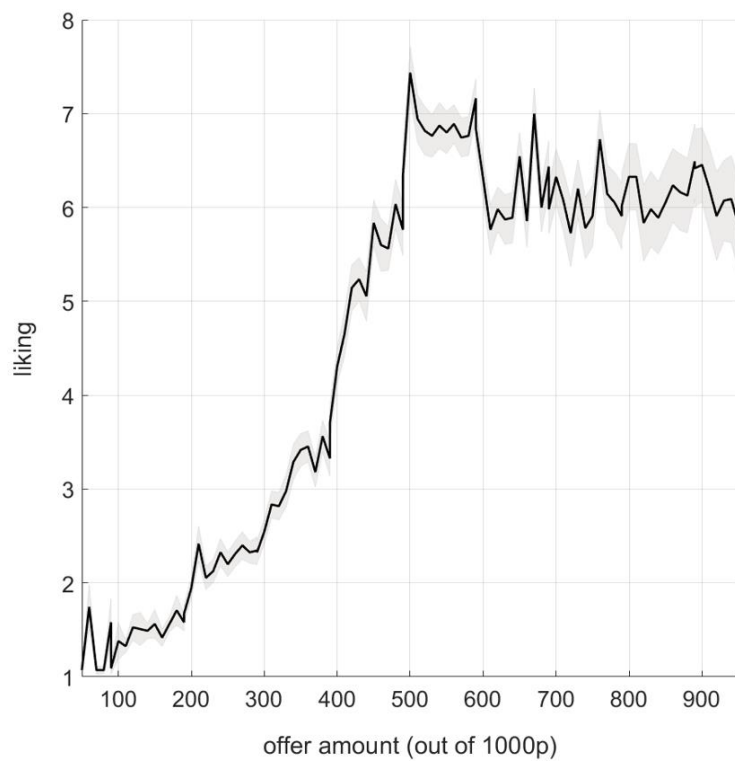
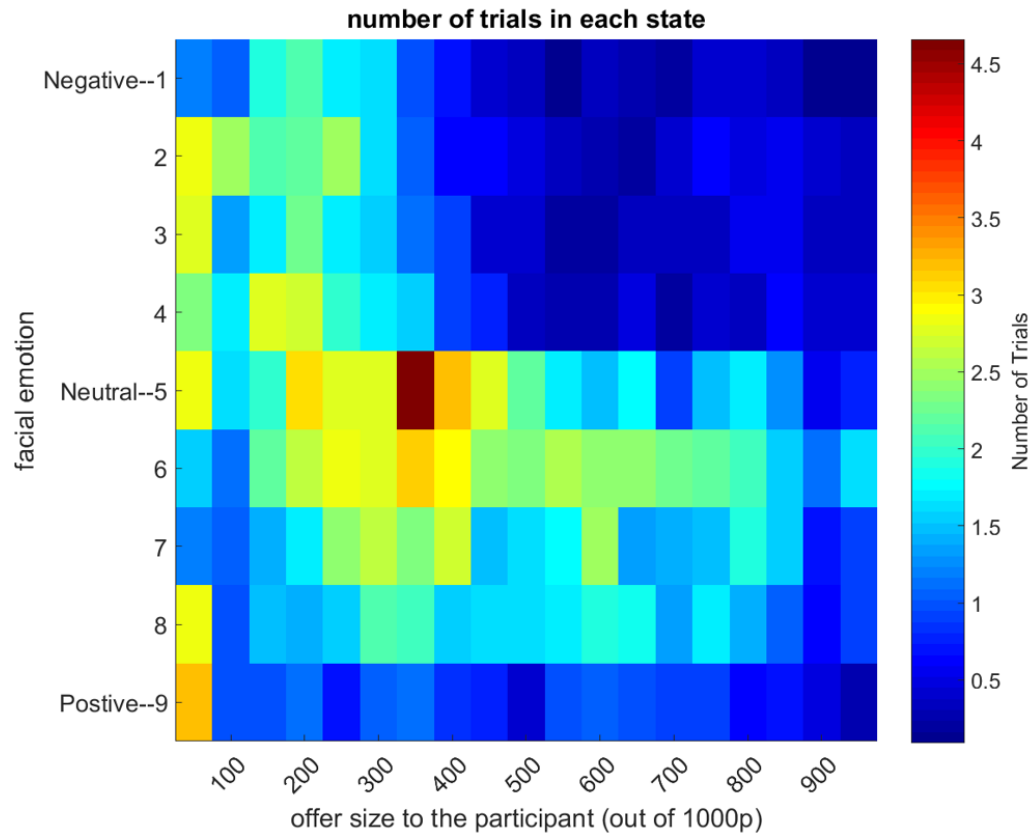


