | P = 0.02 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.03 | 0.32 | 14 |  |
| Species Name | 2.13 | 1.46 | 12 |  |
| Obs | 0.21 | 0.45 | 84 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | 0.05 | -0.15, 0.25 | 0.52 | 0.60 |
| SSD | 0.13 | -0.56, 0.81 | 0.36 | 0.72 |
| ***Aggression*** |  |  |  |  |
| **Fish** |  |  |  |  |
| ***SMD*** |  |  |  |  |
| QE=334.17 | P<0.0001 |  |  |  |
| F=0.23 | P=0.63 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.02 | 0.14 | 16 |  |
| Species Name | 0.33 | 0.58 | 13 |  |
| Obs | 0.17 | 0.41 | 93 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | -0.16 | -0.96, 0.63 | -0.41 | 0.68 |
| SSD | 0.27 | -0.84, 1.37 | 0.48 | 0.63 |
| ***lnCVR*** |  |  |  |  |
| QE=68.27 | P=0.96 |  |  |  |
| F=0.15 | P=0.70 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.02 | 0.15 | 16 |  |
| Species Name | 0 | 0 | 13 |  |
| Obs | 0 | 0 | 93 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| **Intercept** | **-0.12** | **-0.23, 0.00** | **-1.95** | **0.05\*** |
| SSD | -0.13 | -0.81, 0.55 | -0.39 | 0.70 |
| **Mammals** |  |  |  |  |
| ***SMD*** |  |  |  |  |
| QE=313.78 | P<0.0001 |  |  |  |
| F=3.92 | P=0.05 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0 | 0 | 15 |  |
| Species Name | 0.69 | 0.83 | 13 |  |
| Obs | 0.14 | 0.38 | 85 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | -0.09 | -1.29, 1.10 | -0.16 | 0.88 |
| **SSD** | **1.36** | **-0.01, 2.73** | **1.98** | **0.05\*** |
| ***lnCVR*** |  |  |  |  |
| QE=201.50 | P<0.0001 |  |  |  |
| F=0.01 | P=0.94 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.18 | 0.42 | 15 |  |
| Species Name | 0 | 0.01 | 13 |  |
| Obs | 0.15 | 0.39 | 85 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | 0.09 | -0.21, 0.39 | 0.59 | 0.56 |
| SSD | -0.05 | -1.43, 1.33 | -0.07 | 0.94 |
| ***Boldness*** |  |  |  |  |
| **Birds** |  |  |  |  |
| ***SMD*** |  |  |  |  |
| QE=1592.83 | P<0.0001 |  |  |  |
| F=0.15 | P=0.70 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 1.82 | 1.35 | 21 |  |
| Species Name | 0 | 0.01 | 78 |  |
| Obs | 0.11 | 0.33 | 233 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | -0.27 | -0.87, 0.33 | -0.88 | 0.38 |
| SSD | -0.23 | -1.45, 0.98 | -0.38 | 0.70 |
| ***lnCVR*** |  |  |  |  |
| QE=256.10 | P=0.12 |  |  |  |
| F=0.59 | P=0.44 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0 | 0 | 21 |  |
| Species Name | 0 | 0.06 | 78 |  |
| Obs | 0 | 0 | 233 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | 0.03 | -0.04, 0.11 | 0.89 | 0.37 |
| SSD | 0.11 | -0.16, 0.37 | 0.77 | 0.44 |
| **Fish** |  |  |  |  |
| ***SMD*** |  |  |  |  |
| QE=614.58 | P<0.0001 |  |  |  |
| F=1.07 | P=0.30 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.02 | 0.13 | 23 |  |
| Species Name | 0.03 | 0.16 | 12 |  |
| Obs | 0.06 | 0.24 | 172 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | -0.04 | -0.33, 0.25 | -0.28 | 0.78 |
| SSD | 0.10 | -0.31, 0.52 | 0.49 | 0.63 |
| ***lnCVR*** |  |  |  |  |
| QE=307.62 | P<0.0001 |  |  |  |
| F=0.24 | P=0.63 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.18 | 0.42 | 23 |  |
| Species Name | 0 | 0.01 | 12 |  |
| Obs | 0.15 | 0.39 | 172 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | 0.09 | -0.21, 0.39 | 0.59 | 0.56 |
| SSD | -0.05 | -1.43, 1.33 | -0.07 | 0.94 |
| **Inverts** |  |  |  |  |
| ***SMD*** |  |  |  |  |
| QE=923.09 | P<0.0001 |  |  |  |
| F=0.46 | P=0.50 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.90 | 0.31 | 22 |  |
| Species Name | 0 | 0 | 22 |  |
| Obs | 0.32 | 0.56 | 161 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | 0.18 | -0.03, 0.38 | 1.68 | 0.09 |
| SSD | 0.28 | -0.54, 1.10 | 0.68 | 0.50 |
| ***lnCVR*** |  |  |  |  |
| QE=561.57 | P<0.0001 |  |  |  |
| F=0.00 | P=0.95 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.03 | 0.16 | 22 |  |
| Species Name | 0 | 0.01 | 22 |  |
| Obs | 0.10 | 0.32 | 161 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | -0.04 | -0.16, 0.09 | -0.58 | 0.56 |
| SSD | 0.02 | -0.47, 0.51 | 0.07 | 0.95 |
| **Mammals** |  |  |  |  |
| ***SMD*** |  |  |  |  |
| QE=402.76 | P<0.0001 |  |  |  |
| F=0.92 | P=0.34 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.02 | 0.16 | 26 |  |
| Species Name | 0 | 0.05 | 26 |  |
| Obs | 0.15 | 0.39 | 163 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | 0.09 | -0.09, 0.27 | 0.96 | 0.34 |
| SSD | -0.16 | -0.50, 0.17 | -0.96 | 0.34 |
| ***lnCVR*** |  |  |  |  |
| QE=175.27 | P<0.0001 |  |  |  |
| F=0.88 | P=0.35 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0 | 0.03 | 26 |  |
| Species Name | 0 | 0 | 26 |  |
| Obs | 0.02 | 0.14 | 163 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | 0.07 | -0.03, 0.16 | 1.37 | 0.16 |
| SSD | 0.08 | -0.09, 0.25 | 0.94 | 0.35 |
| ***Exploration*** |  |  |  |  |
| **Mammals** |  |  |  |  |
| ***SMD*** |  |  |  |  |
| QE=658.46 | P<0.0001 |  |  |  |
| F=0.04 | P=0.85 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.05 | 0.22 | 19 |  |
| Species Name | 0 | 0 | 16 |  |
| Obs | 0.13 | 0.36 | 213 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | 0.00 | -0.18, 0.18 | -0.02 | 0.99 |
| SSD | -0.05 | -0.60, 0.50 | -0.19 | 0.85 |
| ***lnCVR*** |  |  |  |  |
| QE=361.16 | P<0.0001 |  |  |  |
| F=0.27 | P=0.61 |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |
| Study ID | 0.02 | 0.14 | 19 |  |
| Species Name | 0.03 | 0.16 | 16 |  |
| Obs | 0.03 | 0.18 | 213 |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* |
| Intercept | -0.06 | -0.36, 0.24 | -0.40 | 0.69 |
| SSD | 0.13 | -0.37, 0.64 | 0.52 | 0.61 |

**Table S4.** Sensitivity meta-regression models for each of the taxonomic groups with personality and precision both included as moderator terms. Including precision in our full trait models allows us to look for evidence of publication bias (as indicated when the slope for precision is significant). See Methods for calculation of precision.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Birds** | | | | | |
| ***SMD*** | | | | | |
| QE=2670.88 | P<0.0001 |  | | | |
| F=3.20 | P=0.004 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.65 | 0.81 | 50 |  |  |
| Species Name | 0 | 0 | 106 |  |  |
| Obs | 0.14 | 0.38 | 483 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *p-value* |  |
| Activity | -0.20 | -0.54, 0.14 | -1.16 | 0.25 |  |
| Aggression | -0.21 | -0.56, 0.14 | -1.19 | 0.23 |  |
| Boldness | -0.26 | -0.57, 0.05 | -1.16 | 0.11 |  |
| Exploration | 0.03 | -0.29, 0.35 | 0.18 | 0.86 |  |
| **Sociality** | **-0.74** | **-1.25, -0.24** | **-2.88** | **0.004\*\*** |  |
| Precision | 0.01 | -0.02, 0.05 | 0.69 | 0.49 |  |
| ***lnCVR*** |  |  |  |  |  |
| QE=3683.35 | P<0.0001 |  |  |  |  |
| F=0.99 | P=0.43 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.31 | 0.56 | 50 |  |  |
| Species Name | 0 | 0 | 106 |  |  |
| Obs | 0.39 | 0.62 | 483 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *p-value* |  |
| Activity | 0.04 | -0.29, 0.36 | 0.21 | 0.83 |  |
| Aggression | -0.09 | -0.43, 0.26 | -0.48 | 0.63 |  |
| Boldness | -0.03 | -0.30, 0.25 | -0.18 | 0.86 |  |
| Exploration | -0.27 | -0.58, 0.04 | -1.73 | 0.08 |  |
| Sociality | 0.12 | -0.42, 0.66 | 0.44 | 0.66 |  |
| Precision | 0.00 | -0.03, 0.04 | 0.26 | 0.80 |  |
| **Fish** | | | | | |
| ***SMD*** | | | | | |
| QE=1342.38 | P<0.0001 |  | | | |
| F=1.56 | P=0.16 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.03 | 0.17 | 44 |  |  |
| Species Name | 0.11 | 0.32 | 22 |  |  |
| Obs | 0.13 | 0.37 | 493 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *p-value* |  |
| Activity | -0.23 | -0.79, 0.33 | -0.81 | 0.42 |  |
| Aggression | -0.11 | -0.63, 0.41 | -0.43 | 0.67 |  |
| Boldness | -0.22 | -0.76, 0.31 | -0.82 | 0.41 |  |
| Exploration | -0.11 | -0.64, 0.42 | -0.40 | 0.69 |  |
| Sociality | -0.47 | -1.03, 0.09 | -1.64 | 0.10 |  |
| Precision | 0.02 | -0.05, 0.08 | 0.55 | 0.58 |  |
| ***lnCVR*** |  |  |  |  |  |
| QE=912.54 | P<0.0001 |  |  |  |  |
| F=0.98 | P=0.44 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.01 | 0.10 | 44 |  |  |
| Species Name | 0 | 0 | 22 |  |  |
| Obs | 0.08 | 0.29 | 493 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *p-value* |  |
| Activity | -0.07 | -0.26, 0.13 | -0.67 | 0.50 |  |
