Supplement to "Response mode and stochastic choice together explain preference reversals"

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Appendix B: Additional data analysis

B.1 *Summary of raw data and estimated Blavatskyy model parameters*

The results of MLE estimation of the Blavatskyy model are reported in Table 10, with a summary of raw data in Table 9 as an adjunct. Also reported are estimated parameters from single-mechanism subsets of the data (up, down, and binary choice) analyzed in Section 4.7. However, for this latter analysis, some subjects were dropped from the estimation because in at least one of the BDM treatments, the dropped subject always chose a value at the ends of the distribution. (This happened for 3 of the 60 subjects, as noted in Table 10.) These fitted parameters were also used to calculate probability mass functions for the frequency of different types of reversals and chained dominance violations across all subjects. From these calculations, we report the respective expected frequency of reversals and chained dominance violations in Tables 3 and 4, as well as the respective equal-tailed p-values in Tables 11 and 12.[26]

For the sake of comparison with the broader literature, we also report estimates of standard deviation (σ_i) and CRRA risk aversion (ρ_i) parameters for each subject using an untruncated Fechner model of homoscedastic random errors (Becker, Degroot, and Marschak (1963)) in Table 10. These parameters are estimated with MLE jointly using the same BDM and binary choice data from which the Blavatskyy model parameters are estimated.

Are there systematic differences in reversals between subjects with more or less stochasticity in choice? In Table 13, we address this question by dividing the sample into

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[26] In Tables 11 and 12, the null hypothesis is that the joint Blavatskyy model estimates reported in Table 10 are the population values (i.e., $\alpha_1 = 0.71$ and $\rho_1 = -0.29$ for subject 1, $\alpha_2 = 0.86$ and $\rho_2 = -0.30$ for subject 2, and so on). The test statistic is the respective frequency of reversals or chained dominance violations, with the p-value being the likelihood that the observed frequencies for each cell of the table would occur under the null hypothesis.

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TABLE 9. Summary of raw data by subject.

			Observed Frequencies by Subject											
			Reversals (Std., Non-)				Chained Violations			Single-Round Violations				
Subject	Session	Order	Up	Down	Left	Right	Up	Down	Right	Up	Down	Left	Right	BC
1	1	HUD	1 (0, 1)	1 (0, 1)	3 (0, 3)	4 (2, 2)	2	15	10	1	2	6	9	0
2	1	HUD	2 (2, 0)	2 (2, 0)	3 (1, 2)	2 (2, 0)	5	8	8	0	1	6	6	0
3	1	HUD	2 (2, 0)	3 (2, 1)	2 (1, 1)	1 (1, 0)	14	2	3	2	0	0	0	0
4	1	HUD	0 (0, 0)	1 (1, 0)	2 (1, 1)	1 (0, 1)	0	1	2	1	1	1	1	0
5	2	DHU	3 (3, 0)	4 (4, 0)	3 (1, 2)	0 (0, 0)	3	1	2	1	1	0	0	0
6	2	DHU	3 (1, 2)	1 (1, 0)	3 (0, 3)	2 (2, 0)	16	9	10	2	2	5	5	0
7	2	DHU	1 (1, 0)	1 (0, 1)	2 (0, 2)	3 (0, 3)	3	2	3	1	1	0	0	0
8	2	DHU	1 (1, 0)	2 (1, 1)	3 (0, 3)	2 (0, 2)	3	1	4	0	1	0	2	0
9	2	DHU	0 (0, 0)	0 (0, 0)	2 (1, 1)	1 (0, 1)	6	3	3	1	1	0	2	0
10	2	DHU	4 (4, 0)	0 (0, 0)	3 (0, 3)	5 (4, 1)	6	0	4	2	2	0	6	0
11	2	DHU	1 (1, 0)	0 (0, 0)	1 (0, 1)	0 (0, 0)	7	3	6	1	1	0	0	0
12	3	DHU	3 (1, 2)	1 (0, 1)	3 (0, 3)	4 (1, 3)	6	4	7	1	1	0	13	0
13	3	DHU	1 (1, 0)	1 (0, 1)	2 (0, 2)	2 (0, 2)	0	2	0	0	0	0	7	0
14	3	DHU	4 (4, 0)	1 (0, 1)	1 (0, 1)	1 (0, 1)	4	10	8	0	1	0	14	0
15	4	HDU	3 (3, 0)	0 (0, 0)	3 (0, 3)	2 (1, 1)	0	8	8	0	2	1	11	0
16	4	HDU	4 (4, 0)	1 (1, 0)	3 (0, 3)	0 (0, 0)	2	8	1	1	1	0	8	0
17	5	HDU	3 (2, 1)	2 (2, 0)	2 (0, 2)	2 (2, 0)	12	8	4	0	1	2	6	1
18	6	HDU	1 (1, 0)	0 (0, 0)	1 (0, 1)	4 (1, 3)	2	1	2	0	1	1	0	0
19	7	HDU	3 (2, 1)	2 (1, 1)	2 (0, 2)	1 (0, 1)	7	5	3	0	0	0	2	0
20	7	HDU	1 (1, 0)	0 (0, 0)	1 (0, 1)	1 (1, 0)	1	3	7	0	0	0	1	0
21	8	UDH	1 (1, 0)	3 (2, 1)	2 (1, 1)	2 (0, 2)	3	8	7	1	0	1	6	0
22	9	HUD	2 (1, 1)	1 (0, 1)	2 (0, 2)	1 (0, 1)	3	4	1	0	0	0	2	0
23	9	HUD	2 (2, 0)	0 (0, 0)	3 (1, 2)	1 (1, 0)	1	2	9	1	2	2	5	0
24	9	HUD	2 (2, 0)	2 (1, 1)	4 (1, 3)	2 (0, 2)	3	12	2	2	2	0	7	0
25	9	HUD	5 (5, 0)	1 (0, 1)	1 (1, 0)	0 (0, 0)	0	0	5	0	0	0	4	0

(*Continues*)

