**For Online Publication**

# Web Appendix E. Details of CRRA Preference Estimation and Additional and Robustness Analyses

This section contains details of estimating the structural model specified in Section IV of the paper, as well as the results of several heterogeneity analyses and robustness checks.

We obtain maximum likelihood estimates by estimating Bayesian posterior modes for the parameters, where we assume a uniform prior on a bounded interval for each parameter. As long as the maximum likelihood estimate for every parameter lies within the prior interval, the posterior modes are known to be equal to maximum likelihood estimates, but our approach allows us to use Bayesian computational machinery. Specifically, we use the No-U-Turn sampler of Hamiltonian Monte Carlo as implemented in CmdStan (version 2.25.0) to jointly estimate all the parameters of the structural model. We also use R (version 4.0.5) to prepare the data and to summarize the estimates from CmdStan.

The likelihood function requires the use of the 10-dimensional normal cumulative distribution (because each participant makes choices in 2 waves × 5 stages, and the global preference shock make the choices correlated across these 10 dimensions). As of the time of writing (June 2021), Stan has not allowed for such a high-dimensional normal cumulative function. Therefore, instead of integrating out the global and wave shocks, we formulate the model as a hierarchical model and estimate the shocks, which allows us to use a normal cumulative distribution in the (conditional) likelihood function that is only 1-dimensional. For each participant, we estimate two shocks: the sum of the wave and global shocks (which are not separately identified in either wave) in each of the two waves. Because we have 237 participants, we thus need to estimate 474 (= 237 × 2) shocks.

As noted in the paper, because there is a discrete number of contingent strategies in the master decision tree, participant-specific parameters are not point-identified. In particular, this lack of identification applies to the 474 participant-wave-specific shocks. However, by restricting each of the (uniform) priors on the shocks to put positive probability on a narrow enough interval, we are effectively imposing a joint constraint on the shock realizations, which makes them all identifiable. Specifically, we use the interval [-6,6] for the prior on each of the 474 shocks. Because these shocks are on a log scale, we are effectively allowing each shock to make CRRA as small as $e^{-6} \approx 0.002$ times or as large as $e^6 \approx 403$ times its shock-free value. This interval is sufficiently narrow to allow us to identify all 474 shocks, but it is wide enough that it only rules out values that we think are implausible.

Turning next to our prior intervals for the parameters corresponding to the mean and variance of ln(CRRA) among participants, we inform our selection of these intervals by running ten (2 waves × 5 stages) by-stage MLEs. These by-stage MLEs estimate only the mean and "total variance" of ln(CRRA) in each stage, where the "total variance" includes not only the variance in preferences within the stage but also variance due to response error. The mean ln(CRRA) estimates from these by-stage MLEs are mostly negative and between 0 and -1. We thus use the interval [-3,3] for the prior on the mean ln(CRRA) parameter in the full Bayesian estimation.

This prior interval is more than wide enough to include all the by-stage MLE estimates of mean ln(CRRA).

Reassuringly, the posterior modes of our parameter estimates from the full Bayesian estimation imply stage-specific mean ln(CRRA)'s that are close to our by-stage estimates. In addition, the estimates of the variances from the full Bayesian estimation add up to about 8 in each stage, which is close to most of the estimates of the "total variance" from the by-stage MLEs.

**Table E.8a: Fastest quintile of participants dropped.**

**A. Pairwise Choices Between Complete Strategies**

| | (1)<br>ln(CRRA) | (2)<br>ln($\sigma_\epsilon$) | (3)<br>$\sigma_v^2$ | (4)<br>$\sigma_{\eta_1}^2$ | (5)<br>$\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.106 | -0.396 | | | |
| | (0.279) | (0.195) | | | |
| stage | -0.012 | -0.088 | | | |
| | (0.022) | (0.017) | | | |
| wave2*stage | 0.008 | 0.047 | | | |
| | (0.028) | (0.023) | | | |
| constant | -0.199 | 0.741 | 1.626 | 1.695 | 1.493 |
| | (0.223) | (0.141) | (0.438) | (0.730) | (0.734) |

**B. Pairwise Choices Between Compound Lotteries**

| | (1)<br>ln(CRRA) | (2)<br>ln($\sigma_\epsilon$) | (3)<br>$\sigma_v^2$ | (4)<br>$\sigma_{\eta_1}^2$ | (5)<br>$\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.014 | -0.410 | | | |
| | (0.275) | (0.184) | | | |
| stage | 0.018 | -0.105 | | | |
| | (0.024) | (0.017) | | | |
| wave2*stage | -0.013 | 0.054 | | | |
| | (0.030) | (0.023) | | | |
| constant | -0.292 | 0.804 | 1.998 | 1.247 | 1.330 |
| | (0.217) | (0.128) | (0.468) | (0.654) | (0.719) |