| **Aggression** | -0.15 | -0.32, 0.01 | -1.83 | 0.07 |  |
| Boldness | -0.06 | -0.22, 0.11 | -0.67 | 0.50 |  |
| Exploration | -0.06 | -0.22, 0.11 | -0.68 | 0.50 |  |
| Sociality | 0.03 | -0.19, 0.26 | 0.29 | 0.77 |  |
| Precision | 0.01 | -0.03, 0.05 | 0.46 | 0.65 |  |
| **Inverts** | | | | | |
| ***SMD*** | | | | | |
| QE=2656.83 | P<0.0001 |  | | | |
| F=2.58 | P=0.02 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.87 | 0.93 | 37 |  |  |
| Species Name | 0 | 0 | 36 |  |  |
| Obs | 0.32 | 0.57 | 422 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *p-value* |  |
| **Activity** | **0.62** | **0.21, 1.03** | **2.95** | **0.003\*\*** |  |
| Aggression | 0.66 | -0.08, 1.39 | 1.76 | 0.08 |  |
| **Boldness** | **0.63** | **0.22, 1.05** | **2.99** | **0.003\*\*** |  |
| Exploration | 0.33 | -0.17, 0.82 | 1.30 | 0.19 |  |
| Sociality | 0.75 | -0.06, 1.56 | 1.83 | 0.07 |  |
| **Precision** | **-0.08** | **-0.13, -0.02** | **-2.84** | **0.005\*\*** |  |
| ***lnCVR*** |  |  |  |  |  |
| QE=1427.27 | P<0.0001 |  |  |  |  |
| F=0.87 | P=0.52 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.04 | 0.19 | 37 |  |  |
| Species Name | 0 | 0 | 36 |  |  |
| Obs | 0.11 | 0.33 | 422 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *p-value* |  |
| Activity | -0.07 | -0.23, 0.09 | -0.84 | 0.40 |  |
| Aggression | 0.16 | -0.13, 0.44 | 0.19 | 0.85 |  |
| Boldness | -0.05 | -0.21, 0.11 | -0.30 | 0.76 |  |
| Exploration | 0.06 | -0.16, 0.27 | 0.56 | 0.58 |  |
| Sociality | 0.26 | -0.17, 0.68 | 1.41 | 0.16 |  |
| Precision | 0.00 | -0.02, 0.03 | -0.03 | 0.97 |  |
| **Mammals** | | | | | |
| ***SMD*** | | | | | |
| QE=2147.01 | P<0.0001 |  | | | |
| F=1.36 | P=0.23 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.13 | 0.36 | 61 |  |  |
| Species Name | 0.05 | 0.23 | 45 |  |  |
| Obs | 0.15 | 0.39 | 674 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *p-value* |  |
| Activity | -0.05 | -0.47, 0.37 | -0.24 | 0.81 |  |
| Aggression | 0.23 | -0.18, 0.64 | 1.10 | 0.27 |  |
| Boldness | 0.27 | -0.12, 0.65 | 1.37 | 0.17 |  |
| Exploration | 0.17 | -0.23, 0.56 | 0.82 | 0.41 |  |
| Sociality | 0.22 | -0.20, 0.63 | 1.02 | 0.31 |  |
| Precision | -0.03 | -0.09, 0.03 | -1.04 | 0.30 |  |
| ***lnCVR*** |  |  |  |  |  |
| QE=1039.19 | P<0.0001 |  |  |  |  |
| F=0.26 | P=0.95 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.04 | 0.19 | 61 |  |  |
| Species Name | 0.04 | 0.21 | 45 |  |  |
| Obs | 0.04 | 0.19 | 674 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *p-value* |  |
| Activity | 0.08 | -0.23, 0.39 | 0.48 | 0.63 |  |
| Aggression | 0.08 | -0.23, 0.39 | 0.51 | 0.61 |  |
| Boldness | 0.03 | -0.26, 0.32 | 0.21 | 0.83 |  |
| Exploration | 0.01 | -0.29, 0.31 | 0.09 | 0.93 |  |
| Sociality | 0.03 | -0.28, 0.34 | 0.20 | 0.84 |  |
| Precision | 0.01 | -0.02, 0.03 | 0.51 | 0.61 |  |
| **Reptiles / Amphibians** | | | | | |
| ***SMD*** | | | | | |
| QE=149.09 | P<0.0001 |  | | | |
| F=1.14 | P=0.35 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.03 | 0.16 | 11 |  |  |
| Species Name | 0 | 0 | 10 |  |  |
| Obs | 0.05 | 0.23 | 95 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *p-value* |  |
| Activity | 0.66 | -0.43, 1.74 | 1.20 | 0.23 |  |
| Aggression | 0.80 | -0.51, 2.11 | 1.21 | 0.23 |  |
| Boldness | 0.78 | -0.19, 1.76 | 1.60 | 0.11 |  |
| Exploration | 0.87 | -0.06, 1.79 | 1.86 | 0.07 |  |
| Sociality | 0.60 | -0.45, 1.66 | 1.14 | 0.26 |  |
| Precision | -0.23 | -0.56, 0.10 | -1.40 | 0.17 |  |
| ***lnCVR*** |  |  |  |  |  |
| QE=73.63 | P=0.88 |  |  |  |  |
| F=1.10 | P=0.37 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.04 | 0.20 | 11 |  |  |
| Species Name | 0 | 0 | 10 |  |  |
| Obs | 0 | 0 | 95 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *p-value* |  |
| Activity | -0.14 | -0.76, 0.49 | -0.43 | 0.67 |  |
| Aggression | 0.32 | -0.19, 0.82 | 1.24 | 0.22 |  |
| Boldness | 0.07 | -0.42, 0.56 | 0.28 | 0.78 |  |
| Exploration | -0.13 | -0.55, 0.30 | -0.59 | 0.56 |  |
| Sociality | -0.14 | -0.85, 0.56 | -0.40 | 0.69 |  |
| Precision | 0.01 | -0.12, 0.14 | 0.12 | 0.90 |  |

**Table S5.** Primary and secondary keyword searches used for our literature search conducted on 11 December 2018. Keyword searches differed slightly to account for how operator terms are employed by each database. The searches were further refined by using relevant biological categories in ISI or SCOPUS.

|  |  |  |
| --- | --- | --- |
|  | ***ISI Web of Science*** | ***SCOPUS*** |
| *Primary keyword search terms* | (personalit\* OR “behavioural syndrome\*” OR “behavioral syndrome\*” OR temperament) AND (sex\*) NOT (man OR men OR woman OR women OR human) | personalit\* OR “behavioural syndrome” OR “behavioral syndrome” OR temperament AND sex AND NOT man AND NOT woman AND NOT human |
| *Secondary keyword search terms* | animal\* AND behav\* AND (bold\* OR shy\* OR neoph\* OR aggress\* OR explor\* OR hid\*) AND “sex differences” NOT man NOT woman NOT human | animal\* AND (bold\* OR shy\* OR neoph\* OR aggress\* OR explor\* OR hid\*) AND “sex differences” AND NOT man AND NOT woman AND NOT human |
| *Refined by categories* | zoology, ecology, biology, multidisciplinary sciences, evolutionary biology | agriculture & biology |

**Table S6.** Sensitivity contrast models for each of the taxonomic groups with score data type included as a moderator. These models compare score data to the rest of the dataset (intercept) to see if effect sizes calculated from scores are significantly different from our transformed (and normally-distributed) effect size dataset.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Birds** | | | | | |
| ***SMD*** | | | | | |
| Q=2723.54 | P<0.0001 |  | | | |
| F=0.25 | P=0.62 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.59 | 0.77 | 50 |  |  |
| Species Name | 0 | 0.01 | 106 |  |  |
| Obs | 0.16 | 0.40 | 483 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* | *k* |
| Intercept | -0.12 | -0.352, 0.11 | -1.02 | 0.31 | 426 |
| Scores | -0.06 | -0.30, 0.18 | -0.50 | 0.62 | 57 |
| ***lnCVR*** | | | | | |
| Q=3819.02 | P<0.0001 |  | | | |
| F=0.02 | P=0.88 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.01 | 0.12 | 50 |  |  |
| Species Name | 0.36 | 0.6 | 106 |  |  |
| Obs | 0.4 | 0.63 | 483 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* | *k* |
| Intercept | -0.15 | -0.66, 0.36 | -0.57 | 0.57 | 426 |
| Scores | 0.02 | -0.24, 0.28 | 0.16 | 0.88 | 57 |
| **Fish** | | | | | |
| ***SMD*** | | | | | |
| Q=1380.98 | P<0.0001 |  | | | |
| F=0.62 | P=0.43 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.04 | 0.21 | 44 |  |  |
| Species Name | 0.04 | 0.21 | 22 |  |  |
| Obs | 0.13 | 0.36 | 493 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* | *k* |
| Intercept | -0.07 | -0.40, 0.27 | -0.4 | 0.69 | 435 |
| Scores | 0.08 | -0.12, 0.28 | 0.79 | 0.43 | 58 |
| ***lnCVR*** | | | | | |
| Q=915.16 | P<0.0001 |  | | | |
| F=1.32 | P=0.25 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.01 | 0.07 | 44 |  |  |
| Species Name | 0 | 0 | 22 |  |  |
| Obs | 0.09 | 0.29 | 493 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* | *k* |
| Intercept | -0.03 | -0.08, 0.03 | -0.98 | 0.33 | 435 |
| Scores | -0.08 | -0.22, 0.06 | -1.15 | 0.25 | 58 |
| **Inverts** | | | | | |
| ***SMD*** | | | | | |
| Q=2891.60 | P<0.0001 |  | | | |
| F=4.45 | P=0.04 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.73 | 0.85 | 44 |  |  |
| Species Name | 0 | 0 | 41 |  |  |
| Obs | 0.27 | 0.52 | 483 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* | *k* |
| **Intercept** | **0.3** | **0.02, 0.57** | **2.12** | **0.03\*** | **422** |
| **Scores** | **-0.29** | **-0.57, -0.02** | **-2.11** | **0.04\*** | **61** |
| ***lnCVR*** | | | | | |
| Q=1536.77 | P<0.0001 |  | | | |
| F=1.92 | P=0.17 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.04 | 0.2 | 44 |  |  |
| Species Name | 0 | 0 | 41 |  |  |
| Obs | 0.09 | 0.3 | 483 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* | *k* |
| Intercept | 0.00 | -0.08, 0.08 | 0.00 | 0.999 | 422 |
| Scores | -0.11 | -0.26, 0.05 | -1.38 | 0.17 | 61 |
| **Mammals** | | | | | |
| ***SMD*** | | | | | |
| Q=2190.73 | P<0.0001 |  | | | |
| F=2.64 | P=0.10 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.1 | 0.32 | 61 |  |  |
