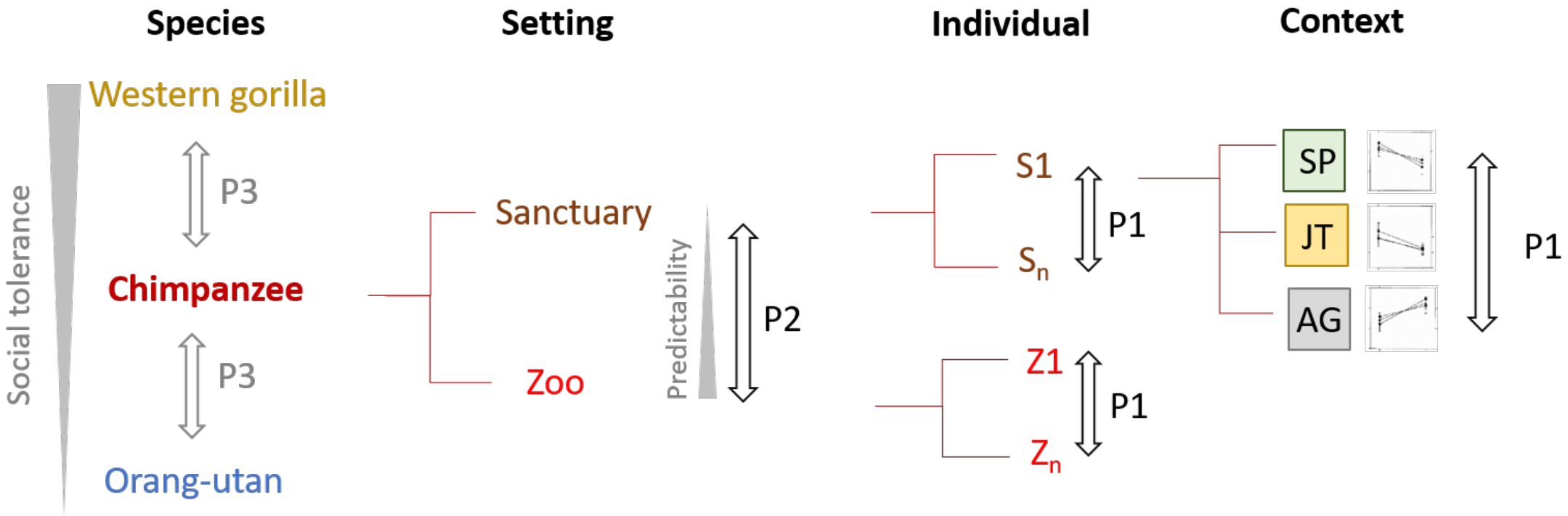

Fig. 1. Conceptual summary of proposed project*. Communicative variation in the coordination of joint activities will be studied on an individual (within- vs between-subject effects for different contexts; P1), population/setting (different groups of semi-wild vs captive; P2), and species level (chimpanzee, Bornean/Sumatran orangutan, western gorilla; back-up project P3). Contexts of joint activities include social play (SP), joint travel (JT), and allogrooming (AG).*