**C. Pairwise Choices Between Reduced Simple Lotteries**

| | (1)<br>ln(CRRA) | (2)<br>ln($\sigma_\epsilon$) | (3)<br>$\sigma_v^2$ | (4)<br>$\sigma_{\eta_1}^2$ | (5)<br>$\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.038 | -0.401 | | | |
| | (0.277) | (0.191) | | | |
| stage | -0.001 | -0.113 | | | |
| | (0.025) | (0.017) | | | |
| wave2*stage | -0.009 | 0.037 | | | |
| | (0.032) | (0.023) | | | |
| constant | -0.250 | 0.933 | 1.904 | 1.167 | 1.610 |
| | (0.233) | (0.142) | (0.492) | (0.703) | (0.763) |

**D. Combined Frames**

| | (1)<br>ln(CRRA) | (2)<br>ln($\sigma_\epsilon$) | (3)<br>$\sigma_v^2$ | (4)<br>$\sigma_{\eta_1}^2$ | (5)<br>$\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.044 | -0.347 | | | |
| | (0.264) | (0.160) | | | |
| stage | 0.006 | -0.109 | | | |
| | (0.015) | (0.010) | | | |
| wave2*stage | -0.004 | 0.047 | | | |
| | (0.019) | (0.013) | | | |
| constant | -0.436 | 0.970 | 2.121 | 1.614 | 2.051 |
| | (0.206) | (0.115) | (0.485) | (0.682) | (0.747) |

**Note:** Wave 1+2 sample, with fastest quintile of participants dropped. #Obs is 17,010 choices. Standard errors in parentheses. In panels A, B, C, and D, respectively, the difference between $\sigma_{\eta_1}^2$ (columns 4) and $\sigma_{\eta_2}^2$ (columns 5) is -0.014 (1.251), -0.198 (1.229), -0.347 (1.292), and -0.555 (1.251).

**Table E.8b: Heterogeneity by sex and psychological characteristics.**

**A. Pairwise Choices Between Complete Strategies**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.565 | -0.350 | | | |
| | (0.291) | (0.186) | | | |
| stage | -0.009 | -0.095 | | | |
| | (0.022) | (0.015) | | | |
| wave2*stage | 0.012 | 0.056 | | | |
| | (0.026) | (0.021) | | | |
| male | -0.374 | 0.054 | | | |
| | (0.268) | (0.121) | | | |
| cognition | -0.804 | -0.373 | | | |
| | (0.251) | (0.115) | | | |
| extraversion | 0.300 | -0.007 | | | |
| | (0.252) | (0.118) | | | |
| agreeableness | -0.022 | 0.019 | | | |
| | (0.248) | (0.113) | | | |
| conscientiousness | -0.167 | 0.262 | | | |
| | (0.257) | (0.120) | | | |
| emotional stability | -0.179 | -0.116 | | | |
| | (0.259) | (0.121) | | | |
| open to experience | -0.458 | -0.153 | | | |
| | (0.255) | (0.121) | | | |
| constant | 0.413 | 0.832 | 2.051 | 2.169 | 1.477 |
| | (0.273) | (0.100) | (0.426) | (0.640) | (0.638) |

**B. Pairwise Choices Between Compound Lotteries**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.236 | -0.396 | | | |
| | (0.293) | (0.179) | | | |
| stage | 0.022 | -0.099 | | | |
| | (0.022) | (0.015) | | | |
| wave2*stage | -0.003 | 0.061 | | | |
| | (0.027) | (0.021) | | | |
| male | -0.215 | -0.033 | | | |
| | (0.248) | (0.118) | | | |
| cognition | -0.768 | -0.342 | | | |
| | (0.237) | (0.116) | | | |
| extraversion | 0.330 | 0.059 | | | |
| | (0.241) | (0.116) | | | |
| agreeableness | 0.125 | 0.007 | | | |
| | (0.228) | (0.108) | | | |
| conscientiousness | -0.133 | 0.280 | | | |
| | (0.233) | (0.114) | | | |
| emotional stability | -0.164 | -0.019 | | | |
| | (0.243) | (0.117) | | | |
| open to experience | -0.236 | -0.132 | | | |
| | (0.239) | (0.114) | | | |
| constant | 0.074 | 0.846 | 2.246 | 1.602 | 1.454 |
| | (0.267) | (0.098) | (0.437) | (0.581) | (0.617) |

**C. Pairwise Choices Between Reduced Simple Lotteries**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.105 | -0.307 | | | |
| | (0.319) | (0.183) | | | |
| stage | -0.019 | -0.112 | | | |
| | (0.026) | (0.015) | | | |
| wave2*stage | 0.006 | 0.052 | | | |
| | (0.031) | (0.020) | | | |
| male | -0.397 | -0.245 | | | |
| | (0.263) | (0.118) | | | |