| Species Name | 0.07 | 0.26 | 45 |  |  |
| Obs | 0.16 | 0.39 | 674 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* | *k* |
| Intercept | 0.13 | -0.21, 0.48 | 0.75 | 0.45 | 582 |
| Scores | -0.21 | -0.47, 0.04 | -1.62 | 0.10 | 92 |
| ***lnCVR*** | | | | | |
| Q=1074.89 | P<0.0001 |  | | | |
| F=0.14 | P=0.71 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.03 | 0.18 | 61 |  |  |
| Species Name | 0.05 | 0.23 | 45 |  |  |
| Obs | 0.03 | 0.19 | 674 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* | *k* |
| Intercept | 0.08 | -0.20, 0.36 | 0.55 | 0.58 | 582 |
| Scores | -0.03 | -0.22, 0.15 | -0.38 | 0.71 | 92 |
| **Reptiles / Amphibians** | | | | | |
| ***SMD*** | | | | | |
| Q=163.14 | P<0.0001 |  | | | |
| F=0.17 | P=0.68 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.03 | 0.19 | 11 |  |  |
| Species Name | 0 | 0.01 | 10 |  |  |
| Obs | 0.06 | 0.23 | 95 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* | *k* |
| Intercept | 0.06 | -0.11, 0.23 | 0.70 | 0.49 | 92 |
| Scores | -0.42 | -0.44, 0.67 | 0.42 | 0.68 | 3 |
| ***lnCVR*** | | | | | |
| Q=77.56 | P=0.88 |  | | | |
| F=0.23 | P=0.63 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0 | 0.01 | 11 |  |  |
| Species Name | 0 | 0.05 | 10 |  |  |
| Obs | 0 | 0.01 | 95 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *p-value* | *k* |
| Intercept | 0.06 | -0.04, 0.16 | 1.15 | 0.26 | 92 |
| Scores | -0.09 | -0.46, 0.28 | -0.48 | 0.63 | 3 |

**Table S7.** Intercept-only meta-analysis models for each of the taxonomic groups with the inclusion of our **D** matrix (*r* = 0.8) as a random effect (replacing *obs*). These sensitivity models check whether correlations between personality traits measured on the same individuals, and on the same trait types in the same study, significantly change the interpretation of our models.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Birds** | | | | | |
| ***SMD*** | | | | | |
| Q=2804.93 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.45 | 0.67 | 50 |  |  |
| Species Name | 0 | 0.01 | 106 |  |  |
| Obs | 0.27 | 0.52 | 483 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | -0.12 | -0.34, 0.97 | -1.09 | -1.80, 1.55 | 0.27 |
| ***lnCVR*** | | | | | |
| Q=3820.60 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0 | 0 | 50 |  |  |
| Species Name | 0 | 0 | 106 |  |  |
| Obs | 1.26 | 1.12 | 483 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | -0.05 | -0.23, 0.13 | -0.54 | -2.26, 2.16 | 0.59 |
| **Fish** | | | | | |
| ***SMD*** | | | | | |
| Q=1385.84 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.01 | 0.1 | 44 |  |  |
| Species Name | 0.02 | 0.13 | 22 |  |  |
| Obs | 0.26 | 0.51 | 493 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.05 | -0.19, 0.28 | 0.41 | -1.02, 1.12 | 0.68 |
| ***lnCVR*** | | | | | |
| Q=924.06 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0 | 0 | 44 |  |  |
| Species Name | 0 | 0 | 22 |  |  |
| Obs | 0.09 | 0.31 | 493 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | -0.03 | -0.09, 0.03 | -0.98 | -0.64, 0.57 | 0.33 |
| **Inverts** | | | | | |
| ***SMD*** | | | | | |
| Q=2678.23 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.9 | 0.95 | 37 |  |  |
| Species Name | 0 | 0 | 36 |  |  |
| Obs | 0.77 | 0.88 | 422 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.31 | -0.05, 0.67 | 1.69 | -2.26, 2.87 | 0.09 |
| ***lnCVR*** | | | | | |
| Q=1459.70 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.01 | 0.11 | 37 |  |  |
| Species Name | 0.01 | 0.08 | 36 |  |  |
| Obs | 0.24 | 0.49 | 422 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.00 | -0.13, 0.13 | -0.01 | -1.00, 1.00 | 0.99 |
| **Mammals** | | | | | |
| ***SMD*** | | | | | |
| Q=2218.15 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.02 | 0.15 | 61 |  |  |
| Species Name | 0.08 | 0.29 | 45 |  |  |
| Obs | 0.32 | 0.56 | 674 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.07 | -0.30, 0.43 | 0.36 | -1.26, 1.39 | 0.72 |
| ***lnCVR*** | | | | | |
| Q=1074.96 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.02 | 0.15 | 61 |  |  |
| Species Name | 0.12 | 0.13 | 45 |  |  |
| Obs | 0.04 | 0.21 | 674 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.05 | -0.12, 0.23 | 0.59 | -0.54, 0.65 | 0.55 |
| **Reptiles / Amphibians** | | | | | |
| ***SMD*** | | | | | |
| Q=163.37 | P<0.0001 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.03 | 0.18 | 11 |  |  |
| Species Name | 0 | 0.01 | 10 |  |  |
| Obs | 0.05 | 0.23 | 95 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.07 | -0.09, 0.23 | 0.84 | -0.54, 0.67 | 0.40 |
| ***lnCVR*** | | | | | |
| Q=77.72 | P=0.89 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0 | 0 | 11 |  |  |
| Species Name | 0 | 0.03 | 10 |  |  |
| Obs | 0.01 | 0.11 | 95 |  |  |
| *Model* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
|  | 0.05 | -0.05, 0.14 | 0.98 | -0.20, 0.30 | 0.33 |

**Table S8.** Multi-level meta-regression models for each of the taxonomic groups with personality trait type as a moderator and the inclusion of our D matrix (*r* = 0.8) as a random effect (reported here as *obs*). These sensitivity models check whether correlations between personality traits measured on the same individuals, or on the same trait types within the same study, significantly change the interpretation of our models.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Birds** | | | | | |
| ***SMD*** | | | | | |
| QE=2670.89 | P<0.0001 |  | | | |
| F=2.19 | P=0.05 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.52 | 0.72 | 50 |  |  |
| Species Name | 0 | 0 | 106 |  |  |
| Obs | 0.23 | 0.48 | 483 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.11 | -0.47, 0.25 | -0.60 | -1.85, 1.63 | 0.55 |
| Aggression | -0.05 | -0.39, 0.30 | -0.26 | -1.78, 1.69 | 0.79 |
| Boldness | -0.20 | -0.45, 0.06 | -1.51 | -1.92, 1.53 | 0.13 |
| Exploration | 0.03 | -0.24, 0.30 | 0.24 | -1.69, 1.76 | 0.81 |
| **Sociality** | **-0.60** | **-1.18, -0.02** | **-2.02** | **-2.40, 1.20** | **0.04\*** |
| ***lnCVR*** |  |  |  |  |  |
| QE=3711.80 | P<0.0001 |  |  |  |  |
| F=0.20 | P=0.96 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0 | 0 | 50 |  |  |
| Species Name | 0 | 0 | 106 |  |  |
| Obs | 1.27 | 1.13 | 483 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.24 | -0.73, 0.26 | -0.94 | -2.51, 2.04 | 0.35 |
| Aggression | -0.01 | -0.47, 0.45 | -0.04 | -2.27, 2.26 | 0.97 |
| Boldness | -0.03 | -0.27, 0.21 | -0.24 | -2.26, 2.20 | 0.81 |
| Exploration | -0.04 | -0.34, 0.26 | -0.25 | -2.28, 2.20 | 0.80 |
| Sociality | 0.08 | -0.63, 0.79 | 0.22 | -2.25, 2.41 | 0.82 |
| **Fish** | | | | | |
| ***SMD*** | | | | | |
| QE=1347.79 | P<0.0001 |  | | | |
| F=0.59 | P=0.71 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0 | 0 | 44 |  |  |
| Species Name | 0.06 | 0.24 | 22 |  |  |
| Obs | 0.26 | 0.51 | 493 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | 0.07 | -0.36, 0.50 | 0.31 | -1.12, 1.26 | 0.75 |
| Aggression | 0.05 | -0.35, 0.45 | 0.25 | -1.12, 1.23 | 0.80 |
| Boldness | -0.02 | -0.42, 0.37 | -0.12 | -1.20, 1.15 | 0.90 |
| Exploration | -0.01 | -0.43, 0.42 | -0.04 | -1.19, 1.17 | 0.97 |
| Sociality | -0.21 | -0.69, 0.26 | -0.87 | -1.41, 0.99 | 0.38 |
| ***lnCVR*** |  |  |  |  |  |
| QE=915.16 | P<0.0001 |  |  |  |  |
| F=1.04 | P=0.39 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0 | 0 | 44 |  |  |
| Species Name | 0 | 0 | 22 |  |  |
| Obs | 0.1 | 0.31 | 493 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.06 | -0.22, 0.11 | -0.71 | -0.69, 0.57 | 0.48 |
| **Aggression** | **-0.13** | **-0.26, 0.00** | **-1.95** | **-0.76, 0.50** | **0.05\*** |
| Boldness | 0.02 | -0.08, 0.12 | 0.46 | -0.60, 0.64 | 0.65 |
| Exploration | -0.04 | -0.19, 0.11 | -0.57 | -0.67, 0.59 | 0.57 |
| Sociality | 0.06 | -0.16, 0.28 | 0.55 | -0.59, 0.71 | 0.58 |
| **Inverts** | | | | | |
| ***SMD*** | | | | | |
| QE=2657.20 | P<0.0001 |  | | | |
| F=1.44 | P=0.21 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.88 | 0.94 | 37 |  |  |
| Species Name | 0 | 0 | 36 |  |  |
| Obs | 0.78 | 0.89 | 422 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| **Activity** | **0.56** | **0.12, 1.00** | **2.50** | **-2.01, 3.13** | **0.01\*** |
