

SUPPLEMENTARY MATERIALS

Evaluations of dyadic synchrony: Observers' traits influence estimation and enjoyment of synchrony in mirror-game movements

Section 1 – Descriptive statistics and parameter estimates

Supplementary Table 1: Descriptive statistics for interindividual measures. See Figure 1A in main manuscript for depiction of distributions. SD = standard deviation.

Measure	Experiment 1		Experiment 2	
	Mean	SD	Mean	SD
Extraversion	30.61	7.90	30.89	6.80
Self-Esteem	18.39	5.35	17.80	3.79
Body Perception	66.57	19.07	65.39	17.38
Body Competence	9.40	3.39	9.11	2.76
Empathy	69.65	13.78	70.32	11.88
Autistic Traits	113.63	26.27	109.43	22.10

Supplementary Table 2: Parameter estimates for Accuracy (measured movement similarity - estimated movement similarity) overall, as well as for low and high synchrony. HPD = 95% highest posterior density region.

Synchrony	Experiment 1		Experiment 2	
	Estimate	HPD	Estimate	HPD
Mean	28.30	26.90, 29.70	26.90	25.40, 28.40
Low	43.00	41.30, 44.70	42.60	40.82, 44.40
High	13.60	12.30, 15.00	11.30	9.84, 12.70

Supplementary Table 3: Relationship between accuracy and measured predictability and similarity of movements, per degree of synchrony. HPD = 95% highest posterior density region.

Measure	Synchrony	Experiment 1		Experiment 2		Experiment 1+2	
		Estimate	HPD	Estimate	HPD	Estimate	HPD
Predictability	Low	-1.17	-2.37, -0.02	-2.61	-3.78, -1.41	-1.93	-2.77, -1.10
	High	1.05	0.60, 1.50	0.32	-0.12, 0.76	0.69	0.38, 1.02
Enjoyment	Low	1.30	0.20, 2.41	-0.23	-1.36, 0.92	-0.58	-0.23, 1.37
	High	-2.31	-2.96, -1.69	-2.58	-3.22, 1.97	-2.46	-2.90, -2.00
Reproducibility	Low	0.43	-0.66, 1.49	2.22	1.01, 3.47	1.38	0.53, 2.18
	High	-1.37	-2.05, -0.70	-2.01	-2.69, -1.28	-1.65	-2.16, -1.17

Supplementary Table 4: Relationship between accuracy and interindividual measures, per degree of synchrony. HPD = 95% highest posterior density region.

Measure	Synchrony	Experiment 1		Experiment 2		Experiment 1+2	
		Estimate	HPD	Estimate	HPD	Estimate	HPD
Extraversion	Low	1.02	-0.61, 2.69	-0.17	-2.03, 1.74	-0.87	-2.34, 0.56
	High	0.86	-0.51, 2.16	0.74	-0.77, 2.33	0.55	-0.64, 1.77
Self-esteem	Low	-0.91	-2.70, 0.86	-2.38	-4.46, 0.21	-0.91	-2.51, 0.67
	High	0.38	-1.08, 1.79	-0.81	-2.56, 0.96	-0.12	-1.44, 1.17
Body Perception	Low	-1.41	-3.00, 0.79	-1.01	-2.96, 0.89	-0.90	-2.31, 0.57
	High	-0.42	-1.91, 1.17	-0.16	-1.41, 1.75	0.10	-1.11, 1.29
Body Competence	Low	-1.77	-3.48, -0.12	-1.46	-3.28, 0.47	-1.49	-2.85, -0.07
	High	0.33	-1.07, 1.68	0.28	-1.23, 1.85	0.34	-0.82, 1.50
Empathy	Low	0.57	-1.29, 2.44	0.69	-1.17, 2.53	0.56	-0.77, 1.91
	High	0.79	-0.77, 2.30	-0.93	-2.41, 0.58	-0.69	-1.81, 0.42
Autistic Traits	Low	1.00	-1.08, 2.96	-2.46	-4.63, 0.32	-0.87	-2.49, 0.68
	High	0.79	-0.85, 2.47	1.12	-0.69, 2.87	1.37	0.07, 2.72

Supplementary Table 5: Relationship between very low enjoyment and interindividual measures. HPD = 95% highest posterior density region. For Experiment 1+2: 10 % of HPD for body perception is above 0.