**D. Combined Frames**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.314 | -0.249 | | | |
| | (0.284) | (0.151) | | | |
| stage | 0.005 | -0.108 | | | |
| | (0.014) | (0.008) | | | |
| wave2*stage | -0.001 | 0.057 | | | |
| | (0.018) | (0.012) | | | |
| male | -0.312 | -0.078 | | | |
| | (0.249) | (0.102) | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| cognition | -0.612 | -0.248 | | | | -0.799 | -0.310 | | | |
| | (0.253) | (0.110) | | | | (0.243) | (0.095) | | | |
| extraversion | 0.155 | 0.018 | | | | 0.262 | 0.007 | | | |
| | (0.249) | (0.109) | | | | (0.239) | (0.096) | | | |
| agreeableness | 0.078 | 0.005 | | | | 0.062 | -0.017 | | | |
| | (0.246) | (0.104) | | | | (0.226) | (0.089) | | | |
| conscientiousness | -0.086 | 0.149 | | | | -0.138 | 0.157 | | | |
| | (0.251) | (0.113) | | | | (0.234) | (0.102) | | | |
| emotional stability | -0.032 | -0.106 | | | | -0.094 | -0.039 | | | |
| | (0.258) | (0.112) | | | | (0.238) | (0.097) | | | |
| open to experience | -0.177 | -0.139 | | | | -0.255 | -0.162 | | | |
| | (0.251) | (0.110) | | | | (0.238) | (0.092) | | | |
| constant | 0.006 | 1.044 | 2.451 | 1.849 | 1.602 | 0.043 | 0.971 | 2.364 | 1.743 | 1.807 |
| | (0.303) | (0.107) | (0.480) | (0.695) | (0.690) | (0.265) | (0.083) | (0.434) | (0.574) | (0.640) |

**Note:** Wave 1+2 sample. #Obs is 21,330 choices. Standard errors in parentheses. The variables cognition, extraversion, agreeableness, conscientiousness, emotional stability, and open to experience are dummy variables that are equal to 1 if the participant scored above median in the respective measures of psychological characteristics and 0 otherwise. In panels A, B, C, and D, respectively, the difference between $\sigma^2_{\eta_1}$ (columns 4) and $\sigma^2_{\eta_2}$ (columns 5) is 0.572 (1.114), 0.038 (1.070), 0.030 (1.233), and -0.184 (1.082).

## Table E.8c: Heterogeneity by rightside-up vs. upside-down randomization.

### A. Pairwise Choices Between Complete Strategies

| | (1) $\ln(CRRA)$ | (2) $\ln(\sigma_\epsilon)$ | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.022 | -0.410 | | | |
| | (0.226) | (0.157) | | | |
| stage | -0.068 | -0.094 | | | |
| | (0.030) | (0.015) | | | |
| wave2*stage | 0.071 | 0.026 | | | |
| | (0.034) | (0.025) | | | |
| upside down | 0.014 | 0.145 | | | |
| | (0.119) | (0.088) | | | |
| upside down*wave2 | -0.537 | -0.326 | | | |
| | (0.165) | (0.112) | | | |
| upside down*stage | -0.003 | -0.001 | | | |
| | (0.034) | (0.026) | | | |
| upside down*wave2*stage | 0.066 | 0.074 | | | |
| | (0.053) | (0.039) | | | |
| constant | -0.098 | 0.798 | 2.230 | 2.007 | 1.514 |
| | (0.185) | (0.101) | (0.441) | (0.650) | (0.645) |

### B. Pairwise Choices Between Compound Lotteries

| | (1) $\ln(CRRA)$ | (2) $\ln(\sigma_\epsilon)$ | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.022 | -0.405 | | | |
| | (0.231) | (0.157) | | | |
| stage | -0.044 | -0.102 | | | |
| | (0.029) | (0.015) | | | |
| wave2*stage | 0.063 | 0.017 | | | |
| | (0.034) | (0.025) | | | |
| upside down | 0.101 | 0.232 | | | |
| | (0.119) | (0.088) | | | |
| upside down*wave2 | -0.285 | -0.339 | | | |
| | (0.164) | (0.115) | | | |
| upside down*stage | 0.013 | -0.019 | | | |
| | (0.034) | (0.026) | | | |
| upside down*wave2*stage | -0.040 | 0.047 | | | |
| | (0.054) | (0.039) | | | |
| constant | -0.214 | 0.823 | 2.451 | 1.542 | 1.356 |
| | (0.196) | (0.104) | (0.461) | (0.619) | (0.633) |

### C. Pairwise Choices Between Reduced Simple Lotteries

| | (1) $\ln(CRRA)$ | (2) $\ln(\sigma_\epsilon)$ | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.081 | -0.420 | | | |
| | (0.246) | (0.161) | | | |
| stage | -0.054 | -0.109 | | | |
| | (0.034) | (0.015) | | | |
| wave2*stage | 0.045 | -0.001 | | | |
| | (0.038) | (0.025) | | | |
| upside down | 0.117 | 0.174 | | | |
| | (0.137) | (0.082) | | | |
| upside down*wave2 | -0.182 | -0.297 | | | |
| | (0.183) | (0.112) | | | |
| upside down*stage | -0.009 | 0.011 | | | |
| | (0.039) | (0.024) | | | |
| upside down*wave2*stage | -0.016 | -0.007 | | | |
| | (0.062) | (0.036) | | | |