Table 9. *Continued.*

Subject	Session	Order	Observed Frequencies by Subject											
			Reversals (Std., Non-)				Chained Violations			Single-Round Violations				
			Up	Down	Left	Right	Up	Down	Right	Up	Down	Left	Right	BC
26	9	HUD	0 (0, 0)	1 (0, 1)	0 (0, 0)	0 (0, 0)	8	3	11	2	1	4	8	0
27	9	HUD	3 (3, 0)	3 (2, 1)	2 (0, 2)	2 (1, 1)	1	8	10	1	2	2	5	0
28	9	HUD	1 (0, 1)	2 (2, 0)	2 (0, 2)	2 (1, 1)	1	2	16	2	2	8	4	0
29	9	HUD	4 (4, 0)	1 (0, 1)	2 (0, 2)	2 (2, 0)	7	12	11	1	2	7	5	0
30	9	HUD	3 (3, 0)	4 (4, 0)	0 (0, 0)	3 (2, 1)	7	6	10	1	2	10	2	0
31	9	HUD	5 (5, 0)	0 (0, 0)	4 (1, 3)	2 (2, 0)	1	11	11	1	2	2	7	0
32	10	DHU	0 (0, 0)	1 (0, 1)	4 (1, 3)	2 (0, 2)	7	7	7	2	2	0	8	1
33	10	DHU	5 (5, 0)	4 (4, 0)	3 (0, 3)	1 (1, 0)	3	6	6	1	2	8	6	0
34	10	DHU	2 (1, 1)	1 (0, 1)	3 (1, 2)	2 (0, 2)	1	14	10	1	2	5	3	0
35	10	DHU	2 (2, 0)	1 (1, 0)	0 (0, 0)	2 (1, 1)	2	4	7	1	0	2	3	0
36	10	DHU	1 (0, 1)	0 (0, 0)	1 (0, 1)	2 (2, 0)	10	10	6	0	1	7	7	1
37	10	DHU	5 (5, 0)	1 (0, 1)	1 (0, 1)	1 (0, 1)	0	4	8	1	1	2	10	0
38	10	DHU	2 (2, 0)	3 (2, 1)	2 (1, 1)	0 (0, 0)	3	5	2	2	1	0	3	0
39	10	DHU	0 (0, 0)	1 (1, 0)	2 (1, 1)	0 (0, 0)	2	10	0	1	2	9	6	0
40	10	DHU	2 (2, 0)	0 (0, 0)	3 (0, 3)	2 (1, 1)	2	1	8	1	1	0	9	0
41	10	DHU	4 (4, 0)	2 (2, 0)	0 (0, 0)	4 (3, 1)	11	5	3	1	1	2	0	0
42	11	DUH	4 (4, 0)	3 (3, 0)	3 (1, 2)	1 (0, 1)	8	12	16	2	2	3	3	1
43	11	DUH	3 (3, 0)	1 (0, 1)	4 (1, 3)	2 (1, 1)	6	9	12	2	2	3	8	0
44	11	DUH	4 (4, 0)	3 (3, 0)	2 (0, 2)	1 (0, 1)	8	2	13	2	2	6	6	0
45	11	DUH	4 (4, 0)	1 (0, 1)	3 (0, 3)	1 (0, 1)	1	3	4	0	2	1	7	0
46	11	DUH	4 (4, 0)	1 (0, 1)	0 (0, 0)	3 (2, 1)	1	2	6	1	2	1	2	0
47	11	DUH	3 (3, 0)	1 (0, 1)	2 (1, 1)	0 (0, 0)	1	0	7	1	1	5	2	0
48	11	DUH	3 (3, 0)	2 (1, 1)	4 (1, 3)	3 (3, 0)	6	7	9	2	1	0	6	0
49	11	DUH	3 (3, 0)	2 (1, 1)	2 (1, 1)	0 (0, 0)	0	2	6	1	1	1	0	0
50	11	DUH	0 (0, 0)	0 (0, 0)	2 (1, 1)	1 (1, 0)	2	0	6	0	0	1	4	0

(*Continues*)

TABLE 9. *Continued.*

			Observed Frequencies by Subject											
			Reversals (Std., Non-)				Chained Violations			Single-Round Violations				
Subject	Session	Order	Up	Down	Left	Right	Up	Down	Right	Up	Down	Left	Right	BC
51	11	DUH	1 (1, 0)	1 (1, 0)	1 (0, 1)	0 (0, 0)	0	0	2	1	1	0	0	0
52	12	UDH	5 (5, 0)	1 (0, 1)	1 (0, 1)	1 (0, 1)	2	2	14	1	2	0	5	0
53	12	UDH	5 (5, 0)	3 (3, 0)	3 (1, 2)	1 (1, 0)	1	0	9	1	1	0	7	0
54	12	UDH	2 (2, 0)	2 (1, 1)	0 (0, 0)	2 (2, 0)	6	3	5	1	2	8	4	0
55	12	UDH	0 (0, 0)	1 (0, 1)	1 (0, 1)	1 (0, 1)	1	2	10	2	1	2	9	0
56	12	UDH	5 (5, 0)	0 (0, 0)	1 (0, 1)	2 (1, 1)	1	4	10	1	1	2	8	0
57	12	UDH	1 (1, 0)	1 (0, 1)	1 (0, 1)	0 (0, 0)	1	1	6	1	1	4	0	0
58	12	UDH	3 (3, 0)	1 (0, 1)	2 (1, 1)	1 (1, 0)	0	3	9	1	1	1	6	0
59	12	UDH	1 (1, 0)	2 (1, 1)	1 (0, 1)	1 (1, 0)	1	7	3	1	1	2	6	0
60	13	UDH	3 (3, 0)	1 (1, 0)	2 (1, 1)	3 (0, 3)	0	2	4	1	2	1	0	0

Note: Reported values are observed frequencies and estimated parameters of the two-parameter fitted Blavatskyy model. Order refers to the order of the BDM tasks, with "U" denoting up (cash for lottery), "D" denoting down (lottery for cash), and "H" denoting horizontal (lottery for lottery; i.e., left and right). There are 5 reversals possible for each mechanism (with standard and nonstandard reversals, respectively, in parentheses), with aggregated results reported in Tables 2 and 3. There are 20 possible chained dominance violations in each mechanism, with aggregate results reported in Table 4 (except for left, where observing chained dominance violations is not possible, as noted in footnote 18). There are 2 possible single-round dominance violations in each of up and down, 14 possible in each of left and right, and 1 possible in binary choice (BC), as discussed in Section 4.5.

Table 10. Summary of estimated parameters by subject.

