**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; WP1), population/setting (different groups of semi-wild vs captive; WP2), and species level (chimpanzee, Bornean/Sumatran orang-utan, western gorilla; WP3). Contexts of joint activities include social play (SP), joint travel (JT), and allo-grooming (AG).*
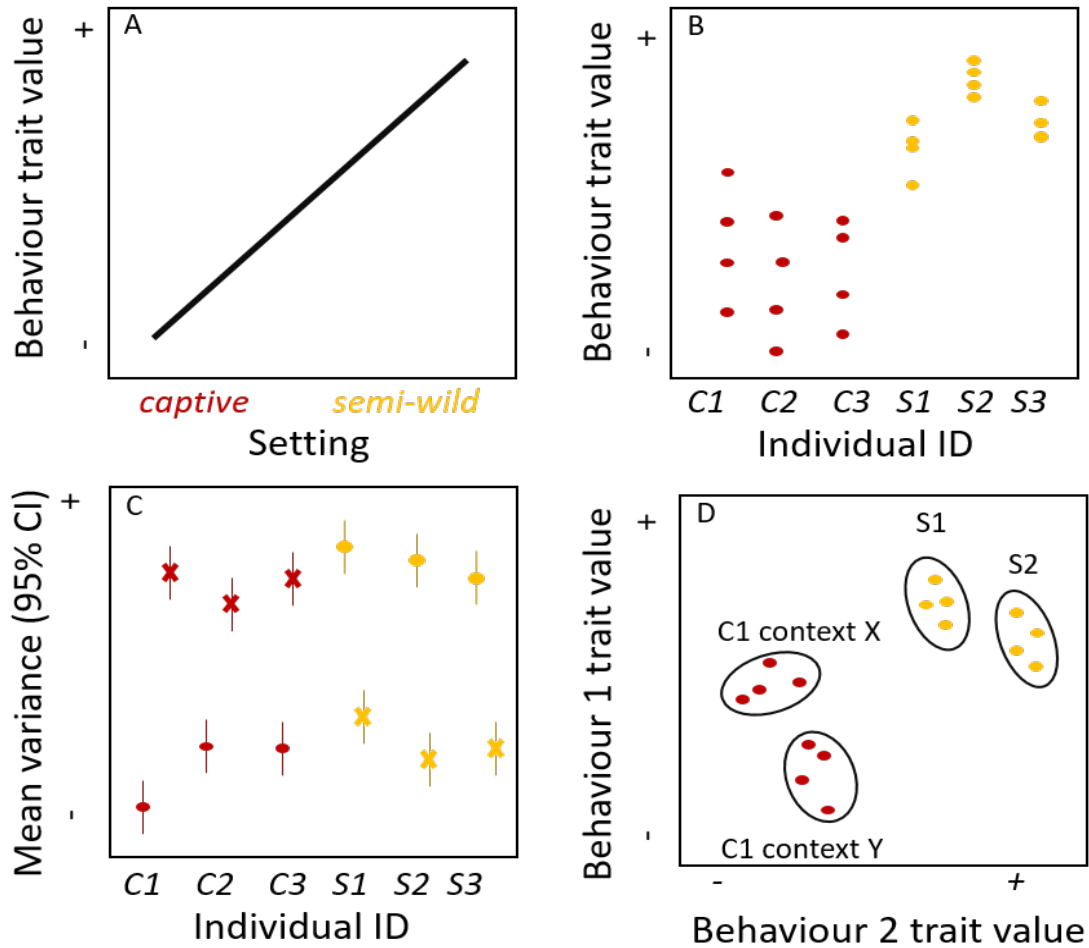
**Fig. 2. Predictions P1.**
**(A)** *Research setting affects a specific communicative trait value (e.g. responsiveness).*
**(B)** *Individuals of captive settings vary less in their communicative behaviour than those in semi-wild settings.