Measure	Very low enjoyment (0-10/100)					
	Experiment 1		Experiment 2		Experiment 1+2	
	Estimate	HPD	Estimate	HPD	Estimate	HPD
Extraversion	-0.20	-0.26, -0.14	-0.11	-0.18, -0.04	-0.07	-0.12, -0.02
Self-Esteem	0.15	0.08, 0.22	-0.34	-0.43, -0.27	-0.31	-0.36, -0.25
Body Percep.	0.31	0.23, 0.38	-0.08	-0.16, -0.01	0.10	0.05, 0.15
Body Compet.	0.11	0.05, 0.17	-0.32	-0.38, -0.25	-0.04	-0.09, 0.01
Empathy	-0.17	-0.24, -0.10	0.06	-0.01, 0.13	-0.08	-0.12, -0.03
Autistic Traits	-0.24	-0.33, -0.17	-0.34	-0.42, -0.26	-0.28	-0.33, -0.22
Similarity	-0.04	-0.10, 0.22	-0.08	-0.15, -0.02	-0.05	-0.10, -0.01
Predictability	0.05	-0.01, 0.11	0.00	-0.07, 0.06	0.02	-0.02, 0.06

Supplementary Table 6: Relationship between enjoyment per se and interindividual measures. HPD = 95% highest posterior density region. Experiment 1+2: for enjoyment per se, 5% of empathy HPD is below 0. Body Compet. = Body competence; Body Percep. = Body perception.

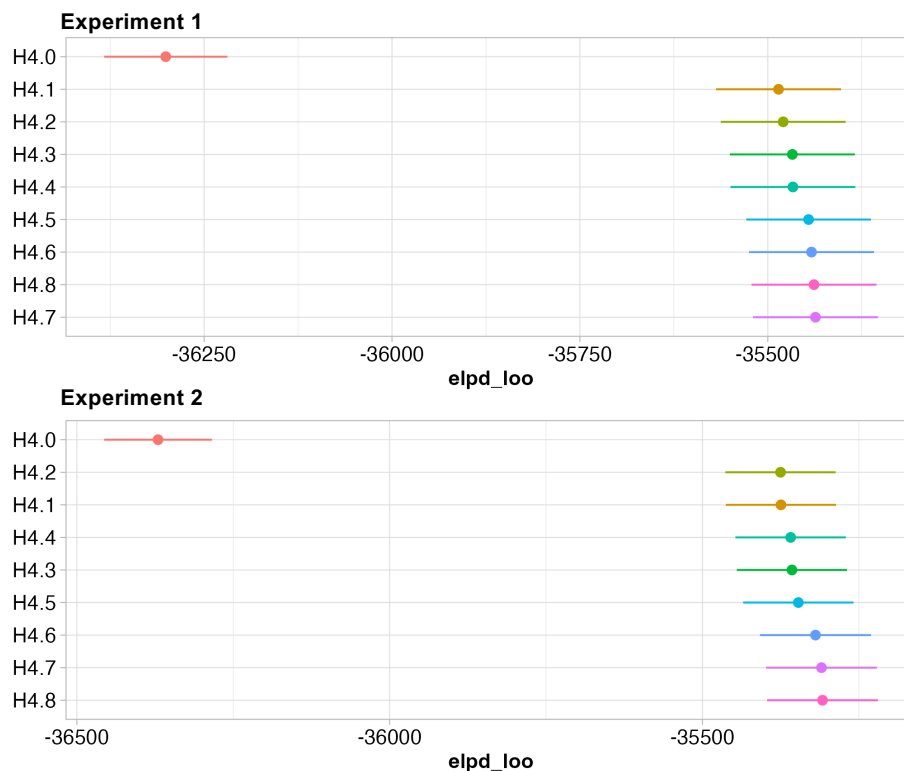
Measure	Enjoyment per se (11-100/100)					
	Experiment 1		Experiment 2		Experiment 1+2	
	Estimate	HPD	Estimate	HPD	Estimate	HPD
Extraversion	2.23	0.36, 4.00	0.02	-1.76, 2.02	0.48	-1.07, 2.01
Self-Esteem	0.38	-1.62, 2.25	2.87	0.68, 4.92	2.84	1.11, 4.59
Body Percep.	-1.07	-3.19, 1.09	2.65	0.70, 4.64	1.03	-0.63, 2.62
Body Compet.	-0.81	-2.57, 1.06	2.81	0.94, 4.58	0.31	-1.20, 1.81
Empathy	1.70	-0.36, 3.68	2.03	0.24, 3.85	1.29	-0.15, 2.79
Autistic Traits	-1.89	-4.10, 0.31	-0.40	-2.56, 1.78	-0.80	-2.60, 0.89
Similarity	0.50	0.06, 0.93	1.22	0.80, 1.67	0.86	0.56, 1.16
Predictability	-0.76	-1.19, 0.33	-1.04	-1.46, -0.62	-0.90	-1.20, -0.60