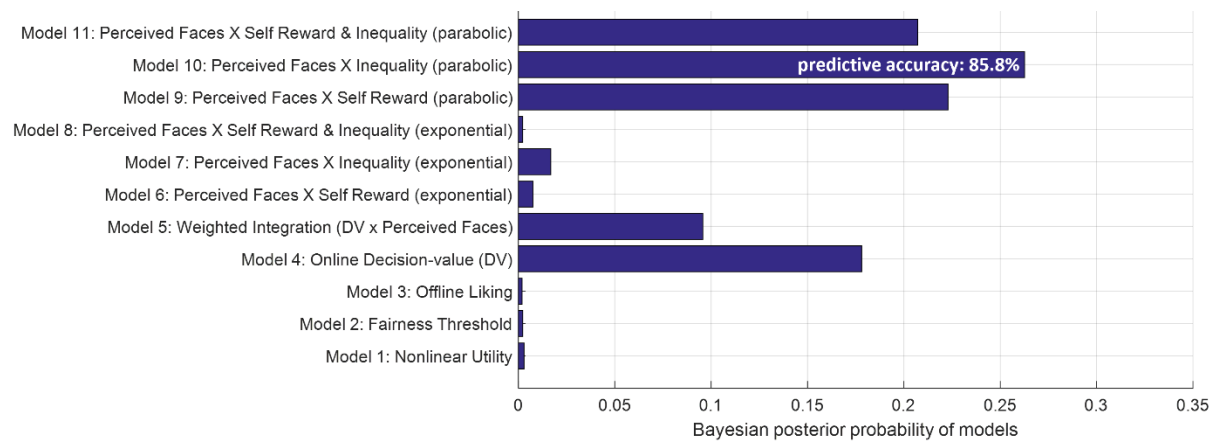
Supplementary Figures



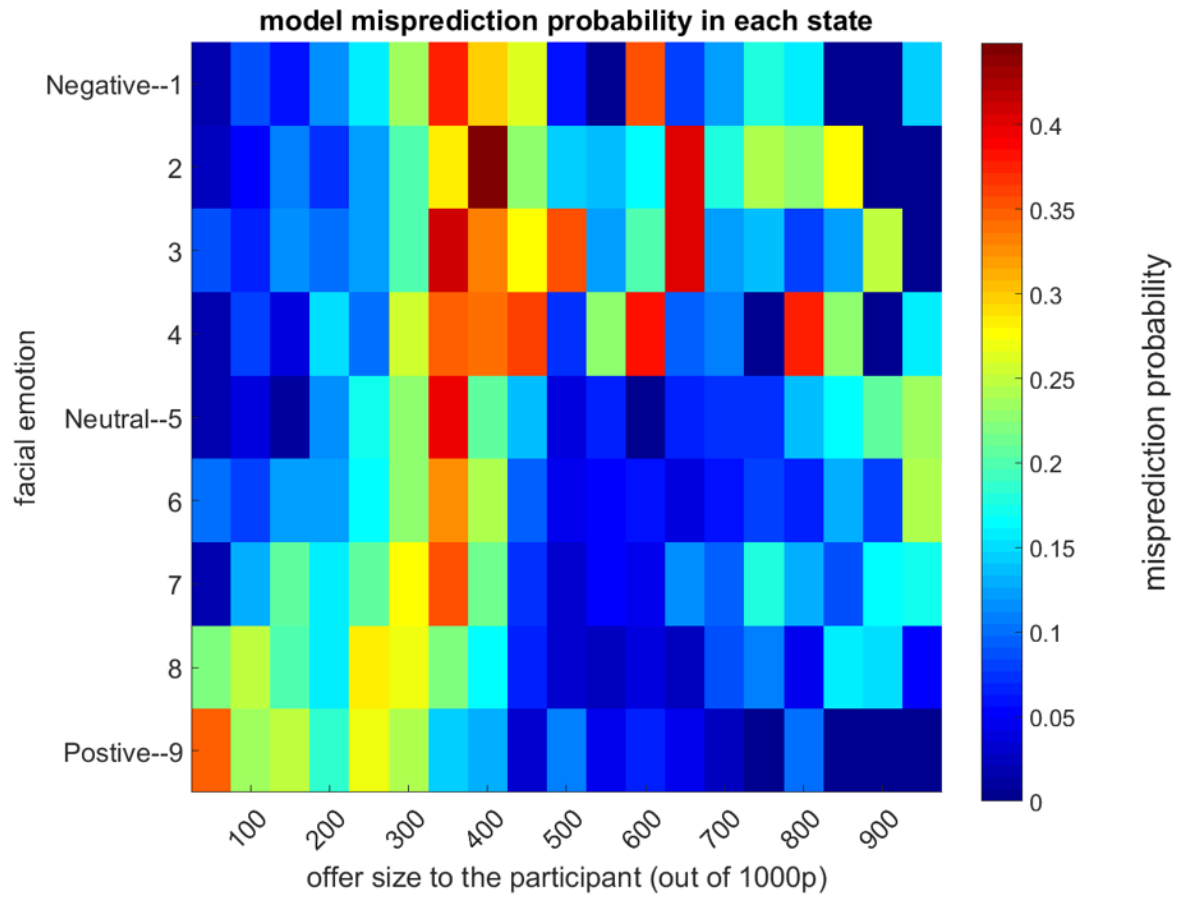
Supplementary Figure 1. Participants' liking ratings monotonically increase from 50p to 500p, which was the point of 50/50 split in the current experimental design. Relatively lower ratings for advantageous offers (>500p) indicate inequality aversion in this cohort. Wider SEM shading around the ratings of advantageous offers indicate a greater individual variability in terms of self-other inequality relative to how unfair offers were rated.