| Aggression | 0.22 | -0.71, 1.15 | 0.46 | -2.48, 2.92 | 0.65 |
| Boldness | 0.17 | -0.25, 0.59 | 0.79 | -2.40, 2.74 | 0.43 |
| Exploration | 0.10 | -0.52, 0.72 | 0.31 | -2.51, 2.71 | 0.76 |
| Sociality | 0.35 | -0.60, 1.31 | 0.72 | -2.35, 3.06 | 0.47 |
| ***lnCVR*** |  |  |  |  |  |
| QE=1427.81 | P<0.0001 |  |  |  |  |
| F=0.37 | P=0.87 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.01 | 0.1 | 37 |  |  |
| Species Name | 0.01 | 0.08 | 36 |  |  |
| Obs | 0.24 | 0.49 | 422 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.04 | -0.21, 0.13 | -0.47 | -1.06, 0.97 | 0.64 |
| Aggression | 0.16 | -0.22, 0.54 | 0.85 | -0.91, 1.23 | 0.40 |
| Boldness | -0.01 | -0.18, 0.16 | -0.14 | -1.03, 1.00 | 0.89 |
| Exploration | 0.07 | -0.21, 0.35 | 0.47 | -0.97, 1.11 | 0.64 |
| Sociality | 0.23 | -0.33, 0.79 | 0.79 | -0.92, 1.37 | 0.43 |
| **Mammals** | | | | | |
| ***SMD*** | | | | | |
| QE=2158.51 | P<0.0001 |  | | | |
| F=1.01 | P=0.41 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.03 | 0.16 | 61 |  |  |
| Species Name | 0.06 | 0.24 | 45 |  |  |
| Obs | 0.32 | 0.57 | 674 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.18 | -0.59, 0.22 | -0.90 | -1.50, 1.13 | 0.37 |
| Aggression | 0.16 | -0.23, 0.56 | 0.80 | -1.15, 1.47 | 0.42 |
| Boldness | 0.08 | -0.25, 0.41 | 0.48 | -1.22, 1.38 | 0.63 |
| Exploration | 0.01 | -0.35, 0.37 | 0.06 | -1.29, 1.31 | 0.95 |
| Sociality | 0.18 | -0.22, 0.58 | 0.87 | -1.14, 1.49 | 0.38 |
| ***lnCVR*** |  |  |  |  |  |
| QE=1044.60 | P<0.0001 |  |  |  |  |
| F=0.64 | P=0.67 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.02 | 0.15 | 61 |  |  |
| Species Name | 0.01 | 0.1 | 45 |  |  |
| Obs | 0.05 | 0.22 | 674 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | 0.11 | -0.09, 0.31 | 1.09 | -0.48, 0.70 | 0.28 |
| Aggression | 0.08 | -0.12, 0.28 | 0.76 | -0.51, 0.67 | 0.45 |
| Boldness | 0.06 | -0.10, 0.21 | 0.71 | -0.52, 0.63 | 0.48 |
| Exploration | 0.00 | -0.17, 0.18 | 0.03 | -0.58, 0.58 | 0.98 |
| Sociality | -0.03 | -0.24, 0.18 | -0.29 | -0.62, 0.56 | 0.77 |
| **Reptiles / Amphibians** | | | | | |
| ***SMD*** | | | | | |
| QE=151.82 | P<0.0001 |  | | | |
| F=1.20 | P=0.32 |  | | | |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.02 | 0.13 | 11 |  |  |
| Species Name | 0 | 0 | 10 |  |  |
| Obs | 0.06 | 0.25 | 95 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.07 | -0.50, 0.36 | -0.34 | -0.77, 0.62 | 0.73 |
| Aggression | -0.08 | -0.34, 0.19 | -0.57 | -0.69, 0.53 | 0.57 |
| Boldness | 0.12 | -0.12, 0.36 | 0.97 | -0.48, 0.72 | 0.33 |
| **Exploration** | **0.26** | **0.04, 0.49** | **2.32** | **-0.33, 0.86** | **0.02\*** |
| Sociality | -0.04 | -0.62, 0.53 | -0.15 | -0.84, 0.75 | 0.88 |
| ***lnCVR*** |  |  |  |  |  |
| QE=73.79 | P=0.89 |  |  |  |  |
| F=1.19 | P=0.32 |  |  |  |  |
| *Variance* | *Estimate* | *SQRT* | *n* |  |  |
| Study ID | 0.04 | 0.19 | 11 |  |  |
| Species Name | 0 | 0 | 10 |  |  |
| Obs | 0 | 0 | 95 |  |  |
| *Personality Trait* | *Estimate* | *95% CIs* | *t-score* | *Prediction Interval* | *p-value* |
| Activity | -0.11 | -0.52, 0.30 | -0.53 | -0.71, 0.49 | 0.60 |
| Aggression | 0.32 | -0.05, 0.70 | 1.71 | -0.25, 0.90 | 0.09 |
| Boldness | 0.10 | -0.14, 0.33 | 0.80 | -0.40, 0.59 | 0.42 |
| Exploration | -0.10 | -0.35, 0.15 | -0.81 | -0.60, 0.40 | 0.42 |
| Sociality | -0.11 | -0.76, 0.54 | -0.33 | -0.89, 0.67 | 0.74 |

**Table S9.** Studies included in our final dataset and used in our meta-analysis (also included in reference list, refs 71-271 in bold).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Study ID*** | ***Year Published*** | ***Article Title*** | ***Authors*** | ***Reference*** |
| P001 | 2012 | The Social Behavior of Brown Spider Monkeys (*Ateles hybridus*) in a Fragmented Forest in Colombia | Abondano, L.A.; Link, A. | (*71*) |
| P002 | 2018 | Personality links with lifespan in chimpanzees | Altschul, D.M.; Hopkins, W.D.; Herrelko, E.S.; Inoue-Murayama, M.; Matsuzawa, T.; King, J.E.; Ross, S.R.; Weiss, A. | (*72*) |
| P003 | 2014 | Selective aggressiveness in European free-tailed bats (*Tadarida teniotis*): Influence of familiarity, age and sex | Ancillotto, L.; Russo, D. | (*73*) |
| P004 | 2018 | Innovation as part of a wider behavioural syndrome in the guppy: The effect of sex and body size | Berdal, M.A.; Rosenqvist, G.; Wright, J. | (*74*) |
| P006 | 2009 | Sex-dependent use of information on conspecific feeding activities in an amphibian urodelian | Aragon, P. | (*75*) |
| P008 | 2011 | Variation in aggressive behaviour in the poeciliid fish *Brachyrhaphis episcopi*: Population and sex differences | Archard, G. A.; Braithwaite, V.A. | (*76*) |
| P009 | 2013 | Disassortative mating for boldness decreases reproductive success in the guppy | Ariyomo, T.O.; Watt, P.J. | (*77*) |
| P010 | 2013 | Aggression and sex differences in lateralization in the zebrafish | Ariyomo, T.O.; Watt, P.J. | (*78*) |
| P011 | 2015 | Effect of hunger level and time of day on boldness and aggression in the zebrafish *Danio rerio* | Ariyomo, T.O.; Watt, P.J. | (*79*) |
| P013 | 2018 | Repeatability and reliability of exploratory behavior in proactive and reactive zebrafish, *Danio rerio* | Baker, M.R.; Goodman, A.C.; Santo, J.B.; Wong, R.Y. | (*80*) |
| P014 | 2015 | Juvenile social relationships reflect adult patterns of behavior in wild geladas | Barale, C.L.; Rubenstein, D.I.; Beehner, J.C. | (*81*) |
| P015 | 2016 | Phenotype Matching and Early Social Conditions Affect Shoaling and Exploration Decisions | Barbosa, M.; Camacho-Cervantes, M.; Ojanguren, A.F. | (*82*) |
| P016 | 2016 | Predator-prey interactions mediated by prey personality and predator hunting mode | Belgrad, B.A.; Griffen, B.D. | (*83*) |
| P017 | 2016 | Sexually antagonistic selection on genetic variation underlying both male and female same-sex sexual behavior | Berger, D.; You, T.; Minano, M.R.; Grieshop, K.; Lind, M.I.; Arnqvist, G.; Maklakov, A.A. | (*84*) |
| P018 | 2012 | Experimental evidence that adult antipredator behaviour is heritable and not influenced by behavioural copying in a wild bird | Bize, P.; Diaz, C.; Lindström, J. | (*85*) |
| P019 | 2017 | Boldness towards novel objects predicts predator inspection in wild vervet monkeys | Blaszczyk, M.B. | (*86*) |
| P020 | 2013 | Cannibalism as an interacting phenotype: Precannibalistic aggression is influenced by social partners in the endangered Socorro Isopod (*Thermosphaeroma thermophilum*) | Bleakley, B.H.; Welter, S.M.; McCauley-Cole, K.; Shuster, S.M.; Moore, A.J. | (*87*) |
| P021 | 2005 | Sexually dimorphic patterns of space use throughout ontogeny in the spotted hyena (*Crocuta crocuta*) | Boydston, E.E.; Kapheim, K.M.; Van Horn, R.C.; Smale, L.; Holekamp, K.E. | (*88*) |
| P022 | 2014 | Individual variation in dispersal associated behavioral traits of the invasive Chinese mitten crab (*Eriocheir sinensis*, H. Milne Edwards, 1854) during initial invasion of Lake Vänern, Sweden | Brodin, T.; Drotz, M.K. | (*89*) |
| P023 | 2007 | Heritable and experiential effects on boldness in a tropical poeciliid | Brown, C.; Burgess, F.; Braithwaite, V.A. | (*90*) |
| P024 | 1999 | Differences in measures of exploration and fear in MHC-congenic C57BL/6J and B6-H-2K mice | Brown, R.E.; Corey, S.C.; Moore, A.K. | (*91*) |
| P025 | 1978 | SEX-DIFFERENCES, DOMINANCE, AND PERSONALITY IN CHIMPANZEE | Buirski, P.; Plutchik, R.; Kellerman, H. | (*92*) |
| P026 | 2015 | Similar nest defence strategies within pairs increase reproductive success in the eastern bluebird, *Sialia sialis* | Burtka, J.L.; Grindstaff, J.L. | (*93*) |
| P027 | 2016 | Into the wild: Developing field tests to examine the link between elasmobranch personality and laterality | Byrnes, E.E.; Pouca, C.V.; Chambers, S.L.; Brown, C. | (*94*) |
| P028 | 2011 | Personality traits and the effects of DHA supplementation in the budgerigar (*Melopsittacus* *undulatus*) | Callicrate, T.E.; Siewerdt, F.; Koutsos, E.; Estevez, I. | (*95*) |
| P029 | 2013 | Individual and spatio-temporal variations in the home range behaviour of a long-lived, territorial species | Campioni, L.; Delgado, M.M.; Lourenço, R.; Bastianelli, G.; Fernandez, N.; Penteriani, V. | (*96*) |