Section 2 – Full models predicting accuracy and enjoyment of synchronous dyadic movements

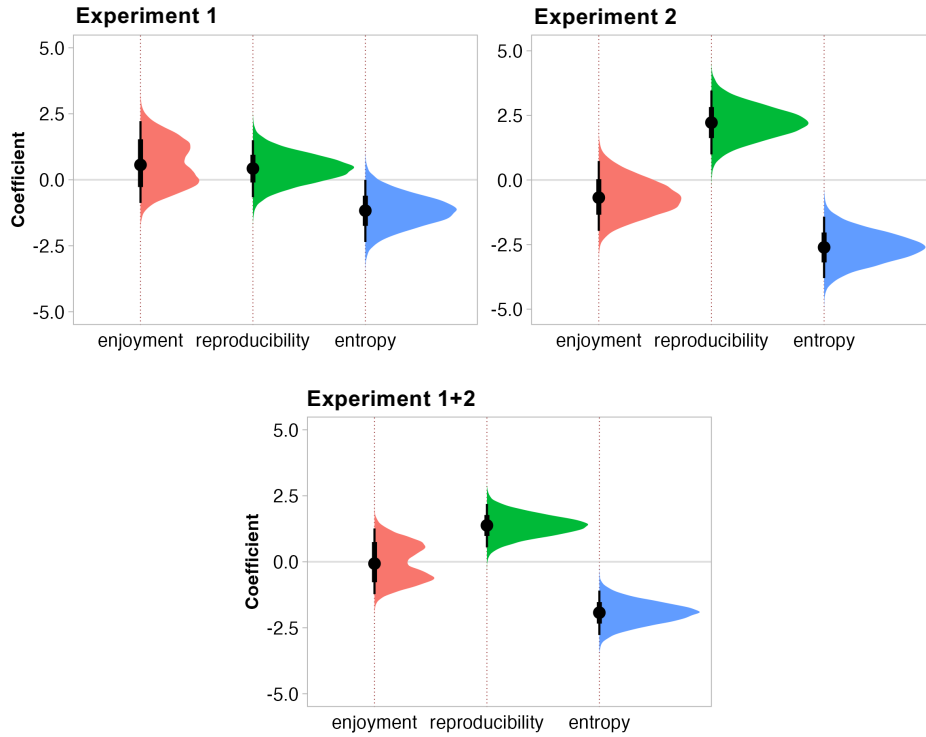
Supplementary Figure A) Influence of enjoyment, reproducibility, and predictability on accuracy: Model comparison using LOO (leave-one-out cross-validation). In both experiments, H4.0 is the worst model. Error bars for all other models overlap greatly, suggesting that no model offers uniquely better predictive accuracy. $elpd_loo$ = expected log pointwise predictive density, a way of ranking models by predictive accuracy.