### D. Combined Frames

| | (1) $\ln(CRRA)$ | (2) $\ln(\sigma_\epsilon)$ | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.001 | -0.449 | | | |
| | (0.209) | (0.125) | | | |
| stage | -0.059 | -0.105 | | | |
| | (0.020) | (0.009) | | | |
| wave2*stage | 0.069 | 0.011 | | | |
| | (0.022) | (0.014) | | | |
| upside down | 0.042 | 0.235 | | | |
| | (0.078) | (0.048) | | | |
| upside down*wave2 | -0.400 | -0.310 | | | |
| | (0.110) | (0.063) | | | |
| upside down*stage | 0.027 | -0.018 | | | |
| | (0.022) | (0.014) | | | |
| upside down*wave2*stage | 0.000 | 0.011 | | | |
| | (0.035) | (0.021) | | | |

| constant | -0.275 | 1.022 | 2.547 | 1.752 | 1.498 | -0.331 | 0.983 | 2.552 | 2.039 | 1.572 |
|----------|--------|-------|-------|-------|-------|--------|-------|-------|-------|-------|
|          | (0.210) | (0.107) | (0.491) | (0.679) | (0.697) | (0.183) | (0.082) | (0.459) | (0.613) | (0.623) |

**Note**: Wave 1+2 sample. #Obs is 21,330 choices. Standard errors in parentheses. The variable *upside down* is a dummy variable that is 1 if the decision trees were depicted upside down and 0 otherwise. In panels A, B, C, and D, respectively, the difference between $\sigma^2_{\eta_1}$ (columns 4) and $\sigma^2_{\eta_2}$ (columns 5) is 0.653 (1.134), 0.187 (1.132), 0.165 (1.242), and 0.590 (1.102). Furthermore, we ran likelihood ratio tests and found that adding variables related to the orientation of decision trees (*upside down*, *upside down*wave*, *upside down*stage*, *upside down*wave2*stage*) does not significantly improve the goodness-of-fit of the model in panel A ($p = 0.4886$), panel B ($p = 0.4672$), panel C ($p = 0.5443$), or panel D ($p = 0.3131$).

**Table E.8d: Heterogeneity by randomization to receive text-based, binary hypothetical risky choices during part 1 or part 5 of the experiment.**

**A. Pairwise Choices Between Complete Strategies**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.018 | -0.402 | | | |
| | (0.229) | (0.154) | | | |
| stage | -0.093 | -0.098 | | | |
| | (0.030) | (0.015) | | | |
| wave2*stage | 0.093 | 0.025 | | | |
| | (0.034) | (0.025) | | | |
| calibration | 0.280 | 0.068 | | | |
| | (0.125) | (0.091) | | | |
| calibration*wave2 | -0.627 | -0.259 | | | |
| | (0.170) | (0.115) | | | |
| calibration*stage | -0.015 | 0.017 | | | |
| | (0.036) | (0.028) | | | |
| calibration*wave2*stage | 0.037 | 0.005 | | | |
| | (0.054) | (0.040) | | | |
| constant | -0.169 | 0.806 | 2.189 | 2.016 | 1.464 |
| | (0.195) | (0.097) | (0.440) | (0.647) | (0.652) |

**B. Pairwise Choices Between Compound Lotteries**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.112 | -0.413 | | | |
| | (0.229) | (0.155) | | | |
| stage | -0.080 | -0.103 | | | |
| | (0.030) | (0.015) | | | |
| wave2*stage | 0.103 | 0.024 | | | |
| | (0.034) | (0.025) | | | |
| calibration | 0.241 | 0.189 | | | |
| | (0.123) | (0.089) | | | |
| calibration*wave2 | -0.569 | -0.347 | | | |
| | (0.167) | (0.117) | | | |
| calibration*stage | -0.005 | -0.006 | | | |
| | (0.035) | (0.027) | | | |
| calibration*wave2*stage | -0.041 | 0.068 | | | |
| | (0.054) | (0.039) | | | |
| constant | -0.138 | 0.824 | 2.477 | 1.580 | 1.455 |
| | (0.183) | (0.100) | (0.469) | (0.611) | (0.648) |

**C. Pairwise Choices Between Reduced Simple Lotteries**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.019 | -0.424 | | | |
| | (0.237) | (0.159) | | | |
| stage | -0.081 | -0.110 | | | |
| | (0.035) | (0.015) | | | |
| wave2*stage | 0.070 | -0.001 | | | |
| | (0.039) | (0.024) | | | |
| calibration | 0.153 | 0.172 | | | |
| | (0.141) | (0.084) | | | |
| calibration*wave2 | -0.319 | -0.337 | | | |
| | (0.188) | (0.113) | | | |
| calibration*stage | -0.033 | 0.010 | | | |
| | (0.040) | (0.026) | | | |
| calibration*wave2*stage | -0.034 | -0.010 | | | |

**D. Combined Frames**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.036 | -0.379 | | | |
| | (0.210) | (0.128) | | | |
| stage | -0.089 | -0.107 | | | |
| | (0.020) | (0.008) | | | |
| wave2*stage | 0.093 | 0.010 | | | |
| | (0.023) | (0.014) | | | |
| calibration | 0.185 | 0.180 | | | |
| | (0.082) | (0.049) | | | |
| calibration*wave2 | -0.573 | -0.326 | | | |
| | (0.115) | (0.063) | | | |
| calibration*stage | 0.019 | -0.003 | | | |
| | (0.023) | (0.015) | | | |
| calibration*wave2*stage | -0.005 | 0.012 | | | |