| P030 | 2017 | Mate similarity in foraging Kerguelen shags: A combined bio-logging and stable isotope investigation | Camprasse, E.C.M.; Cherel, Y.; Arnould, J.P.Y.; Hoskins, A.J.; Bustamante, P.; Bost, C.-A. | (*97*) |
| P031 | 2015 | Aggression and sociality: conflicting or complementary traits of a successful invader? | Capelle, P.M.; McCallum, E.S.; Balshine, S. | (*98*) |
| P032 | 2005 | Personalities in great tits, *Parus major*: Stability and consistency | Carere, C.; Drent, P.J.; Privitera, L.; Koolhaas, J.M.; Groothuis, T.G.G. | (*99*) |
| P033 | 2013 | Temperature-Specific Competition between Invasive Mosquitofish and an Endangered Cyprinodontid Fish | Carmona-Catot, G.; Magellan, K.; Carcêa-Berthou, E. | (*100*) |
| P034 | 2017 | Individual and sex differences in high and low responder phenotypes | Carreira, M.B.; Cossio, R.; Britton, G.B. | (*101*) |
| P035 | 2010 | Individual consistency in flight initiation distances in burrowing owls: A new hypothesis on disturbance-induced habitat selection | Carrete, M.; Tella, J.L. | (*102*) |
| P036 | 2013 | High individual consistency in fear of humans throughout the adult lifespan of rural and urban burrowing owls | Carrete, M.; Tella, J.L. | (*103*) |
| P037 | 2011 | Behavioral responses to physical vs. social novelty in male and female laboratory rats | Cavigelli, S.A.; Michael, K.C.; West, S.G.; Klein, L.C. | (*104*) |
| P039 | 2013 | Sex and the Syndrome: Individual and Population Consistency in Behaviour in Rock Pool Prawn *Palaemon elegans* | Chapman, B.B.; Hegg, A.; Ljungberg, P. | (*105*) |
| P040 | 2018 | Personality differentially affects individual mate choice decisions in female and male Western mosquitofish (*Gambusia affinis*) | Chen, B.-J.; Liu. K.; Zhou, L.-J.; Gomes-Silva, G.; Sommer-Trembo, C.; Plath, M. | (*106*) |
| P041 | 2015 | A strong genetic correlation underlying a behavioural syndrome disappears during development because of genotype-age interactions | Class, B.; Brommer, J.E. | (*107*) |
| P042 | 2015 | Long-Term Provision of Environmental Resources Alters Behavior but not Physiology or Neuroanatomy of Male and Female BALB/c and C57BL/6 Mice | Clipperton-Allen, A.E.; Ingrao, J.C.; Ruggiero, L.; Batista, L.; Ovari, J.; Hammermueller, J.; Armstrong, J.N.; Bienzle, D.; Choleris, E.; Turner, P.V. | (*108*) |
| P043 | 2002 | Counter aggression and reconciliation in Assamese macaques (*Macaca assamensis*) | Cooper, M.A.; Bernstein, I.S. | (*109*) |
| P045 | 2017 | Effects of captivity on house mice behaviour in a novel environment: Implications for conservation practices | Courtney Jones, S.K.; Munn, A.J.; Byrne, P.G. | (*110*) |
| P047 | 2011 | Boldness predicts social status in zebrafish (*Danio rerio*) | Dahlbom, S.J.; Lagman, D.; Lundstedt-Enkel, K.; Sundström, L.F.; Winberg, S. | (*111*) |
| P048 | 2012 | Are personality differences in a small iteroparous mammal maintained by a life-history trade-off? | Dammhahn, M. | (*112*) |
| P049 | 2014 | Shaping the antipredator strategy: Flexibility, consistency, and behavioral correlations under varying predation threat | David, M.; Salignon, M.; Perrot-Minnot, M.-J. | (*113*) |
| P050 | 2016 | Integrating the pace-of-life syndrome across species, sexes and individuals: Covariation of life history and personality under pesticide exposure | Debecker, S.; Sanmartên-Villar, I.; de Guinea-Luengo, M.; Cordero-Rivera, A.; Stoks, R. | (*114*) |
| P051 | 2015 | Short- and long-term repeatability of docility in the roe deer: Sex and age matter | Debeffe, L.; Lemaître, J.F.; Bergvall, U.A.; Hewison, A.J.M.; Gaillard, J.M.; Morellet, N.; Goulard, M.; Goulard, M.; Monestier, C.; David, M.; Verheyden-Tixier, H.; Jäderberg, L.; Vanpé, C.; Kjellander, P. | (*115*) |
| P052 | 2014 | The link between behavioural type and natal dispersal propensity reveals a dispersal syndrome in a large herbivore | Debeffe, L.; Morellet, N.; Bonnot, N.; Gaillard, J.M.; Cargnelutti, B.; Verheyden-Tixier, H.; Vanpé, C.; Coulon, A.; Clobert, J.; Bon, R.; Hewison, A.J.M. | (*116*) |
| P053 | 2016 | Exploration in a dispersal task: Effects of early experience and correlation with other behaviors in prairie voles (*Microtus ochrogaster*) | del Razo, R.A.; Bales, K.L. | (*117*) |
| P055 | 2003 | Natal dispersal and personalities in great tits (*Parus major*) | Dingemanse, N.J.; Both, C.; Van Noordwijk, A.J.; Rutten, A.L.; Drent, P.J. | (*118*) |
| P056 | 2009 | Evolution of genetic integration between dispersal and colonization ability in a bird | Duckworth, R.A.; Kruuk, L.E.B. | (*119*) |
| P057 | 2017 | Personality types in budgerigars, *Melopsittacus undulatus* | Duggan, M.R.; Lee-Soety, J.Y.; Anderson, M.J. | (*120*) |
| P058 | 2011 | Personality and parasites: Sex-dependent associations between avian malaria infection and multiple behavioural traits | Dunn, J.C.; Cole, E.F.; Quinn, J.L. | (*121*) |
| P060 | 2009 | Habituation potential of yellow-eyed penguins depends on sex, character and previous experience with humans | Ellenberg, U.; Mattern, T.; Seddon, P.J. | (*122*) |
| P061 | 2018 | Sex-specific cognitive-behavioural profiles emerging from individual variation in numerosity discrimination in *Gambusia affinis* | Etheredge, R.I.; Avenas, C.; Armstrong, M.J.; Cummings, M.E. | (*123*) |
| P065 | 1990 | Temperament in a fish: a longitudinal study of the development of individual differences in aggression and social rank in the Midas Cichlid | Francis, R.C. | (*124*) |
| P066 | 1999 | Inter-individual distances during open-field tests in Japanese quail (*Coturnix japonica*) selected for high or low levels of social reinstatement behaviour | François, N.; Mills, A.D.; Faure, J.M. | (*125*) |
| P067 | 1981 | Sexual dimorphism in responses to unfamiliar intruders in the tamarin, *Saguinus oedipus* | French, J.A.; Snowdon, C.T. | (*126*) |
| P068 | 2014 | A sex-specific behavioral syndrome in a wild passerine | Fresneau, N.; Kluen, E.; Brommer, J.E. | (*127*) |
| P069 | 2016 | Acoustic signalling reflects personality in a social mammal | Friel, M.; Kunc, H.P.; Griffin, K.; Asher, L.; Collins, L.M. | (*128*) |
| P070 | 2015 | Consistent individual differences in haemolymph density reflect risk propensity in a marine invertebrate | Furtbauer, I. | (*129*) |
| P071 | 2010 | Behavioural syndromes in Steller's jays: The role of time frames in the assessment of behavioural traits | Gabriel, P.O.; Black, J.M. | (*130*) |
| P072 | 2018 | Physiological and behavioral responses of house sparrows to repeated stressors | Gormally, B.M.G.; Wright-Lichter, J.; Reed, J.M.; Romero, L.M. | (*131*) |
| P073 | 2014 | Turning shy on a winter's day: Effects of season on personality and stress response in *Microtus arvalis* | Gracceva, G.; Herde, A.; Groothuis, T.G.G.; Koolhaas, J.M.; Palme, R.; Eccard, J.A. | (*132*) |
| P074 | 2017 | Is the behavioural divergence between range-core and range-edge populations of cane toads (*Rhinella marina*) due to evolutionary change or developmental plasticity? | Gruber, J.; Brown, G.; Whiting, M.J.; Shine, R. | (*133*) |
| P075 | 2018 | Behavioural divergence during biological invasions: A study of cane toads (*Rhinella marina*) from contrasting environments in Hawai’i | Gruber, J.; Brown, G.; Whiting, M.J.; Shine, R. | (*134*) |
| P076 | 2018 | Variation in personality traits across a metal pollution gradient in a free-living songbird | Grunst, A.S.; Grunst, M.L.; Thys, B.; Raap, T.; Daem, N.; Pinxten, R.; Eens, M. | (*135*) |
| P077 | 2018 | Are the big and beautiful less bold? Differences in avian fearfulness between the sexes in relation to body size and colour | Guay, P.-J.; Leppitt, R.; Weston, M.A.; Yeager, T.R.; van Dongen, W.F.D.; Symonds, M.R.E. | (*136*) |
| P078 | 2014 | The ontogeny of personality in the wild guinea pig | Guenther, A.; Finkemeier, M.-A.; Trillmich, F. | (*137*) |
| P083 | 2015 | Intimidating courtship and sex differences in predation risk lead to sex-specific behavioural syndromes | Han, C.S.; Jablonski, P.G.; Brooks, R.C. | (*138*) |
| P084 | 2015 | Sex-specific dispersal responses to inbreeding and kinship | Hardouin, L.A.; Legagneux, P.; Hingrat, Y.; Robert, A. | (*139*) |