$simDif$ = objectively measured similarity – estimated similarity
 $Moving$ = categorical variable high or low synchrony
 $enjoyment_z$ = z-scored ratings of enjoyment
 $reproducibility_z$ = z-scored ratings of reproducibility
 $M_entropy1_z$ = z-scored and averaged entropy of right and left wrists

- H4.0: $simDif \sim 1 + Moving, \sigma \sim Moving$
- H4.1: $simDif \sim 1 + Moving + (1|ID), \sigma \sim Moving$
- H4.2: $simDif \sim 1 + Moving + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H4.3: $simDif \sim 1 + Moving + enjoyment_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H4.4: $simDif \sim 1 + Moving + enjoyment_z + reproducibility_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H4.5: $simDif \sim 1 + Moving * (enjoyment_z) + reproducibility_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H4.6: $simDif \sim 1 + Moving * (enjoyment_z + reproducibility_z) + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H4.7: $simDif \sim 1 + Moving * (enjoyment_z + reproducibility_z + M_entropy1_z) + (1|ID), \sigma \sim Moving$
- H4.8: $simDif \sim 1 + Moving * (enjoyment_z * reproducibility_z + M_entropy1_z) + (1|ID), \sigma \sim Moving$



Supplementary Figure B) Influence of enjoyment, reproducibility, and predictability on accuracy: Parameter estimates from H4.8. Entropy is our measure of predictability, where greater positive values represent less predictability and smaller values represent a ‘more pure’, more predictable, signal.

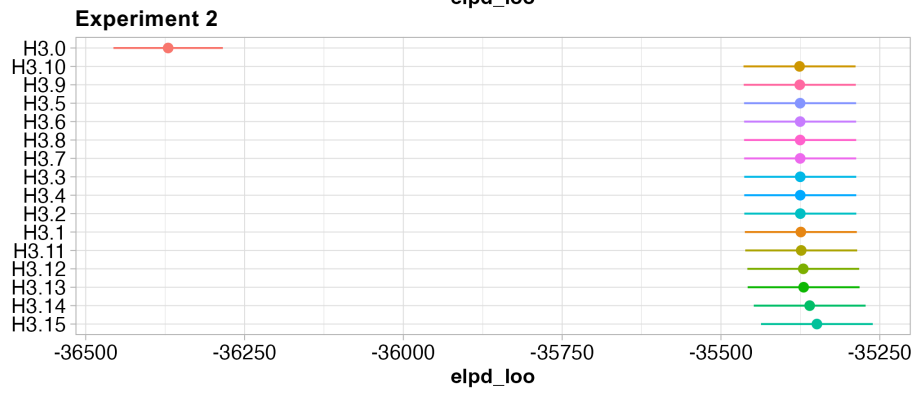
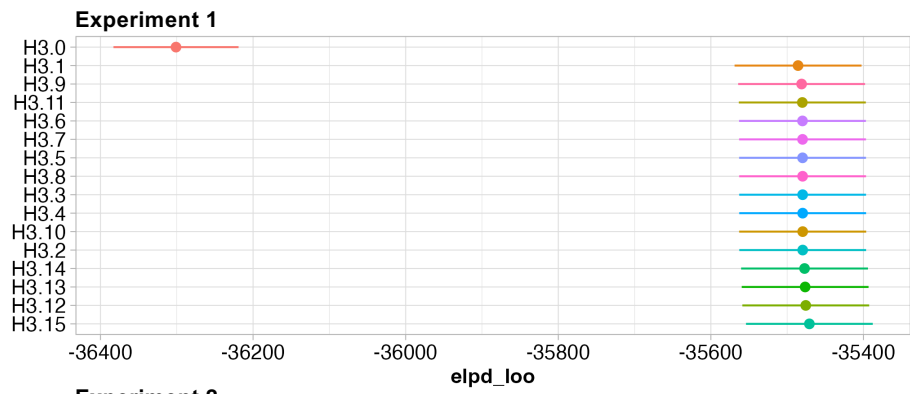