*
**(C)** *Between- (point symbol) and within- (cross symbol) individual variance components show opposite trends in semi-wild versus captive settings.*
**(D)** *In the zoo, communicative patterns may commonly at within-individual level, whereas those in sanctuaries correlate more correlate at between-individual level.*
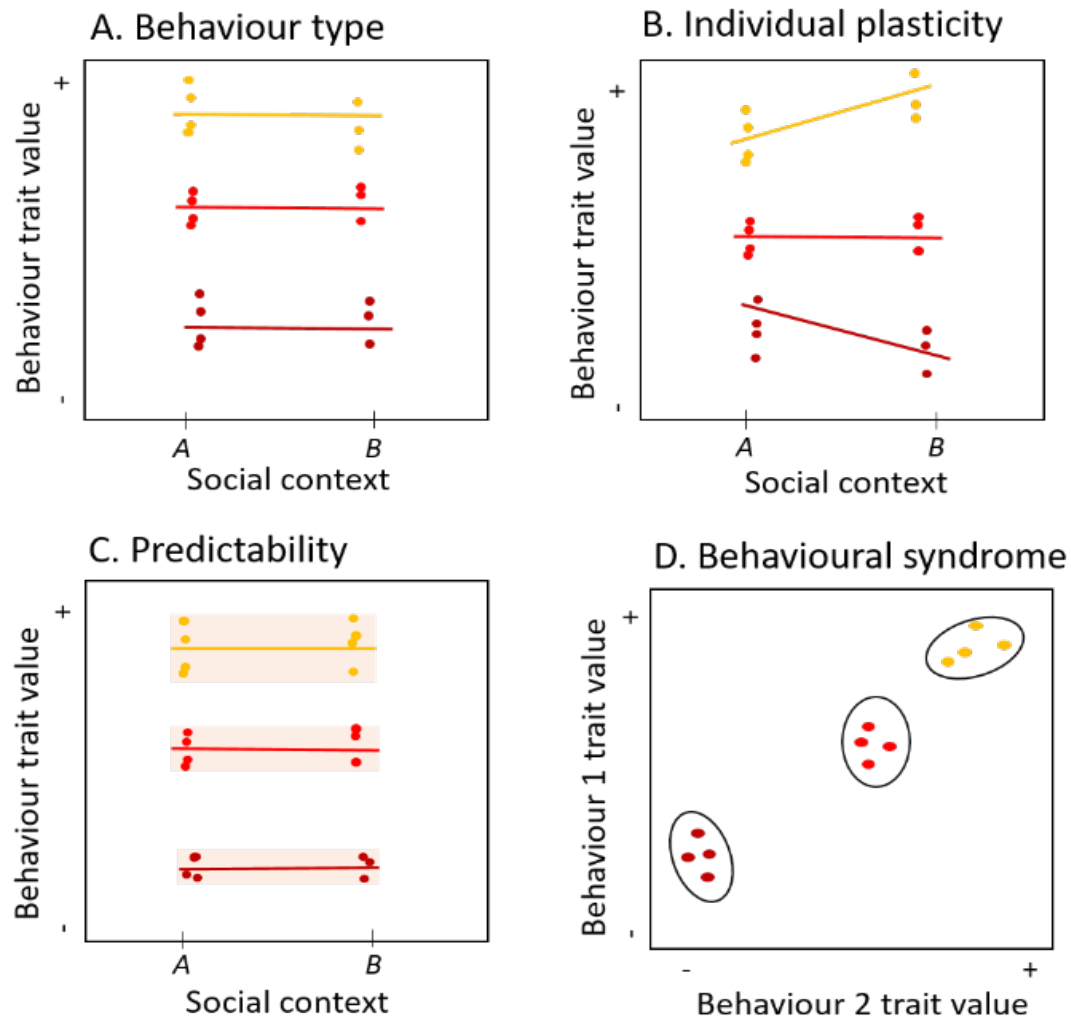
**Fig. 3. Concepts of behavioural reaction norms:**
**(A)** *Behavioural type: between-individual differences in mean behavioural expression over repeated measures.*
**(B)** *Linear reaction norm plot: individuals differ in their behavioural plasticity (slope) across social