			Blavatskyy Model Parameter Estimates								Fechner Est.	
			Joint		Up		Down		BC		Joint	
Subject	Session	Order	$\hat{\alpha}_i$	$\hat{\rho}_i$	$\hat{\alpha}_i$	$\hat{\rho}_i$	$\hat{\alpha}_i$	$\hat{\rho}_i$	$\hat{\alpha}_i$	$\hat{\rho}_i$	$\hat{\sigma}_i$	$\hat{\rho}_i$
1	1	HUD	0.71	−0.29	1.06	−0.19	0.54	0.29	17.92	−0.06	6.38	0.32
2	1	HUD	0.86	−0.30	0.77	−0.90	1.39	−0.88	0.26	0.73	10.70	0.06
3	1	HUD	1.67	0.06	1.43	0.09	2.96	−0.23	2.03	0.29	7.42	0.18
4	1	HUD	6.33	0.03	8.33	0.00	15.65	−0.01	2.57	0.26	8.05	0.12
5	2	DHU	3.18	0.33	3.59	0.22	4.66	0.26	2.71	0.65	4.71	0.41
6	2	DHU	0.87	0.24	1.60	0.58	1.04	−0.54	0.14	0.96	6.55	0.30
7	2	DHU	1.67	−0.18	1.68	−0.82	2.78	0.33	1.75	−0.62	12.40	−0.04
8	2	DHU	2.95	0.11	2.31	0.16	4.34	0.13	4.07	−0.01	9.46	0.05
9	2	DHU	1.98	0.33	2.35	0.15	2.60	0.63	1.77	0.20	6.01	0.30
10	2	DHU	2.39	0.21	2.64	0.00	–	–	13.86	0.55	8.93	0.18
11	2	DHU	2.48	0.25	2.17	0.04	3.41	0.28	3.27	0.47	5.83	0.28
12	3	DHU	1.37	0.15	1.66	0.08	1.52	0.60	1.44	−0.57	7.14	0.25
13	3	DHU	1.72	−0.13	4.78	−1.11	3.50	0.48	3.70	0.02	9.98	0.06
14	3	DHU	1.46	0.35	2.17	−0.27	2.23	0.74	13.44	0.44	5.33	0.37
15	4	HDU	1.90	0.06	6.78	0.11	1.39	−0.27	0.63	0.57	9.01	0.14
16	4	HDU	1.79	0.50	2.97	0.06	2.57	0.65	9.13	0.84	4.19	0.51
17	5	HDU	1.16	0.31	1.88	0.55	1.30	−0.55	0.84	0.52	6.13	0.35
18	6	HDU	3.34	0.06	3.12	0.11	8.15	0.15	2.00	−0.50	11.99	−0.04
19	7	HDU	1.54	0.14	1.93	0.40	1.75	−0.18	1.55	0.09	7.73	0.17
20	7	HDU	3.46	−0.06	3.51	−0.15	3.55	−0.03	4.23	0.08	9.21	0.06
21	8	UDH	2.28	−0.12	4.00	−0.29	1.57	0.08	3.54	0.02	11.87	−0.02
22	9	HUD	2.34	0.06	2.44	−0.42	3.72	0.31	7.03	0.29	6.45	0.21
23	9	HUD	2.08	0.14	3.83	0.06	1.44	−0.04	8.22	0.45	6.09	0.26
24	9	HUD	0.93	−0.04	1.63	0.28	0.70	−0.30	0.46	0.02	7.77	0.23
25	9	HUD	1.91	0.34	4.05	−0.28	5.06	0.62	7.17	0.60	5.01	0.37
26	9	HUD	1.00	0.19	0.76	0.10	1.23	−0.05	9.30	0.28	90.87	−0.63
27	9	HUD	1.78	−0.14	2.22	−0.69	1.97	−0.18	5.09	0.40	10.37	0.03
28	9	HUD	0.75	−0.18	1.50	−0.15	0.76	−1.42	0.87	0.66	10.17	0.09
29	9	HUD	0.76	−0.39	1.55	0.20	0.73	−1.72	1.98	0.43	9.88	0.12
30	9	HUD	1.96	0.30	1.91	0.35	2.50	−0.02	2.57	0.49	6.67	0.26
31	9	HUD	1.28	0.25	3.56	0.14	0.82	−0.17	11.33	0.65	6.36	0.31
32	10	DHU	1.28	−0.27	1.44	0.17	1.35	−0.30	1.78	−1.28	11.87	−0.02
33	10	DHU	1.20	0.24	1.66	0.30	1.01	−0.68	1.26	0.63	6.51	0.30
34	10	DHU	1.12	0.00	1.85	0.22	0.79	0.08	1.23	−0.23	7.76	0.22
35	10	DHU	1.47	0.25	1.67	−0.10	1.22	0.46	3.06	0.45	5.39	0.33
36	10	DHU	0.86	0.17	1.74	0.64	0.89	−0.04	0.61	−0.62	5.97	0.36
37	10	DHU	1.51	0.16	3.79	−0.65	1.52	0.46	4.64	0.52	5.12	0.37
38	10	DHU	2.15	0.30	2.93	0.24	1.82	0.16	2.31	0.57	5.05	0.38
39	10	DHU	3.86	0.56	–	–	–	–	3.86	0.56	0.88	0.51
40	10	DHU	2.12	0.46	2.26	0.30	1.99	0.58	6.86	0.59	4.72	0.44
41	10	DHU	0.77	−0.28	0.65	−0.41	1.51	−1.61	3.49	0.42	13.24	−0.11
42	11	DUH	0.57	−0.23	0.60	−0.41	0.67	−1.53	0.43	0.80	8.54	0.21
43	11	DUH	0.90	−0.25	0.99	−3.55	1.06	−0.03	2.52	0.40	9.40	0.09
44	11	DUH	0.84	0.10	1.01	−3.75	1.78	0.07	0.40	0.96	7.59	0.22
45	11	DUH	1.10	0.03	1.27	−4.56	1.22	−0.29	14.72	0.46	4.65	0.15

(*Continues*)

TABLE 10. *Continued.*

			Blavatskyy Model Parameter Estimates								Fechner Est.	
			Joint		Up		Down		BC		Joint	
Subject	Session	Order	$\hat{\alpha}_i$	$\hat{\rho}_i$	$\hat{\alpha}_i$	$\hat{\rho}_i$	$\hat{\alpha}_i$	$\hat{\rho}_i$	$\hat{\alpha}_i$	$\hat{\rho}_i$	$\hat{\sigma}_i$	$\hat{\rho}_i$
46	11	DUH	2.38	0.18	3.18	−0.18	2.99	0.24	2.01	0.52	6.38	0.25
47	11	DUH	1.99	0.45	3.07	−0.00	6.31	0.69	5.19	0.58	4.65	0.41
48	11	DUH	0.98	−0.34	0.93	−0.96	1.05	−0.21	0.56	−0.66	8.78	0.06
49	11	DUH	2.37	0.49	2.05	0.49	2.70	0.44	5.61	0.54	4.62	0.42
50	11	DUH	2.42	0.07	2.35	−0.13	2.47	0.23	15.40	0.13	8.39	0.10
51	11	DUH	2.63	0.01	6.14	−0.43	3.59	0.36	10.59	0.21	9.00	0.08
52	12	UDH	0.71	0.21	0.70	−3.11	0.77	−0.46	3.58	0.67	5.77	0.30
53	12	UDH	1.50	0.41	2.97	−0.43	3.33	0.49	8.48	0.87	4.58	0.45
54	12	UDH	2.01	−0.03	1.88	−0.06	3.16	−0.21	1.73	0.10	12.33	−0.01
55	12	UDH	1.08	−0.11	1.13	−1.91	2.35	0.45	1.72	0.25	7.68	0.16
56	12	UDH	1.27	0.17	4.27	−1.75	3.30	0.55	2.23	0.53	6.05	0.29
57	12	UDH	2.73	0.26	3.00	−0.02	5.12	0.50	15.21	0.22	6.92	0.19
58	12	UDH	1.40	0.25	2.46	−0.57	2.93	0.71	2.24	0.31	6.77	0.27
59	12	UDH	1.87	0.05	2.43	−0.40	1.79	0.33	8.11	0.36	8.84	0.12
60	13	UDH	1.27	−0.19	–	–	1.52	−0.55	1.31	0.19	7.18	−0.12