Supplementary Figure C) Influence of interindividual traits and predictability on accuracy: Model comparison using LOO (leave-one-out cross-validation). In both experiments, H3.0 is the worst model. Error bars for all other models overlap greatly, suggesting that no model offers uniquely better predictive accuracy.

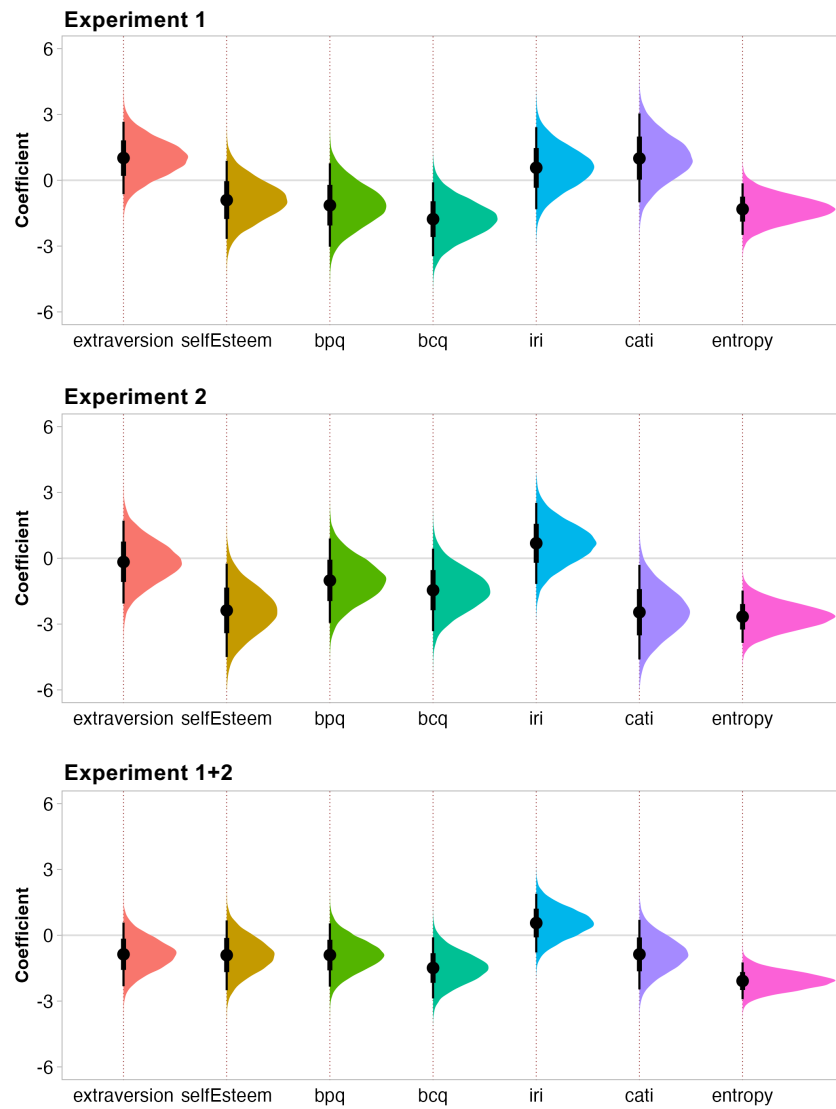
elpd_loo = expected log pointwise predictive density, a way of ranking models by predictive accuracy.