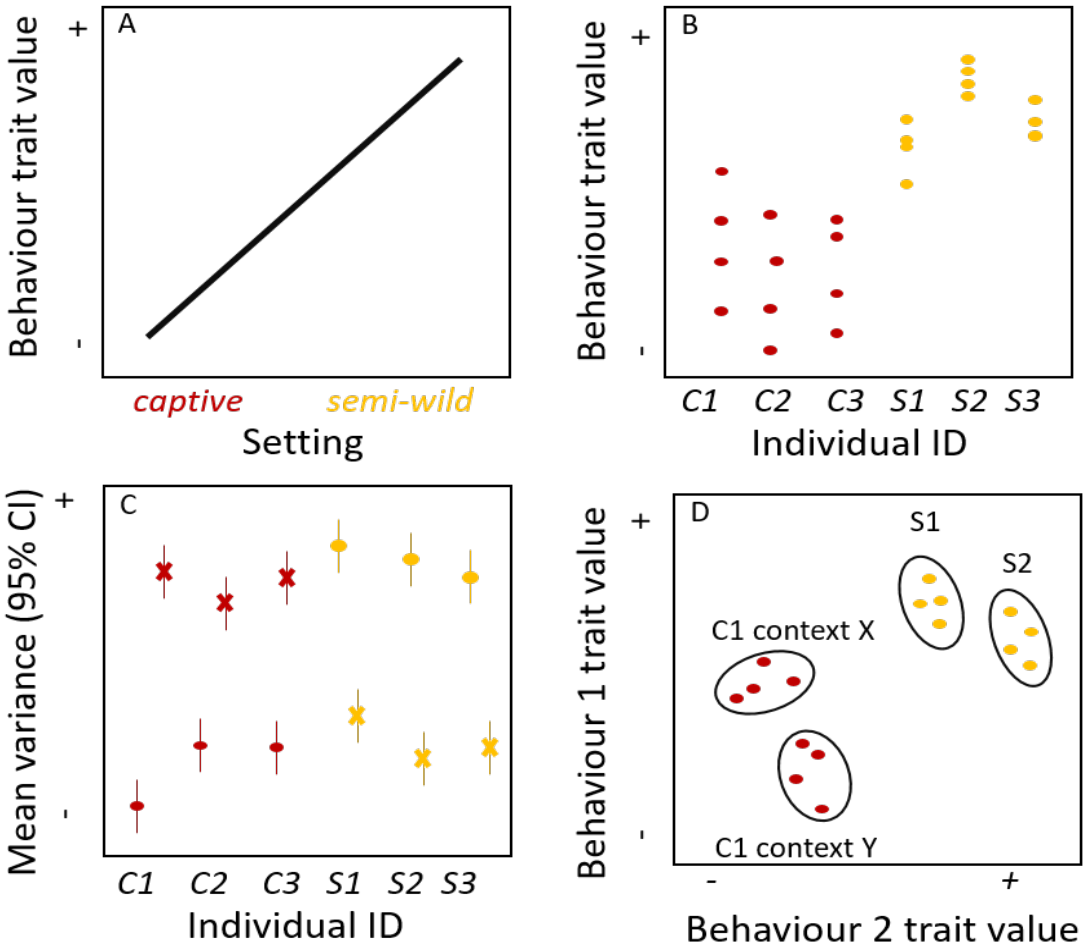

Fig. 2. Predictions P1.
(A) *Research setting affects a specific communicative trait value (e.g. persistence or responsiveness).*
(B) *Individuals in captive settings vary less in their communicative behaviour than those in semi-wild settings.*
(C) *Between- (point symbol) and within- (cross symbol) individual variance components show opposite trends in captive versus semi-wild settings.*
(D) *In the zoo, communicative patterns may commonly correlate at within-individual level, whereas those in sanctuaries correlate more at between-individual level.*