Note: Reported values are observed frequencies and estimated parameters of the two-parameter fitted Blavatskyy model. Order refers to the order of the BDM tasks, with "U" denoting up (cash for lottery), "D" denoting down (lottery for cash), and "H" denoting horizontal (lottery for lottery; i.e., left and right). Blavatskyy model stochasticity ($\hat{\alpha}_i$) and CRRA risk aversion ($\hat{\rho}_i$) parameters are estimated jointly from the data and from those estimated from a single-mechanism subset of data. Subjects with missing single-mechanism estimates (10, 39, and 60) for reasons noted in Appendix A.7 were excluded from analysis in Section 4.7. Fechner model standard deviation ($\hat{\sigma}_i$) and CRRA risk aversion ($\hat{\rho}_i$) parameters are presented for comparison and estimated jointly from the data.

two halves. The "High $\hat{\alpha}_i$" half includes the half of the subjects with the greatest determinism in choices (e.g., those with estimated α_i's greater than the median). The "Low $\hat{\alpha}_i$" half includes the half of subjects with the greatest stochasticity in choice.

B.2 *Parametric bootstrapping of reported statistical tests and coefficients*

Once the parametric Blavatskyy model has been fitted to the data by maximum likelihood, parametric bootstrapping reported in Section 4.7 proceeds by drawing samples of subject responses from the fitted model with the same sample size as the original data (with random draws from the cdfs defined previously). A large number of samples (9999) are drawn under the null hypothesis of the Kolmogorov–Smirnov test to determine a p-value, which is how often a test statistic less than the observed statistic is generated by chance under the null hypothesis. Similarly, samples are drawn under the null hypothesis of the Spearman correlation test to determine how often a test statistic greater than the observed statistic is generated by chance.[27] Efron and Tibshirani (1993) provide an overview of approaches to bootstrapping, and MacKinnon (2009) provides a recent survey.

[27] *Larger* values of the Kolmogorov–Smirnov statistic indicate a departure from the null hypothesis of the Kolmogorov–Smirnov test, while *smaller* values of the Spearman correlation test statistic indicate a departure from the null hypothesis of the Spearman correlation test.

TABLE 11. The p-values of types of reversals by p-bet and \$-bet pair.

		Project Up		Project Down		Project Left		Project Right	
Pair of Bets		Standard	Nonstandard	Standard	Nonstandard	Standard	Nonstandard	Standard	Nonstandard
$P1 \circ D1$ or $P6 \circ D6$		0.0073	0.0002	0.3262	–	–	< 0.0001	0.3939	0.0438
$P2 \circ D2$ or $P7 \circ D7$		< 0.0001	0.0022	0.4194	–	–	0.0140	0.6829	0.1640
$P3 \circ D3$ or $P8 \circ D8$		< 0.0001	< 0.0001	0.1084	–	–	0.0065	0.6114	0.6300
$P4 \circ D4$		< 0.0001	0.0005	0.0221	–	0.0060	–	0.8837	0.0582
$P5 \circ D5$ or $P9 \circ D9$		< 0.0001	< 0.0001	–	0.6738	0.7229	–	0.7014	0.0002
Total		< 0.0001	< 0.0001	0.0069	0.6738	0.0136	0.0316	0.9862	0.7662
$P2 \circ D2$ or $P7 \circ D7$	(OC)	< 0.0001	< 0.0001	0.4194	–	–	0.0140	0.6829	0.1640
$P4 \circ D4$	(OC)	< 0.0001	0.0005	0.0221	–	0.0060	–	0.8837	0.0582

Note: Reported equal-tailed p-values are the likelihood that the observed frequency of preference reversal by type (standard and nonstandard) as reported in Table 3 would occur given the two-parameter Blavatskyy model ML estimates (presented in the Table 10). The acronym OC stands for ordering control. Dashes indicate that it is not possible to observe a particular type of reversal for the given parameterization, as discussed in footnote 16.

TABLE 12. The p-values of chained dominance violations across p-bet and \$-bet pairs.

Panel A. p Bets		Project Up				Project Down				Project Right			
		$P1$ (FA)	$P2$	$P3$	$P4$ (CT)	$P1$ (FA)	$P2$	$P3$	$P4$ (CT)	$P1$ (FA)	$P2$	$P3$	$P4$ (CT)
$P5$	(FA)	0.6534	0.6934	0.2691	0.0012	0.0220	0.4831	0.1293	0.5099	0.0005	0.0320	$<$ 0.0001	0.0407
$P4$		0.1859	0.0775	0.1282	–	0.7283	0.2411	0.0674	–	0.0018	0.9561	0.8796	–
$P3$		0.0017	0.0040	–	–	0.7018	0.0783	–	–	0.0946	0.0784	–	–
$P2$	(CT)	0.0109	–	–	–	0.7000	–	–	–	0.2517	–	–	–

Panel B. \$ Bets		Project Up				Project Down				Project Right			
		$D1$ (FA)	$D2$	$D3$	$D4$ (CT)	$D1$ (FA)	$D2$	$D3$	$D4$ (CT)	$D1$ (FA)	$D2$	$D3$	$D4$ (CT)
$D5$	(FA)	0.3288	0.0183	0.0027	0.0011	0.6571	0.5870	0.0602	$<$ 0.0001	$<$ 0.0001	0.0001	0.0022	0.1828
$D4$		0.4111	0.0684	0.0964	–	0.8063	0.8254	0.3560	–	$<$ 0.0001	0.0567	0.7998	–
$D3$		0.0720	0.0003	–	–	$<$ 0.0001	0.1639	–	–	0.0011	0.9703	–	–
$D2$	(CT)	0.0208	–	–	–	$<$ 0.0001	–	–	–	0.1243	–	–	–

Note: Reported equal-tailed p-values are the likelihood that the observed frequency of chained dominance violations reported in Table 4 would occur given the two-parameter Blavatskyy model ML estimates (presented in Table 10). The acronym FA stands for further apart and CT stands for closer together on the grid in Figure 1. Chained dominance violations cannot be observed in left, as elaborated upon in footnote 18.