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| | (0.062) | (0.038) | | | | (0.036) | (0.021) | | | |
| constant | -0.168 | 0.995 | 2.476 | 1.815 | 1.406 | -0.252 | 0.968 | 2.484 | 1.845 | 1.623 |
| | (0.216) | (0.113) | (0.498) | (0.693) | (0.680) | (0.176) | (0.082) | (0.454) | (0.613) | (0.627) |

**Note**: Wave 1+2 sample. #Obs is 21,330 choices. Standard errors in parentheses. The variable *calibration* is a dummy variable that is 1 if the text-based, binary hypothetical risky choices ("calibration questions") were asked in part 5 of the experiment and 0 if in part 1. In panels A, B, C, and D, respectively, the difference between $\sigma_{\eta_1}^2$ (columns 4) and $\sigma_{\eta_2}^2$ (columns 5) is 0.535 (1.140), 0.078 (1.137), 0.330 (1.229), and 0.290 (1.112). Furthermore, we ran likelihood ratio tests and found that adding variables related to calibration questions (*calibration*, *calibration\*wave2*, *calibration\*stage*, *calibration\*wave2\*stage*) does not improve the goodness-of-fit of the model in panel A ($p = 0.5158$), panel B ($p = 0.4241$), panel C ($p = 0.5070$), or panel D ($p = 0.2123$).

# Table E.8e: Heterogeneity by randomization to cut-in-half monetary levels.

**A. Pairwise Choices Between Complete Strategies**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.090 | -0.412 | | | |
| | (0.230) | (0.162) | | | |
| stage | -0.050 | -0.096 | | | |
| | (0.028) | (0.015) | | | |
| wave2*stage | 0.046 | 0.032 | | | |
| | (0.032) | (0.024) | | | |
| cut in half | 0.120 | 0.071 | | | |
| | (0.126) | (0.091) | | | |
| cut in half*wave2 | -0.319 | -0.191 | | | |
| | (0.173) | (0.124) | | | |
| cut in half*stage | -0.019 | 0.015 | | | |
| | (0.038) | (0.029) | | | |
| cut in half*wave2*stage | 0.035 | 0.013 | | | |
| | (0.057) | (0.041) | | | |
| constant | -0.257 | 0.792 | 2.162 | 2.059 | 1.420 |
| | (0.195) | (0.103) | (0.445) | (0.666) | (0.656) |

**B. Pairwise Choices Between Compound Lotteries**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.045 | -0.371 | | | |
| | (0.240) | (0.159) | | | |
| stage | -0.029 | -0.106 | | | |
| | (0.028) | (0.015) | | | |
| wave2*stage | 0.047 | 0.022 | | | |
| | (0.032) | (0.024) | | | |
| cut in half | 0.061 | 0.180 | | | |
| | (0.127) | (0.088) | | | |
| cut in half*wave2 | -0.239 | -0.321 | | | |
| | (0.177) | (0.123) | | | |
| cut in half*stage | 0.027 | -0.012 | | | |
| | (0.039) | (0.028) | | | |
| cut in half*wave2*stage | -0.077 | 0.001 | | | |
| | (0.059) | (0.040) | | | |
| constant | -0.296 | 0.843 | 2.488 | 1.689 | 1.283 |
| | (0.202) | (0.108) | (0.468) | (0.648) | (0.632) |

**C. Pairwise Choices Between Reduced Simple Lotteries**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.089 | -0.403 | | | |
| | (0.241) | (0.163) | | | |
| stage | -0.071 | -0.111 | | | |
| | (0.033) | (0.015) | | | |
| wave2*stage | 0.062 | -0.006 | | | |
| | (0.037) | (0.024) | | | |
| cut in half | 0.253 | 0.217 | | | |
| | (0.144) | (0.085) | | | |
| cut in half*wave2 | -0.412 | -0.450 | | | |
| | (0.200) | (0.117) | | | |
| cut in half*stage | -0.035 | -0.010 | | | |
| | (0.043) | (0.027) | | | |
| cut in half*wave2*stage | 0.025 | 0.014 | | | |
| | (0.067) | (0.039) | | | |

**D. Combined Frames**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.060 | -0.388 | | | |
| | (0.210) | (0.127) | | | |
| stage | -0.048 | -0.110 | | | |
| | (0.019) | (0.009) | | | |
| wave2*stage | 0.054 | 0.019 | | | |
| | (0.022) | (0.014) | | | |
| cut in half | 0.111 | 0.157 | | | |
| | (0.084) | (0.050) | | | |
| cut in half*wave2 | -0.398 | -0.297 | | | |
| | (0.119) | (0.067) | | | |
| cut in half*stage | 0.029 | -0.001 | | | |
| | (0.025) | (0.016) | | | |
| cut in half*wave2*stage | -0.006 | -0.006 | | | |
| | (0.038) | (0.022) | | | |

| constant | -0.224 | 1.008 | 2.434 | 1.622 | 1.409 | -0.293 | 1.000 | 2.696 | 1.828 | 1.662 |
| | (0.208) | (0.112) | (0.494) | (0.702) | (0.696) | (0.188) | (0.084) | (0.454) | (0.623) | (0.624) |