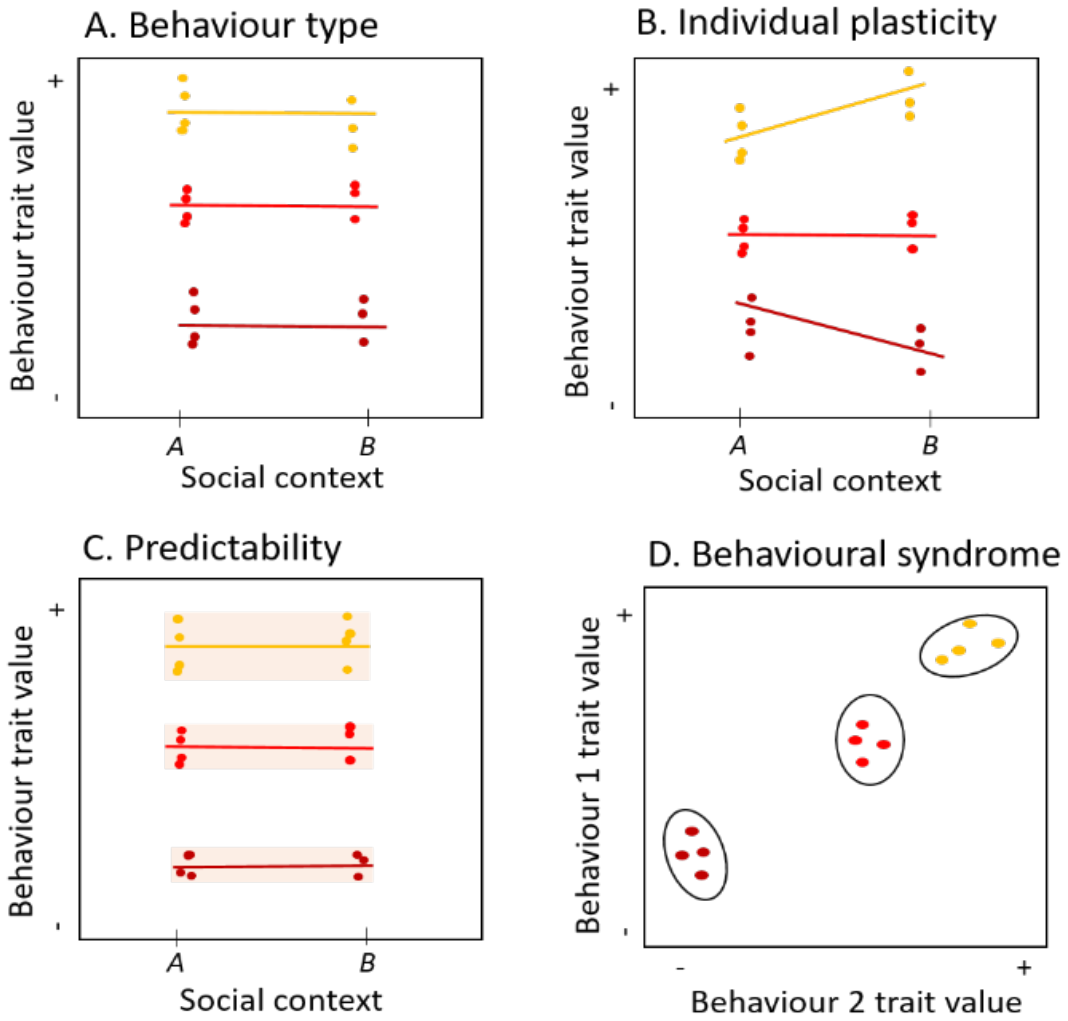

Fig. 3. Concepts of behavioural reaction norms.
(A) *Behavioral type: between-individual differences in mean behavioral expression over repeated measures.*
(B) *Linear reaction norm plot: individuals differ in their behavioral plasticity (slope) across social contexts and there is a positive correlation between an individual's behavioral type (intercept) and its plasticity (slope).*
(C) *Predictability: individuals differ in within-individual behavioral variability from more predictable individuals (narrow ribbon) to less predictable individuals (wide ribbon).*
(D) *Behavioral syndrome: positive between-individual correlation for two distinct behaviors, 1 and 2. Individuals with on average higher expressions of 1 also have higher average expressions of 2. Adapted from Hertel et al. (2020)*