TABLE 13. Observed and predicted frequencies of types of reversals by p-bet and \$-bet pair for high and low $\hat{\alpha}_i$ subjects.

Panel A. High $\hat{\alpha}_i$		Project Up		Project Down		Project Left		Project Right	
		Standard	Nonstandard	Standard	Nonstandard	Standard	Nonstandard	Standard	Nonstandard
$P1 \circ D1$ or $P6 \circ D6$	Observed	0.2000	**0.0000**	0.1667	–	–	**0.3000**	0.1000	0.0667
(Closest)	Predicted	0.1391	0.1597	0.1700			0.8759	0.0734	0.0534
$P2 \circ D2$ or $P7 \circ D7$	Observed	**0.4000**	**0.0333**	0.2333	–	–	**0.4667**	0.1333	0.0333
	Predicted	0.1623	0.1827	0.2077			0.7481	0.1215	0.0744
$P3 \circ D3$ or $P8 \circ D8$	Observed	**0.4000**	**0.0000**	0.2000	–	–	**0.6333**	0.1333	0.1667
	Predicted	0.1738	0.2109	0.2682			0.5688	0.1826	0.1380
$P4 \circ D4$	Observed	**0.4000**	**0.0000**	**0.2000**	–	**0.3667**	–	0.2333	0.1333
(B&L points)	Predicted	0.2058	0.2226	0.3524		0.1995		0.2153	0.2155
$P5 \circ D5$ or $P9 \circ D9$	Observed	**0.4667**	**0.0000**	–	0.5000	0.0333	–	0.0333	**0.3000**
(Farthest)	Predicted	0.2208	0.1741		0.4507	0.0172		0.0501	0.1046
Total	Observed	**0.3733**	**0.0067**	0.1600	0.1000	**0.0800**	**0.2800**	0.1267	0.1400
	Predicted	0.1803	0.1900	0.1996	0.0901	0.0433	0.4386	0.1286	0.1172
$P2 \circ D2$ or $P7 \circ D7$	Observed	0.4000	0.0000	0.2333	–	–	0.4667	0.1667	0.0333
(Order control)									
$P4 \circ D4$	Observed	0.4333	0.0333	0.2000	–	0.3667	–	0.0667	0.1000
(Order control)									

(*Continues*)

TABLE 13. *Continued.*

Panel B. Low $\hat{\alpha}_i$		Project Up		Project Down		Project Left		Project Right	
		Standard	Nonstandard	Standard	Nonstandard	Standard	Nonstandard	Standard	Nonstandard
$P1 \circ D1$ or $P6 \circ D6$	Observed	**0.4333**	**0.0667**	0.2000	–	–	0.7000	0.2333	**0.0333**
(Closest)	Predicted	0.2029	0.1995	0.2847			0.6174	0.1736	0.1772
$P2 \circ D2$ or $P7 \circ D7$	Observed	**0.5333**	0.1000	0.2000	–	–	0.5000	0.1667	0.1333
	Predicted	0.2161	0.2122	0.2998			0.4936	0.2031	0.1899
$P3 \circ D3$ or $P8 \circ D8$	Observed	**0.5000**	**0.0333**	0.2333	–	–	**0.6667**	0.2333	0.1667
	Predicted	0.2270	0.2237	0.3336			0.3779	0.2221	0.2284
$P4 \circ D4$	Observed	**0.5667**	0.1333	0.2667	–	0.3333	–	0.2000	0.1667
(B&L points)	Predicted	0.2500	0.2248	0.3730		0.1864		0.2199	0.2670
$P5 \circ D5$ or $P9 \circ D9$	Observed	**0.6000**	**0.0000**	–	0.5333	0.0333	–	0.1000	**0.4000**
(Farthest)	Predicted	0.2585	0.2204		0.5120	0.0542		0.0953	0.1998
Total	Observed	**0.5267**	**0.0667**	**0.1800**	0.1067	0.0733	**0.3733**	0.1867	0.1800
	Predicted	0.2309	0.2161	0.2582	0.1024	0.0481	0.2978	0.1828	0.2125
$P2 \circ D2$ or $P7 \circ D7$ (Order control)	Observed	0.5333	0.0667	0.2000	–	–	0.5000	0.0667	0.1667
$P4 \circ D4$ (Order control)	Observed	0.5000	0.0000	0.2667	–	0.3333	–	0.2000	0.1000

Note: Reported values are observed and predicted frequencies (by the two-parameter fitted Blavatskyy model) of preference reversal by type (standard and nonstandard) as a proportion of total possible reversals pooled across subjects with above- and below-median $\hat{\alpha}_i$'s (in panels A and B, respectively). Frequencies in boldface are outside of the 95% confidence interval. Closest and farthest refer to the relative distance to the relevant boundary. Dashes indicate that it not possible to observe a particular type of reversal for the given parameterization, as discussed in footnote 16.

TABLE 14. The p-values of "reversed" bootstrapped tests on the estimated Blavatskyy parameters.

	Kolmogorov–Smirnov Tests		Spearman Correlation Tests	
Treatment	PE	BC	PE	BC
	Estimated Blavatskyy Risk Aversion Parameters ($\hat{\rho}_i$)			
CE	0.0002	< 0.0001	0.8853	0.5919
PE		< 0.0001		0.6721
	Estimated Blavatskyy Stochasticity Parameters ($\hat{\alpha}_i$)			
CE	0.2440	0.0069	< 0.0001	0.0021
PE		0.0657		0.0046

Note: Parametric bootstraps employed 9999 replications and used the estimated parameters from the *columns* in generating data from the null hypothesis.

Even for simple models, "there are many ways to specify the bootstrap [data generating process]. The key requirement is that it should satisfy the restrictions of the null hypothesis" (Davidson and MacKinnon (2004, p. 159)). In the case at hand, there exist two sets of estimated parameters for each test. Which should be treated as the "true" set of parameters for the purpose of the data generating process? We calculate bootstraps for *both* alternatives. For the Kolmogorov–Smirnov test, replications from the *column* mechanism (in Table 7 within the main text) are generated (under the null hypothesis) using the $\{\hat{\alpha}_i, \hat{\rho}_i\}$ pairs estimated via ML estimation for the *row* mechanism. For the Spearman correlation test, the $\{\hat{\alpha}_i, \hat{\rho}_i\}$ pairs from the column mechanism (in Table 7) are reshuffled randomly (under the null hypothesis). The results for the reverse approach (that is, substituting columns for rows as described previously) are reported in Table 14. There is only one nonnegligible difference in the significance of results between Tables 7 and 14: when generating data for CE with the BC parameters under the null hypothesis in the Kolmogorov–Smirnov test, the hypothesis that the distributions of $\hat{\alpha}_i$ are the same is rejected at the 1% level rather than the 10% level, as opposed to the "nonreverse" method. (We opt in the text to report the nonreverse result because it is more conservative with respect to rejection of the null.) Additionally, we report the uncorrected and nonbootstrapped p-values in Table 15 for comparison.