contexts and there is a positive correlation between an individual's behavioural type (intercept) and its plasticity (slope).*
**(C)** *Predictability: individuals differ in within-individual behavioural variability from more predictable individuals (narrow ribbon) to less predictable individuals (wide ribbon).*
**(D)** *Behavioural syndrome: positive between-individual correlation for two distinct behaviours, X and Y. Individuals with on average higher expressions of X also have higher average expressions of Y. Adapted from Hertel et al. (2020)*
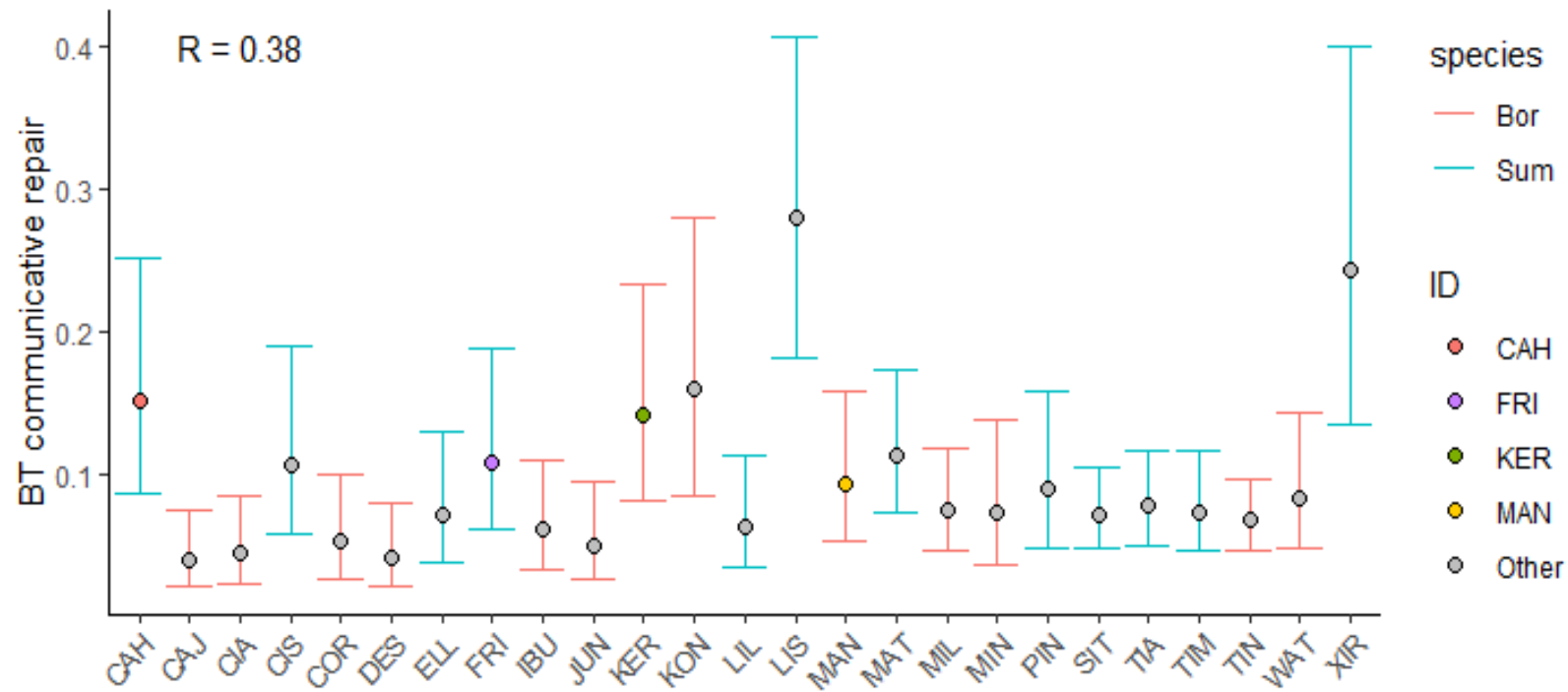