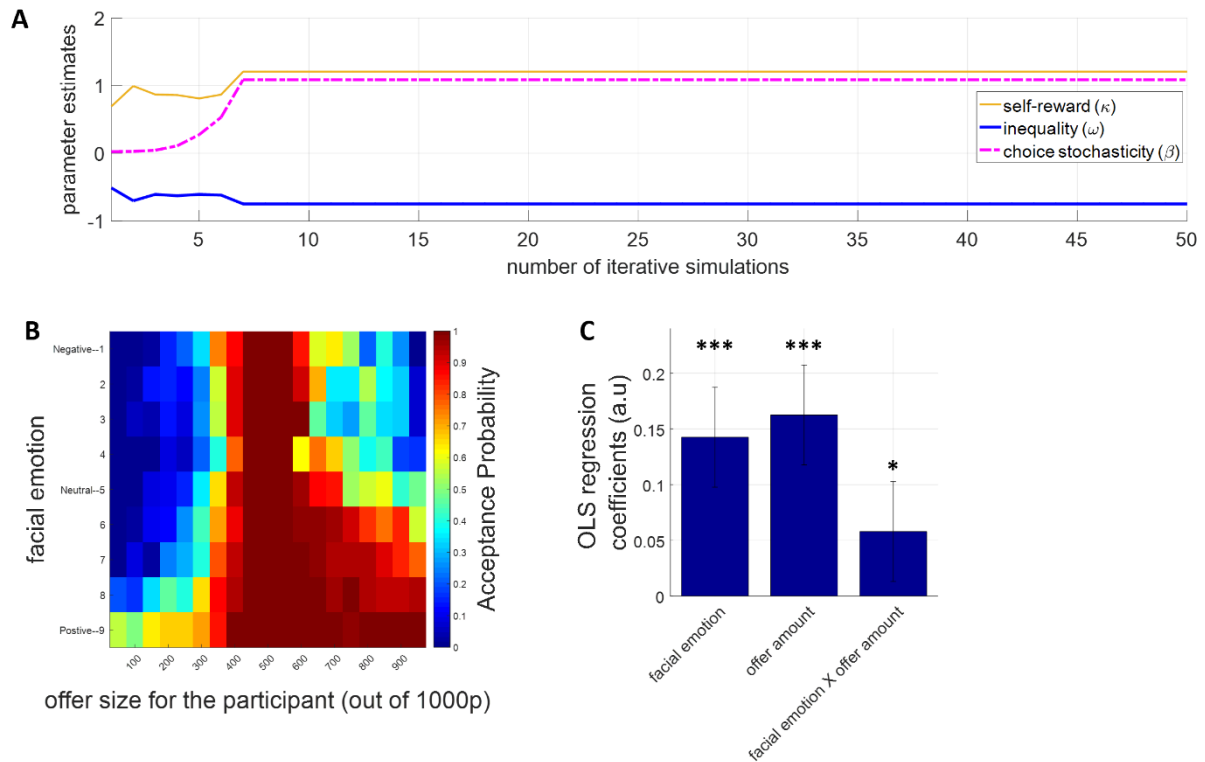
Supplementary Figure 2. Out of 240 trials, average number of trials participants spent in each state-space (i.e. combinations of proposer's facial emotion (y-axis) and offer amounts (x-axis)) represented as a heat map. Colour bar shows the number of trials. On average participants had 12.6 ± 15.9 (mean $\pm$ SD) trials in the upper right hand quarter (i.e. advantageous offers while the proposer is displaying a negative facial expression).