| P085 | 2011 | Changes in behavioural trait integration following rapid ecotype divergence in an aquatic isopod | Harris, S.; Eroukhmanoff, F.; Green, K.K.; Svensson, E.I.; Pettersson, L.B. | (*140*) |
| P086 | 2010 | Picking personalities apart: Estimating the influence of predation, sex and body size on boldness in the guppy *Poecilia reticulata* | Harris, S.; Ramnarine, I.W.; Smith, H.G.; Pettersson, L.B. | (*141*) |
| P087 | 2010 | Individuality in the predator defense behaviour of the crab *Heterozius rotundifrons* | Hazlett, B.A.; Bach, C.E. | (*142*) |
| P088 | 2018 | Gender difference in unconditioned and conditioned predator fear responses in Smith's zokors (*Eospalax smithii*) | Hegab, I.M.; Qian, Z.; Pu, Q.; Wang, Z.; Yukun, K.; Cai, Z.; Guo, H.; Wang, H.; Ji, W.; Hanafy, A.M.; Su, J. | (*143*) |
| P089 | 2016 | Predicting multifarious behavioural divergence in the wild | Heinen-Kay, J.L.; Schmidt, D.A.; Stafford, A.T.; Costa, M.T.; Peterson, M.N.; Kern, E.M.A.; Langerhans, R.B. | (*144*) |
| P091 | 2005 | Quantitative genetics of natural variation of behavior in *Drosophila melanogaster*: The possible role of the social environment on creating persistent patterns of group activity | Higgins, L.A.; Jones, K.M.; Wayne, M.L. | (*145*) |
| P092 | 2016 | Population differentiation and behavioural association of the two 'personality' genes DRD4 and SERT in dunnocks (*Prunella modularis*) | Holtmann, B.; Grosser, S.; Lagisz, M.; Johnson, S.L.; Santos, E.S.A.; Lara, C.E.; Robertson, B.C.; Nakagawa, S. | (*146*) |
| P093 | 2017 | Personality-matching habitat choice, rather than behavioural plasticity, is a likely driver of a phenotype-environment covariance | Holtmann, B.; Santos, E.S.A.; Lara, C.E.; Nakagawa, S. | (*147*) |
| P095 | 2016 | Behavioral, morphometric, and gene expression effects in adult zebrafish (*Danio rerio*) embryonically exposed to PFOA, PFOS, and PFNA | Jantzen, C.E.; Annunziato, K.M.; Cooper, K.R. | (*148*) |
| P096 | 2012 | Spatial navigation strategies in *Peromyscus*: a comparative study | Jašarević, E.; Williams, S.A.; Roberts, R. M.; Geary, D.C.; Rosenfeld, C.S. | (*149*) |
| P097 | 2015 | Sex differences in risk-taking and associative learning in rats | Jolles, J.W.; Boogert, N.J.; van den Bos, R. | (*150*) |
| P098 | 2018 | Behavioral variation post-invasion: Resemblance in some, but not all, behavioral patterns among invasive and native praying mantids | Jones, C.; DiRienzo, N. | (*151*) |
| P099 | 2018 | Urbanisation and sex affect the consistency of butterfly personality across metamorphosis | Kaiser, A.; Merckx, T.; Van Dyck, H. | (*152*) |
| P100 | 2017 | Adult wheel access interaction with activity and boldness personality in Siberian dwarf hamsters (*Phodopus sungorus*) | Kanda, L.L.; Abdulhay, A.; Erickson, C. | (*153*) |
| P101 | 2007 | The influence of sex, line, and fight experience on aggressiveness of the Siamese fighting fish in intrasexual competition | Karino, K.; Someya, C. | (*154*) |
| P102 | 2018 | Consistently bolder turtles maintain higher body temperatures in the field but may experience greater predation risk | Kashon, E.A.F.; Carlson, B.E. | (*155*) |
| P104 | 2016 | Unsociable juvenile male three-spined sticklebacks grow more attractive | Kim, S.-Y.; Velando, A. | (*156*) |
| P105 | 2001 | Spatial learning and memory in the blind mole-rat in comparison with the laboratory rat and Levant vole | Kimchi, T.; Terkel, J. | (*157*) |
| P106 | 2013 | Sex-differences and temporal consistency in stickleback fish boldness | King, A.J.; Fürtbauer, I.; Mamuneas, D.; James, C.; Manica, A. | (*158*) |
| P111 | 2014 | Artificial selection on relative brain size reveals a positive genetic correlation between brain size and proactive personality in the guppy | Kotrschal, A.; Lievens, E.J.; Dahlbom, J.; Bundsen, A.; Semenova, S.; Sundvik, M.; Maklakov, A.A.; Winberg, S.; Panula, P.; Kolm, N. | (*159*) |
| P112 | 2017 | Different patterns of behavioral variation across and within species of spiders with differing degrees of urbanization | Kralj-Fišer, S.; Hebets, E.A.; Kuntner, M. | (*160*) |
| P113 | 2014 | Sex-specific associations between nest defence, exploration and breathing rate in breeding pied flycatchers | Krams, I.A.; Vrublevska, J.; Sepp, T.; Abolins-Abols, M.; Rantala, M.J.; Mierauskas, P.; Krama, T. | (*161*) |
| P114 | 2017 | Consistent variation in individual migration strategies of brown skuas | Krietsch, J.; Hahn, S.; Kopp, M.; Phillips, R.A.; Peter, H.-U.; Lisovski, S. | (*162*) |
| P115 | 2017 | The transition to independence: sex differences in social and behavioural development of wild bottlenose dolphins | Krzyszczyk, E.; Patterson, E.M.; Stanton, M.A.; Mann, J. | (*163*) |
| P116 | 2017 | Comparative analysis of the brain transcriptome in a hyper-aggressive fruit fly, *Drosophila prolongata* | Kudo, A.; Shigenobu, S.; Kadota, K.; Nozawa, M.; Shibata, T.F.; Ishikawa, Y.; Matsuo, T. | (*164*) |
| P117 | 2014 | U-shaped relationship between ageing and risk-taking behaviour in a wild-type rodent | Lafaille, M.; Féron, C. | (*165*) |
| P118 | 2015 | Social Conditioned Place Preference in the Captive Ground Squirrel (*Ictidomys tridecemlineatus*): Social Reward as a Natural Phenotype | Lahvis, G.P.; Panksepp, J.B.; Kennedy, B.C.; Wilson, C.R.; Merriman, D.K. | (*166*) |
| P119 | 2014 | Effects of a post-weaning cafeteria diet in young rats: Metabolic syndrome, reduced activity and low anxiety-like behaviour | Lalanza, J.F.; Caimari, A.; Del Bas, J.M.; Torregrosa, D.; Cigarroa, I.; Pall\_s, M.; Capdevila, L.; Arola, L.; Escorihuela, R.M. | (*167*) |
| P120 | 2015 | Temporally fluctuating selection on a personality trait in a wild rodent population | Le Cœur, C.; Thibault, M.; Pisanu, B.; Thibault, S.; Chapuis, J.-L.; Baudry, E. | (*168*) |
| P122 | 2017 | Males are quicker to adjust aggression towards heterospecific intruders in a cichlid fish | Lehtonen, T.K.; Wong, B.B.M. | (*169*) |
| P123 | 2011 | Better the devil you know: Familiarity affects foraging activity of red-backed salamanders, *Plethodon cinereus* | Liebgold, E.B.; Dibble, C.J. | (*170*) |
| P124 | 2018 | Behavioral differences in an over-invasion scenario: marbled vs. spiny-cheek crayfish | Linzmaier, S.M.; Goebel, L.S.; Ruland, F.; Jeschke, J.M. | (*171*) |
| P125 | 2014 | The influence of mitonuclear genetic variation on personality in seed beetles | Løvlie, H.; Immonen, E.; Gustavsson, E.; Kazancioğlu, E.; Arnqvist, G. | (*172*) |
| P127 | 2017 | Sex composition modulates the effects of familiarity in new environment | Lucon-Xiccato, T.; Mazzoldi, C.; Griggio, M. | (*173*) |
| P128 | 2002 | Risk taking during exploration of a plus-maze is greater in adolescent than in juvenile or adult mice | Macrì, S; Adriani, W; Chiarotti, F; Laviola, G | (*174*) |
| P129 | 2015 | Exploratory and defensive behaviours change with sex and body size in eastern garter snakes (*Thamnophis sirtalis*) | Maillet, Z.; Halliday, W.D.; Blouin-Demers, G. | (*175*) |
| P130 | 2011 | Zebra finches are bolder in an asocial, rather than social, context | Mainwaring, M.C.; Beal, J.L.; Hartley, I.R. | (*176*) |
| P131 | 2013 | Hatching asynchrony and offspring sex influence the subsequent exploratory behaviour of zebra finches | Mainwaring, M.C.; Hartley, I.R. | (*177*) |
| P132 | 2012 | Altered Prey Responses in Round Goby from Contaminated Sites | Marentette, J.R.; Balshine, S. | (*178*) |
| P133 | 2015 | Maternal rank influences the outcome of aggressive interactions between immature chimpanzees | Markham, A.C.; Lonsdorf, E.V.; Pusey, A.E.; Murray, C.M. | (*179*) |
| P134 | 2012 | Exploring novelty: A component trait of behavioural syndromes in a colonial fish | Martins, C.I.M.; Schaedelin, F.C.; Mann, M.; Blum, C.; Mandl, I.; Urban, D.; Grill, J.; Schößwender, J.; Wagner, R.H. | (*180*) |
| P135 | 2015 | Does metabolic rate predict risk-taking behaviour? A field experiment in a wild passerine bird | Mathot, K.J.; Nicolaus, M.; Araya-Ajoy, Y.G.; Dingemanse, N.J.; Kempenaers, B. | (*181*) |
| P136 | 2002 | Developmental changes in responsiveness to parents and unfamiliar adults in a monogamous monkey (*Callicebus moloch*) | Mayeaux, D.J.; Mason, W.A.; Mendoza, S.P. | (*182*) |