**Note**: Wave 1+2 sample. #Obs is 21,330 choices. Standard errors in parentheses. The variable *cut in half* is a dummy variable that is 1 if the monetary values were halved and 0 if they were not. In panels A, B, C, and D, respectively, the difference between $\sigma^2_{\eta_1}$ (columns 4) and $\sigma^2_{\eta_2}$ (columns 5) is 0.650 (1.167), 0.173 (1.160), 0.179 (1.263), and -0.087 (1.125). Furthermore, we ran likelihood ratio tests and found that adding variables related to monetary level (*cut in half*, *cut in half*wave2*, *cut in half*stage*, *cut in half*wave2*stage*) does not improve the goodness-of-fit of the model in panel A ($p = 0.5265$), panel B ($p = 0.4911$), panel C ($p = 0.5072$), or panel D ($p = 0.3621$).

**Table E.8f: Heterogeneity by randomization to receive probability training during part 1 of the experiment.**

**A. Pairwise Choices Between Complete Strategies**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.091 | -0.377 | | | |
| | (0.230) | (0.160) | | | |
| stage | -0.088 | -0.093 | | | |
| | (0.030) | (0.015) | | | |
| wave2*stage | 0.092 | 0.016 | | | |
| | (0.034) | (0.025) | | | |
| training | 0.238 | 0.179 | | | |
| | (0.125) | (0.090) | | | |
| training*wave2 | -0.534 | -0.383 | | | |
| | (0.172) | (0.117) | | | |
| training*stage | 0.051 | -0.032 | | | |
| | (0.037) | (0.030) | | | |
| training*wave2*stage | -0.005 | 0.047 | | | |
| | (0.054) | (0.040) | | | |
| constant | -0.214 | 0.781 | 2.151 | 2.047 | 1.449 |
| | (0.195) | (0.104) | (0.446) | (0.660) | (0.644) |

**B. Pairwise Choices Between Compound Lotteries**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.003 | -0.300 | | | |
| | (0.230) | (0.160) | | | |
| stage | -0.068 | -0.102 | | | |
| | (0.030) | (0.015) | | | |
| wave2*stage | 0.078 | -0.007 | | | |
| | (0.034) | (0.025) | | | |
| training | 0.279 | 0.179 | | | |
| | (0.128) | (0.092) | | | |
| training*wave2 | -0.541 | -0.558 | | | |
| | (0.179) | (0.120) | | | |
| training*stage | 0.023 | -0.027 | | | |
| | (0.038) | (0.029) | | | |
| training*wave2*stage | -0.035 | 0.053 | | | |
| | (0.057) | (0.040) | | | |
| constant | -0.231 | 0.843 | 2.453 | 1.590 | 1.388 |
| | (0.192) | (0.103) | (0.471) | (0.628) | (0.653) |

**C. Pairwise Choices Between Reduced Simple Lotteries**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.013 | -0.325 | | | |
| | (0.223) | (0.154) | | | |
| stage | -0.108 | -0.110 | | | |
| | (0.036) | (0.015) | | | |
| wave2*stage | 0.102 | -0.019 | | | |
| | (0.039) | (0.025) | | | |
| training | 0.166 | 0.189 | | | |
| | (0.142) | (0.090) | | | |
| training*wave2 | -0.570 | -0.439 | | | |
| | (0.200) | (0.116) | | | |
| training*stage | 0.055 | -0.011 | | | |
| | (0.042) | (0.029) | | | |
| training*wave2*stage | -0.021 | -0.001 | | | |
| | (0.063) | (0.039) | | | |

**D. Combined Frames**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.005 | -0.307 | | | |
| | (0.205) | (0.130) | | | |
| stage | -0.093 | -0.106 | | | |
| | (0.021) | (0.009) | | | |
| wave2*stage | 0.094 | -0.004 | | | |
| | (0.023) | (0.014) | | | |
| training | 0.284 | 0.173 | | | |
| | (0.085) | (0.051) | | | |
| training*wave2 | -0.685 | -0.396 | | | |
| | (0.126) | (0.065) | | | |
| training*stage | 0.020 | -0.012 | | | |
| | (0.024) | (0.016) | | | |
| training*wave2*stage | 0.024 | 0.001 | | | |
| | (0.036) | (0.021) | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| constant | -0.100 | 1.016 | 2.460 | 1.692 | 1.500 | -0.257 | 0.974 | 2.548 | 1.915 | 1.686 |
| | (0.199) | (0.111) | (0.484) | (0.670) | (0.643) | (0.176) | (0.089) | (0.459) | (0.628) | (0.629) |

**Note**: Wave 1+2 sample. #Obs is 21,330 choices. Standard errors in parentheses. The variable *training* is a dummy variable that is 1 if the participant received both probability training and quiz in part 1 and 0 if the participant did not receive the probability training in part 1 (and took the probability quiz in part 5). In panels A, B, C, and D, respectively, the difference between $\sigma_{\eta_1}^2$ (columns 4) and $\sigma_{\eta_2}^2$ (columns 5) is 0.400 (1.143), 0.215 (1.158), 0.166 (1.169), and 0.291 (1.124). Furthermore, we ran likelihood ratio tests and found that adding variables related to training (*training*, *training\*wave2*, *training\*stage*, *training\*wave2\*stage*) does not improve the goodness-of-fit of the model in panel A ($p = 0.4624$), panel B ($p = 0.3880$), panel C ($p = 0.4389$), or panel D ($p = 0.1868$).