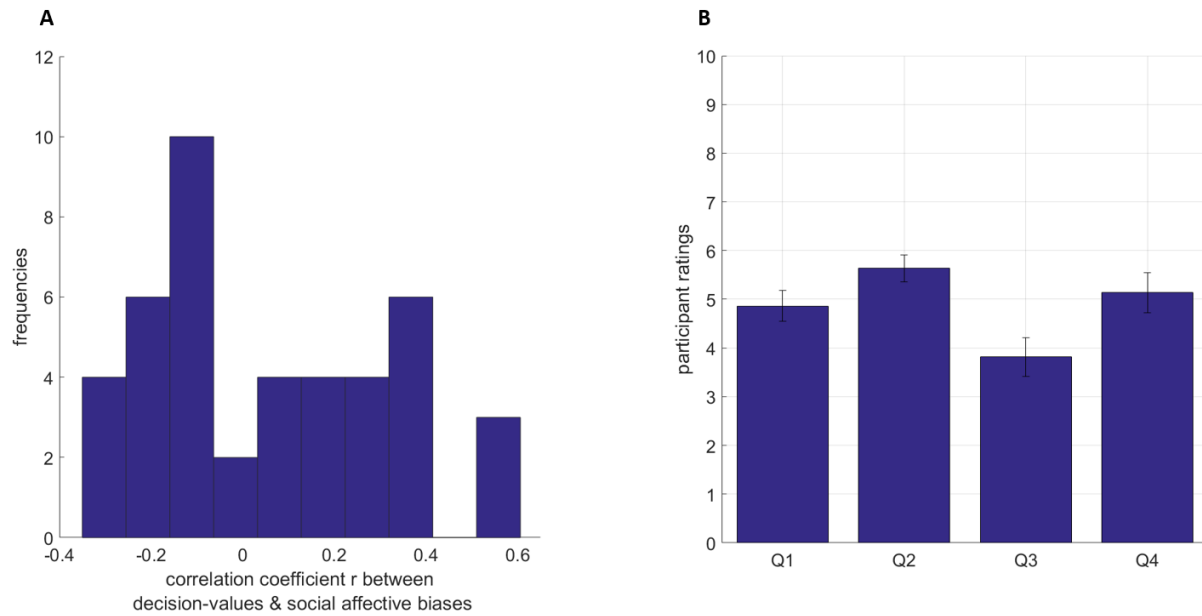
Supplementary Figure 3. Model selection implemented by feeding log-likelihood values from all models in a matrix format (number of participants x number of models) to `spm_BMS.m` (i.e. the Bayesian Model Selection script from SPM12 library), suggests that Model 10 is most likely to be the generative model for the observed data (based on model exceedance probabilities). This model suggests that perceived facial emotions selectively modulate the inequality term in a parabolic form.