| P137 | 2014 | Nestling activity levels during begging behaviour predicts activity level and body mass in adulthood | McCowan, L.S.C.; Griffith, S.C. | (*183*) |
| P138 | 2015 | Active but asocial: Exploration and activity is linked to social behaviour in a colonially breeding finch | McCowan, L.S.C.; Griffith, S.C. | (*184*) |
| P139 | 2018 | Thermal parental effects on offspring behaviour and their fitness consequences | McDonald, S.; Schwanz, L.E. | (*185*) |
| P140 | 2003 | The evolution of movements and behaviour at boundaries in different landscapes: A common arena experiment with butterflies | Merckx, T.; Van Dyck, H.; Karlsson, B.; Leimar, O. | (*186*) |
| P141 | 2016 | Are behavioural syndromes sex specific? Personality in a widespread lizard species | Michelangeli, M.; Chapple, D.G.; Wong, B.B.M. | (*187*) |
| P143 | 2014 | Pulsed resources and the coupling between life-history strategies and exploration patterns in eastern chipmunks (*Tamias striatus*) | Montiglio, P.-O.; Garant, D.; Bergeron, P.; Messier, G.D.; Reale, D. | (*188*) |
| P144 | 2010 | Individual variation in temporal activity patterns in open-field tests | Montiglio, P.-O.; Garant, D.; Thomas, D.; Reale, D. | (*189*) |
| P145 | 2013 | Weevil x Insecticide: Does ‘personality’ matter? | Morales, J.A.; Cardoso, D.G.; Della Lucia, T.M.C.; Guedes, R.N.C. | (*190*) |
| P149 | 2007 | Behavioral syndromes and the evolution of correlated behavior in zebrafish | Moretz, J.A.; Martins, E.P.; Robison, B.D. | (*191*) |
| P150 | 2015 | Sex, boldness and stress experience affect convict cichlid, *Amatitlania nigrofasciata*, open field behaviour | Moscicki, M.K.; Hurd, P.L. | (*192*) |
| P151 | 2018 | Inbreeding affects personality and fitness of a leaf beetle | Müller, T.; Juškauskas, A. | (*193*) |
| P152 | 2016 | Effects of larval versus adult density conditions on reproduction and behavior of a leaf beetle | Müller, T.; Küll, C.L.; Müller, C. | (*194*) |
| P154 | 2013 | Parental provisioning behaviour plays a key role in linking personality with reproductive success | Mutzel, A.; Dingemanse, N.J.; Araya-Ajoy, Y.G.; Kempenaers, B. | (*195*) |
| P155 | 2010 | A behavioral syndrome in the adzuki bean beetle: Genetic correlation among death feigning, activity, and mating behavior | Nakayama, S.; Miyatake, T. | (*196*) |
| P156 | 2010 | Genetic correlation between behavioural traits in relation to death-feigning behaviour | Nakayama, S.; Nishi, Y.; Miyatake, T. | (*197*) |
| P157 | 2012 | Dopaminergic system as the mechanism underlying personality in a beetle | Nakayama, S.; Sasaki, K.; Matsumura, K.; Lewis, Z.; Miyatake, T. | (*198*) |
| P159 | 2010 | Biogenic amines, caffeine and tonic immobility in *Tribolium castaneum* | Nishi, Y.; Sasaki, K.; Miyatake, T. | (*199*) |
| P160 | 2015 | Context matters: Multiple novelty tests reveal different aspects of shyness-boldness in farmed American mink (*Neovison vison*) | Noer, C.L.; Needham, E.K.; Wiese, A.-S.; Balsby, T.J.S.; Dabelsteen, T. | (*200*) |
| P162 | 2018 | Sun-basking fish benefit from body temperatures that are higher than ambient water | Nordahl, O.; Tibblin, P.; Koch-Schmidt, P.; Berggren, H.; Larsson, P.; Forsman, A. | (*201*) |
| P165 | 2013 | Differences in boldness are repeatable and heritable in a long-lived marine predator | Patrick, S.C.; Charmantier, A.; Weimerskirch, H. | (*202*) |
| P166 | 2011 | Factors affecting aggression in a captive flock of Chilean flamingos (*Phoenicopterus chilensis*) | Perdue, B.M.; Gaalema, D.E.; Martin, A.L.; Dampier, S.M.; Maple, T.L. | (*203*) |
| P167 | 2014 | Does sex influence intraspecific aggression and dominance in Nile tilapia juveniles? | Pinho-Neto, C.F.; Miyai, C.A.; Sanches, F.H.C.; Giaquinto, P.C.; Delicio, H.C.; Barcellos, L.J.G.; Volpato, G.L.; Barreto, R.E. | (*204*) |
| P169 | 2014 | Precocial bird mothers shape sex differences in the behavior of their chicks | Pittet, F.; Houdelier, C.; Lumineau, S. | (*205*) |
| P170 | 2010 | Sex matters: A social context to boldness in guppies (*Poecilia reticulata*) | Piyapong, C.; Krause, J.; Chapman, B.B.; Ramnarine, I.W.; Louca, V.; Croft, D.P. | (*206*) |
| P171 | 2008 | Novel environmental enrichment may provide a tool for rapid assessment of animal personality: A case study with giant pandas (*Ailuropoda melanoleuca*) | Powell, D.M.; Svoke, J.T. | (*207*) |
| P173 | 2014 | Sociality and oxytocin and vasopressin in the brain of male and female dominant and subordinate mandarin voles | Qiao, X.; Yan, Y.; Wu, R.; Tai, F.; Hao, P.; Cao, Y.; Wang, J. | (*208*) |
| P175 | 2008 | Juvenile female aggression in cooperatively breeding pied babblers: causes and contexts | Raihani, N.J.; Ridley, A.R.; Browning, L.E.; Nelson-Flower, M.J.; Knowles, S. | (*209*) |
| P177 | 2017 | Predation environment affects boldness temperament of neotropical livebearers | Rasmussen, J.E.; Belk, M.C. | (*210*) |
| P178 | 2008 | Aggression, sex and individual differences in cerebral lateralization in a cichlid fish | Reddon, A.R.; Hurd, P.L. | (*211*) |
| P179 | 2016 | A time to wean? Impact of weaning age on anxiety-like behaviour and stability of behavioural traits in full adulthood | Richter, S.H.; K\_stner, N.; Loddenkemper, D.-H.; Kaiser, S.; Sachser, N. | (*212*) |
| P180 | 2018 | The function of ultrasonic vocalizations during territorial defence by pair-bonded male and female California mice | Rieger, N.S.; Marler, C.A. | (*213*) |
| P181 | 2014 | Sex-specific differences in offspring personalities across the laying order in magpies *Pica pica* | Rokka, K.; Pihlaja, M.; Siitari, H.; Soulsbury, C.D. | (*214*) |
| P182 | 2018 | Phenotypic determinants of inter-individual variability of litter consumption rate in a detritivore population | Rota, T.; Jabiol, J.; Chauvet, E.; Lecerf, A. | (*215*) |
| P183 | 2018 | Population, sex and body size: Determinants of behavioural variations and behavioural correlations among wild zebrafish *Danio rerio* | Roy, T.; Bhat, A. | (*216*) |
| P184 | 2015 | Under the influence: Sublethal exposure to an insecticide affects personality expression in a jumping spider | Royaute, R.; Buddle, C.M.; Vincent, C. | (*217*) |
| P186 | 2012 | The development of exploratory behaviour in the African striped mouse *Rhabdomys* reflects a gene x environment compromise | Rymer, T.L.; Pillay, N. | (*218*) |
| P187 | 2017 | Impacts of the antidepressant fluoxetine on the anti-predator behaviours of wild guppies (*Poecilia reticulata*) | Saaristo, M.; McLennan, A.; Johnstone, C.P.; Clarke, B.O.; Wong, B.B.M. | (*219*) |
| P188 | 2017 | How to be a great dad: parental care in a flock of greater flamingo (*Phoenicopterus roseus*) | Sandri, C.; Vallarin, V.; Sammarini, C.; Regaiolli, B.; Piccirillo, A.; Spiezio, C. | (*220*) |
| P189 | 2018 | Habitat-dependent effects of personality on survival and reproduction in red squirrels | Santicchia, F.; Gagnaison, C.; Bisi, F.; Martinoli, A.; Matthysen, E.; Bertolino, S.; Wauters, L.A. | (*221*) |
| P190 | 2010 | Novelty-Seeking Temperament in Captive Stumptail Macaques (*Macaca arctoides*) and Spider Monkeys (*Ateles geoffroyi*) | Santillán-Doherty, A.M.; Cortés-Sotres, J.; Arenas-Rosas, R.V.; Márquez-Arias, A.; Cruz, C.; Medellín, A.; Aguirre, A.J.; Muñóz-Delgado, J.; Díaz, J.L. | (*222*) |
| P191 | 2018 | Predictability is attractive: Female preference for behaviourally consistent males but no preference for the level of male aggression in a bi-parental cichlid | Scherer, U.; Kuhnhardt, M.; Schuett, W. | (*223*) |
| P192 | 2018 | Ground beetles in city forests: Does urbanization predict a personality trait? | Schuett, W.; Delfs, B.; Haller, R.; Kruber, S.; Roolfs, S.; Timm, D.; Willmann, M.; Drees, C. | (*224*) |
| P193 | 2010 | Life history and behavioral type in the highly social cichlid *Neolamprologus pulcher* | Schürch, R.; Heg, D. | (*225*) |
| P194 | 2017 | Repeatability and consistency of individual behaviour in juvenile and adult Eurasian harvest mice | Schuster, A.C.; Carl, T.; Foerster, K. | (*226*) |
| P195 | 2005 | Aggression in bottlenose dolphins: Evidence for sexual coercion, male-male competition, and female tolerance through analysis of tooth-rake marks and behaviour | Scott, E.M.; Mann, J.; Watson-Capps, J.J.; Sargeant, B.L.; Connor, R.C. | (*227*) |