simDif = objectively measured similarity – estimated similarity
 Moving = categorical variable high or low synchrony
 extraversion_z = z-scored extraversion score
 selfEsteem_z = z-scored selfesteem score
 bpq_z = z-scored body perception score
 bcq_z = z-scored body competence score
 iri_z = z-scored empathy score
 cati_z = z-scored autistic trait score
 M_entropy1_z = z-scored and averaged entropy of right and left wrists

- H3.0: $simDif \sim 1 + Moving, \sigma \sim Moving$
- H3.1: $simDif \sim 1 + Moving + (1|ID), \sigma \sim Moving$
- H3.2: $simDif \sim 1 + Moving + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.3: $simDif \sim 1 + Moving + extraversion_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.4: $simDif \sim 1 + Moving + extraversion_z + selfEsteem_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.5: $simDif \sim 1 + Moving + extraversion_z + selfEsteem_z + bpq_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.6: $simDif \sim 1 + Moving + extraversion_z + selfEsteem_z + bpq_z + bcq_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.7: $simDif \sim 1 + Moving + extraversion_z + selfEsteem_z + bpq_z + bcq_z + iri_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.8: $simDif \sim 1 + Moving + extraversion_z + selfEsteem_z + bpq_z + bcq_z + iri_z + cati_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.9: $simDif \sim 1 + Moving * (extraversion_z) + selfEsteem_z + bpq_z + bcq_z + iri_z + cati_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.10: $simDif \sim 1 + Moving * (extraversion_z + selfEsteem_z) + bpq_z + bcq_z + iri_z + cati_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.11: $simDif \sim 1 + Moving * (extraversion_z + selfEsteem_z + bpq_z) + bcq_z + iri_z + cati_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.12: $simDif \sim 1 + Moving * (extraversion_z + selfEsteem_z + bpq_z + bcq_z) + iri_z + cati_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.13: $simDif \sim 1 + Moving * (extraversion_z + selfEsteem_z + bpq_z + bcq_z + iri_z) + cati_z + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.14: $simDif \sim 1 + Moving * (extraversion_z + selfEsteem_z + bpq_z + bcq_z + iri_z + cati_z) + M_entropy1_z + (1|ID), \sigma \sim Moving$
- H3.15: $simDif \sim 1 + Moving * (extraversion_z + selfEsteem_z + bpq_z + bcq_z + iri_z + cati_z + M_entropy1_z) + (1|ID), \sigma \sim Moving$



Supplementary Figure D) Influence of interindividual traits and predictability (i.e., entropy) on accuracy: Parameter estimates from H3.15. bpq = body perception; bcq = body competence; iri = empathy; cati = autistic traits.



Supplementary Figure E) Influence of interindividual traits, movement similarity, and predictability on enjoyment. We used a hurdle-gaussian model to calculate the likelihood of very low enjoyment (ratings <11) for each trait, as well as the relationships between traits and ratings of enjoyment per se (ratings 11-100) in a single model. No model comparison using LOO (leave-one-out cross-validation) possible, as the *hurdle_gaussian* custom family from Andrew Heiss' tutorial (<https://www.andrewheiss.com/blog/2022/05/09/hurdle-lognormal-gaussian-brms/>) has yet to be integrated into the *brms* package. Our final model was:

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Expl.17: enjoyment_H ~ 1 + M_entropy1_z + M_similarity1_z + extraversion_z + selfEsteem_z + bpq_z + bcq_z + iri_z + cati_z + (1|ID), hu ~ 1 + M_entropy1_z + M_similarity1_z + extraversion_z + selfEsteem_z + bpq_z + bcq_z + iri_z + cati_z
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Enjoyment_H = enjoyment, where all ratings <11 out of 100 are replaced with 0