Supplementary Figure 4. Misprediction probabilities of the best-fitting model over the stimuli space. A regression analysis of the trials mispredicted by the best-fitting model did not show a significant main effect of proposer's facial emotions or the offer amount, indicating that the model does not miss the behavioural effect of faces and the offer amount (Figure 3) in a systematic manner.



Supplementary Figure 5. Model recovery analyses. (A) A control analysis involving iterative simulations of the best-fitting model based on the population average of the model parameters on a task environment experienced by a representative subject demonstrate that parameter estimates quickly stabilise. In these simulations choices were generated stochastically by a sigmoid function and the parameters in the current simulation ($i+1$) were re-estimated based on the generated choices from the previous simulation (i). **(B-C)** Reanalysis of the raw data originally reported in Figure 3 by replacing participant choices with the choices generated by the best fitting dynamic inequality aversion model, is able to reproduce the essence of human behaviour and recapture significant main effects of facial emotions, offer amounts and their interaction (* $P < 0.05$, *** $P < 0.001$).



Supplementary Figure 6. Relationship between social affective biases and decision-values. (A) The distribution of correlation coefficients r between social affective biases and decision-values entered in to the pupillary model. Frequencies on the y-axis indicate the number of participants.

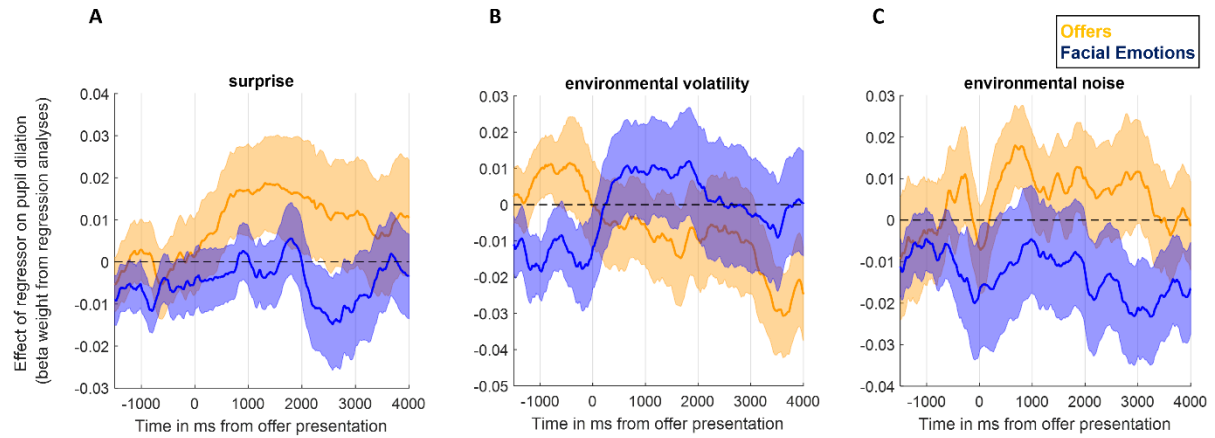
(B) Participants rated the proposer on 4 questions from 0 to 10.

Q1. How much do you think this person cares about rewards to others? (0: does not care at all, 10: cares very much)

Q2. How much would you like this person if you spent 1 hour with him/her in real-life? (0: strong dislike, 10: very likeable)

Q3. How many people do you know in real life who resembles this person (not physical appearance)? (number 0-10)

Q4. How socially close do you feel towards those people that you know? (0: not close at all, 10: very close).



Supplementary Figure 7. Pupillary signal correlating with regressors estimated by the Bayesian filter. (A) Time evolution of coefficient estimates from the pupillary OLS regression model correlating with surprise associated with offer amounts and proposer's facial emotions. The surprise signal peaks around decision RT=1.74 seconds. **(B-C)** Time evolution of regression coefficients from the pupillary regression model for regressors describing environmental change. Pupil response was not statistically significant for any of these regressors. Error shading denotes ± 1 SEM.