**Fig. 4. Inter-individual variation in communicative persistence in Bornean and Sumatran orang-utan mothers.** *Plotted are individual random effect coefficients (best linear unbiased predictors, BLUPs) from a model examining variation in signalling persistence. Note that persistence is overall higher, but also more variable in Bornean species.*
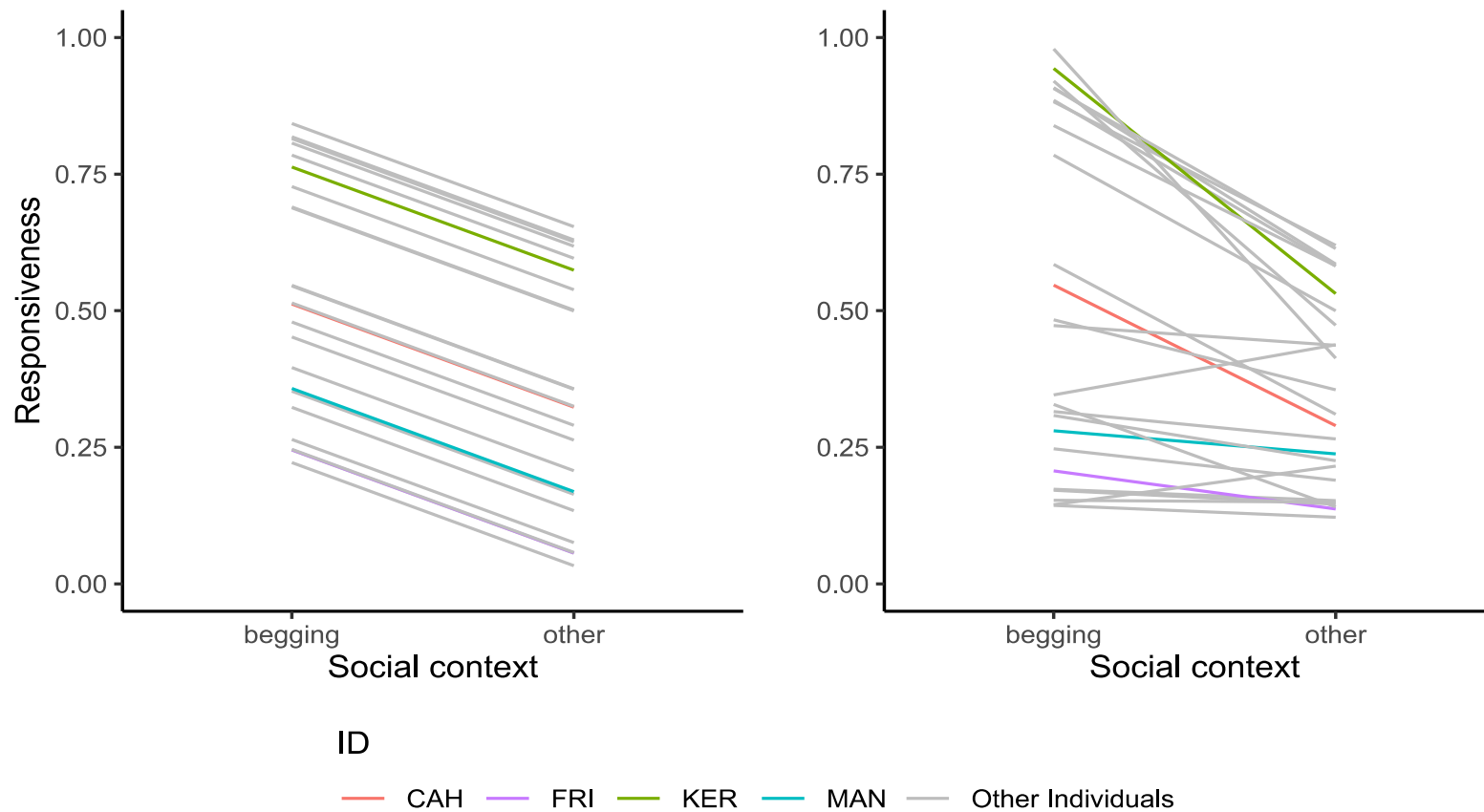
**Fig. 5. Individual shifts in maternal responsiveness to infant requests in food begging versus non-begging contexts**. *The left panels depict prediction lines assuming orang-utan mothers adjust behaviour equally between social contexts (random intercept). The