| P196 | 2017 | Are there consistent behavioral differences between sexes and male color morphs *in Pelvicachromis pulcher*? | Seaver, C.M.S.; Hurd, P.L. | (*228*) |
| P197 | 2006 | Habitat exploration and use in dispersing juvenile flying squirrels | Selonen, V.; Hanski, I.K. | (*229*) |
| P200 | 2009 | Intersexual differences in European lobster (*Homarus gammarus*): Recognition mechanisms and agonistic behaviours | Skog, M. | (*230*) |
| P201 | 2009 | Sex differences in the social behavior of wild spider monkeys (*Ateles geoffroyi* yucatanensis) | Slater, K.Y.; Schaffner, C.M.; Aureli, F. | (*231*) |
| P202 | 2006 | Social partner preferences of male and female fighting fish (*Betta splendens*) | Snekser, J.L.; McRobert, S.P.; Clotfelter, E.D. | (*232*) |
| P203 | 2018 | Risk-taking behavior, urbanization and the pace of life in birds | Sol, D.; Maspons, J.; Gonzalez-Voyer, A.; Morales-Castilla, I.; Garamszegi, L.Z.; Møller, A.P. | (*233*) |
| P204 | 2010 | Preferences for limited versus no contact in SD rats | Sørensen, D.; Hanse, H.; Krohn, T.; Bertelsen, T. | (*234*) |
| P205 | 2012 | Individual and sex-based differences in behaviour and ecology of rat snakes in winter | Sperry, J.H.; Weatherhead, P.J. | (*235*) |
| P206 | 2017 | Personality in the cockroach *Diploptera punctata*: Evidence for stability across developmental stages despite age effects on boldness | Stanley, C.R.; Mettke-Hofmann, C.; Preziosi, R.F. | (*236*) |
| P207 | 2009 | Dichotomies in perceived predation risk of drinking wallabies in response to predatory crocodiles | Steer D.; Doody, J.S. | (*237*) |
| P211 | 2015 | Sex differences in exploratory behaviour of laboratory CD-1 mice (*Mus musculus*) | Tanaka, T. | (*238*) |
| P212 | 2014 | Behavioral Responses to Social Separation Stressor Change Across Development and Are Dynamically Related to HPA Activity in Marmosets | Taylor, J.H.; Mustoe, A.C.; French, J.A. | (*239*) |
| P213 | 1988 | Sex differences in investigatory and grooming behaviors of laboratory rats (*Rattus norvegicus*) following exposure to novelty | Thor, D.H.; Harrison, R.J.; Schneider, S.R.; Carr, W.J. | (*240*) |
| P214 | 2018 | Individual behavioral variation reflects personality divergence in the upcoming model organism *Nothobranchius furzeri* | Thoré, E.S.J.; Steenaerts, L.; Philippe, C.; Grégoir, A.; Brendonck, L.; Pinceel, T. | (*241*) |
| P215 | 2013 | Dear enemies and nasty neighbors in crayfish: Effects of social status and sex on responses to familiar and unfamiliar conspecifics | Tierney, A.J.; Andrews, K.; Happer, K.R.; White, M.K.M. | (*242*) |
| P216 | 2014 | Effect of predation threat on repeatability of individual crab behavior revealed by mark-recapture | Toscano, B.J.; Gatto, J.; Griffen, B.D. | (*243*) |
| P217 | 2018 | Does it always pay to defend one's nest? A case study in African penguin | Traisnel, G.; Pichegru, L. | (*244*) |
| P218 | 2013 | Individual differences in activity levels in zebrafish (*Danio rerio*) | Tran, S.; Gerlai, R. | (*245*) |
| P219 | 2012 | Is the exploratory behavior of *Liolaemus nitidus* modulated by sex? | Troncoso-Palacios, J.; Labra, A. | (*246*) |
| P220 | 2003 | Are the effects of different enrichment designs on the physiology and behaviour of DBA/2 mice consistent? | Tsai, P.P.; Stelzer, H.D.; Hedrich, H.J.; Hackbarth, H. | (*247*) |
| P221 | 2018 | House sparrows' (*Passer domesticus*) behaviour in a novel environment is modulated by social context and familiarity in a sex-specific manner | Tuliozi, B.; Fracasso, G.; Hoi, H.; Griggio, M. | (*248*) |
| P222 | 2015 | Hidden semi-Markov models reveal multiphasic movement of the endangered Florida panther | van de Kerk, M.; Onorato, D.P.; Criffield, M.A.; Bolker, B.M.; Augustine, B.C.; McKinley, S.A.; Oli, M.K. | (*249*) |
| P223 | 2017 | Differential participation in cognitive tests is driven by personality, sex, body condition and experience | van Horik, J.O.; Langley, E.J.G.; Whiteside, M.A.; Madden, J.R. | (*250*) |
| P224 | 2015 | No evidence for correlational selection on exploratory behaviour and natal dispersal in the great tit | van Overveld, T.; Adriaensen, F.; Matthysen, E. | (*251*) |
| P225 | 2014 | Seasonal- and sex-specific correlations between dispersal and exploratory behaviour in the great tit | van Overveld, T.; Careau, V.; Adriaensen, F.; Matthysen, E. | (*252*) |
| P226 | 2017 | Sex-specific phenotypes and metabolism-related gene expression in juvenile sticklebacks | Velando, A.; Costa, M.M.; Kim, S.-Y. | (*253*) |
| P227 | 2011 | Social control of unreliable signals of strength in male but not female crayfish, *Cherax destructor* | Walter, G.M.; Van Uitregt, V.O.; Wilson, R.S. | (*254*) |
| P229 | 2015 | Genetic sources of individual variation in parental care behavior | Wetzel, D.P.; Hatch, M.I.; Westneat, D.F. | (*255*) |
| P230 | 2014 | Parental care syndromes in house sparrows: Positive covariance between provisioning and defense linked to parent identity | Wetzel, D.P.; Westneat, D.F. | (*256*) |
| P231 | 2016 | Behavioral repeatability of flour beetles before and after metamorphosis and throughout aging | Wexler, Y.; Subach, A.; Pruitt, J.N.; Scharf, I. | (*257*) |
| P232 | 2017 | Activity syndromes and metabolism in giant deep-sea isopods | Wilson, A.D.M.; Szekeres, P.; Violich, M.; Gutowsky, L.F.G.; Eliason, E.J.; Cooke, S.J. | (*258*) |
| P233 | 2010 | Behavioral correlations across activity, mating, exploration, aggression, and antipredator contexts in the European house cricket, *Acheta domesticus* | Wilson, A.D.M.; Whattam, E.M.; Bennett, R.; Visanuvimol, L.; Lauzon, C.; Bertram, S.M. | (*259*) |
| P234 | 2013 | Causes and consequences of contest outcome: Aggressiveness, dominance and growth in the sheepshead swordtail, *Xiphophorus birchmanni* | Wilson, A.J.; Grimmer, A.; Rosenthal, G.G. | (*260*) |
| P235 | 1996 | Agonistic and sensory behaviour of the salamander *Ensatina eschscholtzii* during asymmetrical contests | Wiltenmuth, E.B. | (*261*) |
| P236 | 2018 | Behavioral responses of two species of dolphins to novel video footage: An exploration of sex differences | Winship, K.A.; Eskelinen, H.C. | (*262*) |
| P237 | 2012 | Comparing behavioral responses across multiple assays of stress and anxiety in zebrafish (*Danio rerio*) | Wong, R.Y.; Perrin, F.; Oxendine, S.E.; Kezios, Z.D.; Sawyer, S.; Zhou, L.; Dereje, S.; Godwin, J. | (*263*) |
| P238 | 2010 | Responses to Environmental Enrichment Differ with Sex and Genotype in a Transgenic Mouse Model of Huntington's Disease | Wood, N.I.; Carta, V.; Milde, S.; Skillings, E.A.; McAllister, C.J.; Ang, Y.L.M.; Duguid, A.; Wijesuriya, N.; Afzal, S.M.; Fernandes, J.X.; Leong, T.W.; Morton, J. | (*264*) |
| P239 | 2015 | Personality over ontogeny in zebra finches: Long-term repeatable traits but unstable behavioural syndromes | Wuerz, Y.; Krüger, O. | (*265*) |
| P240 | 2014 | Gender-Dependent Effects of Maternal Immune Activation on the Behavior of Mouse Offspring | Xuan, I.C.Y.; Hampson, D.R. | (*266*) |
| P241 | 2016 | Variation among free-living spotted hyenas in three personality traits | Yoshida, K.C.S.; Van Meter, P.E.; Holekamp, K.E. | (*267*) |
| P242 | 2017 | Predictors of aggressive response towards simulated intruders depend on context and sex in Crimson Finches (*Neochmia phaeton*) | Young, C.M.; Cain, K.E.; Svedin, N.; Backwell, P.R.Y.; Pryke, S.R. | (*268*) |
| P243 | 2015 | Evaluating behavioral syndromes in coyotes (*Canis latrans*) | Young, J.K.; Mahe, M.; Breck, S. | (*269*) |
| P244 | 2018 | The relationship between learning speed and personality is age- and task-dependent in red junglefowl | Zidar, J.; Balogh, A.; Favati, A.; Jensen, P.; Leimar, O.; Sorato, E.; Løvlie, H. | (*270*) |
| P245 | 2017 | Early experience affects adult personality in the red junglefowl: A role for cognitive stimulation? | Zidar, J.; Sorato, E.; Malmqvist, A.-M.; Jansson, E.; Rosher, C.; Jensen, P.; Favati, A.; Løvlie, H. | (*271*) |
| P246 | 2019 | Grey literature – Eastern grey kangaroos data | Menario-Costa, W.; King, W.; Festa-Bianchet, M.; Kruuk, L.E.B. |  |
| P247 | 2019 | Grey literature – White-winged choughs data | Leon, C.; Heinsohn, R. |  |