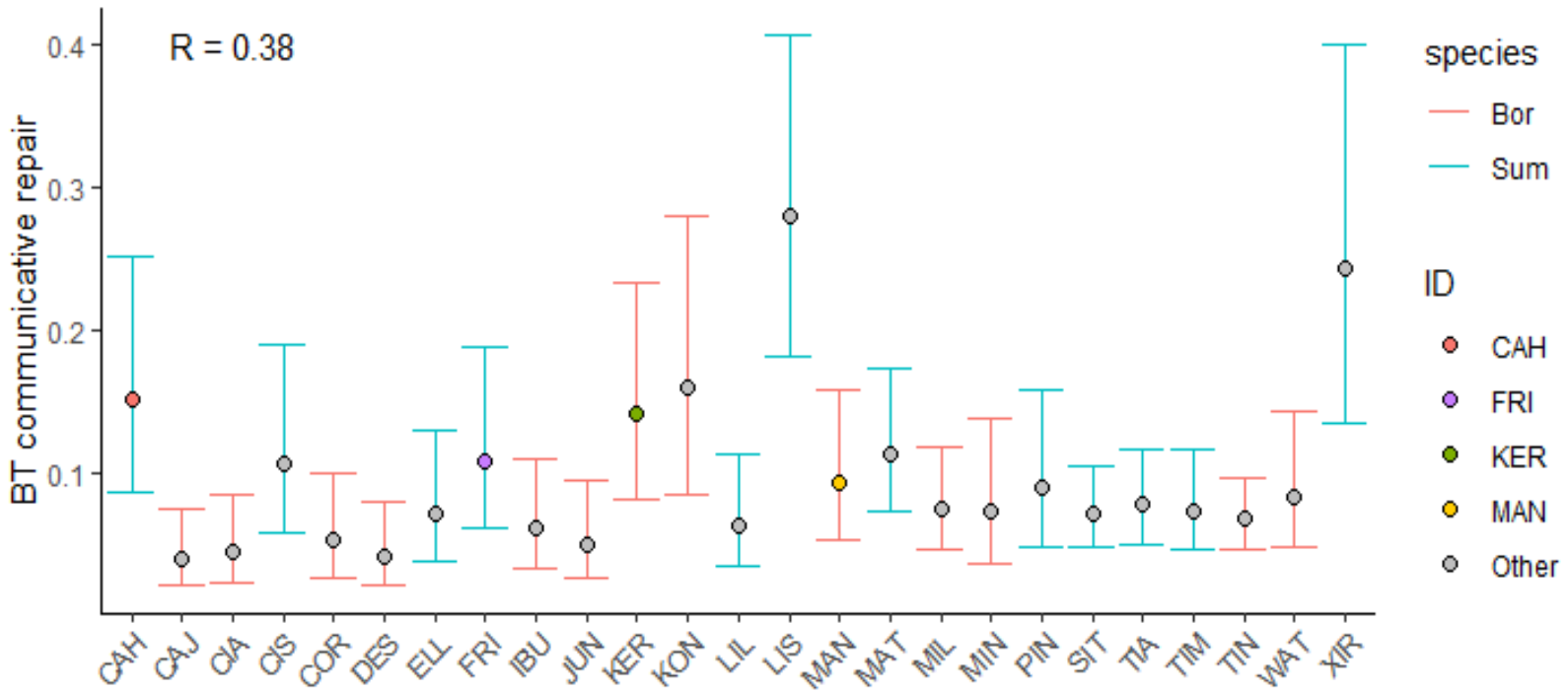

Fig. 4. Inter-individual variation in communicative persistence in Bornean and Sumatran orangutan mothers. *Plotted are individual random effect coefficients (best linear unbiased predictors, BLUPs) from a model examining variation in signalling persistence. Note that persistence is overall higher, but also more variable in Bornean species.*