**Table E.8g: Heterogeneity by randomization of the order in which the frames were presented.**

**A. Pairwise Choices Between Complete Strategies**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.106 | -0.344 | | | |
| | (0.226) | (0.152) | | | |
| stage | -0.105 | -0.091 | | | |
| | (0.034) | (0.015) | | | |
| wave2*stage | 0.104 | 0.004 | | | |
| | (0.037) | (0.026) | | | |
| order1to7 | 0.359 | 0.010 | | | |
| | (0.164) | (0.115) | | | |
| order1to7*wave2 | -0.452 | -0.197 | | | |
| | (0.215) | (0.148) | | | |
| order1to7*stage | 0.009 | 0.010 | | | |
| | (0.049) | (0.038) | | | |
| order1to7*wave2*stage | -0.052 | 0.004 | | | |
| | (0.072) | (0.052) | | | |
| order7to1 | 0.236 | 0.071 | | | |
| | (0.156) | (0.107) | | | |
| order7to1*wave2 | -0.516 | -0.375 | | | |
| | (0.212) | (0.144) | | | |
| order7to1*stage | 0.032 | 0.008 | | | |
| | (0.046) | (0.034) | | | |
| order7to1*wave2*stage | 0.055 | 0.022 | | | |
| | (0.071) | (0.050) | | | |
| constant | -0.231 | 0.822 | 2.220 | 2.168 | 1.302 |
| | (0.199) | (0.093) | (0.450) | (0.636) | (0.613) |

**B. Pairwise Choices Between Compound Lotteries**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | -0.008 | -0.297 | | | |
| | (0.239) | (0.157) | | | |
| stage | -0.076 | -0.099 | | | |
| | (0.034) | (0.015) | | | |
| wave2*stage | 0.095 | -0.015 | | | |
| | (0.037) | (0.027) | | | |
| order1to7 | 0.230 | 0.111 | | | |
| | (0.163) | (0.114) | | | |
| order1to7*wave2 | -0.428 | -0.510 | | | |
| | (0.218) | (0.152) | | | |
| order1to7*stage | 0.024 | -0.009 | | | |
| | (0.049) | (0.037) | | | |
| order1to7*wave2*stage | -0.061 | 0.047 | | | |
| | (0.073) | (0.051) | | | |
| order7to1 | 0.234 | 0.145 | | | |
| | (0.154) | (0.102) | | | |
| order7to1*wave2 | -0.446 | -0.379 | | | |
| | (0.217) | (0.142) | | | |
| order7to1*stage | -0.013 | -0.039 | | | |
| | (0.046) | (0.032) | | | |
| order7to1*wave2*stage | 0.006 | 0.039 | | | |
| | (0.073) | (0.048) | | | |
| constant | -0.257 | 0.848 | 2.560 | 1.615 | 1.507 |
| | (0.200) | (0.098) | (0.472) | (0.620) | (0.653) |

**C. Pairwise Choices Between Reduced Simple Lotteries**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.008 | -0.353 | | | |
| | (0.243) | (0.159) | | | |
| stage | -0.126 | -0.105 | | | |
| | (0.040) | (0.015) | | | |
| wave2*stage | 0.114 | -0.035 | | | |
| | (0.044) | (0.026) | | | |

**D. Combined Frames**

| | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.014 | -0.269 | | | |
| | (0.211) | (0.126) | | | |
| stage | -0.103 | -0.101 | | | |
| | (0.023) | (0.009) | | | |
| wave2*stage | 0.104 | -0.015 | | | |
| | (0.026) | (0.015) | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| order1to7 | 0.435 | 0.119 | | | | 0.277 | 0.050 | | | |
| | (0.192) | (0.112) | | | | (0.111) | (0.064) | | | |
| order1to7*wave2 | -0.713 | -0.398 | | | | -0.541 | -0.271 | | | |
| | (0.254) | (0.144) | | | | (0.149) | (0.080) | | | |
| order1to7*stage | 0.007 | 0.005 | | | | 0.041 | 0.004 | | | |
| | (0.057) | (0.037) | | | | (0.032) | (0.020) | | | |
| order1to7*wave2*stage | 0.053 | -0.002 | | | | -0.028 | -0.033 | | | |
| | (0.084) | (0.049) | | | | (0.048) | (0.027) | | | |
| order7to1 | 0.400 | 0.265 | | | | 0.306 | 0.165 | | | |
| | (0.179) | (0.096) | | | | (0.103) | (0.058) | | | |
| order7to1*wave2 | -0.601 | -0.456 | | | | -0.524 | -0.428 | | | |
| | (0.241) | (0.139) | | | | (0.143) | (0.078) | | | |
| order7to1*stage | -0.053 | -0.031 | | | | -0.010 | -0.014 | | | |
| | (0.052) | (0.030) | | | | (0.029) | (0.018) | | | |
| order7to1*wave2*stage | 0.044 | 0.036 | | | | 0.025 | 0.027 | | | |
| | (0.081) | (0.046) | | | | (0.047) | (0.026) | | | |
| constant | -0.231 | 1.043 | 2.602 | 1.756 | 1.396 | -0.348 | 0.998 | 2.727 | 2.035 | 1.605 |
| | (0.219) | (0.107) | (0.498) | (0.697) | (0.674) | (0.181) | (0.078) | (0.459) | (0.606) | (0.633) |