In Table 8 in the main text, we report the Spearman correlation coefficients calculated for the unadjusted estimates $\hat{\alpha}$ and $\hat{\rho}_i$. In Table 16, we use parametric bootstrapping to calculate the bias (that is, the mean of the bootstrapped coefficients minus the estimated coefficient from the sample) and standard error of those reported correlation coefficients.

B.3 *Strong reversals*

A *strong reversal* in project up occurs when a subject reports a certainty equivalent of a \$ bet that exceeds the up-state payoff of a p bet, but then selects the p bet over the \$ bet in binary choice. Similarly, a strong reversal in project right occurs when a subject reports a probability equivalent of a p bet that exceeds the probability of the up-state payoff

TABLE 15. The p-values of uncorrected statistical tests on the estimated Blavatskyy parameters.

Treatment	Kolmogorov–Smirnov Tests PE	Kolmogorov–Smirnov Tests BC	Spearman Correlation Tests PE	Spearman Correlation Tests BC
	Estimated Blavatskyy Risk Aversion Parameters ($\hat{\rho}_i$)			
CE	0.0382	< 0.0001	0.2360	0.8251
PE		0.0040		0.6434
	Estimated Blavatskyy Stochasticity Parameters ($\hat{\alpha}_i$)			
CE	0.3466	0.0133	< 0.0001	0.0031
PE		0.0679		0.0077

Note: Unadjusted and nonbootstrapped p-values are reported for comparison with bootstrapped results in Tables 7 and 14.

TABLE 16. Bootstrapped bias and standard error of Spearman rank correlation coefficients.

	Treatment	Risk Aversion Parameters ($\hat{\rho}_i$) PE	Risk Aversion Parameters ($\hat{\rho}_i$) BC	Stochasticity Parameters ($\hat{\alpha}_i$) PE	Stochasticity Parameters ($\hat{\alpha}_i$) BC
Estimate	CE	−0.1593	−0.0297	0.6366	0.3841
Bias		0.0296	0.0013	−0.1408	−0.1109
Std. error		(0.0809)	(0.0790)	(0.0656)	(0.0737)
Estimate	PE		−0.0621		0.3479
Bias			0.0764		−0.0834
Std. error			(0.0884)		(0.0812)

Note: Estimates, bias, and standard error (in parentheses) for Spearman rank correlation coefficients are reported using parametric bootstraps employing 9999 replications.

for a \$ bet, but then selects the \$ bet over the p bet in binary choice. In both cases, the elicited certainty or probability equivalent of the lottery *not* selected in binary choice first-order-stochastically dominates the lottery that *is* selected. However, in up, a strong reversal may only be coincident with a standard reversal, while in right, a strong reversal may only be coincident with a nonstandard reversal.[28]

Using the notation introduced in Appendix A, one may quantify the probabilities assigned by the Blavatskyy model to strong reversals in both project up and project right. First, consider project up. Let y be the highest possible outcome of the p bet (P). Then the probability that the certainty equivalent of the \$ bet (D) is strictly greater than y is $1 - CE_D(y) = p(D, y)$. If follows that the probability of observing a strong reversal in up is

[28]In right, subjects reported probability equivalents between 0 and 1. It was, therefore, possible in right that (a) a subject reports a probability equivalent for *both* a p bet and \$ bet that exceeds the probability of the up-state payoff for the \$ bet, (b) the probability equivalent of the \$ bet exceeds that of the p bet, and (c) the subject selects the \$ bet over the p bet in binary choice. While in this case, the probability equivalent for the p bet exceeds the probability of the up-state payoff for the \$ bet and the \$ bet is selected over the p bet in binary choice, we do not consider this a strong reversal because no reversal has taken place. (The subject both selects the \$ bet in binary choice and assigns it a higher probability equivalent.) In up, BDM responses were limited to the up-state payoff, so if the certainty equivalent of a \$ bet exceeds the up-state payoff of a p bet, the \$ bet must always have a greater certainty equivalent than the p bet.

TABLE 17. Observed and predicted frequencies of strong reversals by p-bet and \$-bet pair.

Pair of Bets		Project Up	Project Right
		Strong, Standard	Strong, Nonstandard
$P1 \circ D1$ or $P6 \circ D6$	Observed	**0.3167**	**0.0333**
(Closest)	Predicted	0.1546	0.1043
$P2 \circ D2$ or $P7 \circ D7$	Observed	**0.3833**	0.0833
	Predicted	0.1507	0.1051
$P3 \circ D3$ or $P8 \circ D8$	Observed	**0.2833**	0.1500
	Predicted	0.1394	0.1130
$P4 \circ D4$	Observed	**0.2667**	0.1000
(B&L Points)	Predicted	0.1290	0.0958
$P5 \circ D5$ or $P9 \circ D9$	Observed	**0.3667**	**0.2000**
(Farthest)	Predicted	0.1023	0.0304
Total	Observed	**0.3233**	0.1133
	Predicted	0.1352	0.0897
$P2 \circ D2$ or $P7 \circ D7$ (Order control)	Observed	0.3667	0.1167
$P4 \circ D4$ (Order control)	Observed	0.4167	0.1000
$P4 \circ D4$ B&L (2007)	Observed	0.2022	0.0788

Note: Reported values are observed and predicted frequencies (by the two-parameter fitted Blavatskyy model) of strong preference reversals (standard for project up, nonstandard for project right) as a percentage of total possible reversals pooled across all subjects. Frequencies in boldface are outside of the 95% confidence interval. Closest and farthest refer to the relative distance to the relevant boundary.

$p(P, D) \cdot P(D, y)$. A similar logic may be applied for project right. Let z be the probability of the highest possible outcome of the \$ bet for a benchmark dollar amount (\$80) in lottery $Z(z)$. The probability that the probability equivalent of the p bet is greater than z is $p(P, Z)$. The probability of strong reversal in right is thus $p(D, P) \cdot p(P, Z)$. The incidence and predicted incidence of strong reversals are reported in Table 17.

APPENDIX C: INSTRUCTIONS

Note: Relevant sections of the instructions were delivered immediately before each decision task. Subject instructions did not have headings; these are provided for the convenience of the reader only.