M_entropy1_z = z-scored and averaged entropy of right and left wrists

M_similarity_z = z-scored and averaged similarity of movements

extraversion_z = z-scored extraversion score

selfEsteem_z = z-scored selfesteem score

bpq_z = z-scored body perception score

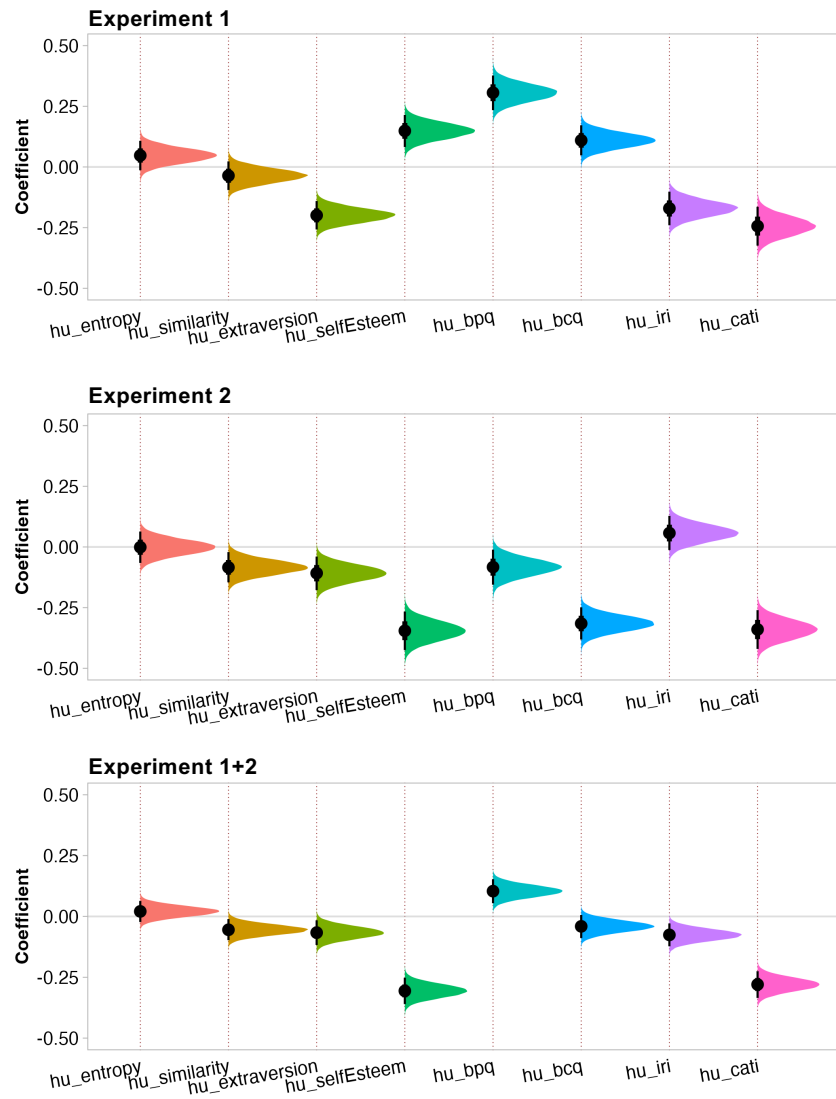
bcq_z = z-scored body competence score

iri_z = z-scored empathy score

cati_z = z-scored autistic trait score

hu = the intercept representing the likelihood of very low enjoyment (ratings <11 out of 100)

Supplementary Figure F) Influence of interindividual traits, enjoyment, reproducibility, and predictability (entropy) on enjoyment: Hu (very low enjoyment, i.e., ratings of enjoyment that were <11 out of 100) parameter estimates from Exp1.17.



Supplementary Figure G) Influence of interindividual traits, movement similarity, and predictability (entropy) on enjoyment: Mu (enjoyment per se, i.e., rating between 11-100) parameter estimates from Exp1.17.