Note: Wave 1+2 sample. #Obs is 21,330 choices. Standard errors in parentheses. There were three orders of frames: 1 up to 7, 7 down to 1, or a random order. The variable *order1to7* is a dummy variable that is 1 if the order of the frames was 1 up to 7, and 0 otherwise. The variable *order7to1* is a dummy variable that is 1 if the order of the frames was 7 down to 1, and 0 otherwise. ). In panels A, B, C, and D, respectively, the difference between $\sigma^2_{\eta_1}$ (columns 4) and $\sigma^2_{\eta_2}$ (columns 5) is 0.828 (1.087), 0.025 (1.152), 0.413 (1.227), and 0.526 (1.104). Furthermore, we ran likelihood ratio tests and found that adding variables related to the order in which the frames were presented (*order1to7*, *order1to7*wave2*, *order1to7*stage*, *order1to7*wave2*stage*, *order7to1*, *order7to1*wave2*, *order7to1*stage*, *order7to1*wave2*stage*) does not improve the goodness-of-fit of the model in panel A ($p = 0.5519$), panel B ($p = 0.5614$), panel C ($p = 0.5654$), or panel D ($p = 0.3012$).

**Table E.8h: Restricted to choices of C vs. D or E vs. F.**

**A. Pairwise Choices Between Complete Strategies**

|  | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.175 | -0.620 | | | |
|  | (0.219) | (0.184) | | | |
| stage | 0.003 | -0.137 | | | |
|  | (0.019) | (0.021) | | | |
| wave2*stage | 0.001 | 0.068 | | | |
|  | (0.023) | (0.031) | | | |
| constant | -0.075 | 0.383 | 1.960 | 1.539 | 0.938 |
|  | (0.192) | (0.128) | (0.460) | (0.634) | (0.666) |

**B. Pairwise Choices Between Compound Lotteries**

|  | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.093 | -0.589 | | | |
|  | (0.219) | (0.177) | | | |
| stage | 0.029 | -0.157 | | | |
|  | (0.020) | (0.021) | | | |
| wave2*stage | -0.024 | 0.093 | | | |
|  | (0.025) | (0.031) | | | |
| constant | -0.157 | 0.407 | 2.283 | 1.102 | 1.248 |
|  | (0.194) | (0.127) | (0.485) | (0.583) | (0.627) |

**C. Pairwise Choices Between Reduced Simple Lotteries**

|  | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.030 | -0.528 | | | |
|  | (0.210) | (0.179) | | | |
| stage | -0.032 | -0.145 | | | |
|  | (0.021) | (0.021) | | | |
| wave2*stage | 0.004 | 0.069 | | | |
|  | (0.026) | (0.031) | | | |
| constant | -0.004 | 0.446 | 2.339 | 1.230 | 1.373 |
|  | (0.176) | (0.126) | (0.490) | (0.635) | (0.676) |

**D. Combined Frames**

|  | (1) ln(CRRA) | (2) ln($\sigma_\epsilon$) | (3) $\sigma_v^2$ | (4) $\sigma_{\eta_1}^2$ | (5) $\sigma_{\eta_2}^2$ |
|---|---|---|---|---|---|
| wave2 | 0.139 | -0.564 | | | |
|  | (0.199) | (0.159) | | | |
| stage | 0.006 | -0.150 | | | |
|  | (0.012) | (0.012) | | | |
| wave2*stage | -0.004 | 0.067 | | | |
|  | (0.015) | (0.017) | | | |
| constant | -0.145 | 0.460 | 2.258 | 1.193 | 1.239 |
|  | (0.168) | (0.109) | (0.459) | (0.582) | (0.639) |

**Note**: Wave 1+2 sample, restricted to subsamples involving choices of C vs. D or E vs. F. #Obs is 17,010 choices. Standard errors in parentheses. In panels A, B, C, and D, respectively, the difference between $\sigma_{\eta_1}^2$ (columns 4) and $\sigma_{\eta_2}^2$ (columns 5) is 0.493 (1.142), -0.191 (1.099), -0.195 (1.189), and -0.147 (1.103).

# References

**Betancourt, Michael** (2017). "A conceptual introduction to Hamiltonian Monte Carlo." *arXiv* preprint arXiv:1701.02434.

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