C.1 *Initial instructions*

Instructions: This is an experiment in the economics of decision-making. The instructions are simple, and if you follow them carefully and make good decisions, you may earn a considerable amount of money, which will be paid to you in cash at the end of the experiment. At this point there should be no further communication with any other participant.

How You Will Earn Money: In addition to your $15U.S. show-up fee, each decision you make in the experiment will result in the possibility of earning money. You will make 90 decisions. After the experiment, you will be paid in cash for one decision that you made here today. The number of the decision for which you are to be paid is written in an envelope in the front of the room and will be revealed at the conclusion of the experiment. The decision number has been drawn by a computerized random number generator, with each decision you will make being equally likely to be selected for payment. Because you will not know in advance which decision has been selected for payment, you should treat each decision as though it will be the one for which you will be paid. Furthermore, because the decision for which you will be paid has already been determined, nothing you do in the experiment will effect the decision number for which you are to be paid.

It should be noted that while there are other people in this room participating in the same type of experiment as you, their experiments are totally separate from the one in which you are participating. That is to say, the only human decisions that influence your earnings in this experiment are your own.

Random Number Process: Your payment today may be determined by a random number process (which will call the RP). Before we can explain your first decision task, we will cover how the RP works.

In every RP there are two possible outcomes. The first possible outcome is that you will be paid a positive amount of money and the second is that will be paid $0. The computer will draw a random number to determine whether you will be paid the positive amount or $0 based on a specific probability.

For example, say that the RP pays $\$X$ with a probability of P and $0 with a probability of $100 - P$. The computer will determine whether you are paid $\$X$ or $0 by drawing an integer between 1 and 100, with all numbers equally likely. If the random number is between 1 and P, you will be paid $\$X$. If the random number is between $P + 1$ and 100, you will be paid $0.

In all cases, random numbers will be drawn *independently*. That is to say, the outcome of one draw does not affect the outcome of any other draw.

C.2 *Certainty equivalent selling BDM (lottery for cash)*

Please note that in this decision task, the following is the case: In this decision task, you begin the period with an initial endowment. You will be asked to enter a number that will determine whether you retain the initial endowment or instead receive an alternative.

Depending on the number you enter and chance, one of two possibilities will result:

1. You *do not make the exchange* and do not receive the alternative. Instead, you keep the initial endowment.

2. You *do make the exchange* and do not keep the initial endowment. Instead, you receive the alternative.

Exactly what your endowment is, what the alternative is, and how it will be determined whether the exchange is made will now be explained below in detail for this decision task.

In each period of this decision task, you start out endowed with an RP. You will be asked to state the amount of money you would require so as to exchange the RP for cash. You will enter this amount as a dollar value to the nearest cent.

If you enter $\$X$, you are saying that you would be willing to exchange the RP for $\$X$.

Your choice of $\$X$ helps to determine whether you make the exchange. Once you have chosen the amount ($\$X$) you would require to exchange the RP for a cash amount, the computer will display a random dollar amount drawn between the lowest and highest possible outcome of the RP, with equal likelihood of any dollar value to the cent. If the random amount displayed by the computer (call it $\$Y$) is *less than* the number $\$X$ you have entered into the computer as the amount you would require to exchange the RP for a cash amount, then no exchange will take place and your earnings for the period will be the outcome of the RP. If the number drawn by the computer is *greater than or equal to* your entered value $\$X$, then you will make the exchange and receive a dollar amount instead of the RP; that dollar amount equals the draw $\$Y$. (Note that when you receive a dollar amount in exchange for the RP, you will receive the amount $\$Y$, which is necessarily greater than the $\$X$ you entered as being sufficient to make the exchange.)

Your most advantageous decision in terms of your earnings is to submit an amount $\$X$ that accurately reflects the amount you would require to make you indifferent between accepting the exchange or not. If you submit an amount that is EITHER *higher* than that amount OR *lower* than that amount, you will either not change your earnings or you will lower them. There is no “right” or “wrong” value to submit to the computer; rather it is a matter of submitting a value that truly reflects what dollar amount will make you willing to make the exchange.

The reason it is in your best interest to state your true value, and not some other number, is that if you state a number other than your value, the following could happen.

1. Suppose your true value is some number V and you state a number X that is less than V ($X < V$). Then the computer might draw a number Y between X and V. So, $X < Y < V$. If this happens, you would make the exchange. Thus, you would end up with the number drawn (Y), rather than the RP, when the value of the RP to you (V) is actually greater than that of the number drawn (Y).

2. Suppose your true value is some number V and you state a number X that is greater than V ($X > V$). Then the computer might draw a number Y between X and V. So, $X > Y > V$. If this happens, you would not make the exchange. Thus, you would end up with the RP, rather than the number drawn (Y), when the value of the RP to you (V) is actually less than that of the number drawn (Y).

There is *no* circumstance in which stating a number not equal to your true value is to your advantage; it can only decrease your earnings or make no difference.

C.3 *Probability equivalent dual-to-selling BDM (cash for lottery)*

Please note that in this decision task, the following is the case: In this decision task, you begin the period with an initial endowment. You will be asked to enter a number that will determine whether you retain the initial endowment or instead receive an alternative.

Depending on the number you enter and chance, one of two possibilities will result:

1. You *do not make the exchange* and do not receive the alternative. Instead, you keep the initial endowment.

2. You *do make the exchange* and do not keep the initial endowment. Instead, you receive the alternative.

Exactly what your endowment is, what the alternative is, and how it will be determined whether or not the exchange is made will now be explained below in detail for this decision task.

In each period of this decision task, you will be endowed with an initial cash amount. You will be asked to state the probability of the positive (greater than $0) outcome in an RP that you would require to exchange the cash amount for such an RP. You will enter this amount as a percentage to the nearest whole percentage point.

If you choose X percent probability of the positive outcome, you are saying that you would be willing to make the exchange (to receive the RP instead of the initial cash amount) if the RP were to have an X percent chance of receiving the positive outcome and a $(100 - X)$ percent chance of receiving $0.

Your choice of X helps to determine whether or not you make the exchange. Once you have chosen your desired probability (X) of the positive outcome in the RP, the computer will display a random number drawn between 0 and 100, with equal likelihood of any number $0, 1, 2, \ldots, 100$. If the random number displayed by the computer (call it Y) is *less than* the number X you have entered into the computer as your desired probability of the positive outcome, then no exchange will take place and your earnings for the period will be your initial endowment. If the number drawn by the computer (Y) is *greater than or equal to* your entered value X, then you will make the exchange and receive the outcome of the RP instead of the initial endowment; the RP will then have probability Y of the positive outcome and probability $(100 - Y)$ of the $0 outcome. (Note that when you receive the RP in exchange for the initial cash amount, the RP you will receive has Y as the probability of the positive outcome, and that Y is greater than the number X you entered as being sufficient to make the exchange.)