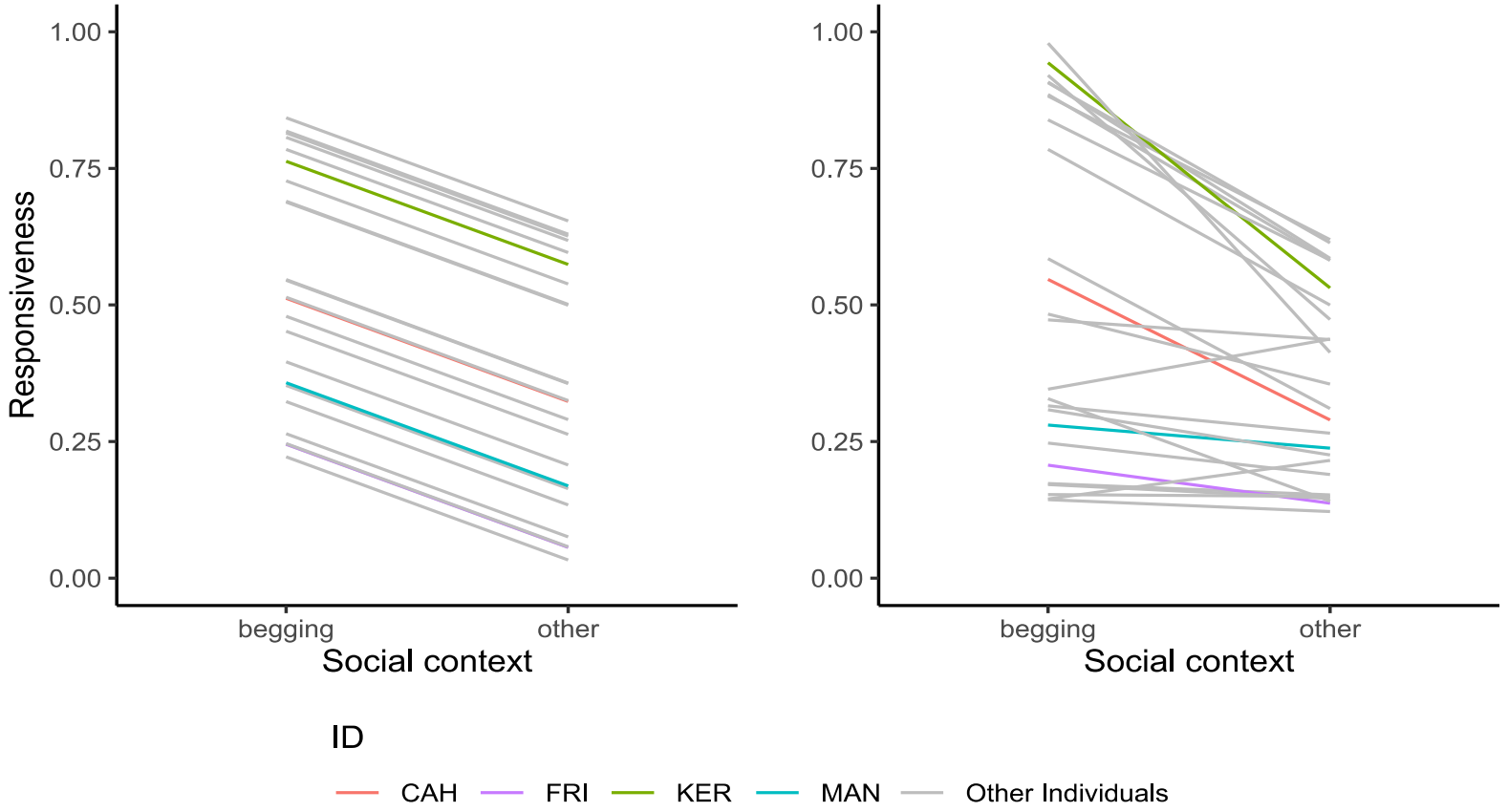

Fig. 5. Individual shifts in maternal responsiveness to infant requests in food begging versus non-begging contexts*. The left panels depict prediction lines assuming orang-utan mothers adjust behaviour equally between social contexts (random intercept). The right panels depict prediction lines assuming orangutans differ in the extent to which they change behaviour between conditions (random intercept and slope). Different colours represent different individuals.*

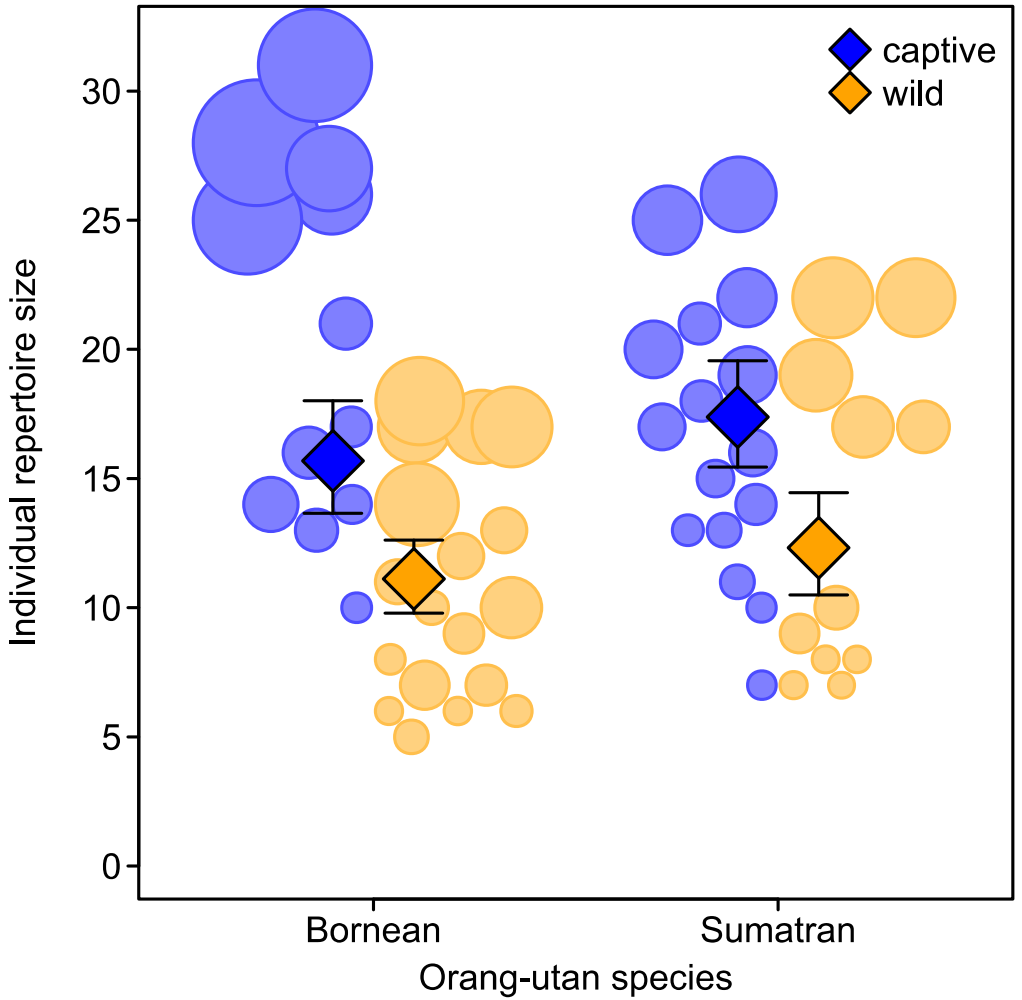

***Fig. 6. Individual repertoire size as a function of research setting and orangutan species**, restricted to subjects with > 40 samples. Circles represent different individuals with area corresponding to sample size, diamonds depict model estimates with 95% confidence intervals (all other variables cantered to a mean of zero). Retrieved from Fröhlich et al. (2021)*