right panels depict prediction lines assuming orang-utans differ in the extent to which they change behaviour between conditions (random intercept and slope). Different colours represent different individuals.*
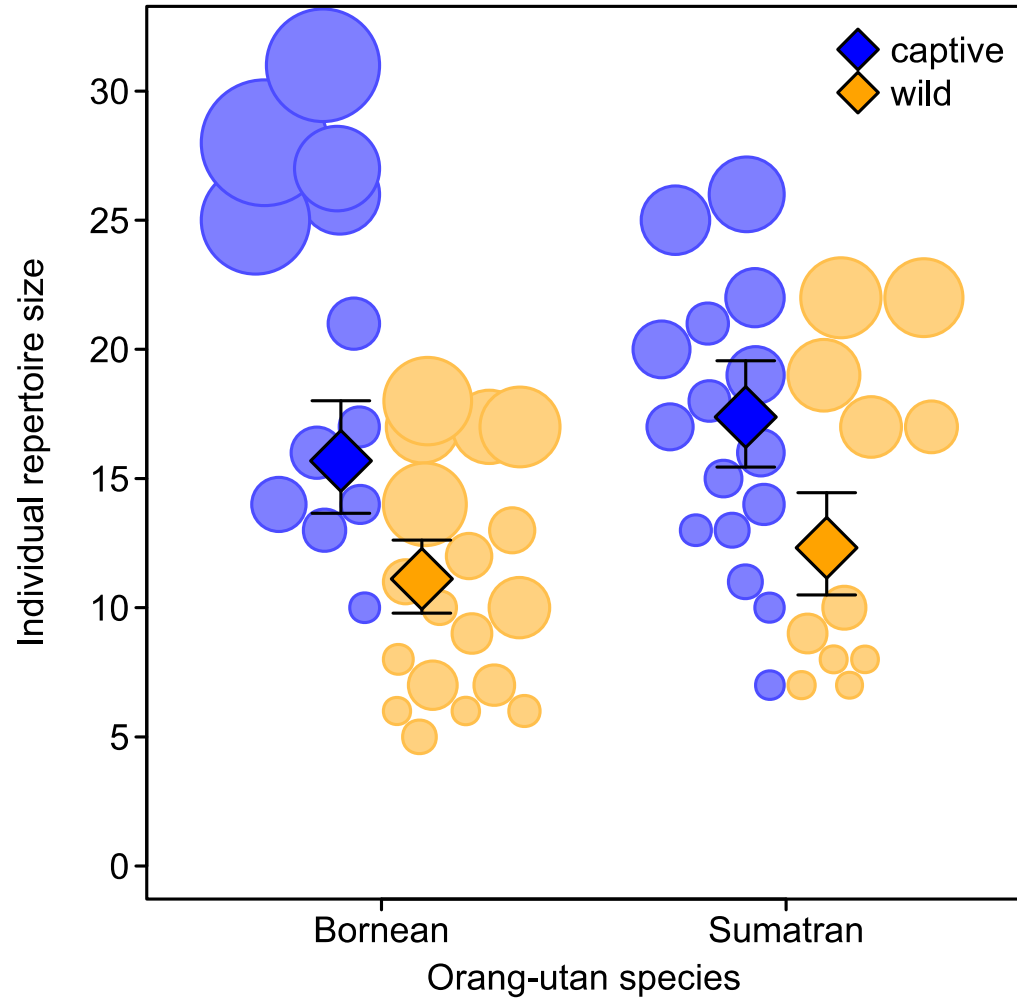
**Fig. 6 Individual repertoire size as a function of research setting and orang-utan species**, *restricted to subjects with > 40 samples. Circles represent different individuals with area corresponding to sample size, diamonds depict model estimates with 95% confidence intervals (all other variables cantered to a mean of zero). From Fröhlich et al. (2021)*