Finally, the computer will then determine the result of the RP. (This will happen whether you made the exchange or not; however, this will affect your earnings only if you made the exchange.) A second draw with the equal likelihood of any number from $0, 1, 2, \ldots, 100$ will take place. If the number drawn is between 0 and Y, the positive outcome to the RP occurs; if a number between $Y + 1$ and 100 is drawn, the zero outcome to the RP occurs.

Your most advantageous decision in terms of your earnings is to submit a number X that accurately reflects the probability of the positive outcome that makes you indifferent between accepting the exchange or not. If you submit a number that is EITHER *higher* than that probability OR *lower* than that probability, you will either not change your earnings or you will lower them. There is no “right” or “wrong” value to submit to the computer; rather it is a matter of submitting a probability that truly reflects what probability of the positive outcome will make you willing to make the exchange.

The reason it is in your best interest to state your true probability and not some other number is that if you state a number other than that probability, the following could happen.

1. Suppose your true probability is some number P and you state a number X that is less than P ($X < P$). Then the computer might draw a number Y between X and P. So, $X < Y < P$. If this happens, you would make the exchange. Thus, you would end up exchanging the initial cash amount for an RP with Y probability of the positive outcome, but $Y < P$, and P is the probability of the positive outcome sufficient to make the RP worth taking in place of your initial cash amount.

2. Suppose your true probability is some number P and you state a number X that is greater than P ($X > P$). Then the computer might draw a number Y between X and P. So, $X > Y > P$. If this happens, you would not make the exchange. Thus, you would end up with the initial cash amount instead of exchanging it for a RP with Y probability of the positive outcome, despite $Y > P$, where P is the probability of the positive outcome sufficient to make the RP worth taking in place of your initial cash amount.

There is *no* circumstance in which stating a number not equal to your true probability is to your advantage; it can only decrease your earnings or make no difference.

C.4 *Probability equivalent dual-to-selling BDM (lottery for lottery)*

Please note that in this decision task, the following is the case: In this decision task, you begin the period with an initial endowment. You will be asked to enter a number that will determine whether you retain the initial endowment or instead receive an alternative.

Depending on the number you enter and chance, one of two possibilities will result:

1. You *do not make the exchange* and do not receive the alternative. Instead, you keep the initial endowment.

2. You *do make the exchange* and do not keep the initial endowment. Instead, you receive the alternative.

Exactly what your endowment is, what the alternative is, and how it will be determined whether or not the exchange is made will now be explained below in detail for this decision task.

In each period of this decision task, you will be endowed with an initial RP. You will be asked to state the probability of the positive (greater than $0) outcome in an alternative RP that you would require to exchange the alternative RP for your initial RP. You will enter this amount as a percentage to the nearest whole percentage point.

If you choose X percent probability of the positive outcome in the alternative RP, you are saying that you would be willing to make the exchange (to the receive the alternative RP instead of the initial RP) if the alternative RP were to have an X percent chance of receiving the positive outcome and a $(100 - X)$ chance of the zero outcome.

Your choice of X (your desired probability of the positive outcome in the alternative RP) helps to determine whether or not you make the exchange. Once you have chosen your desired probability of the positive outcome in the alternative RP, again let us call this X, the computer will display a random number drawn between 0 and 100, with equal likelihood of any number $0, 1, 2, \ldots, 100$. If the random number displayed by the computer (call it Y) is *less than* the number X you have entered into the computer as your desired probability of the positive outcome in the alternative RP, then no exchange will take place; your earnings for the period will then be the outcome of the initial RP. If the number drawn by the computer is *greater than or equal to* your entered value X, then you will make the exchange and receive the alternative RP instead of the initial RP; your earnings for the period will then be the outcome of the alternative RP. (Note that when you receive the alternative RP in exchange for the initial RP, the alternative RP you will receive has Y as the probability of the positive outcome, and that Y is greater than the number X you entered as being sufficient to make the exchange.)

Finally, the computer will determine the result of the RP you end up with. If the initial RP is exchanged for the alternative RP (having thus determined, as above, the probability with which you would receive the positive outcome), the computer will then determine the result of the alternative RP; a draw with the equal likelihood of any number from $0, 1, 2, \ldots, 100$ will take place; if the number drawn is between 0 and Y, you will receive the dollar amount of the positive outcome; if the number is between $Y + 1$ and 100, you will receive zero. If you keep the initial RP, a draw according to the probabilities initially described in that round will occur.

Your most advantageous decision in terms of your earnings is to submit a number X that accurately reflects the probability of the positive outcome in the alternative RP that makes you indifferent between accepting the exchange or not. If you submit a number that is EITHER *higher* than that probability OR *lower* than that probability, you will either not change your earnings or you will lower them. There is no “right” or “wrong” value to submit to the computer; rather it is a matter of submitting a value that truly reflects what probability of the positive outcome in the alternative RP will make you willing to make the exchange.

The reason it is in your best interest to state your true probability and not some other number is that if you state a number other than that probability, the following could happen.

1. Suppose your true probability is some number P and you state a number X that is less than P ($X < P$). Then the computer might draw a number Y between X and P. So, $X < Y < P$. If this happens, you would make the exchange. Thus, you would end up exchanging the initial RP for an alternate RP having Y as the probability of the positive outcome, but $Y < P$, and P is the probability of the positive outcome sufficient to make the alternate RP worth taking in place of the initial RP.

2. Suppose your true probability is some number P and you state a number X that is greater than P ($X > P$). Then the computer might draw a number Y between X and P. So, $X > Y > P$. If this happens, you would not make the exchange. Thus, you would end with the initial RP instead of exchanging it for an alternate RP having Y as the probability of the positive outcome, despite $Y > P$, where P is the probability of the positive outcome sufficient to make the alternate RP worth taking in place of the initial RP.

There is *no* circumstance in which stating a number not equal to your true probability is to your advantage; it can only decrease your earnings or make no difference.

C.5 *Binary choice*

In each period of this decision task, you will be asked to choose the RP you prefer when presented with a choice between two RPs, presented as pie charts. The RP you choose will be used to determine your proceeds for the period.

C.6 *BDM ordering controls*

In each period of this decision task, you will be asked to make a decision from one of the first three decision tasks as they have been previously described to you.

You will begin the period with either a cash endowment or the claim to the proceeds of an RP. You will be asked to enter a number that will determine whether you retain the initial endowment or instead receive an alternative dollar amount or RP.

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